A Framework for Poverty Alleviation with ICTs

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> *It is past time to put to rest the sterile debate over whether new technologies are a luxury or a necessity for the poor. The real challenge now is for all of us to work together to identify and accelerate the real benefits of technological advances[1].*

Abstract/Executive Summary

This report addresses the digital divide and the use of Information and Communication Technologies (ICTs) for the alleviation of poverty. The digital divide describes the stark disparities between the few people with abundant access to ICTs and the vast numbers of people without any access. Information and knowledge are critical components of poverty alleviation strategies, and ICTs offer the promise of easy access to huge amounts of information useful for the poor.

However, the digital divide is the result rather than the cause of poverty, and efforts to bridge it must be embedded within effective strategies that address the causes of poverty. Earlier patterns of adoption and diffusion suggest that ICTs will not achieve their full potential without suitable attention being paid to the processes that they are intended to assist and the context within they are being implemented. However, there are many examples of successful implementations that allow for a synthesis of experience that can lead to an understanding of how to approach the use of ICTs for widespread alleviation of poverty.

Poor people will gain fruitful access to ICTs through shared facilities that are appropriately managed and properly constituted within sound development strategies. Implementation efforts have to take into account the wide variety of factors that are critical for success. A poverty alleviation framework is presented to facilitate the full consideration of all such factors. Models of ICT adoption and diffusion are discussed followed by an examination of the areas in which ICTs have been shown to demonstrate effective poverty alleviation. Lessons learned from the examples are presented within the context of the adoption and diffusion models. An outline of development telecentres follows along with a consideration for project implementation. A framework for poverty alleviation is derived and it is used to analyse the outcomes and the factors that influence them.

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[1] Mark Malloch Brown, UNDP Administrator

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I. Introduction

The Uneven Global Distribution of ICTs

The uneven global distribution of access to the Internet has highlighted a digital divide that separates individuals who are able to access computers and the Internet from those who have no opportunity to do so. Kofi Annan, Secretary-General of the United Nations, has said:

> "The new information and communications technologies are among the driving forces of globalisation. They are bringing people together, and bringing decision makers unprecedented new tools for development. At the same time, however, the gap between information 'haves' and 'have-nots' is widening, and there is a real danger that the world's poor will be excluded from the emerging knowledge-based global economy."
> (Anan, 2002)

A few statistics serve to highlight the alarming differences at either ends of the digital divide:

- All the developing countries of the world own a mere 4% of the world's computers
- 75% of the world's 700 million telephone sets can be found in the nine richest countries
- There are more web hosts in New York than in continental Africa; more in Finland than in Latin America and the Caribbean combined
- There were only 6.3 million Internet subscribers on the entire African continent in September 2002 compared with 34.3 million in the UK.
  (Nua Internet)

Table 1 shows the gap in Internet access between the industrialised and developing worlds. More than 85 per cent of the world's Internet users are in developed countries, which account for only about 22 per cent of the world's population.

Table 1	
Online Users as of September 2002	
World Total	605.60 million
Africa	6.31 million
Asia/Pacific	187.24 million
Europe	190.91 million
Middle East	5.12 million
Canada & USA	182.67 million
Latin America	33.35 million
Nua Internet	

Drilling down into the access statistics reveals further levels of inequality within the developing countries that are least served. Typically, a high percentage of developing country residents live in rural areas. The proportion can rise to as much as 85 percent of the population in the least developed countries and is estimated at 75% overall in Asia. Rural access to communication networks in developing countries is much more limited than in urban areas. Table 2 depicts teledensity levels across a range of countries based

on comparative income levels. The data overestimates rural access because the "rest of country" includes everything except the largest city.

Table 2 Access to telecommunications, countries of different income categories, 1999			
Country classification	Teledensity (Telephone lines per 100 people)		
	National	Urban	Rest of country
High income	46.0	52.9	43.8
Upper middle	13.7	25.7	11.5
Lower middle	9.7	22.1	7.2
Low income	2.5	6.5	2.3

(ITU, 1999)

Unsurprisingly, the digital divide mirrors divides in other resources that have a more insidious effect, for example, access to education, health care, capital, shelter, employment, clean water and food. In the sense that the digital divide can be seen more as an absence of access to information than as an absence of access to technology, these other divides can arguably be seen as more of the result of an imbalance in access to information than as its cause. Information is critical to the social and economic activities that comprise the development process. If information is critical to development, then ICTs, as a means of sharing information, are a link in the chain of the development process itself (ILO, 2001).

Dimensions of the Digital Divide

Eliminating the problems that the digital divide represents requires more than the provision of access to technologies. According to the ILO, ICTs can contribute significantly to socio-economic development, but investments in them alone are not sufficient for development to occur (ILO, 2001). Put simply, telecommunications is a necessary but insufficient condition for economic development (Schmandt et. al, 1990). Martin and McKeown suggest that the application of ICTs is not sufficient to address problems of rural areas without adherence to principles of integrated rural development. Unless there is minimal infrastructure development in transport, education, health, and social and cultural facilities, it is unlikely that investments from ICTs alone will enable rural areas to cross the threshold from decline to growth (Martin and McKeown, 1993).

The digital divide then goes beyond access to the technology and can be expressed in terms of multiple dimensions. If societies wish to share the *benefits* of access to technology, then further provisions have to be implemented in order to address all the dimensions of the digital divide. Table 3 summarises some of these dimensions.

Table 3	
Dimensions of the Digital Divide	
Service availability	The services made available through the use of ICTs should be freely available to all who might wish to make use of them.
Awareness	Everyone is aware of how they might be able to use ICTs for their own benefit.
Opportunity to learn and use new media	Everyone has the opportunity to attain computer literacy.
Mastery of technologies	Everyone understands which tools are best suited for which tasks.
Experience	Everyone is able to accumulate sufficient experience with the use of ICTs to enable them to fully exploit their potential.
Skills	Everyone has the right skills for performing ICT related tasks.
Support	Everyone has access to appropriate assistance when they need it to help them make good use of ICTs.
Attitudes (motivation)	Everyone is encouraged to participate in the sharing of benefits available from equal access to ICTs.
Content	Sufficient content is available to enable everyone to gain benefit from ICTs
Cultural	The other dimensions are adapted as required to the cultures of all potential users.
Disability	The other dimensions are adapted as required so that disability is not a barrier to equal enjoyment of the benefits of ICTs.
Linguistic	The other dimensions are adapted as required so that language is not a barrier to equal enjoyment of the benefits of ICTs.
Gender	The other dimensions are adapted as required so that gender is not a barrier to equal enjoyment of the benefits of ICTs.
Empowerment of civil society	Structural, political, and governance factors do not impede equal enjoyment of the benefits of ICTs.

These dimensions of the digital divide that go beyond access to the technology imply a variety of societal concerns to do with education and capacity building, social equity, including gender equity, and the appropriateness of technology and information to its socio-economic context. Moreover, some consider even the use of the term "digital divide" to be problematic. Firstly, it's not the real issue; it's the information and knowledge gap that is the real concern and in that regard, the multiple dimensions in table 3 deserve equal attention. Secondly, talk of a digital divide, something that seems to require mere technology to redress, often implies that digital access alone will overcome the associated problems. Digital access only requires purchase and installation of technology. However, the multiple dimensions imply that it's not money and technology that matters but the right approach and unless these other divides are also addressed, crossing the digital bridge will not achieve much. Finally, and possibly more significant is an understanding of the patterns of cause and effect. As the G8 DOT Force report points out, the digital divide is a reflection of existing broader socio-economic inequalities, and a symptom of much more profound and long-standing economic and social divides within and between societies. The report goes on, "there is no dichotomy between the 'digital divide' and the broader social and economic divides which the

development process should address; the digital divide needs to be understood and addressed in the context of those broader divides." (G8 DOT Force, 2001). The argument seems to be that the digital divide is the result rather than the cause of poverty, and that efforts to "bridge the digital divide" and increase access to ICTs, unless clearly rooted in, and subordinate to, a broader strategy to combat poverty, risk diverting attention and resources from addressing its underlying causes, such as unfair trade policies, corruption, bad governance and so on.

This report examines the processes that could lead to closure of the so-called digital divide and to the use of ICTs and attendant practices that can lead to poverty alleviation. In section II we examine the processes by which ICTs are diffused and adopted within organisational and social settings, addressing the simultaneous processes of providing physical access to the technology and aspects of adopting its use once it has been made available. In section III, a discussion of poverty alleviation strategies using ICTs is presented, along with specific examples of where they have been applied in rural settings in Asia. Section IV synthesises a number of lessons learned, suggesting success models that move towards best practice. Section V presents a conceptual framework for ICTs for poverty alleviation, drawing on the principles for ICT adoption and diffusion, and informed by the experiences from practice. Finally, the annex introduces further case studies of ICT for rural development within a framework that is designed to assist learning by bringing out why each case is interesting, the approach that it used, the results, and the lessons learned in terms of what worked and what didn't. The cases are offered to foster reflection on the salient issues in the framework and how they might be applicable to the particular situations in which readers might themselves.

II. General Principles in IT Adoption and Diffusion

In this section we examine a number of theoretical constructs relating to the take up and use of ICTs which provide a conceptual basis to underpin analyses of empirical observations and which are helpful in approaching some conception of best practices. This will cover the following concepts:

- Innovation diffusion theory
- ICT diffusion stages
- Stage model of ICT implementation
- Relationship between development, information and ICTs

Innovation Diffusion Theory

The foundation for innovation diffusion theory comes from Rogers (1983). Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. The theory has been shown to be applicable in a wide variety of situations involving the take up of innovations, including the use of ICTs. It is therefore important in facilitating an understanding of how the use of ICTs spreads among groups of people. In general, adopters of innovations fall into one of five categories:

Innovators	Early adopters	Early majority	Late majority	Laggards

The distribution of adoption categories across a target population is depicted in figure 1.

Research has revealed that the characteristics of innovations that influence the different rates of adoption are as follows:

Relative advantage	The degree to which an innovation is perceived as better than the idea it supersedes.
Compatibility	The degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
Complexity	The degree to which an innovation is perceived as being difficult to understand and use.
Trialability	The degree to which an innovation may be experimented with on a limited basis.
Observability	The degree to which the results of an innovation are visible to others.
Communication Channel	The means by which messages get from one individual to another, including; - Mass-media, - Interpersonal face-to-face exchanges.

Innovation diffusion theory facilitates an understanding of the reasons for the varying rates at which individuals, groups, communities and organisations adopt new practices, as well as suggesting means for influencing those rates of adoption. Any innovation can be judged along these dimensions and judgements can be drawn as to how each might present a barrier to diffusion and each can be made to contribute to diffusion.

ICT Diffusion Stages

One of the more influential factors affecting the take-up of technology is the use to which it is put. The way that ICTs are used, or expected to be used, affects take-up rates, and the historical pattern of diffusion. In this regard, it is convenient to distinguish between what has been observed to be three distinct phases of ICT diffusion and associated modes of technology use. *Substitution* occurs when a new or improved technology merely substitutes for an existing one. *Enhancement* exists when the new technology leads to substantial performance improvement. *Transformation* takes place when technology adoption opens up opportunities for the redefinition of tasks by way of wholesale transformation of work practices and organisational structures. Figure 2 sets out the three ICT diffusion stages or levels of ICT use. It relates typical strategies, or what ICT use is intended achieve, with typical tactics of how to go about achieving it, and the probable outcomes in each stage.

In the case of ICTs, most adoption decisions are driven by substitution rather than by enhancement or transformation. However, transformation usually becomes the eventual outcome reality when the initially unforeseen potential of the technology is fully realised (Hanna, Guy and Arnold, 1995).   The more significant outcome of transformation is less commonly targeted during the initial stages of adoption because of the characteristic that ICTs have of being an *intellectual* technology, as opposed to an *industrial* technology. Industrial technologies, like a water pump or a generator, typically have a fixed set of functionalities. Information technologies, however, have functionalities that are not fixed at the outset, but can be innovated endlessly, depending on the interaction with the people who implement and use them. In the process of its implementation within an information system, a given set of information technology becomes subject to the shaping influence of the intellects of its implementers and users, who can end up creating an information system that the inventors and promoters of the technology never had in mind. It is important to note therefore that transformational benefits might be associated with unexpected outcomes from ICT implementations.

Barriers to diffusion of ICTs are similar at each stage, although their magnitude may vary. Cost of technology is always a factor, as well as awareness and capability, both individual and institutional. The softer costs associated with capacity building and managing change usually increase as a proportion of the total costs of the project as the later stages approach. With relatively mature technologies, however, it is fairly easy for late adopters to jump directly to the third, transformation, stage, as long as appropriate skills and training are available. The existence of different diffusion stages, and varying barriers within each, has implications for government policy formulation for ICT diffusion:

- Since the barriers to take-up vary at each stage, policies to spread ICTs need to be based on a sound understanding of the barriers at each stage.

- There are unlikely to be any rapid improvements in aggregate measures of benefit, e.g., poverty alleviation, so long as the major thrust of diffusion involves first generation users in the substitution phase.
- Transformational benefits will be hard to achieve without strategies to remove barriers to institutional overhaul.

Stage Model of ICT Implementation

Another perspective of ICT implementation adopts a closer view by illustrating how ICT implementations evolve over their workable lifetime.   A stage model of ICT implementation, adapted from Cooper and Zmud (1990), is presented. The model depicts an organisational effort directed toward diffusing appropriate information technology within a user community. Shown in table 4, it has six stages, each with a process and a product, as follows:

Initiation	Adoption	Adaptation	Acceptance	Routinisation	Infusion

Table 4 depicts the stage model by describing the process and product at each stage and a suggestion of possible obstacles and recommended remedies. The stage model of ICT implementation provides a temporal dimension of project implementation and facilitates an understanding of the implementation process as well as the interpretation of observable results. The model can be used to assess the extent to which an information system has been taken up by a community and to gauge its level of maturity. In turn this can guide decision-making with regard to the actions that might be needed to ensure the application reaches its optimum level of contribution towards the development objective. The model suggests that an ICT innovation will take time to become fully integrated into the natural life of its user community.

Table 4. Stage Model of IT Implementation, Adapted for ICTs for Poverty Alleviation at the Project Level				
Stage	Process	Product	Possible Obstacles	Recommended Remedies
Initiation	Active and/or passive scanning of development problems / opportunities and IT solutions are undertaken. Pressure to change evolves from either organisational need (pull) technological innovation (push), or both.	A match is found between an IT solution and its application in the organisation.	Lack of funds. Scepticism of the applicability of ICTs to poverty alleviation.	Low cost approaches. Awareness raising of promising applications and understanding of the conditions under which they were possible. Exposure of failures and their causes. Widening the applicability of ICTs to other areas, health, education, culture, not directly concerned with poverty alleviation.
Adoption	Rational and political negotiations ensue to get organisational backing for implementation of the IT application.	A decision is reached to invest resources necessary to accommodate the implementation effort.	Low priorities assigned to ICTs. Inadequate funding for effective pilots. Inappropriate focus on technology outcomes instead of development outcomes. Absence of in-country experience.	High-level champion. National body for oversight, co-ordination and promotion. Sharing of experiences and knowledge. Cross-fertilisation of ideas. Pooling of resources with other projects.
Adaptation	The IT application is developed, installed and maintained. Developmental procedures are revised and developed. Stakeholders are trained both in the new procedures and in the application.	The IT application is available for use.	Mission drift. Over budget. Complex technology. Insufficient skills. Lack of awareness.	Project management techniques. Steering committee with system user representation. Project management by a system user. Phased implementations; restricted but successive ambition horizons. Utilise proven technology with available skills. Awareness and training.
Acceptance	Stakeholders are induced to commit to IT application usage.	The IT application is employed in development work.	Resistance to change, institutional rigidity. Lack of understanding about new tasks and roles.	Effective change management, top-level involvement and support. Awareness and training.
Routinisation	Usage of the IT application is encouraged as a normal activity	Governance systems are adjusted to account for the IT application; the IT application is no longer perceived as something out of the ordinary.	Residual reluctance to adopt among laggards. Long-term unsustainability. Changing environment renders application unusable, irrelevant. Inability to adapt the application to changing circumstances. Technology obsolescence.	Attention to sustainability; financial, service and manpower planning. Application maintenance planning; skills retention, re-engineering.
Infusion	Increased organisational effectiveness is obtained by using the IT application in a more comprehensive and integrative manner to support higher aspects of organisational work.	The IT application is used within the organisation to its fullest potential.	Changing environment. Technology obsolescence.	Redesign.

The Relationship between Development, Information and ICTs.

There is a risk that the argument in support of ICTs for development becomes used excessively, in support of projects that cannot otherwise be justified by more rational means. The attendant danger is that the concept loses credibility among development planners and decision makers. Nevertheless, the potential of information as a strategic development resource should be incorporated as a routine element into the development planning process, so that project managers become used to thinking in these new terms. However, focussing on the technology itself does not lead to its successful implementation. More constructively, the most effective route to achieving substantial benefit with ICTs is to concentrate on re-thinking development activities by analysing current problems and associated contextual conditions, and considering ICT as just one ingredient of the solution.   This implies an approach to developing strategies for information systems and technology that are derived and integrated with other components of the overall development strategy. This approach is depicted in figure 3.

The general rule is that the application of ICTs to development should always begin with a development strategy. From that, an information plan can be derived and only out of that should come a technology plan. It sounds simple and intuitive yet it is easy to find and recognise implementations that start the other way round, by beginning with the technology and working back to the development.   Whilst the strategic thinking can be informed by an appreciation of the capabilities of ICTs, it is essential to have clear development targets that are specific to the context before the form of use of the ICTs is defined.   Additionally, in considering the development strategy, it is well to note that bottom-up, demand-driven development objectives are usually preferable to top-down, supply-driven objectives, so that goals begin with an appreciation of the needs of development recipients, as they would themselves express them.

From an unambiguous articulation of the development strategy, an information plan is drawn. This will set down the information resources that will be required to achieve the development strategy.   Again, this determination can be made against an informed background with regard to the capabilities of ICTs, but it should not be driven by the mere application of technology. Finally, a plan for the technology can be drawn up that will be capable of delivering the information resources required for achievement of the strategy. Whilst such an approach makes sense intuitively, there are many examples of technology related development projects that are technology-driven, top-down and supply-driven, and they often result in sub-optimal outcomes because of this.

Modelling the relationship between ICTs and development addresses the earlier comments about the digital divide in greater depth. The model is applicable at all points at which closing the divide is attempted. It was developed to facilitate a grass roots implementation targeting community development where heavy emphasis was placed on empowering the community to construct their own agenda for ICT-assisted development, prior to introducing the technology (Harris, et al., 2001).

III.   Strategies for Poverty Alleviation with ICTs

Before examining how ICTs might be used to alleviate poverty, it is appropriate to address what is actually meant by poverty and what actually are ICTs. The World Bank reports that of the world's 6 billion people, 2.8 billion, almost half, live on less than US$2 a day, and 1.2 billion, a fifth, live on less than US$1 a day, with 44 percent living in South Asia.   Goals set for 2015 by the international development agencies include reducing by half the proportion of people living in extreme income poverty, those living on less than $1 a day. Figure 4 indicates the global distribute of poverty (World Bank, 2001/2002).

The World Bank report goes beyond the view of income levels in its definition of poverty, suggesting that poverty includes powerlessness, voicelessness, vulnerability, and fear. Additionally, the European Commission suggests that poverty should not be defined merely as a lack of income and financial resources. It should also include the deprivation of basic capabilities and the lack of access to education, health, natural resources, employment, land and credit, political participation, services and infrastructure. (European Commission, 2001).   Another analysis adds an even broader definition of poverty to see it as being deprived of the information needed to participate in the wider society, at the local, national or global level (ZEF, 2002).

The assertion that a knowledge gap is an important determinant of persistent poverty, combined with the notion that developed countries already possess the knowledge required to assure a universally adequate standard of living, suggest the need for policies which encourage greater communication and information flows both within and between countries. One of the best possible ways to achieve this greater interaction is through the use of ICTs.

The most common perception of ICTs is that of computers and the Internet, but many see this as limited, excluding more common technologies of radio and television that also carry information. In particular, the potential value of radio as a purveyor of development information should not be overlooked, especially in view of its almost ubiquitous presence in developing countries, including rural locations. For example, a recent survey of 15 hill villages in Nepal found radios in every village, with farmers listening to them while working in their fields. Another survey of 21,000 farmers enrolled in radio-backed farm forums in Zambia found that 90% found programs relevant and more than 50% credited the programs and forums with increasing their crop yields (Dodds, 1999). In the Philippines, a partnership program between UNESCO, the Danish International Development Agency, and the Philippine government is providing local radio equipment and training to a number of remote villages. The project is designed to ensure that programming initiative and content originate within the communities. According to UNESCO, the project has not only increased local business and agricultural productivity, but also resulted in the formation of civic organizations and more constructive dialogue with local officials (UNESCO Courier 1997). In South Africa, clockwork radios that do not require battery or mains electricity supplies are being distributed to villages to enable them to listen to development programming. The Baygen Freeplay radio marks one of the first commercially successful communication devices to employ a clockwork mechanism as its power supply. It is sold on a commercial basis for approximately US$75

and has been used extensively by a number of non-governmental organisations as a key element in community education programmes and disaster relief efforts. For instance, Freeplay radios were distributed by the National Institute for Disaster Management in Mozambique so that flood victims could receive broadcasts on the weather, health issues, government policy toward the displaced, missing family members, the activities of the aid community and the location of land mines. In Ghana, the government distributed 30,000 Freeplay radios so villagers could follow elections. In Nepal, a digital broadcast initiative is being tested that will broadcast digital radio programming via satellite to low cost receivers in rural and remote villagers. The programme is targeting HIV/AIDS awareness, and has the potential to link with computers to receive multimedia content.

The discussion of radio and television technologies in the context of ICTs for poverty alleviation illustrates some of the technology choices available and underscores the need to be clear of the development and information delivery strategies before deciding on the technology. In highlighting where such strategies may be applied, subsequent sections provide a brief overview of the major areas of application of ICTs to poverty alleviation that have been observed to offer some promise.

Content for local relevance

A consistent finding of surveys of Internet users and providers in developing countries is that the lack of local language and locally relevant content is a major barrier to increased use. Unless there is a concerted effort to overcome these constraints, Internet growth in many developing countries could be stuck in a low-use equilibrium (Kenny et al., 2001). The undersupply of pro-poor local content inhibits the virtuous circle whereby as an online community grows, it makes the development of Internet content a more attractive commercial and social proposition, and increasing amounts of attractive content encourage the growth of the online community.

In the Village Information Shops in Pondicherry, India, a major contributory factor to all operations is the use of Tamil language and Tamil script in the computers. Despite there being no standard for the representation of Tamil in software at the time of implementation, the project staff were able to develop the use of Microsoft Office applications in Tamil script. Moreover, the applications are operated in Tamil using a western, Roman script QWERTY keyboard. The operators (semi-literate ladies) have learned the appropriate keyboard codes for the Tamil characters and are quite proficient at data entry. The centre in Villianur has generated a number of databases for local use, and all but one are in Tamil. The centres collect information on indigenous knowledge systems and are developing useful brochures in Tamil for display in their news bulletins. Beyond the entry of data, it cannot be underestimated the extent to which the use of Tamil language has promoted the use of the information shops and fostered interactivity and engagement between the various information systems that are available and their intended beneficiaries. Local content is directed towards the information needed to satisfy the communities' needs, and is developed in collaboration with the local people. There are close to a hundred databases, including rural yellow pages, which are updated as often as needed. An entitlements database serves as a single-window for the entire range of government programmes, fostering greater transparency in government. Relevant content is obtained from elsewhere if it is found useful to the local community. For example, useful information has been collected from Government departments, the Tamil Nadu Agricultural University, Aravind Eye Hospital, and the US Navy's website. The centres

have held health camps in the villages in cooperation with local hospitals as part of gathering information about local health care needs. The centres use multimedia and loud speakers to reach out to illiterate clients, and publish a fortnightly Tamil newspaper called *Namma Ooru Seithi* (Our Village News), which has become so popular that Government departments such as the District Rural Development Agency, Social Welfare Board, and the Small Scale Industries Centre use it to publicize their schemes (Arunachalam, 2002).

The Gyandoot project in Madhya Pradesh State of India is an intranet in the district of Dhar that connects rural cyber cafes catering to the everyday needs of the masses[2]. It provides the following services:

Commodity marketing Information System.	Below Poverty Line Family List.
Income Certificate.	Employment news.
Domicile Certificate	Rural matrimonial.
Caste Certificate.	Rural Market
Landholder's passbook of land rights and loans	Rural News Paper
Rural Hindi e-mail.	Advisory module
Public Grievance Redressal	E-education.
Forms of Various Government Schemes.	Driving License.

Disadvantaged and marginal groups

Within populations of poor people, disadvantaged and marginalized sections of society usually face impediments to using, and making good use of ICTs in much the same way as they might face impediments in using other resources. Women in developing countries particularly, face difficulties in using ICTs, as they tend to be poorer, face greater social constraints and are less likely to be educated or literate than men. They are likely to use ICTs in different ways, and have different information requirements, to men. Women are less likely to be able to pay for access to ICTs, either because of an absolute lack of funds or because they lack control of household expenditure. Constraints on women's time or their movement outside of the home can also reduce their ability to access technologies (Marker, et al. 2002). Such groups usually require special assistance and attention in order to benefit from programmes that are targeted at poor people. People who do not understand the English language are also a marginalized section of society on the Internet, and this includes the majority populations of French-speaking Africa, the Middle East, Eastern Europe and Latin America. Even when users have basic English proficiency, they are put off from using web sites that are only in English.

The collection, classification, protection and commercialisation of indigenous knowledge has become a focus of certain minority groups using ICTs. Traditional remedies are being recorded in databases and afforded protection from foreign applications for patents. The value of such practices is evident from the stringent rules imposed by the state government of Sarawak, Malaysia, on the island of Borneo, over the collection of flora samples in their rain forests, where a particular tree species promises to yield substances that might lead to a cure for HIV/AIDS. Also, a recent report from researchers at Columbia George Washington Universities stated "except for a herbal remedy developed by Aboriginal peoples, most of the exotic berries, teas, herbs and oils frequently taken by women to ease menopause symptoms have been ineffective in clinical trials." The Honey

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[2] http://gyandoot.nic.in/

Bee network in India collects local innovations, inventions and remedies, stores them on-line and helps owners obtain incomes from local patents and commercialisation of inventions. The database contains more than 1,300 innovations.

The Kelabit ethnic group of Sarawak, one of Borneo's smaller ethnic minorities, are recording their oral history in a database of stories told by the old people. They are also using computers to assemble their genealogical records. Examples of selling handicrafts on the Internet, a form of e-commerce, also provide the ability to combine the historical and cultural background with indigenous products, adding value to the transaction for the customer. Middlemen traders of such products deliberately disconnect ethnic artefacts from the identity of the artist in order to keep down the prices at which they can obtain their works. Providing such artisans with more direct access through the Internet to their market allows them to build up a clientele and achieve recognition as the creator of original art and crafts.   Aboriginal people in Australia complain that T-shirt manufacturers freely plagiarise their designs without any recompense to the creators, and web sites that feature aboriginal art can now be found with strict warnings against using such designs without permission. Whether such warnings are effective is hard to tell, but at least the web site can be used to register ownership rights and to demonstrate priority in the creation of designs.

Nearly 80% of the world's disabled population of 500 million people lives in developing countries. Usually their disability only compounds the difficulties they already face as (possibly poor) citizens of developing countries, but like people who live in isolated and remote location they probably stand to gain far more benefit relatively from being able to make good use of ICTs. Efforts to enable access to ICTs by disabled people are under way. One such relates to the development of adaptive technology, which is a major prerequisite for many people with disabilities to use computer technology. These are modifications or upgrades to a computer's hardware and software to provide alternative methods of entering and receiving data. Many of those modifications can be made relatively inexpensively. Some modifications can be as simple as lowering a computer desk or as elaborate as attaching an input device that tracks eye movements. Common adaptive technologies include programs that read or describe the information on the screen, programs that enlarge or change the colour of screen information, and special pointing or input devices. There are standards and guidelines for World Wide Web accessibility and electronic document accessibility for individuals with disabilities. Web Content Accessibility Guidelines set out by the Web Accessibility Initiative (WAI)[3] is the world standard for WWW contents accessibility.

Digital Divide Data Entry is a philanthropic organization that uses the Internet, the English language and the computer skills of Cambodia's youth to provide basic information services to North America corporations. They employ 10 disabled people to copy type documents into a computer, a simple task that requires only typing skills and a basic knowledge of English. The organisation is currently working on a $30,000 contract to input more than 100 years of archives of the Harvard University newspaper. Once completed, the work can be sent to the US via e-mail. There are plans to hire more disabled people, more women and more poor people and to expand from data entry to more complicated tasks, like creating Web pages and Power Point presentations.

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[3] (http://www.w3.org/TR/WCAG20/)

Local entrepreneurship

ICTs have been claimed to potentially have an impact on the livelihood strategies of small-scale enterprises and local entrepreneurs in the following areas:

- Natural Capital; opportunities for accessing national government policies.
- Financial Capital; communication with lending organizations, e.g. for micro-credit.
- Human Capital; increased knowledge of new skills through distance learning and processes required for certification.
- Social capital; cultivating contacts beyond the immediate community.
- Physical capital; lobbying for the provision of basic infrastructure.

Small-scale entrepreneurs in developing countries, especially women, have shown the ability to harness ICTs for developing their enterprises. A group of ladies in Kizhur village Pondicherry decided they wanted to start a small business enterprise manufacturing incense sticks. They began as sub-contractors but their confidence and enterprise grew as a result of utilising the local telecentre. As a result of some searches by the telecentre operators, they were able to develop the necessary skills for packaging and marketing their own brand name incense. The ladies were quickly able to develop local outlets for their products and they are confidently using the telecentre to seek out more distant customers.

In Gujarat, computerized milk collection centres are helping ensure fair prices for small farmers who sell milk to dairy cooperatives. The fat content of milk used to be calculated hours after the milk was received; farmers were paid every 10 days and had to trust the manual calculations of milk quality and quantity made by the staff of cooperatives. Farmers often claimed that the old system resulted in malfeasance and underpayments, but such charges were hard to prove. Computerized milk collection now increases transparency, expedites processing, and provides immediate payments to farmers (World Bank, 2002).

ICT and e-commerce are attractive to women entrepreneurs (who in many developing countries account for the majority of small and medium-size enterprise owners), allowing them to save time and money while trying to reach out to new clients in domestic and foreign markets. Success stories in business-to-consumer (B2C) retailing or e-retailing are heard from all developing-country regions, demonstrating how women have used the Internet to expand their customer base in foreign markets while at the same time being able to combine family responsibilities with lucrative work. However, in spite of the publicity given to e-retailing, its scope and spread in the poorer parts of the world have remained small, and especially women working in micro-enterprises and the informal sector are far from being in a position to access and make use of the new technologies. Moreover, B2C e-commerce is small compared to business-to-business (B2B) e-commerce and thus only benefits a small number of women (UNCTAD, 2002).

India Shop is an Internet based virtual shopping mall selling Indian handicrafts, established by the Foundation of Occupational Development (FOOD) in Chennai. The initiative involves e-marketers who promote the goods over the Internet, through chat-rooms and mail lists. They work from a computer, either at home or in a cyber café, and draw commissions on the sales that they achieve. The e-marketers respond to sales enquiries and liase with the craftspeople, typically exchanging multiple e-mails with

clients before sales are closed. There are more than 100 people marketers, earning between Rs2,000-Rs10,000 per month.

Health

Health care is one of the most promising areas for poverty alleviation with ICTs, based largely as it is on information resources and knowledge. There are many ways in which ICTs can be applied to achieve desirable health outcomes. ICTs are being used in developing countries to facilitate remote consultation, diagnosis and treatment. Physicians in remote locations can take advantage of the professional skills and experiences of colleagues and collaborating institutions (DOI, 2001). Health workers in developing countries are accessing relevant medical training through ICT-enabled delivery mechanisms. Several new malaria Internet sites for health professionals include innovative "teach and test" self-assessment modules. Centralized data repositories connected to ICT networks enable remote healthcare professionals to keep abreast of the rapidly evolving stock of medical knowledge. When applied to disease prevention and epidemic response efforts, ICT can provide considerable benefits and capabilities. Public broadcast media such as radio and television have a long history of effectively facilitating the dissemination of public health messages and disease prevention techniques in developing countries. The Internet can also be utilized to improve disease prevention by enabling more effective monitoring and response mechanisms.

The World Health Organization and the world's six biggest medical journal publishers are providing access to vital scientific information to close to 100 developing countries they otherwise could not afford. The arrangement allows almost 1,000 of the world's leading medical and scientific journals to become available through the Internet to medical schools and research institutions in developing countries for free or at deeply reduced rates. Previously, biomedical journal subscriptions, both electronic and print, were priced uniformly for medical schools, research centres and similar institutions irrespective of geographical location. Annual subscription prices cost on average several hundred dollars per title. Many key titles cost more than US$1500 per year. This has made it all but impossible for the large majority of health and research institutions in the poorest countries to access critical scientific information.

Apollo Hospitals has set up a telemedicine centre at Aragonda in Andhra Pradesh, to offer medical advice to the rural population using ICTs. The centre links healthcare specialists with remote clinics, hospitals and primary care physicians to facilitate medical diagnosis and treatment. The rural telemedicine centre caters to the 50,000 people living in Aragonda and the surrounding six villages. As part of the project the group has constructed a 50 bed multi-speciality hospital at the village with CT scan, X-ray, eight bed intensive care unit and a blood bank. It also has equipment to scan, convert and send data images to the tele-consultant stations at Chennai and Hyderabad. The centre provides free health screening camps for detection of a variety of diseases. There is a VSAT facility at Aragonda for connectivity to Hyderabad and Chennai. The scheme is available to all the families in the villages at a cost of Re 1 per day for a family of five.

In Ginnack, a remote island village on the Gambia River, nurses use a digital camera to take pictures of symptoms for examination by a doctor in a nearby town. The physician can send the pictures over the Internet to a medical institute in the UK for further evaluation. X-ray images can also be compressed and sent through existing

telecommunications networks. Across Sub-Saharan Africa, the Internet is used to report daily cases of meningitis to monitor emerging epidemics. When threshold levels are reached, mass vaccination is required and the Internet is used to rapidly mobilize medical personnel and effectively coordinate laboratories and specialist services.

In Andhra Pradesh again, handheld computers are enabling auxiliary nurse midwives to eliminate redundant paperwork and data entry, freeing time to deliver health care to poor people. Midwives provide most health services in the state's vast rural areas, with each serving about 5,000 people, typically across multiple villages and hamlets. They administer immunizations, offer advice on family planning, educate people on mother-child health programs, and collect data on birth and immunization rates. Midwives usually spend 15–20 days a month collecting and registering data. But with handheld computers they can cut that time by up to 40 percent, increasing the impact and reach of limited resources (World Bank, 2002).

Education, e-learning, life-long learning

The growth of distance education is being fuelled by an urgent need felt by poor countries to close the education gap with the rich nations. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), only about 3 percent of young people in sub-Saharan Africa and 7 percent in Asia attend some form of postsecondary education. This compares with 58 percent in industrialized countries as a whole, and 81 percent in the United States. Developing countries see investing in distance programmes as a way to educate more people for less money. UNESCO and the World Bank reported that at the world's 10 biggest distance education institutions, the majority of them in the third world, the cost of education per student is on average about one third the cost at traditional institutions in the same country. In China, where only one out of 20 young people receives higher education, distance learning is helping the education system move from elite to a mass education because traditional universities can't meet the demand. China Central Radio and Television University has 1.5 million students, two-thirds of them in degree programs, and caters to working adults. It broadcasts radio and TV lectures at fixed times to students at 2,600 branch campuses and 29,000 study centres, as well as at workplaces.

Distance education seems a natural pre-cursor to on-line education, but the two are not the same, and the transition from the former to the latter can be a challenge. Even the pioneering British Open University still bases its course work on hard copy material, using the Internet for the support aspects of education, such as student and tutor interaction. Initial enthusiasm for the idea of a virtual university has been slow to materialise and there are still very few fully accredited degree programmes that can be taken entirely on-line. Some of the difficulties arose from the slow emergence of understanding about the role that ICTs contribute to the pedagogical aspects of the teaching-learning process; for instance, that most learning in the traditional environment occurred outside the classroom, so that attempts to use ICTs to replace the classroom failed to deliver a complete learning experience for the pupil. Other barriers to e-learning include the time and cost required to prepare digital material, which can be multiple orders of magnitude greater than traditional methods.

Distance education is better suited to adult learners and there are now many organisations opening virtual universities to cater for them. The element of flexible timing for learning

appeals to adults who are in employment and who wish to engage with life-long learning in order to learn new skills for a changing work environment. Most development in e-learning though, benefit the already privileged.   But examples of pro-poor learning suggest indicate the possibilities for the less privileged. It is almost a universally observable phenomenon that children seem to take to computers naturally, and in a unique experiment in India, this has been turned into a new mode of education; minimally invasive education. In 1999, Sugata Mitra, of NIIT Ltd. positioned an Internet capable personal computer behind a glass screen in a wall of his office building that looked onto a piece of land occupied by street kids. In what became known as the "Hole in the Wall" experiment, the children very quickly learned an impressive range of computer skills without any tuition at all. As one child learned something new from experimentation, he/she passed it onto the next. The experiment has since been repeated in half a dozen locations, and Mitra is making plans for 100,000 kiosks to create 100 million computer literates in five years.

In education, at the primary and secondary levels, radio and television are increasingly important means of reaching the rural poor. In Mexico, over 700,000 secondary-school students in remote villages now have access to the *Telesecundaria* program, which provides televised classes and a comprehensive curriculum through closed-circuit television, satellite transmissions, and teleconferencing between students and teachers. Studies have found that the program is only 16 percent more expensive per pupil served than normal urban secondary schools, while students benefit from much smaller student-to-teacher ratios. Rural students enter the program with substantially lower mathematics and language test scores than their counterparts at traditional urban schools, but by graduation, they have equalled their math scores and cut the language score deficit in half. (de Moura et al. 1999).

Further evidence that the impact of the Internet need not be limited to higher education or wealthier students, can be found in Brazil's urban slums. The Committee to Democratise Information Technology (CDI) has created 110 sustainable and self-managed community-based Computer Science and Citizenship Schools using recycled technology, volunteer assistance, and very limited funds. CDI schools train more than 25,000 young students per year in ICT skills that give them better opportunities for jobs, education, and life changes. CDI also provides social education on human rights, non-violence, the environmental, health, and sexuality. CDI cites many cases in which participants have developed renewed interest in formal schooling, resisted the lure to join drug gangs, and greatly increased their self-esteem. Also, many of the program's graduates are putting their computer skills to work in various community activities, including health education and AIDS awareness campaigns. Most teachers in CDI's schools are themselves graduates of the program who have embraced technology and want to continue CDI's work in their own communities (InfoDev).

Trade and e-commerce

It is in the Asia Pacific region that e-commerce is spreading most quickly among developing countries. The region's enterprises, particularly in manufacturing, are exposed to pressure from customers in developed countries to adopt e-business methods and are investing to be able to do so. China's population of Internet users is already the world's third largest.   M-commerce is often defined as the buying and selling of goods and services using wireless handheld devices such as mobile telephones or personal data

assistants (PDAs). In the last four years, growth in the number of mobile telephone users worldwide has exceeded fixed lines, expanding from 50 million to almost one billion in 2002. This fast growth stems from the cost advantage of mobile infrastructure over fixed-line installation and from the fact that mobile network consumers can simply buy a handset and a prepaid card and start using it as soon as the first base stations are in place, without having to open a post-paid account.   The introduction of wireless communications has also brought wireless data services, essential to conducting m-commerce, to many developing countries. If the convergence of mobile and fixed Internet and ICTs continues, first access to the Internet for a significant part of the world will be achieved using mobile handsets and networks. Wireless technologies have made inroads even in relatively low-income areas, where prepaid cards allow access to people who cannot have a prepaid subscription because of billing or creditworthiness problems. Developing Asia is the leader in this area (UNCTAD 2002).

The main areas of m-commerce use are in text messaging or SMS (short messaging service), micro-payments, financial services, logistics, information services and wireless customer relationship management. Text messaging has been by far the most successful m-commerce application in developing countries, where rates of low fixed-line connectivity and Internet access have made it an e-mail surrogate. Operators in China and other Asian developing countries are gearing up for m-commerce applications for financial services in particular. However, difficulties in making electronic payments and concerns over the security and privacy of transactions are limiting the conduct of m-commerce, which may have to await third-generation wireless technologies and fully Internet-enabled handsets.

ICTs have been widely touted as windows to global markets for small-scale developing country producers. However, the barriers facing artisans in the developing world trading directly with consumers (business to consumer) via the Internet are very significant. Apart from anecdotal stories, there is little evidence of craft groups successfully dealing direct with end consumers on a sustainable basis. Business to business e-commerce offers the greatest opportunities for artisan groups to enhance the service given to business customers (exporters, importers, alternative trade organisations, wholesale and retail buyers etc). This is likely to be much more fruitful and cost-effective for artisans.

PEOPLink is a non-profit organization which has been equipping and training grass-roots artisan organizations all over the world to use digital cameras and the Internet to market their wares while showcasing their cultural richness[4]. Between 1996 and 2000, PEOPLink developed training modules and used them as the basis for on-site workshops and on-line support for web catalogue development by 55 trading partners serving more than 100,000 artisans in 22 countries. PEOPLink offers a tool-kit to communities that enables them to create a digital catalogue of their handicrafts for posting onto a web site. It also provides additional services such as on-line trend reports, product development and feedback tools as well as providing logistical support and services such as payment collection, distribution, and handling of returns. One client, Mahaguthi Crafts with a Conscience, in Kathmandu Nepal, achieved sales of $450,000 for 2000. Many new jobs were created for hundreds of poor artisans in isolated Nepalese villages. The Rockefeller Foundation commissioned a strategic plan for PEOPLink. It found that "Internet commerce is essential for third world artisan and SME development and PEOPLink can

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[4] http://www.peoplink.org/wto

be a leader." However, whilst some reports suggest PEOPLink is generating substantial revenue, with daily sales ranging from US$50–500, other reports indicate that PEOPLink has achieved very low sales. Apart from anecdotal stories and illustrations, there seems to be little evidence to suggest that these operations are selling a significant amount of craft goods direct to consumers. According to a DFID report, PEOPLink has had a disappointing level of sales with no producer contacted having sold any products through its site (Batchelor and Webb, 2002). PEOPLink is now focussing on its CatGen system, software to assist in the creation of on-line catalogues, to enhance B2B (business to business) operations.

One area of potential for e-commerce that shows potential is the promotion and marketing of pro-poor, community-based tourism. Pro-poor tourism aims to increase the net benefits for the poor from tourism, and ensure that tourism growth contributes to poverty reduction. It is not a specific product or sector of tourism, but a specific approach to tourism. Pro-poor tourism strategies unlock opportunities for the poor, whether for economic gain, other livelihood benefits, or participation in decision-making (Ashley et al., 2001). Early experience shows that pro-poor tourism strategies do appear able to 'tilt' the industry at the margin, to expand opportunities for the poor and have potentially wide application across the industry. Poverty reduction through pro-poor tourism can therefore be significant at a local or district level. Moreover, the poverty impact may be greater in remote areas, though the tourism itself may be on a limited scale (Roe and Khanya).

Poor communities are often rich in natural assets; scenery, climate, culture and wildlife. Community based tourism is closely associated with ecotourism, and is regarded as a tool for natural and cultural resource conservation and community development. It is a community-based practice that provides contributions and incentives for natural and cultural conservation as well as providing opportunities for community livelihood. Community-based tourism provides alternative economic opportunities, which are in essence in rural areas. It has the potential to create jobs and generate a wide spectrum of entrepreneurial opportunities for people from a variety of backgrounds, skills and experiences, including rural communities and especially women [5].

Tourism and e-commerce are natural partners (UNCTAD, 2001). Tourism is highly information-intensive. Purchase and delivery are normally remote occurrences. During the intermediary period the tourism product exists in the form of information only (reservation number, ticket, voucher). Value added by international tourism intermediaries, who are often no more than marketers and information handlers and who rarely own or manage physical tourism facilities, can be as high as 30 per cent or more, thus controlling general terms and conditions throughout the whole value chain. Although it is the destination's socio-economic, cultural and geographical content that forms the fundamental tourism product, it often happens that with each intermediary party taking a commission, little income remains for the destination at which the product is consumed. Electronic commerce for tourism (e-tourism) can disintermediate and deconstruct the tourism value chain driving income closer towards the actual providers of tourism experiences. But online payment possibilities, which are fundamental to closing sales, and a lack of local financial and technological infrastructure that is typical of rural and remote locations in developing countries, regularly force e-businesses to establish

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[5] See Proceedings of the Conference on Community Based Ecotourism in Southeast Asia, Thailand, 27 February - 8 March 2002, http://www.recoftc.org/download/CBT_discussion/CBETconf_summary.pdf

external subsidiaries and accounts, thereby perpetuating dependence on established intermediary operations.

Governance

An area of ICT use that shows rapidly increasing promise for alleviating the powerlessness, voicelessness, vulnerability, and fear dimensions of poverty is e-governance. Where national or local governments have taken positive steps to spread democracy and inclusion to the poor, ICTs have dramatically demonstrated how they can be used to assist in the process. The effect can be to break down traditional patterns of exclusion, opaqueness, inefficiency and neglect in public interactions with government officials.

In the Bhoomi project of online delivery of land titles in Karnataka, India, the Department of Revenue in Karnataka has computerized 20 million records of land ownership of 6.7 million farmers in the state. Previously, farmers had to seek out the village accountant to get a copy of the Record of Rights, Tenancy and Crops (RTC), a document needed for many tasks such as obtaining bank loans. There were delays and harassment and bribes had to be paid. Today, for a fee of Rs.15, a printed copy of the RTC can be obtained online at computerized land record kiosks (Bhoomi centres) in nearly 200 taluks (districts) or at Internet kiosks in rural area offices. The Bhoomi software incorporates the bio-logon metrics system, which authenticates all users of the software using their fingerprint. A log is maintained of all transactions in a session. This makes an officer accountable for his decisions and actions. Previously, requests for changes to the records could take months to process and were subject to manipulation by the officers. Farmers can now get an RTC for any parcel of land and Khata extract (statement of total land holdings of an individual) in 5-30 minutes from an RTC information kiosk at the taluk headquarters. There are plans to use the Bhoomi kiosk for disseminating other information, such as lists of destitute and handicapped pensioners, families living below the poverty line, concession food grain cardholders and weather information. The response of the people at taluk level has been overwhelming. Queues can be seen at the kiosks, and 330,000 people have paid the fee without complaint. When asked what single factor contributed most to the success of this project, the manager unhesitatingly replied "political will".

In Kerala, the state government is sponsoring the *e-shringla* project to set up Internet enabled information kiosks throughout the State. The concept grew out of the state government's experiences with a bill-payment service called FRIENDS, (Fast, Reliable, Instant, Efficient, Network for Disbursement of Service). FRIENDS operates as a one-stop service centre equipped with computers for paying bills by the public as well as for obtaining applications and remitting registration fees. *E-shringla* is the next logical step from FRIENDS. *E-shringla* networks with a variety of government Departments and provides Internet access, enabling online services and e-commerce facilities for citizens. The Karakulam Panchayat has developed a Knowledge Village Portal as an example of a community portal system that delivers a range of government and community information.

Since January 2000 Gyandoot, a government owned computer network, has been making government more accessible to villagers in the poor, drought-prone Dhar district of Madhya Pradesh. Gyandoot reduces the time and money people spend trying to

communicate with public officials and provide immediate, transparent access to local government data and documentation. For minimal fees, Intranet kiosks provide caste, income, and domicile certificates, enabling villagers to avoid the common practice of paying bribes to officials. The kiosks also allow small farmers to track crop prices in the region's wholesale markets, enabling them to negotiate better terms for crop sales. Other services include online applications for land records and a public complaint line for reporting broken irrigation pumps, unfair prices, absentee teachers, and other problems. Kiosks are placed in villages located on major roads or holding weekly markets, to facilitate access by people in neighbouring villages. The network of about 30 kiosks covers more than 600 villages and is run by local private operators along commercial lines (World Bank, 2002).

Capacity and capability building

The meaning of the term capacity building seems to vary according to the user, but there seems to be no doubt that ICTs are capable of helping to achieve it. There are many definitions, but they all carry the same theme concerning developing an organization's (or individual's) core skills and capabilities to help them achieve their development goals. This definition suits the context of ICTs well as it assumes knowledge of the existence of development goals, without which ICTs are unlikely to be of much value. We have already seen examples of how ICTs can help with education, enterprise development, and health care. Hans d'Orville, Director, IT for Development Programme, Bureau for Development Policy, United Nations Development Programme, puts is simply, "the full realisation of the potential of ICTs requires skills, training, individual and institutional capacity among the users and beneficiaries". But the key question for poverty alleviation seems to be whether ICTs can build the capacity of the poorest people to achieve whatever goals they may have. If you are illiterate, destitute, disabled, mal-nourished, low caste, homeless and jobless, will ICTs help? The most likely scenario is that such ultra-poor people will receive assistance from organisations and institutions that use ICTs and whose programmes specifically target such people as beneficiaries.

ICTs in the form of multi-media community centres/telecentres, especially at the rural level can act as a nodal point for community connectivity, local capacity-building, content development and communications, as well as serving as hubs for applications, such as distance education, telemedicine, support to small, medium- size and micro-credit enterprises, promotion of electronic commerce, environmental management, and empowerment of women and youth. Where such services have a pro-ultra-poor strategy, then the benefits of ICTs can be directed to them. The Village Information Shops, in Pondicherry, India have adopted such a programme. They have used ICTs to build awareness in poor communities of the government programmes and entitlements that are available for their assistance. They have a database of more than 100 such entitlements. Moreover, they have acquired the list of ultra-poor people that the government maintains, and made it available through the centres. The staff pro-actively notify the people on the list that they are entitled to claim certain benefits, and they provide assistance in submitting the claims, contacting the appropriate bureaucrat and progressing the application. The government officials had not been well known for promoting these schemes. As a result, every household in one fishing village is now in receipt of the housing subsidies to which they are entitled, whereas previously none were.

Capacity building also relates to the accumulation of social capital, which refers to those features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit and establishing networks for mutual benefit, that can be nurtured and extended through the use of ICTs. ICTs can help create and sustain online and offline networks that introduce and interconnect people who are working toward similar goals. Many organizations in the women's movement have recognized this potential and have projects that provide support for ICT to be used as an advocacy tool. ICTs can also enable certain individuals, especially early adopters, to spark catalytic change in their communities. One very resourceful lady in a small Mongolian town who single-handedly runs an NGO supporting women's micro-enterprises, used the local telecentre to contact a donor agency in the UK and ultimately achieved an award of US$10,000 to help her in her work, a huge sum within that context.

The well-known case of Grameen hand phones in Bangladesh, in which the Grameen Bank, the village-based micro-finance organization, leases cellular mobile phones to successful members, has delivered significant benefits to the poor. The main purposes for which poor people in villages use the phones are for exchanging price, business and health-related information. They generated information flows which resulted in better prices for outputs and inputs, easier job searches, reduced mortality rates for livestock and poultry and better returns on foreign-exchange transactions. For phone owners, a direct increase in income from phone services adds to their income. Poor people account for one-fourth of all the phone calls made. For villagers in general, the phones offer additional non-economic benefits such as improved law enforcement, reduced inequality, more rapid and effective communications during disasters and stronger kinship bonding. The phones also have perceptible and positive effects on the empowerment and social status of phone-leasing women and their households (Bayes et al., 1999).

The 220,000 women members of India's Self-Employed Women's Association (SEWA) who earn a living through their own labour or through small businesses have started using telecommunications as a tool for capacity building among the rural population. SEWA uses a combination of landline and satellite communication to conduct educational programs on community development by distance learning. The community development themes covered in the education programs delivered include: organising; leadership building; forestry; water conservation; health education; child development, the Panchayati Raj System and financial services.

Cultural enrichment

ICTs can be simultaneously a threat and an opportunity to a culture. Whilst threatening to engulf indigenous minorities in the relentless processes of globalisation, they can also be used as tools to assist such groups to engage positively with such processes, on their own terms. The concern at this stage is that the former is more likely to happen than the latter. ICTs will not achieve cultural diversity alone. As with all successful applications of ICTs, adaptations in the behaviour of individuals, groups and institutions is necessary before significant benefits can emerge from the deployment of ICTs. Existing institutions such as libraries and museums can assist in the process of democratising ownership of cultural assets, provided they face up to the limitations of their traditional roles.

The Internet has made the conventional role of libraries and museums obsolete. Yet such institutions have major roles to play in mobilising communities towards a more open and

dynamic approach to the assembly and preservation of indigenous culture. Libraries and museums can facilitate a more dispersed pattern of ownership and custodianship of cultural artefacts that can be increasingly represented digitally. Networks that connect digitised cultural artefacts to the communities from which they were derived can be used to foster a wider appreciation of their value and importance as well as a more inclusive approach as to how they are used and interpreted.

ICTs can be used to help rural indigenous and minority communities achieve custodial ownership and rights of interpretation and commercialisation over their own cultural heritage. Studies of indigenous communities regularly point to the importance they place on their cultural heritage, yet they also highlight the almost complete lack of control or participation such communities have in how their culture is collected or represented. Rather than homogenising culture, ICTs offer the opportunity to celebrate the diversity of culture. Whichever outcome prevails will be a result of society's choice as to how ICTs are used. Among the few experimental ICT projects involving ethnic indigenous people, short term thinking and the pressure for tangible results (deliverables) forces donors to focus on poverty alleviation outcomes, even though, when you talk to members of the communities themselves, it is easy to find considerable interest in using the technology for preserving and strengthening their cultural heritage.

UNESCO is currently formulating a charter and guidelines for the preservation of digital heritage. Digital heritage is that part of all digital materials that has lasting value and significance. New strategies need to be developed to ensure they are saved for posterity. Digital heritage is either 'born digital' where there is no other format but the digital original, or created by conversion from existing materials in any language and area of human knowledge or expression. It includes linear text, databases, still and moving images, audio and graphics, as well as related software whether originated on-line or off-line, in all parts of the world. The intellectual and cultural capital of all nations in digital form is at risk due to its ephemeral nature, says the preamble to the charter. The charter details the need for digital preservation principles and strategies to ensure that this heritage is available to all now and into the future.

The Kelabit people in Sarawak do not feel that they exercise ownership rights over their own cultural heritage. They are concerned that outsiders are able to gain easier access to both the records and the artefacts related to their cultural heritage than they are. Part of their concern arises from the opportunity for misinterpretation of meaning that can arise from such access as well as the inability of the Kelabit people to influence how their cultural heritage is treated. They feel powerless to present to the outside world a picture of themselves, their history and achievements, which they themselves would wish to have known. They see the situation getting worse rather than better, as technology empowers a few people to engage with information relating to their heritage, whilst depriving the majority from an equal opportunity. They are starting to use their telecentre to redress this imbalance by recording their oral histories and genealogical records.

Assyrians started their immigration to the U.S. and Europe more than 100 years ago. The Assyrians of today number more than five million and are the direct descendants of the ancient Assyrian and Babylonian empires. Immigrants from Iraq and Iran preferred to settle in the U.S. and Australia, while Assyrians from Turkey preferred to settle in Europe. The Internet is finally uniting these Assyrian communities in Diaspora, regardless of their geographic, educational, and economic backgrounds.

Agriculture support

Research suggests that increasing agricultural productivity benefits the poor and landless through increased employment opportunities. As the vast majority of poor people live in rural areas and derive their livelihoods directly or indirectly from agriculture, support for farming is a high priority for rural development. ICTs can deliver useful information to farmers in the form of crop care and animal husbandry, fertilizer and feedstock inputs, drought mitigation, pest control, irrigation, weather forecasting, seed sourcing and market prices. Other uses of ICTs can benefit farmers, enabling them to participate in advocacy and co-operative activities.   The Maharashtra State government has plans to link 40,000 villages with Agronet, a specially developed software package for farmers, which aims to provide the latest information on agriculture. In parts of India, for instance, there were times when all the farmers were harvesting their tomatoes at the same time and the market glut pushed prices to rock bottom. Later, when tomatoes weren't available and the prices shot up, the farmers had none to sell. They now use a network of telecentres to co-ordinate their planting so that there is a steady supply to the markets and more regulated and regular prices.

Samaikya Agritech P. Ltd based in Hyderabad, Andhra Pradesh, operates 18 "Agritech Centres". The centres provide agricultural support services to farmers, on a commercial basis. They are permanently manned by qualified agricultural graduates called Agriculture Technical Officers (ATO) and are equipped with computers linked to the head office in Hyderabad, through a modem-to-modem telephone connection. Through these centres Samaikya provides; technical assistance to member farmers, inputs such as seeds, fertilisers and pesticide, machinery hire, tools and spares for sale, soil and water analyses, weather monitoring, field mapping, weekly field inspections and field visits by specialists.

Farmers register with centres and pay a fee per growing season (two or three seasons per year) of Rs.150 (about US$3) per acre/crop. A farmer registers by the field and receives support services that are specific to the fields registered. On registration, the farmer provides detailed information concerning his farming activities, which is held on the centre's database and which provides the basis for the technical support provided. The centre in the village of Choutkur has 53 registered farmers covering 110 acres of registered land.   This is out of a total of around 1,000 farmers within the centre's catchment area. Major crops include sugar cane, padi and pulses.

Advice from the centres is based on data generated from pre-validated crop cultivation practices adopted in the State and provided by the government agricultural services and local institutions. Farming information is up-linked from headquarters to the computers at the centres. If farmers have specific needs for information that cannot be satisfied immediately by the ATO at the centre, then the technician completes an on-line enquiry form on the computer and transmits this via modem to the headquarters.   Specialists with more experience and qualifications at the headquarters organise and co-ordinate replies to queries, which are typically transmitted back to the centre within 24 hours. The database and information systems are operated in the English language. Information is interpreted for the farmer by the ATO. As some farmers are illiterate, the technicians have to spend time with explanations and descriptions. There is no standard for a computerised Telegu script.

Prior to setting up a centre, Samaikya performs a survey of local farming and cultivation practices and to ascertain the political and cultural context of the potential centre. It conducts a pre-launch programme to familiarise farmers with the services. One centre closed down within three months of opening as no farmers registered for the service. This was due to the pressure placed on them by local marketeers, financiers and suppliers of inputs who perceived a threat to their livelihoods from the competing Samaikya services. Farmers were told that any who registered with the centre would not receive credit or essential supplies.

Employment opportunities

Two areas of employment opportunity arise from the deployment of ICTs. First, unemployed people can use ICTs to discover job opportunities, and second, they can become employed within new jobs that are created through the deployment of ICTs. Poor people in rural localities lack opportunities for employment because they often do not have access to information about them. One use of ICTs is to provide on-line services for job placement through electronic labour exchanges in public employment service or other placement agencies. Normally, job brokering is carried out as a closed system involving intermediaries on behalf of their clients. The greater transparency enabled by ICT opens up possibilities for more precise information seeking. Through open job seeker banks, for example, employers can search and directly access résumés, which, in turn, are linked electronically to job vacancy banks. Tools have been developed to assist employers in screening résumés, or to send e-mails automatically to jobseekers when job vacancy announcements fitting certain pre-selected criteria are posted.

The ILO notes that some developing countries have been able to create employment for thousands of women and men through community-access points and telecentres. One common option is to purchase a mobile phone through a micro credit program and to earn income by providing low cost phone calls to others (Curtain, 2001). The widespread use of English on the Internet has created the need for local content and applications to enable non-English speakers to make effective use of it. For the poor in particular, the vast amount of information on the Internet requires an intermediary to sift through it to identify what is relevant and then interpret it in the light of the local context. People with language and ICT skills are well placed to perform this role of 'information intermediary.' Telecentres can also offer the opportunity to use ICT for business purposes to small and micro-enterprises that do not have their own private facilities.

In some countries in the region, telecentres are being set up through public and private initiatives in telephone shops, schools, libraries, community centres, police stations, and clinics. Sharing the expense of equipment, skills and access amongst an ever-increasing number of users also helps to cut costs and make these services viable in remote areas. India, for example, has seen rapid growth in cyber kiosks that provide access to social communication as well as business support services for underprivileged groups. These kiosks are often upgraded Subscriber Trunk Dialling booths that are widely found in all parts of the countryside in India. These are small street shops, offering access to public phones for long distance calls. They number about 300,000 and have generated more than 600,000 jobs. Youth unemployment constitutes over 30% of total unemployment in Asia Pacific and young people are particularly well placed to take advantage of such growth areas.

People with appropriate skills, possibly obtained from ICT-based learning facilities, may gain employment as a result of the growth in remote ICT processing facilities that are located outside the high-income countries. These provide a range of services from help lines, technical support, and handling reservations and sales to data conversion including voice to data transcription. Other remote processing includes payroll accounting to internal auditing and credit appraisals. High-end remote processing includes creating digitised maps of townships, utilities, roads, and other facilities. It is claimed that back office functions likely to grow in importance are settling insurance claims and summarising legal documents, such as witness depositions. A related source of ICT-generated employment for young people is through Call Centres. These offer telephone-based services from a central office to customers in a variety of business sectors. Call Centres handle telephone calls, fax, e-mail and other types of customer contact; in live and automated formats. They have expanded rapidly in Europe and are important sources of work in Hong Kong, Taiwan, South Korea, Malaysia and the Philippines.

The Internet can also play a pre-eminent role in a pro-poor tourism marketing strategy by providing information about remote tourist locations, including photos of key features as well as providing a ready means of low cost communication via e-mail. The Namibia Community-Based Tourism Association in southwest Africa assists local communities to set up tourism enterprises in the previously neglected rural areas of Namibia. The Association has set up a web site with detailed information including a map about each of the seven regions in rural Namibia and the community-based tourism facilities in each region.

An example of the use of ICT to help bridge the gap between employment in the informal sector and the mainstream economy is India's Self Employed Women's Association (SEWA). Its 220,000 members are women and young women who earn a living through their own labour or through small businesses. SEWA has been one of the first organisations in India to realise the potential for harnessing ICT to help women in the informal sector. It has sought to develop the organisation's capacity to use computers by conducting awareness programs and imparting basic computer skills to its team leaders, "barefoot" managers and members of its various member associations. Many of SEWA's member organisations have launched their own websites to sell their products in the global virtual market place.

Social mobilisation

Social mobilisation is a process for harnessing local resources that can foster sustainable forms of community self-development. This has been pioneered by the UNDP South Asia poverty Alleviation Programme (SAPAP) that was established in 1993 to enhance the national capacities for integration of growth and poverty alleviation policies and to demonstrate the feasibility of functioning social mobilisation mechanisms in each of the participating countries. SAPAP is UNDP's largest regional programme in Asia, with an allocation of $11.3 million. The programme is operating in six of the seven SAARC countries: in the Syangja District in Nepal, in the state of Andhra Pradesh in India, in the Kishorganj Sadar Thana in Bangladesh, in the Kohat District of the North West Frontier Province in Pakistan, in the Nuwera-Eliya District in Sri Lanka, and on the Noonu Atoll in Maldives.

The programme's major aim is to help remove the constraints that poor rural communities face in harnessing their potential to develop themselves. To this end, a three-tier strategy is followed, based on social organisation, capital formation and human resource development. First, villagers are brought together to discuss local development issues of common interest and to initiate local development initiatives. Second, they are persuaded of the need to save, which after some time becomes an important source for credit operations. Third, they are trained, mainly in management techniques and income generating activities, in order to create the foundation for grassroots institutional development, to improve sectoral service delivery, and to support those who want to undertake socio-economic activities.

The relevance here is not just that all these activities can be assisted through the use of ICTs, but such activities have been demonstrated to be instrumental in helping communities make the most out of ICTs. A study of the Nepal component of SAPAP highlighted the relationship between social mobilisation and ICTs, suggesting that ICTs could be introduced successfully to communities in the programme as they exhibited characteristics such as organisation capability, learning capacity and development aspirations that are thought to be important predictors of telecentre success. Furthermore, it was noted that after some six to eight years under the programme, communities were hitting a "glass ceiling" in terms of their development activities, having exhausted all the opportunities for exploiting their physical assets. ICTs were being considered as a new engine of growth to enable the communities to start exploiting information assets for further development activities. Social mobilisation offers useful indicators of the right approach in introducing ICTs to poor communities.

IV. Lessons learned

The observations in this section arise from applying the general principles of ICT adoption and diffusion to the experiences of ICT for poverty alleviation detailed in this report.

Models of Success: Towards Best Practices

Innovation diffusion theory

Projects that promote ICTs for poverty alleviation are mostly innovations that are in the early stages, and most of the examples described represent innovators. Apart from anecdotal evidence there is very little proof of aggregate reductions in poverty from ICT deployments. However, it is worth noting that corporate use of ICTs in the west took many years before links between aggregate productivity and ICT could be demonstrated, and even these were contentious. One observer notes that in the last ten years, there was no relationship between what firms spent on information technology and profitability (Strassman, 1999). Field observations though, suggest that poor people are resourceful and not risk averse and that they are often ready to exploit any advantage that comes their way, e.g., the popularity of the Bhoomi system. In that sense, projects that display an observable relative advantage to poor people can be expected to take off quickly. The complexity and trialability characteristics of ICT innovations can militate against them in the eyes of poor people who are unfamiliar with ICTs. In Bario, a survey of 140 households only found one person who had heard of the Internet. The Nepal SAPAP survey spoke to 650 people of whom 28.1% had seen a computer, but only 2.3% had used one (mostly school children), 2.5% knew what a computer is and a mere 8.1% had heard of the Internet.

ICT diffusion stages

Most of the examples can be regarded as being in the substitution stage of ICT diffusion. Where implementations improve existing information channels, making them more efficient or widespread for example, benefits will emerge, but they will be modest compared to the enhancement and transformational potential of ICTs. This is most noticeable in the take up of e-mail as probably the first application for new users of ICTs. Early enthusiasm, such as the ability of poor people to send e-mails to politicians and agricultural research institutions, quickly vaporised when no replies were received. Nevertheless, e-mail remains an important communication channel where postal services are expensive and unreliable, and also for creative means of remitting money across borders. In Nepal, it is estimated that more than half of all foreign earnings are remitted into the country via informal systems based on e-mail, a method that annoys the banks that traditionally sat on foreign remittances for a while to pick up the interest.

The Bhoomi example comes close to having a transformational impact as it completely re-shapes the relationship between the landowner and government officials, with radical improvements in service levels. The Thandarai Telecentre in case number 3 (see annex) depicts an example of transformation in a village whose entire livelihood strategy was revised. Implementations that approach the transformational effect will face considerable challenges in institutional reorganisation, involving wholesale redesign of responsibilities and relationships between individuals and groups, and often facing tough resistance from

factions with a vested interest in preserving the status quo. In the case of Bhoomi, the regular personal involvement of the Chief Minister of the State was a key determinant of success. Implementations that aspire to transformation will face the prospect of high payoffs but will be the hardest to implement, even where the technology is straightforward.

Stage model of ICT implementation

The stage model of ICT implementation provides a kind of second dimension to the diffusion stages. Any particular application initiative can amount to a substitution, an enhancement or a transformation, but whichever it is it is likely to proceed through the stages of implementation, as depicted in figure 5.

The implications of this perspective are that progress through the stages of implementation for applications in the transformation category will face more intense challenges and barriers at each stage than those in the substitution category. The time scale is also likely to be correspondingly longer.

Relationship between development, information and ICTs

Given an appreciation of the stage model of implementation and whichever approach chosen for diffusing ICTs, it is evident that where demonstrable results have emerged, it has been because of a clear focus on the development strategy. To return to the G8 DOT Force report, that "efforts to increase access to ICTs should be rooted in a broader strategy to combat poverty," we can begin to see the true relationship between development, information and ICTs emerge. Noting the experiences of the examples cited here, we could make the following observations:

- *Alone, ICTs are insufficient for significant benefits to emerge.*
  If there is no attendant workable development strategy, ICTs cannot be expected to achieve optimal outcomes. Giving voice to the poor and helping them apply their knowledge is a key element of combating poverty, and should be incorporated into ICT approaches to poverty alleviation. Directly addressing the needs of the poor and most marginalized, particularly women and girls, is vital.

- *ICTs are best deployed to improve processes that are already working reasonably well.*
  This applies more for applications that target process substitution and enhancement (the vast majority). Where transformation takes place, then the original process is reformed so much that the form and quality of its original operations are of little concern.

- *ICTs will not turn bad development into good development, but they can make good development better.*
  ICTs act as an amplifier of underlying processes. What makes development work well will be made to work better by using them. If used inappropriately, ICTs add unnecessary costs to the process and risk disillusionment among users and promoters when expected benefits fail to emerge, hindering subsequent efforts to use ICTs appropriately.

- *Effective applications of ICTs comprise both a technological infrastructure and an information infrastructure.*

The information infrastructure includes all that is required to make the ICTs relevant to their context, including all sources of information and its consumers. Mobilising them into a coherent infrastructure requires methods and skills that are quite different from those required to assemble the technology infrastructure. ICTs can be effective tools to tackle poverty but the spread of technology should not be an objective in itself. Poverty is the problem, not the digital divide.

- *In rural settings in developing countries, (where the vast majority of poor people live) the technological infrastructure is always a challenge to install, but that task is relatively simple compared to establishing the information infrastructure.*

Developing countries suffer from poor and underdeveloped infrastructures and creative approaches to supplement them are often necessary in order to achieve connectivity. No single technology is a magic bullet or suitable to all needs. Each ICT (old and new) will be appropriate in different circumstances. Solutions can be technically demanding, making it advisable to recruit the best technical people that can be found. However, they should not be put in charge. No matter how creative and efficient the technology, implementations will always be judged by their development outcomes. The best technical people devote their entire energies and expertise to the technology and should not be burdened with the softer issues of designing the information infrastructure and mobilising system users. Generally, the two sets of skills that are required tend to be mutually exclusive anyway; if you're good with technology, then you probably don't have the makeup to be good with people, and vice versa.

- *The application of ICTs in the absence of a development strategy that makes effective use of them will inevitably result in sub-optimal outcomes.*

It is important to be able to differentiate between types of outcomes and to balance them against the intentions, aspirations and potential of the technology and its users. At the same time, it is important to recognise that unexpected outcomes can turn out to be more desirable than those that were expected. ICT implementations carry their own dynamics, and projects should acknowledge that introducing technology of itself changes the dynamics of the problem that they are intended to solve. Sub-optimal outcomes are often a product of failing to respond to system dynamics in a way that would have directed the technology more closely towards better development, and adapting to the dynamics of a responsive development strategy.

- *Whilst ICTs provide opportunities for development, desirable outcomes always arise from the actions of people.*

The information infrastructure, and especially the people in it, make up the key enabling environment that will determine the nature of the outcomes. When the main focus is on technology, there is a tendency to leave the people issues to chance. The enabling environment is crucial to providing information and communication services, innovation and entrepreneurship and free flow of information. Education and skills are key enablers of the effective use of ICTs.

Other studies have drawn similar conclusions. The report by DFID draws "the fundamental conclusions of this study are that information, communication and knowledge are critical elements of poverty reduction and meeting the international

development targets. ICTs, used appropriately, can be effective tools to advance DFID's mission." (Marker, et al. 2002).

Telecentres

Income alone explains 78% of the variation in the number of telephone lines and a similar percentage in the variation of access to the Internet per capita across countries. This remains by far the best predictor of the comparative level of ICT rollout across and within countries. Even with further reform and technological advance, it also suggests that the cost of services means that most of the people in developing countries could not afford a telephone in their home, much less an Internet connection. The basic solution to this problem is not complex. It is to provide public access, which allows multiple individuals to share the fixed cost of ICT provision (Kenny et al., 2001).

Many of the cases cited, and the case studies in the annex, involve the use of community telecentres as the medium of access. Community based telecentres provide shared access to ICTs and are the only realistic means of doing this for poor communities. Although they come in many guises, the two key elements are public access and development orientation. It is the latter characteristic that distinguishes telecentres from cyber-cafés. Of course, the cyber café can be a useful device in fostering development through ICTs, but the difference is crucial, because development oriented telecentres embody the principle of providing access for a purpose, that of implementing a development agenda. Table 5 lists some of the *physical* services that a telecentre might provide. It does not suggest the *logical* services of a telecentre; helping communities set their development strategy.

Table 5. The Range of Potential Telecentre Services

- Telephone calls (make calls, receive calls).
- E-mail and Internet access (send/receive e-mail, browse the web).
- Word processing (typing and formatting of letters, job applications and other documents).
- Internet searches have staff research a topic on the Internet for study, business or pleasure).
- Desktop publishing (newsletters, flyers, stationery, business cards, tickets, circulars)
- Pamphlets, (logos and computer artwork).
- Spreadsheets and databases (financial budgeting, bookkeeping, invoicing and farm management).
- Computer use (hourly or daily rates can be charged for this).
- Education and training (distance education, tele-learning, face-to-face Adult and Community Education).
- Computer training (basic computer literacy - keyboards, mouse, Windows etc., computer applications: spreadsheets, e-mail, word processing. etc.).
- Graphic design (assist with presentations, assignments, adverts).
- Printing (laser printing and copying for promotional materials and presentations)
- Web Page design (personal home page design, launch and regularly maintained through the Telecentre)
- Professional writing (prepare grant applications and funding submissions).
- Scanning (text, graphics, photographs for use in a newsletter, e-mail or for printing).
- Photocopying (school study material, circulars, newsletters, license applications, etc. with different coloured paper).
- Binding (for professional presentation of documents and booklets).
- Laminating
- Fax communications.
- Business and secretarial services (the Telecentre could act as a message service).
- Service directories (development of a local community phone directory - this could be printed out on paper as well as be in electronic format).
- Video conferencing (two-way audio and video conferencing with other regions).
- Video or still camera hire (daily or weekly hire of photo/video recording equipment for private, professional, business or community events).

Table 6 lists some bi-polar characteristics of telecentres, depicting some of the differences between the different approaches.

Table 6.   Common Dimensions of Telecentre Characteristics

NARROW FOCUS Provides access to technology only	**MULTIPURPOSE** Provides services, e.g. training, and development information
COMMUNITY-BASED Represents a broad constituency	**ESTABLISHMENT** Top-down government or business organisation based
STAND ALONE Not associated with another institution	**ATTACHED** Operates as part of another institution, e.g. school, government
THEMATIC Specific to theme, e.g. education, health.	**UNIVERSAL** Whole community needs
INDEPENDENT Operates alone	**NETWORKED** Works with other telecentres
PUBLIC SECTOR Operated by a public body	**PRIVATE SECTOR** Operated by a private body
PROFIT ORIENTED Operates as a business	**SERVICE ORIENTED** Operates as a service
PUBLIC FUNDED Funded by public funds	**PRIVATELY FUNDED** Obtains funds privately
COMMERCIAL Charges clients for its services	**FREE** Provides services for free
URBAN	**RURAL**

The limited experience with telecentres so far suggests the benefit of a participatory style in providing the logical, development strategising services of a telecentre to its host community. This approach is highly recommended by the World Bank as a systematic approach to the application of IT to rural communities. In order to support IT adoption that will contribute to rural development, it is essential to begin with the needs of the rural community. As a first step, a feasibility study is required in order to; identify the needs and priorities of rural communities in such areas as agriculture, education, commerce, natural resource management, and health, etc., determine the types of information needed to help meet those needs, including information gathered from the rural population and transmitted to policy-makers and project designers, and information shared among rural communities, determine the gaps between the information currently available and what is needed, and determine how IT can close those gaps and build valuable synergies by mobilizing information across sectors (World Bank 1998).

Research reflects the World Bank view, suggesting that the characteristics of the host community are at least as important as those of the telecentre in determining outcomes. Observations of the case studies in the annex suggest that whilst the technology in two communities is more or les the same, the outcomes of their use can be markedly different,

so that differences between the communities are likely to account for the dissimilarities in results. Figure 6 suggests a success model for development telecentres.

Telecentre Characteristics

Start up
The circumstances of project start up appears to influence the adoption process, depending on whether the project is instigated by an NGO, a government agency or a research institution. Adoption seems to be facilitated when a level of local ownership is established early in the life of the telecentre.

Staff
People operating the centre should be customer-focused and familiar with the community, ideally drawn from it. In fulfilling the support role of the telecentre, staff provide training and assistance to community users. In addition, the role of the infomediary has been identified as an individual working in a telecentre and drawn from the community that the telecentre serves, who is capable of using computer and internet technologies in order to respond to requests from members of the community for information or for help in solving some problems that might yield to an internet enquiry. The term is drawn from the phrase information mediator and is sometimes characterised as a knowledge broker. In some instances, the infomediary will pro-actively seek information from the Internet that he/she knows will be useful from their personal knowledge of the community, and will then broadcast or otherwise publicise that information throughout the community.

Location
The centre should be central, visible, easily accessible and not intimidating to prospective client.

Services/ Product mix
The level and quality of services and the product mix that is offered by the telecentre is likely to influence its adoption by the host community. Service and product delivery should be sensitive to community requirements.

Software Tools
The closer the software tools match the needs of the community, the more likely they will be used. The use of suitable language has an impact.

Budget/Financing
Telecentre financing is critical to viability and sustainability.

Planning
The quality and responsiveness of management planning for maintaining suitable levels of service is of vital importance. Telecentre managers are strategic resources.

Networking
The extent to which a telecentre is able to effectively network with other centres in order to share experiences, cross-fertilise ideas and promote joint learning.

Community Characteristics

As technology is introduced into a community it is embedded within its social fabric and outcomes are a result of the interactions that take place as this happens. Some of the social factors that have been observed to define outcomes of telecentres are as follows

Community Aspirations
Technology will function successfully in the absence of some form of community ambition for a better life. Moreover, aspirations often need to be ignited, sometimes by an outside influence, and they need to be kindled and re-kindled over time. The source of inspiration that sets off aspirations often changes during the adoption of the technology, sometimes to unexpected sources e.g. school children, and there are usually many different sources at any one time.

Learning
Most communities are capable of learning new things, skills, ideas, and roles. They blend new information with pre-existing knowledge and build it into something of lasting, perhaps growing, value to themselves. Learning seems to take place at all levels of the community, and its impact is accelerated by the rapid spread of new and useful knowledge within the community. The pace of learning seems to accelerate as technology unfolds its capability and potential, further feeding the desire for new knowledge. People discover new knowledge and they teach each other. The learning that then occurs is usually deeper and more focused on real needs than the learning that is introduced from outside.

Capacities
Learning often leads to expanded capacity, but this is of little value without the aspiration to take advantage of the extra capacity. It is possible to observe the pride that individuals take in the new roles and accomplishments that they have been able to achieve as a result of having their capacities expanded and their aspirations realised. Sometimes training does not always trigger capacity building. People seem to act as a result of a combination of circumstances, and if the right combination does not exist, any single factor in isolation may not be optimally effective. While it is probably a question of timing, the challenge is to be able to recognise the right time to engage with community capacities, i.e. when to trigger aspirations, or when to conduct training.

Organisation
The extent to which a community is and remains organised seems to influence the use it can make of a telecentre. Community organisation in this context relates to the role of co-ordinating the dynamics of many social processes that occur simultaneously, towards a desirable result. Telecentre activities impact all sections of a community and they participate in many of the social processes that define its identity. Organisation then, is a function of harnessing the social dynamics of a community towards its own betterment, with the introduction of new information. This usually requires some locus of community influence, but when new technologies are introduced this is often not the one occupied by the traditional leadership.

Unity
Some of the stories derived from research experience depict a sense of unity of purpose within the community that transcends the many differences that usually exist within any

social group. Desirable results emerge from, and contribute to, the unity of those affected, engendering a camaraderie that further acts on aspirations, capacity building and organisation.

Participation
Participation refers not only to the developer-community relationships and the adoption of equality between them, but also to the inclusion of all sections of the community. Descriptions of the most desirable telecentre outcomes indicate a will to include rather than to exclude sections of the community. Relative advantage is a less appealing benefit than is the greater good. Pride and its spin-offs (aspirations and capacity expansion) are nearly always evident when outcomes have a wide, inclusive, impact. Individuals who achieve community-wide solutions earn respect and status.   Those who exploit technology for selfish purposes lose it.

Relationships
Observations nearly always reveal one or more relationships that were important contributors to a beneficial outcome. Sometimes it appears within the researcher-community relationships, but more often (and more potently) it is a factor of the relationships that exist or which emerge within the community itself. Moreover, relationships seem to amplify the effects of the other factors mentioned here and the influence is recursive, so that good relationships breed aspirations and accomplishment, which in turn generate further good relationships.

Personalities
Many stories of positive telecentre outcomes indicate the presence of an individual within the community whose personality seemed to play an important role. They are sometimes referred to as champions and they act as opinion leaders and innovators in IT implementation and adoption. Stories of positive developments from telecentre adoption often feature an individual's action as a trigger to community adoption.

Information Characteristics

Information should be useful and useable as well as being local and relevant. A telecentre that is designed to support community development should be aggressive and creative in localising its knowledge and information resources (Colle, 2000).

Structural Conditions

Developing country governments should formulate national strategies to narrow knowledge gaps, including those for technology acquisition and distribution, education and training and expanding access to technologies by de-regulation and privatisation (World Bank, 1999).   The Bank goes on to say that societies require policies and institutions to facilitate the acquisition adaptation and dissemination of knowledge, saying that the appropriate course of action for any country will vary depending on the circumstances. Government policies and political leadership will determine the success of such policies.

Individual Characteristics

The characteristics of individual telecentre users have been demonstrated to influence the adoption of computer usage behaviour. They include; personality, demographics, computer anxiety, involvement with application development, expectations, training and education.

Methodological Issues

The World Bank's advice regarding a participatory style of community engagement has the implications for ICT implementation methodologies:
- Methodologies for designing and implementing useful information systems will emerge from participatory action-oriented analytical activities.
- Data will be obtained using a combination of surveys, direct interviews, workshops and discussion groups.
- Useful information systems will be embedded within the needs of the community
- Specific actions are required by both the implementers and the community in order to articulate those needs.
- The implementers should learn about life in the beneficiary communities
- The community should learn about ICTs from the implementers.
- Community members should perform major portions of the implementation.
- The implementers should be able to identify with the community.
- As a team, the community-implementers should be capable of critically reflecting upon iterative cycles of action in order to achieve beneficial outcomes from the project.

Participatory forms of analysis in which community aspirations and development activities are moulded and tracked in a cyclic manner are more likely to achieve desirable results than are technology implementations that are predicated on fixed expectations and inflexible assumptions of what outcomes should look like.

Project implementation considerations

Unexpected Outcomes

The social dynamics of communities when combined with the characteristic of ICTs as intellectual technologies can lead to outcomes of ICT implementations that were not expected. In some cases, these can turn out to be more desirable than those that were targeted, and they are to be encouraged. Figure 7 illustrates a combination of possibilities:

Evaluation

Monitoring and evaluation of social interventions, especially when the desirable and unexpected occurs, often suffers from excessive dependence on numbers. Evaluation can benefit from the richness that story telling can bring. Stories are based on experience and they represent empirical evidence of events. They capture an otherwise unobtainable richness of events and the circumstances of the people involved in the events, their emotions and perspectives of reality. They also relate life histories and the connection between personalities and events. In describing how things actually happened, stories offer learning opportunities for understanding causalities and the shifting dynamics that

occur between people, events, technology, institutions and the environment. Besides, stories evoke a response from the listener and this can add depth to the communication that is taking place during the re-telling. Stories can summarise multiple events that are linked in some meaningful way in a cumulative manner that helps to identify trends so that future behaviour can be directed towards desirable outcomes. Hence, stories cultivate social change; becoming part of the intervention, not separate from it. As the outcome of story telling is in large part determined by the context of the telling, stories can be infinitely re-used within multiple contexts, thereby serving multiple purposes. Whilst it is improbable that statistical analyses would contain stories, it is possible for stories to contain statistical analyses. Moreover, stories collect data that is difficult to represent in statistics, such as emotions, and evidence suggests that such factors are influential in determining community-based reactions to social interventions.

Time Scales

The time scales for ICT projects are often set by donors and implementers with little reference to the recipient community. In some cases these are determined within frameworks of national or international budgeting that have no bearing on the conduct of the project. Experience suggests that communities will determine for themselves the rate at which they take up innovations, and project implementers should be prepared for this. In the case of the Gujarat Milk Co-operative, implementation efforts spanned ten years before the full potential of the application was achieved. Sometimes a focus on "deliverables" denies the dynamics of the social context of the project. Even use of the term "project" can be problematic. Projects have definite start and end points, which are important milestones for management, but the activity is often regarded by the recipient community more as a continuous process, with no ending in sight. The different perspectives can create tension between implementers and recipients.

Top-Down: Bottom-Up

Telecentre implementations tend to fall into one of two categories; top-down projects by central or state governments, or bottom up grass root initiatives by local communities and NGOs. Experience points to, on the one hand, the difficulties that top-down national programmes experience in incorporating the specifics of the local context of a rural community. On the other hand, scaling up the successes of focused grassroots initiatives to wider implementations is also proving to be a challenge. There is a need for a methodology that will enable field workers involved with ICT projects to mobilise communities towards achieving optimum outcomes from them. If a detailed methodology can be formulated, tested and documented, then large numbers of field operatives can be trained to implement it across many implementations. Such a capability would enhance the likelihood of optimal development outcomes from a nationwide implementation, effectively incorporating the benefits of focussed small-scale grassroots projects into a large-scale national programme.

Social mobilisation has already been demonstrated as an efficient means of alleviating poverty on a wide-scale, using methods based on the exploitation of physical assets. An equivalent technique that focuses on exploiting information assets is now required. Methodologies are important for ICT professionals as they bring together simple tools and techniques that are useful in assuring a high degree of success with ICT implementations. Methodologies for the analysis, design and implementation of

information systems account for all the logical processes that need to be considered for an ICT project to achieve, or exceed, its objective. They go beyond the mere installation of technology by addressing the behavioural changes of technology users that are known to be necessary for technology to fulfil its potential. The most useful methodologies are those that can accomplish this whilst being trainable to operatives who need not be highly qualified. They incorporate simple-to-use tools and techniques that are structured together in such a way to ensure that all aspects of the system problem are properly addressed.

Sustainability

Because most ICT projects are recent, experience on sustainability is limited. Many current experiments are more concerned with establishing the social value of ICTs. Few of the Gyandoot kiosks have achieved commercial viability for instance (World Bank 2002), and even though the Village Information Shops in Pondicherry are expanding their operations to new locations, they still require outside financial support. It is commonly assumed, however, that effective rural ICT access requires economic subsidy and financial loss. Others argue that ICTs should be economically viable if they are to gain wide, robust, and long-lived usage. One report suggests that there are at least six broad categories that must be considered for economic self-sustainability: costs, revenue, networks, business models, policy, and capacity (Best and Maclay, 2002).

V. ICT for Poverty Alleviation Framework

From an examination of the examples quoted here, it is possible to trace events and influences backward from beneficiary to inception and to suggest a framework of how implementations engaged with relevant processes and principles on their way towards achieving poverty alleviation. The framework so derived facilitates an understanding of how ICT can help alleviate poverty. A pro-poor ICT policy begins with a development commitment that targets poverty alleviation with government acknowledging its role as a major employer and user of ICTs. This fosters the infrastructure development that will be required to achieve widespread poverty alleviation through local access combines with suitable methods to ensure access is used to the best effect. Government also encourages institution reform leading to the delivery of effective services capable of exploiting the infrastructure. The services are directed towards and delivered to the local access points to the poor people who need them. Figure 8 suggests a framework for ICTs for poverty alleviation.

ICT Policy
ICT policies will be concerned both with ICT production and ICT use. The concern here is for policies for ICT use that specifically target poverty alleviation, as opposed to e-commerce, e-government, e-learning and the like, which whilst carrying the potential for poverty alleviation, also benefit better off citizens and may not necessarily deliver benefits to poor people.

Development Strategies
Specific strategies need to articulate how poverty alleviation will occur, for instance through enterprise development, micro-credit programmes, social mobilisation, pro-poor tourism, HIV/AIDS awareness, etc.

Local Access
Access to technologies has to be planned, organised and well managed. It is most likely in some form of shared access, perhaps through existing institutions should as libraries or post offices, or through the creation of new institutions such as multi-purpose community telecentres.

Government as a User
Governments typically control half of the ICT assets in developing countries; they are a major employer and a major supplier of public services. Their role as users of ICTs is critical to the national response to ICT-based opportunities and the rate of ICT adoption.

Infrastructures, Information and Physical
The physical infrastructure is concerned primarily with the diffusion of telecommunications to rural and under-served populations, usually in some form of universal service scheme. Information infrastructures are those that include existing media and which serve to mobilise information within the country. ICTs open opportunities for new forms of information delivery that can be complimentary to existing flows, without rendering them obsolete.

Methods
Experience indicates that bottom-up approaches to the design of information systems for community development are superior to alternatives. Development that is demand driven

has a far greater likelihood of achieving its aims, and methods that foster listening to the poor and factoring their wishes into the design of solutions are usually more sustainable and more substantial than otherwise. Policies have to cater for the inclusion of such methods.

Institutions
Significant returns from ICTs are achieved when institutions adopt transformational approaches to service delivery, often completely changing the nature of the organisation and revitalising its purpose and goals. If new technology is used merely as a substitute for old technology, without affecting existing patterns of behaviour, organisation and relationship management, then sub-optimal outcomes can be expected.

Specific Purposes
Here the concern is what services ICTs are directed at; e.g., education, health, commerce, etc. and how stakeholders are drawn into productive relationships that result in poverty alleviation. Who is responsible for what, and how activities are co-ordinated.

People
The target population for policy-making for poverty alleviation must be known in relation to each specific service. Service must be capable of differentiating between the poor and the not so poor, so that benefits can be directed to where their intended recipients.

In the annex, nine case studies of poverty alleviation with ICTs are examined within the context of the framework. Firstly, each is described in terms of; why it is interesting, the approach adopted, results, lessons learned, what has worked and what has not worked. Next, each case study is situated within the poverty alleviation framework in figure 8 and a commentary derived with regard to what factors played significant roles and what the framework suggests for project.

VI. Conclusion

Alleviating poverty with ICTs is not as straightforward as merely installing the technology, but it is not conceptually that complex either. Provided a few relatively simple principles can be followed, it seems likely that widespread poverty alleviation can be achieved. The main challenges are not actually in the technology, but they lie in the careful co-ordination of a disparate set of local and national factors, each of which can derail efforts. The following five principles emerge from the ICT for Poverty Alleviation Framework:
- Strategise for poverty alleviation, not for ICT.
- Reform telecommunications: privatisation, competition, independent regulation.
- Promote public access: aggregate demand for sustainability (not only financial).
- Reform institutions: for transformational benefits.
- Develop appropriate approaches for listening to the poor.

As a cross-cutting, multi-dimensional approach to development, ICTs can stretch implementation energies to the full and they challenge traditional approaches to development, but they carry the reward of substantial improvements in the daily lives of millions of poor people. The framework for poverty alleviation is offered as a tool for guiding efforts towards achieving this. It allows for a full consideration of the range of relevant critical factors prior to embarking on implementations as well as for post-hoc

reflections on their outcomes. The framework represents a first effort, and it is acknowledged that other, similar, tools exist. It is expected that through a combination and further synthesising of experiences and observations, the framework can become a practical tool for use by planners and policy-makers with general applicability in multiple contexts.

Annex: Case Studies

Case Study 1		e-Bario, Sarawak, Malaysia
		Universiti Malaysia Sarawak
Reference		http://www.unimas.my/ebario/
Why is it interesting?		The objective is to define opportunities for remote and rural communities in Sarawak to develop socially, culturally and economically from the deployment of ICTs. The experiment is expected to demonstrate the many ways in which ICTs can be used to improve the lives of marginalized groups, specifically the rural and remote communities in Malaysia. Bario is in the Kelabit Highlands of north Sarawak on the island of Borneo. It is the homeland of the Kelabit people, one of Sarawak's smaller ethnic minorities, with their own language and culture. It is accessible only by air. The local population numbers around 1,000 people, which is about half what it was in 1990. There are totally around 5,000 Kelabits, the others living in the towns and cities of Malaysia and beyond. The local school was provided with a computer laboratory and a local IT company organised an IT literacy programme for the pupils. Later, a telecentre was established, with Internet connection via VSAT satellite connection.
The approach		This is a research project run by academics, but with close involvement and participation by the resident community. The researchers spent a long time getting to know the community, and vice versa, and adopted participatory action research (PAR) methods to help define a development agenda before ICTs were introduced. The schools was deliberately chosen as the first benefactor as the Government of Malaysia was promoting a "Smart School" concept at the time which focuses heavily on the use of ICTs for education and administration in schools. Additionally, education in general and the school in particular are strong features in Kelabit culture.
Results		Both the primary and lower secondary schools are equipped with computer laboratories and Internet access. The community telecentre is functional, enabling email exchanges and web browsing. A development agenda has been agreed with the community for implementation. Priorities include e-commerce for Bario rice (a delicacy) and community-based tourism associated with handicraft trade.
	What has worked	Close association between the team and the community, manifested in part by the local project steering committee, consisting of community leaders. The use of PAR as a methodological guide, as well as its extension to incorporate the use of ICTs.
Lessons	What has not worked	The IT literacy programme in the school was in English, which was an inhibitor to learning. It is being re-written in Bahasa Melayu. Some of the teaching and learning software borrowed from the Smart School project failed to outperform traditional teaching methods.

E-Bario

ICT Policy	Development Strategy	Local Access
Towards community development	Clearly articulated by the community	Shared via a telecentre. Challenging to install

Government as a user	Infrastructures	Methods
Not involved	VSAT, very local, remote	Participatory, action - oriented

Institutions	Specific Services	People
Not at the beginning	Slow to develop	Acceptance but no data of impact

Commentary
Government involvement and institutional participation could enhance services. Impact assessment would be helpful.

Case Study 2		Village Information Shops, Pondicherry, India
		MS Swaminathan Research Foundation, India
Reference		http://www.mssrf.org/informationvillage/informationvillage.html
Why is it interesting?		The installation consists of ten villages networked within a hybrid wired and wireless network of public telecentres, consisting of PCs, telephones, VHF duplex radio devices and email connectivity through dial-up telephone lines, that provides voice and data transfer. Initial social surveys uncovered a highly detailed picture of the nature of poverty within the villages, which enabled the definition of a meticulous programme for information provision targeting improved well-being. The contribution of local volunteers has been instrumental in the acceptance of the centres, as well as the principles on which centres are established; community ownership, as a development tool, not a technology demonstrator, and not associated with just one group or caste. In-built gender sensitivity has also been instrumental, and the team has implemented an extensive set of information systems that address a wide range of development issues. The project has generated some remarkable development successes that are widely quoted.
The approach		A research project with extensive application of Participatory Rural Appraisal techniques. Formal agreements between the project and the community that lay out certain conditions under which centres will be established, e.g. gender and caste equity.
Results		A considerable array of success stories has emerged (e.g. see http://www.mssrf.org/informationvillage/pantlegmissionreport.html). Community benefits range from employment opportunities, local entrepreneurial development, health, education, fishing and agriculture support, government entitlements. Many were unexpected outcomes that emerged from newly found empowerment and local activism.
Lessons	What has worked	PAR as a means of engaging with the community and developing relevant information supplies. Insistence on equity, gender and caste, has directed benefits to ultra-poor. Creative deployment of a range of technologies.
	What has not worked	Sustainability, especially financial sustainability has taken a back seat. The centres generate funds, but the project is driven by the need to demonstrate social viability. Scaling up results will be a challenge.

Village Information Shops, Pondicherry, India

ICT Policy	Development Strategy	Local Access
To reach the un-reached	Poverty alleviation	Networked telecentres with an information hub

Government as a user	Infrastructures	Methods
Not involved	Physical-mix of wireless and land lines. Information-multiple databases	Participatory, action - oriented

Institutions	Specific Services	People
Low involvement	Range of available information made locally accessible.	Tangible benefits, focus on disadvantaged

Commentary
Government and institutional involvement would probably extend and intensify benefits.

Case Study 3		Thandarai Telecentre, Pondicherry, India
		Foundation Of Occupational Development, India
Reference		http://www.xlweb.com/food/index.htm
Why is it interesting?		The village of Thandarai in the Union Territory of Pondicherry formerly earned a living from the collection of snakes in the surrounding bush country and the sale of their skins. Environmentalists were alerted to the possible extinction of the local snake species. A UK NGO, Womankind Worldwide, discovered that the village inhabitants had considerable knowledge of the local herbs; one shepherd youngster could identify 360 separate species of herbs and knew how to use them to treat their sheep for a variety of ailments. The village established a telecentre and, with connectivity support from FOOD, used it to learn how to package and market the herbs that they found in the surrounding countryside. FOOD's operations have built-in sustainability, due to the entrepreneurial approach adopted by the organisation. The head of FOOD is a "venture socialist", which is a way of describing the organisation's business-like approach to its mission of creating employment opportunities through the inventive deployment of contemporary ICTs among communities that possess few other technologies.
The approach		A consortium of NGOs effectively re-engineered the village livelihood, using ICTs as a means to help them.
Results		The village now has several buildings that contain the telecentre with a prodigious library on herbs and a burgeoning herbal processing centre. Around 300 women from the surrounding district are engaged in the herb preparation process, and there is a concerted effort under way to record the local knowledge about herbs, from which a book is being planned. The telecentre service was instrumental in sensitising the villagers to the value of their knowledge and in stimulating them towards using it as a means of obtaining their livelihood, as well as saving the snakes from extinction.
Lessons	What has worked	Having a clear development strategy from the outset, well grounded within a business and environmental case that matched a local need with a local opportunity. Creative application of wireless, radio, connectivity in a relatively remote location.
	What has not worked	The telecentre is fully focused on the needs of the herb production and marketing business and no other development activist has come along to mobilise the community into using it for other development opportunities, such as health and education.

Thandarai Telecentre, Pondicherry, India

ICT Policy	Development Strategy	Local Access
Focused on a single application	Embedded within community livelihood strategy	Shared

Government as a user	Infrastructures	Methods
Not involved	Wireless link	Prompts from outside agencies

Institutions	Specific Services	People
Not involved	Limited focus on one livelihood strategy	All working members of the community

Commentary

A wider range of applications, possibly involving institutions and/or government, could increase the range of benefits.

Case Study 4		Multipurpose Community Telecentres, Philippines
		Philippine Council for Health Research and Development
Reference		http://www.barangay-mct.org/about.html
Why is it interesting?		This is a pilot project run by the Philippines government to set up four Multipurpose Community Telecentres (MCTs) in rural villages in Mindanao. Starting in 1999, the project has as its objective to "set up an Internet-linked multipurpose community telecentre in four barangays (villages) to democratise access to people and information in health, education, agriculture, and rural enterprise development. Equally, the project aims to build information resources in partner organizations that are geared for rural communities; as well, to develop the communities' capacity to build their own indigenous information." Implementation is by the Philippines Council for Health Research and Development (PCHRD), under the Department of Science and Technology (DOST). PCHRD has a track record of implementing information systems. The MCTs contain two computers, which are hooked up to the Internet, video facilities, a public address system, educational tapes and interactive CD-ROMS. The outcome is expected to lead into a nation wide implementation involving potentially 44,000 villages.
The approach		Essentially a top down approach to an experiment in community development with ICTs, with a government agency co-ordinating national bodies, local line agencies and the communities.
Results		By October 2001, the DOST regional director characterised the MCTs as "entertainment centres for the local folks, a place where people can send e-mail to relatives abroad, and a learning centre for teachers." Communities have not progressed beyond surface adoption of the technology, mostly using it for amusing but fairly trivial applications.
Lessons	What has worked	A substantial array of institutions has committed to assist the project in the delivery of information to the communities. The project has been able to recruit significant numbers of local volunteers to operate the MCTs.
	What has not worked	Much of the information that has been made available is of doubtful value in terms of the immediate needs of the communities. Information providers do not seem to have any direct contact with the communities. As a top-down exercise, the project doesn't seem to have engaged too closely with the communities. Arrangements for delivering connectivity in one location were held for two years up by a dispute between the national carrier and a private supplier, despite having the Department of Transportation and Communication on the team.

Multipurpose Community Telecentres, Philippines

ICT Policy	Development Strategy	Local Access
Local development	Not clearly articulated	Multipurpose telecentres

Government as a user	Infrastructures	Methods
Co-ordinating institutions	Based on fragile local telephony	Top-down with consultation and collaboration, less than participation.

Institutions	Specific Services	People
Mobilised for information provision, in a static format	General information provision	Surface adoption, limited impact

Commentary

Closer engagement with the community to mobilise information seeking and focused implementation of specific services would yield deeper impacts.

Case Study 5		Internet Centres, Mongolia
		Mongolia's Internet and Information Centre
Reference		http://www.intermedee.org.mn/pantleg/
Why is it interesting?		The Mongolian Foundation for Open Society (MFOS), supported by the Soros Foundation, UNDP and IDRC, has sponsored Mongolia's Internet and Information Centre to establish two Internet centres in small town locations in Mongolia. MFOS, as a non-profit, non-partisan, non-religious organization dedicated to promoting the development of democratic civil society in Mongolia, assisted the Internet Centre in helping Mongolian NGOs set up web sites and make good use of ICTs. The Internet, civil society, democracy and the concept of NGOs are all relatively new to Mongolia. According to its web site, the foundation places greatest emphasis on projects that have the potential to make long-term improvements in the openness, transparency, and accountability of key sectors and systems of Mongolia's civil society, that promote the active participation of citizens in society, and that encourage tolerance and pluralism.
The approach		The two centres, in Choibalsan and Erdenet, were established with support from MFOS, run by the Internet Centre and have been operating in a mix of for-profit and social-responsibility modes of operation. They provide public access to computers and the Internet, for which they charge, although school pupils have subsidised access. Connectivity is achieved via VSAT satellite connection. In Ulan Batar, the Centre conducted a survey of 67 NGOs to help develop and improve its services.
Results		The Internet Centres have secured support from local organisations, a local mine in one case, and the local government in the other. The provision of computer training has been a priority, with a focus on government staff and teachers, school pupils and local NGOs, achieving fairly widespread awareness.
Lessons	What has worked	The early adoption of a business model, within the overall support from the agencies, has fostered a focus on financial sustainability. Community support is strong and effective. Training and awareness raising, at least of ICTs, seems has been effective.
	What has not worked	The absence of pro-active community outreach has not fostered a community development, problem oriented service. Given the focus on NGOs and the development of civil society in Mongolia, it's hard to assess the extent of achieving their goals. There was a bit of a technology cult and in one case the location of the centre, on the first floor of a hotel, inhibited public access

Internet Centres, Mongolia

ICT Policy	Development Strategy	Local Access
Geographic diffusion	Foster open society, strengthen civil society	Internet centres

Government as a user	Infrastructures	Methods
Not especially	Information-local information seeking and training. Physical-VSAT	Outreach directed at NGOs.

Institutions	Specific Services	People
Local government participation	No definite focus	Unclear benefits beyond facilitated access

Commentary

Closer focus on institutions and specific services would increase benefits. Participatory community engagement would help.

Case Study 6		Keltron Information Kiosks, Kerala, India
		Kerala State Electronics Development Corporation Ltd., Thiruvananthapuram, Kerala, India
Reference		http://www.keltron.org/prerel.html# SOFT%20LAUNCH%20OF%20E-GOVERNANCE%20SERVICES
Why is it interesting?		Keltron Corporation is wholly owned by the Kerala state government, but operates as a separate company. They have developed a prototype Community Information Kiosk, *e-sringhala*, for providing e-government services to the public. The kiosks have been developed following the model of E-seva in Andhra Pradesh and Gyan dooth in Madhya Pradesh. They provide information on various schemes, downloading of forms for applying for government support, incentives, and subsidies, and on-line submission of application forms. There are also modules for counselling farmers on agricultural practices, as well as data on the state census and other electoral data. The *e-sringhala* Kiosks are being set up by Keltron in partnership with local Panchayats and other local bodies. Private participation is envisaged and the public will be charged a nominal fee when the kiosks are fully functional. The Thiruvananthapuram Kiosk operates a 64kbps leased line with 20 terminals, 12 of which are connected to the internet. The centre provides public internet access to around 50 people daily, charges Rs.25 per hour and has daily revenues around Rs. 1,400. Trained staff are on hand to provide assistance.
The approach		*E-sringhala* is a government initiative that is being implemented by a wholly-owned state corporation, an arrangement that draws on the flexibility of a highly autonomous for-profit organisation combined with the advantages of access to e-government applications that it can readily implement. The scheme for public franchising of the Kiosks encourages local governments to participate in setting up centres, but it is also intended to draw in the private sector.
Results		Pilot Kiosks are already serving the public with simple e-government information systems and services and access to government databases. Government departments have been alerted to the potential for improving their dealings with the public through the demonstration effect of the early Kiosks. Existing Kiosks are poised to implement community-based information systems.
Lessons	What has worked	The public-private partnership has been instrumental in establishing e-government in Kerala, and looks to set to facilitate a statewide roll–out of public access centres capable of generating income for local investors.
	What has not worked	It is uncertain the ultra-poor will be in a position to benefit from the Kiosks without deliberate programmes that will see their needs represented in future planning and roll-out of further Kiosks.

Keltron Information Kiosks, Kerala, India

ICT Policy	Development Strategy	Local Access
E-government, citizen services	Government services	Public-private partnerships in telecentres

Government as a user	Infrastructures	Methods
Main driver	Physical-local telephone network. Information-based on government databases and services	Promote local investment, but unspecified community outreach

Institutions	Specific Services	People
Government departments	Government services	Benefits are unclear yet, expected broad-based.

Commentary

With government as the initiator, but in local partnerships, wider institutional participation could yield wider benefits.

Case Study 7		**Samaikya Agritech Support Centres, Andhra Pradesh, India**
		Samaikya Agritech P. Ltd.
Reference		
Why is it interesting?		Samaikya Agritech P. Ltd was incorporated in 1999 and started operations in June 2000. Samaikya means "coming together for a good cause" in Telugu, the language of Andhra Pradesh. The company operates 18 "Agritech Centres" in five districts in Andhra Pradesh. The centres provide agricultural support services to farmers, on a commercial basis. Samaikya's Agritech Centres are permanently manned by qualified agricultural graduates called Agricultural Technical Officers (ATO) and are equipped with computers linked to the head office in Hyderabad, through a modem to modem telephone connection. Farmers register with centres and pay a fee per growing season (two or three seasons per year) of Rs.150 (about US$3) per acre/crop. A farmer registers by the field and receives support services that are specific to the fields registered. Specialists with more experience and qualifications at the headquarters organise and co-ordinate replies to queries, which are typically transmitted back to the centre within 24 hours.
The approach		Samaikya Agritech P. Ltd has invested about five million rupees (US$106,000) in the agri-centre programme. The company expects the programme to finance itself within in the next two years (2002/3). The programme was conceived as a self-financing, profit-making activity from the outset. Its purpose is to maintain a sustained service of agricultural assistance to farmers. Prior to setting up a centre, Samaikya performs a survey of local farming and cultivation practices and to ascertain the political and cultural context of the potential centre. It conducts a pre-launch programme to familiarise farmers with the services.
Results		At the end of 2001, the company had slightly more than 1,200 registered farmers.
Lessons	What has worked	By remaining in operation, Samaikya will demonstrate that development information can be sold and that a potential source of revenue exists for telecentres that provide information services that its customers are prepared to pay for. As a commercial concern, Samaikya respects the demands of its customers. Transactions are conducted on a supplier to customer basis because the company knows that if its customers are not satisfied with its service then they will discontinue their patronage. The exchange sits in marked contrast to a typical exchange with a government official in India.
	What has not worked	One centre closed down within three months of opening as no farmers registered for the service. This was due to the pressure placed on them by local marketeers, financiers and suppliers of inputs who perceived a threat to their livelihoods from the competing Samaikya services. Farmers were told that any who registered with the centre would not receive credit or essential supplies.

Samaikya Agritech Support Centres, Andhra Pradesh, India

ICT Policy	Development Strategy	Local Access
Local networking	Agriculture information	Company run information centre, not for public access

Government as a user	Infrastructures	Methods
Not involved	Physical-dial up modems	Local agricultural agents as infomediaries

Institutions	Specific Services	People
Indirectly via the company's network of information providers	Dedicated to agriculture support	Farmers receive benefits.

Commentary

With a sustainable model, the centres could be opened up to public access and a wider audience with multiple services, probably as a money-making proposition.

Case Study 8		Nepal Telecentre Pilot Project
		His Majesty's Government of Nepal and UNDP
Reference		
Why is it interesting?		The project is an expression of the government's policy for rural development through connectivity and intends to implement 15 pilot rural development telecentres. Mechanisms will be installed alongside the technology to ensure communities are able to articulate and prioritise their own information requirements and to implement necessary strategies in order to satisfy those requirements. Arising from the pilots, suitable mechanisms and policy interventions will be designed for replicating successes and for achieving a national rollout of rural development telecentres, possibly reaching 1,000 villages. The government has announced priority areas for information provision, including agricultural information, distance learning, tele-medicine, productive economic activities, environment protection and natural disaster mitigation. But the project will take steps to ensure that recipient communities will be able to define their own information requirements and priorities based o their own development aspirations. Ultimately, the government intends to partner with private sector organisations in replicating telecentres, and the pilot will be provide a test-bed for experimenting with alternative models of achieving this.
The approach		As ICTs are most effective when integrated with already successful development initiatives, close alliances are being forged between the pilot project and such programmes so that information systems will be implemented that support their aims. This is a UNDP funded activity under national execution.
Results		The project is only just formulated.
Lessons	What has worked	Starting with the development of a national policy for ICTs, which was produced through a highly local and participatory process, and which specifically targeted rural connectivity, the government has increasingly focused attention on the modality of achieving rural development through ICTs by tracking trends in neighbouring countries and at the same time acknowledging the critical need for locally specific knowledge as to how that can be achieved. The pilot seems a useful forum in which to understand what it will take to achieve a successful national programme.
	What has not worked	There has been three years deliberation on setting up pilot rural telecentres, depicting, perhaps, undue caution or reluctance to experiment.

Nepal Telecentre Pilot Project

ICT Policy	Development Strategy	Local Access
National policy to diffuse and infuse ICTs	Poverty alleviation	Telecentres, eventually in franchised network

Government as a user	Infrastructures	Methods
Driving implementations and seeding applications	Physical-fragile telephony, probably unsuitable.	Top-down, but accompanied by community engagement.

Institutions	Specific Services	People
Limited to government so far	General areas combine with local requirements	Too early, but pro-poor focus

Commentary

Local entrepreneurial partnerships will foster sustainability. Government influence can promote institutional participation. Replicable approaches to local innovations required.

Case Study 9		Nepal SAPAP Telecentre Project
		South Asia Poverty Alleviation Programme (SAPAP) – Nepal Component
Reference		http://www.sapap.net/country/nepal.htm
Why is it interesting?		SAPAP has been conducting social mobilisation for community development in the Syangja district in Nepal since 1994, involving 22 Village Development Committees (VDCs). The programme has generated substantial development outcomes for the communities involved, but they are now hitting a ceiling in their development activities. It is proposed to establish four pilot telecentres in villages there as it considered that considerable potential exists for intensifying the outcomes from social mobilisation through the use of ICTs, which will provide an engine of additional growth for the rural communities under the programme. Significantly, by 1997, the process of social mobilisation had become so successful that it was being extended through other UNDP programmes throughout Nepal, within 70 districts out of the total 76, covering 380,000 households in more than 600 VDCs. As previous experience indicates a link between mobilised communities and success with ICTs, the SAPAP pilot project has important implications for the national project in Nepal, for other SAPAP components in the other countries and for ICTs in rural communities generally.
The approach		The project was formulated with the purpose of using ICTs to deepen the socio-economic impact of the social mobilisation process by intensifying the empowerment process already in place within the recipient communities. After the development objective was agreed, an information plan was formulated from detailed interactions with village organisations The technology plan cane after that.
Results		Not yet, still in project formulation
	What has worked	During pre-planning, the team made a point of visiting as many as possible of the VDCs that might be involved, visiting 15 out of the 22 in the programme. Interactions with village organisations revealed several factors relating to the potential for ICT-induced development and the probability of successful outcomes.
Lessons	What has not worked	ICTs have moved into the forefront of development thought since the start of SAPAP, and it's not clear that the programme has been capable of adapting readily to changing circumstances and opportunities. ICTs might have been introduced earlier, and their impact better understood before the closing of SAPAP at the end of 2002.

Nepal SAPAP Telecentre Project

ICT Policy	Development Strategy	Local Access
Local networking	Local empowerment to intensify existing gains	Telecentres

Government as a user	Infrastructures	Methods
Local government agencies	Physical-fragile telephony, supplemented with VSAT. Information-local databases	Participatory

Institutions	Specific Services	People
Methodological support, local government offices	Not yet, but community driven	Not yet, but focuses on equality

Commentary

Extended institutional support will yield wide range of services.

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