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Processes and appropriation of ICT in human development in rural India: A Theoretical approach

By Atanu Garai ¹

Since late 1990s, ICT deployments in various rural pockets of India and elsewhere have demonstrated their positive impact on the lives of millions of rural inhabitants. Using both traditional and modern media, such ICT deployments equip the rural communities with appropriate information and communication tools that enable them to elicit, capture, amplify, document, share and transmit knowledge and run applications, leading to social, cultural and economic empowerment in the rural society. Such functionalities quicken the developmental interventions at the grassroots, by establishing communications links within development agencies across local, provincial and national levels.² Today, ICT applications permeate all human activities - education, health, agriculture, community development, livelihoods activities, entrepreneurship development, governance, emergencies, to name a few. Interventions across these sectors lead to prosperity – social, economic, cultural and political at large – that entails wider ramifications for human development at large. Such developmental promises of ICT encourage us; firstly, to elaborate the role knowledge plays in human development to explore the critical interlinkages of knowledge with various facets of human development. While underscoring the need for adopting a knowledge-infused human development approach, we argue, then, how new technologies, such as ICT, facilitate in infusing knowledge in various human functionings. As the key objective of knowledge infusion is to engage human beings in achieving the goals of sustainable development, we then proceed to examine how an ICT mediation assists, or at least promises to assist, in removing the barriers in furthering the sustainable human development agenda. The assessment helps us further in identifying specific development interventions as being undertaken in rural India, where an ICT mediation will not only be helpful in accelerating such processes, but also be inevitable to fulfil the ideals of sustainable human development.

I. Dimensions of knowledge

Knowledge is an integral component of human development. Human beings transfer, imbibe, inherit, adopt, practise, nurture, share and develop numerous kinds of knowledge cultures

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² Grace et al. (2001); Castells (1999).

throughout their lifecycles. The first communication of knowledge is augmented by mothers who teach their children how to utter words, how to eat, how to walk and how to grow up. The ability to communicate using a language is perhaps the most fundamental aspect of knowledge culture. Speaking, writing and reading are, thus, the cornerstones of knowledge culture for any society – they are the basic human capabilities for individuals to participate in learning; in social, cultural and economic activities; and in individual and collective decision-making. The term 'knowledge' evokes variegated connotations as semantics of knowledge varies across academic disciplines - in schools of thoughts belonging to economics, information science, management, philosophy, psychology, sociology, etc. Knowledge exists in multiple forms, communicated in variegated ways – however, at the outset, it is important to understand the knowledge needs that lead to sustainable development of local communities. One form of knowledge already persists within local communities – community workers recognise this form of knowledge as 'local knowledge', termed as 'indigenous knowledge' in scientific literature.

For several decades now, international development circles focus their attention on the issue of 'local knowledge' as evident in developmental interventions adopted by the UN system and bi-lateral and multi-lateral agencies, among others – through instruments like poverty reduction strategy papers, aid policies.³ Local knowledge is often reflected and elicited through agency participation in interventions made by development agencies or by local bodies formed within the communities. It is noted that the local knowledge is often conceptualised or termed as 'indigenous knowledge' in scientific literature, and exploited mainly by economists, environmentalists and sociologists to connote a specific knowledge set dealing largely with dynamic interaction between man and nature. The following definitions of indigenous knowledge provide an understanding of the ideology and its practical relationship with 'local knowledge', a term that is more used in this paper:

Indigenous knowledge – the local knowledge that is unique to a given culture or society – contrasts with the international knowledge system which is generated through the global network of universities and research institutes.⁴

The unique, traditional, local knowledge existing within and developed around specific conditions of women and men indigenous to a particular geographic area.⁵

Indigenous knowledge is the knowledge that people in a given community have developed over time, and continue to develop. It is: based on experience, often tested over centuries of use, adapted to local culture and environment, and dynamic and changing.⁶

Indigenous knowledge rubric is multi-dimensional; current development practices, nevertheless, relate indigenous knowledge to natural resource management, a domain that is

³ See, World Bank. <http://www.worldbank.org/afr/ik/>

⁴ Warren, D; Slikerveer, L. & Brokensha, D. (1995: xv).

⁵ Grenier, Louise. (1998: 1)

⁶ IIRR (1966: 7).

influenced immensely by socio-cultural environs.⁷ For the very susceptibility to surrounding socio-cultural precincts, indigenous knowledge exhibits variations in its evolution, dissemination and cultivation to that of scientific knowledge. Sillitoe, Dixon and Barr (2000) examine the differences in knowledge culture that exist in these two domains. (Table 1) Such differences necessitate appropriation of conventional knowledge systems produced by scientific practices to the locale social, economic and cultural milieu. Development depends on the spread of scientific knowledge and adoption of scientific knowledge into traditional knowledge system and vice versa is a process that is evolutionary, intricate and dynamic in nature. An instance of such an interaction between indigenous and scientific knowledge is reflected in the agricultural extension services where agriculturalists produce advanced farming techniques in the agricultural research institutes, which, then, transferred to farmers through extension services network. Development, therefore, depends on citizen's ability to adapt scientific knowledge and harmonise it with his or her own knowledge for practising better way of living.

Table 1: Indigenous knowledge compared with science

<i>Features</i>	<i>Indigenous</i>	<i>Scientific</i>
Relationship	Subordinate	Dominant
Communication	Oral	Literate
	Teaching through doing	Didactic
Dominant Mode of thought	Intuitive	Analytical
Characteristics	Holistic	Reductionist
	Subjective	Objective
	Experiential	Positivist

Source: Sillitoe, Dixon and Barr (2000: 16).⁸

Since citizens often lack the means to apply knowledge in their functionings, for various social, economic and cultural constraints, development workers need to recognise knowledge transfer processes for building knowledge capacities among local communities. Verrier Elwin who spent many years of his life with the Gond tribal communities in the Central India during mid-1930s mentioned the need for community development workers to be knowledge savvy long ago. Either in 1933, or in 1934, Elwin drafted the constitution, incorporating a set of common principles, of Gond Seva Mondal, reproduced in Guha (1999), which states, "Knowledge, art, music, etc. are not to be despised by the lover of the poor. Knowledge, by purifying and enlarging the mind, actually equips him with the means of better service. Members will be encouraged to make research in the customs and ancient traditions of the people, and to give some time at least daily to general study."⁹ The principles adopted by

⁷ For a detailed discussion on this crosscutting influencing pattern between socio-cultural traditions and indigenous knowledge, see, Antweiler, C. (1998); Warren, D; Slikerveer, L. & Brokensha, D. (1995).

⁸ Sillitoe, P., Dixon, P-J. and Barr, J.J.F. (2000: 16).

⁹ Guha, Ramchandra (2005: 334-339).

Gond Seva Mondal in the British India are still prevalent today and yet to be implemented in practice. Today, the availability of ICT leads us to practise the Gond Seva Mondal principles in a more practical and tangible way than in 1930s.

II. Dimensions of sustainable human development

Since 1990, with the launch of first Human Development Report, UNDP champions measuring the progress of human development – locally, nationally, regionally and globally.¹⁰ In the Foreword of 1990 HDR, Draper III (1990) observes, “We are rediscovering the essential truth that people must be at the centre of all development. The purpose of development is to offer people more options. One of their options is access to income – not as an end in itself but as a means to acquiring human well-being. Nevertheless, there are other options as well, including long life, knowledge, political freedom, personal scrutiny, community participation and guaranteed human rights. People cannot be reduced to single dimension as economic creatures. What makes them and the study of the development process fascinating is the entire spectrum through which human capabilities are expanded and utilised.”¹¹ Similarly, Haq notes, “The basic purpose of development is to enlarge people's choices. In principle, these choices can be infinite and can change over time. People often value achievements that do not show up at all, or not immediately, in income or growth figures: greater access to knowledge, better nutrition and health services, more secure livelihoods, security against crime and physical violence, satisfying leisure hours, political and cultural freedoms and sense of participation in community activities. The objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives.”¹² Human development quintessentially entails not only economic prosperity, but also leading a healthy and learned life while enjoying guaranteed human rights, participatory rights and adequate social, cultural and political freedom. The need for expansion and utilisation of human capabilities are also underscored in the human development paradigm.

The 1990 HDR also offers a definition of human development: “Human development is a process of enlarging people's choices. In principle, these choices can be infinite, and change over time. But at all levels of development, the three essential ones are for people to lead a long and healthy life, to acquire knowledge and to have access to resources needed for a decent standard of living. If these essential choices are not available, many other opportunities remain inaccessible. But human development does not end there. Additional choices, highly valued by many people, range from political, economic and social freedom to opportunities for being creative and productive, and enjoying personal self-respect and guaranteed human rights. Human development has two sides: the formation of human capabilities – such as improved health, knowledge and skills – and the use people make of their acquired capabilities – for leisure, productive purposes or being active in cultural, social and political affairs. If the scales of human development do not finely balance the two sides, considerable human frustration may result. According to this concept of human development, income is clearly only one option that people would like to have, albeit an important one. But

¹⁰ For a complete list of local, national, regional and global human development report published by UNDP, see <http://hdr.undp.org>

¹¹ UNDP (1990).

¹² HDR Website.

it is not the sum total of their lives. Development must, therefore, be more than just the expansion of income and wealth. Its focus must be people.”¹³

Expanding human capabilities, thus, forms the cornerstone of the human development approach. The genesis of such an approach, however, can be found in the 'capability approach' proposed by Sen (1982, 1985, 1987, 1999a)¹⁴ and developed by others, notably Nussbaum (1993, 1995, 2000).¹⁵ The 'capability approach' views economic growth only as the 'means' rather than the 'ends' to human well-being, while expanding people's capabilities is seen as the 'ends'. Drèze and Sen (2002) opine that, “One way of seeing development is in terms of the expansion of the real freedoms that the citizens enjoy to pursue the objectives they have reason to value, and in this sense the expansion of human capability can be, broadly, seen as the central feature of the process of development. The 'capability' of a person is a concept that has distinctly Aristotelian roots. The life of a person can be seen as a sequence of things the person does, or states of being he or she achieves, and these constitute a collection of 'functionalities' – doing or beings the person achieves. 'Capability' refers to the alternative combinations of functionings from which a person can choose. Thus, the notion of capability is essentially one of freedom – the range of options a person has in deciding what kind of life to lead. Poverty of a life, in this view, lies not merely in the impoverished state in which the person actually lives, but also in the lack of real opportunity – given by social constraints as well as personal circumstances – to choose other types living. Even the relevance of low incomes, meagre possessions, and other aspects of what are standardly seen as economic poverty relates ultimately to their role in curtailing capabilities (that is, their role in severely restricting the choices people have to lead valuable and valued lives). Poverty is, thus, ultimately a matter of 'capability deprivation,' and note has to be taken of that basic connection not just at the conceptual level, but also in economic investigations or in social and political analyses.”¹⁶ According to Sen (1999b), 'capability' refers “to the alternative combinations of functionings that are feasible for her to achieve. Capability is thus a kind of freedom: the substantive freedom to achieve alternative functioning combinations (or, less formally put, the freedom to achieve various lifestyles).”¹⁷ It emerges that the 'capability approach' argues for a view of development - holistic and humane in nature - by introducing human choices at the first place, stressing the capacity of poor people to define their own development priorities and goals, whereby outside agents should only 'begin' to work with the community, once it has developed its own 'development plan' and identified its specific needs for outside support. Human choices in 'beings and doings', termed, as 'functionings' are the means for expanding and utilising human capabilities.

In furthering human capabilities, societies more often than not tend to exploit natural resources – water, soil, air, forest, fossil fuel and biodiversity - in a rate faster than the nature can regenerate them for mankind. Preservation of natural resources as essential instruments of sustainable development has taken the centrality in modern development discourse soon

¹³ UNDP (1990: 10).

¹⁴ Sen, Amartya (1982, 1985, 1987, 1999a).

¹⁵ Nussbaum, M and A. Sen, Eds. (1993); Nussbaum, M and J. Glover, Eds. (1995); Nussbaum, M (2000).

¹⁶ Dreze and Sen (2002: 35-36).

¹⁷ Sen, Amartya. (1999b: 75).

after the Second World War. Concern over ever-increasing environmental degradation caused by adverse natural exploitation influenced development thinkers to introduce the concept of 'sustainable human development'. Though appropriate policies and regulatory mechanisms to ensure environmental sustainability have started to evolve at local levels only in 1970s, ensuring environmental sustainability as a pious goal of development was, however, recognised globally long back. Carson's (1962) research was first to suggest the destructive effects on animal species and human health caused by catastrophic level of agricultural pesticide usage, acted as an instant eye-opener to the international community.¹⁸ Subsequently, Ehrlich (1968),¹⁹ in 'Population Bomb,' explored the interconnectedness between human population, resource exploitation and the environment; in June 1971, a panel of experts meeting in Founex (Switzerland) called for the integration of environment and development strategies; Dubos and Ward (1971)²⁰ published '*Only one earth*' sensitising the need to adopt a shared concern for the future generations by ensuring natural sustainability. 1972 witnessed the genesis of United Nations Environment Programme (UNEP) in the United Nations Conference on Human Environment in Stockholm (Sweden), leading to the establishment of many national environment protection agencies. In the same year, Club of Rome published the controversial, yet alarming, study '*Limits to Growth*' that predicts of dire consequences unless the growth graph swings down.²¹ Protests by community women against state-sponsored deforestation and environmental degradation in a rural hamlet in the state of Uttar Pradesh (now, Uttaranchal) in India caught the attention of the world.²² The incidence of 1973 for the first time, helped policy-makers realise the need for community participation in forestry and environmental issues. In 1974, a study by Rowland and Molina (1974) showed that continued use of CFC gases at an unaltered rate would rapidly deplete ozone layer that protects human beings from unhealthy radiations.²³

Poverty, population pressure, social inequity and the terms of trade are identified as prime agents of environmental degradation in the 'World Conservation Strategy', released by IUCN in 1980.²⁴ In the same year, Brandt Report was also published – the Independent Commission on International Development recognised forging stronger economic relationship between North and South as the key to development. The landmark Report of the World Commission on Environment and Development – *Our Common Future*, the Brundtland Report – popularised the term 'sustainable development' while exploring inevitable interconnectedness among social, economic, cultural and environmental issues. According to the Brundtland Report (1987), the sustainability of development must satisfy the condition to fulfil “the needs of the present without compromising the ability of future generations to meet their own needs”.²⁵ In 1992, Earth Summit, the UN Conference on Environment and Development, held in Rio de Janeiro, adopted Agenda 21, the Convention on Biological Diversity, the Framework Convention on Climate Change, the Rio Declaration, and non-binding Forest Principles as international instruments on environmental protection and sustainable

¹⁸ Carson, Rachel (1962).

¹⁹ Ehrlich, Paul R. (1968).

²⁰ Dubos, R. and Barbara W. (1971)

²¹ Club of Rome (1972).

²² Guha, Ramchandra (2005).

²³ Rowland and Molina (1974).

²⁴ IUCN (1980).

²⁵ World Commission on Environment and Development (1987).

development. The first World Conference on Social Development in 1995 in Copenhagen (Denmark) provided a platform for the international community to commit to eradicate absolute poverty. In 2002, the World Summit on Sustainable Development attracted highest level of political participation for assessing the global change since UNCED in 1992 and renew their commitments towards environmentally sustainable development. The concept of sustainable human development emulates the growing concerns pronounced throughout these years; and in 1994, HDR started accommodating 'sustainability' in benchmarking progress made by societies in furthering human development.

III. Dimensions of human capabilities

So, if expanding human capabilities are earmarked as the primary objectives of socio-economic development, what are the central human capabilities that individuals and institutions need to preserve, nurture and practice for their holistic and humane development? Alkire (2002) reviews various literatures that pronounce a wide variety of human capabilities,²⁶ as Sen remains incomplete in providing an operational framework to 'capability approach' for fundamental and pragmatic reasons.²⁷ In an attempt to define a basic set of human capabilities functionings, Alkire (2002) provides comparative analyses of different dimensions of human development founded by thinkers from different schools of thoughts.²⁸ Introspection in their propositions of basic human functionings reveals 'knowledge' imbibed within diverse gamut of human 'beings and doings'. To illustrate, basic human functionings proposed by Nussbaum (2000),²⁹ and Sen and Anand (1994) and Sen (1999) are presented in Box 1 and 2 respectively.

Despite the differences in human needs and functionings, a set of basic human well-being indicators of happiness and freedom emerges from the foregoing analyses. Being healthy is the first prerequisite for all human beings - reflected in longevity, infant and child mortality,

²⁶ Alkire, S (2002: 340).

²⁷ Alkire, S. (2002: 10); Agenda 21; Allardt, E. (1993: 88-94); Andrews, F M., Stephen B. Withey (1976); Argyle, Michael, and Maryanne Martin (1991); Braybrooke, D. (1987); Brentano, F (1973); Chambers, R. (1995); Cummins, R. A. (1996: 303-28); Davitt, T. E. (1968); Diener, Ed and Robert Biswas-Diener (2000); Doyal, L. and Gough I (1993); Grisez, G., John Boyle and John Finnis (1987); Fromm, E. (1949); Galtung, J. (1980); Goulet, D. (1995); Griffin, J. (1996); Krech, D, R. S. Crutchfield and N. Livson. (1969); Lane, Robert E. (1969); Lasswell, H. D., and A. R. Holmberg (1969); Alkire (2002: 81); Max-Neef, Manfred. (1993); Murray, H. A. (1938); Myers, David G. and Ed Diener (1995); Narayan, Deepa et al. (2000); Nielson, Kai (1977); Nussbaum, M C (2000); Packard, Vance (1960); Qizilbash, Muzaffar (1996); Ramsay, Maureen (1992); Rawls, John (1971); Rokeach, Milton (1969); Ryff, Carol D. (1989); Schwartz, S. H. (1992); Sen, Amartya and S. Anand. (1994); Sen, Amartya (1999); Wilson, W. (1967);

²⁹ Nussbaum, Martha C. (2000).

preventable morbidity and nourishment; literacy serves as an indicator of educational attainment while per capita income is an indicator of economic attainment.

Box 1: Nussbaum: Central human functional capabilities

Life: Being able to live to the end of a human life of normal length; not dying prematurely, or before one's life is so reduced as to be not worth living.

Bodily health: Being able to have good health, including reproductive health; to be adequately nourished; to have adequate shelter.

Bodily integrity: Being able to move freely from place to place; having one's bodily boundaries treated as sovereign, i.e. being able to be secure against assault, including sexual assault, child sexual abuse, and domestic violence; having opportunities for sexual satisfaction and for choice in matters of reproduction.

Senses, imagination, thought: Being able to use the senses, to imagine, think, and reason – and to do these things in a 'truly human way', a way informed and cultivated by adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training. Being able to use imagination, and though in connection with experiencing and producing self-expressive works and events of one's choice, religious, literary, musical and so forth. Being able to use one's mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedom of religious exercise. Being able to search for the ultimate meaning of life in one's own way. Being able to have pleasurable experiences, and to avoid non-necessary pain.

Emotions: Being able to have attachments to things and persons outside ourselves; to love those who love and care for us, to grieve at their absence; in general, to love, to grieve, to experience longing, gratitude, and justified anger. Not having one's emotional development blighted by overwhelming fear and anxiety, or by traumatic events of abuse and neglect. (Supporting this capability means supporting forms of human association that can be shown to be crucial in their development).

Practical reason: Being able to form a conception of the good and to engage in critical reflection about the planning of one's own life. (This entails protection for the liberty of conscience.)

Affiliation (i) Being able to live for and towards others, to recognize and show concern for other human beings, to engage in various forms of social interaction; to be able to imagine the situation of another and to have compassion for that situation; to have the capability for both justice and friendship.) Protecting this capability means protecting institutions that constitute and nourish such forms of affiliation, and also protecting the freedoms of assembly and political speech.) (ii) Having the social bases of self-respect and non-humiliation; being able to be treated as a dignified being whose worth is equal to that of others. This entails, at a minimum, protections against discrimination on the basis of race, sex, religion, caste, ethnicity, or national origin.

Other species: Being able to live with concern for and in relation to animals, plants, and the world of nature.

Play: Being able to laugh, to play, to enjoy recreational activities.

Control over one's environment: (i) Political. Being able to participate effectively in political choices that govern one's life; having the right of political participation, protections of free speech and association. (ii) Material. Being able to hold property (both land and movable goods), not just formally but in terms of real opportunity; and having property rights on an equal basis with others; having the right to seek employment on an equal basis with others; having the freedom from unwarranted search and seizure. In work, being able to work as a human being, exercising practical reason and entering into mutual relationship of mutual recognition with other workers.

Source: Nussbaum (2000: 78-80).³⁰

³⁰ Nussbaum (2000: 78-80). Quoted in, Alkire (2002: 35).

Box 2: Basic features of well-being by Sen and Anand (1994); Types of freedom by Sen (1999).

Sen and Anand (1994) Basic features of well-being	Sen (1999) Five types of freedom
Longevity	Political freedom
Infant/ Child mortality	Economic facilities
Preventable morbidity	Social opportunities
Literacy	Transparency guarantees
Nourishment	Protective security
Personal liberty and freedom	

Source: Alkire (2002: 35).

IV. Dimensions of ICT

ICT stands for *information and communications technology* used both as singular and plural nouns. It is used almost synonymously with IT or *information technology*. The term IT (and ITES or *information technology enabled services*) is used more in business contexts and in Americas, whereas ICT is used in development parlance, and in Europe and Oceania. Various authors have attempted toward defining ICT - Drew and Foster (1994); Mansell and Silverstone (1996); Hamelink (1997); Duncombe and Heeks (1999); UN ECA (1999); Chowdhury (2000), among others. According to Drew and Foster (1994), "The term "information technology" embodies a convergence of interest between electronics, computing, and communications, all of which are leading to the rapid development of micro-electronics. These technologies are being utilized to restructure and reorganize the spheres of production, distribution, and circulation."³¹ Mansell and Silverstone (1996) observe that ICTs include electronic networks – embodying complex hardware and software - linked by a vast array of technical protocols.³² Hamelink (1997) classifies ICT according to five distinct functionalities: a) **Capturing technologies:** Input devices that collect and convert information into digital form. Such devices include keyboards, mice, trackballs, touch screens, voice recognition systems, bar code readers, image scanners and palm-size camcorders; b) **Storage technologies:** Devices to store and retrieve information in digital form. Among these are magnetic tapes, floppy disks, hard disks, RAM disks, optical disks (such as CD-ROMs), erasable disks and smart cards (credit-card sized cards with memory and processing capacity for financial transactions or medical data); c) **Processing technologies:** Creating the systems and applications software that is required for the performance of digital ICT; d) **Communications technologies:** Producing the devices, methods and networks to transmit information in digital form. They include digital broadcasting, integrated services digital networks, digital cellular networks, local area networks (LANs), wide area networks (WANs, such as the Internet), electronic bulletin boards, modems, transmission media such as fibre optics, cellular phones and fax machines,

³¹ Drew, E., and F. G. Foster, Eds. (1994).

³² Mansell, R. and R. Silverstone (1996).

and digital transmission technologies for mobile space communications (the new Low Earth Orbit satellite voice and data services); e) **Display technologies:** To create a variety of output devices for the display of digitised information. Such devices include display screens for computers, digital television sets with automatic picture adjustment, set-top boxes for video-on-demand, printers, digital video discs (which might replace CD-ROM drives and audio CD players), voice synthesizers and virtual reality helmets.³³

Duncombe and Heeks (1999) describe ICTs as an “electronic means of capturing, processing, storing and disseminating information”.³⁴ According to the United Nations Economic Commission for Africa, ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities.³⁵ Chowdhury (2000) writes that ICTs encompass technologies that can process different kinds of information (voice, video, audio, text and data) and facilitate different forms of communications among human agents, among humans and information systems, and among information systems.³⁶

V. Knowledge in sustainable human development paradigm

It is to be noted that Nussbaum’s (2000) definition of human capabilities and functionings entails enabling people’s access to and development of, certain assets and capitals – human, economic (or financial), natural and social. Nevertheless, the key question here remains that – how to enable people’s access to, and facilitate development of, such assets and capitals according to their own choices so that exploitation of such assets and capitals results into appropriate, yet optimum, outcome on their well-being leading them to a state of happiness and freedom. Considering that availability of a set of assets and capitals is limited in any given space and time, judicious appropriation and exploitation of such resources is key to local development. Judicious and sustainable, appropriation and exploitation of human, economic and financial, natural and social assets for local development, however, occurs only when responsible human agencies are equipped with the necessary knowledge of socially, economically and technologically locale-appropriated method to exploit the resources optimally to further human capabilities. ‘Knowledge’ or ‘access to knowledge’ as an enabling factor for human development has been recognised in the human development discourse from an early stage. In the context of ‘capability approach,’ defining knowledge is rarely attempted, though it is referred to as one of the key ingredients for effective human functioning, as documented by Alkire (2002).³⁷ Finnis (1980) in his list that contains ‘all the basic purposes of human action,’ puts - life, knowledge, play, aesthetic experience, sociability (friendship), practical reasonableness and religion.³⁸ Grisez, Boyle and Finnis (1987) describe ‘knowledge’ as something, which “human persons can know reality and

³³ Hamelink, Cees J. (1997: 9).

³⁴ Duncombe R. and R. Heeks (1999).

³⁵ Economic Commission for Africa (1999).

³⁶ Chowdhury, N. (2000).

³⁷ Alkire (2002).

³⁸ Grisez, Germain and Joseph Boyle and John Finnis (1987). Quoted in Alkire (2002: 48).

appreciate beauty and whatever intensely engages their capacities to know and to feel.”³⁹ If knowledge is recognised as a basic human functioning, how this functioning leads to fulfilling happiness and freedom? The foregoing discussion shows that knowledge, as a human functioning, empowers a human being to analyse and scrutinise existing situations to be able to choose better opportunities leading to enhancement of human capabilities. The term ‘knowledge’ is explicitly employed in the HDI – ‘knowledge’ is one of the three key components of human development, two others being longevity and standard of living. HDI measures knowledge by a combination of adult literacy (two-thirds weight) and mean years of schooling (one-third weight) and standard of living is measured by purchasing power, based on real GDP per capita adjusted for the local cost of living (purchasing power parity, or PPP). The term ‘knowledge’ is used as the basic capabilities deprivation in the HPI introduced in HDR 1997, containing three basic indicators and represented by:⁴⁰

S = *survival deprivation*: the expected incidence of mortality by age of 40 (at current age specific mortality rates)

K = deprivation of education and knowledge: percentage of people who are illiterate

E = economic deprivation: the mean of three sub-components: $\{(1/3) [h+w+n]\}$, where

H = percentage of population without healthcare

W = percentage of population without safe water

N = percentage of children who are undernourished

HDR, thus, characterises knowledge as an educational attainment. The term 'knowledge' in the context of human development discourse apparently evokes different connotations. We recognise that knowledge is intangible information objects, which are communicable in multiple forms through multiple carriers and capable of instigating, engaging, inspiring human agencies to take active or inactive actions. Though at times knowledge is applied as a substitute of the term ‘information’,⁴¹ they evoke different connotations. Wigand (1997) suggests that ‘information can be interpreted as purpose-oriented knowledge’.⁴² Acquiring knowledge, however, does not necessarily depend on other human capabilities such as reading or writing – acquiring knowledge as a basic human functioning is inherited - a child, for instance, learns to stay away from fire by experiencing the heat emanating from the fire. The illiterate old village woman, for instance, provides genealogy information to fellow villagers serving as the repository of collective memories for the village. The process of knowledge acquisition, sharing, reflecting is continuous and life-long for every human being – irrespective of his social, economic and cultural strata. However, educational attainment enables individuals in the acquisition, reflections and sharing of knowledge that can be applied for better ‘being or doing’. If knowledge is to energise human capabilities expansion, because it has the capacity to do so, knowledge objects needs to be learnt, adopted, nurtured, practised, shared and further cultivated in all aspects of human functionings. In a similar way, decision-making in judicious appropriation and sustainable exploitations of assets depends on knowledge. Being 'knowledgeable' by its very nature has been recognised as an end of human

³⁹ Grisez, Germain and Joseph Boyle and John Finnis (1987). Quoted in, Alkire (2002: 48).

⁴⁰ Quoted in Alkire (2002: 182).

⁴¹ Nonaka, I. And H. Takeuchi (1995).

⁴² Wigand, Rolf, T., A. Picot, et al. (1997). Quoted in, Yudong, Yang

development; however, the state of 'being knowledgeable' itself seen as a means for attaining the goals of human development.

VI. Infusing knowledge through ICT

While underlining the need for judicious appropriation and sustainable exploitation of assets for local development – such that it enables effective functioning of human capabilities – we have introduced the concept of ‘human agencies.’ As the concepts of ‘human agencies’ will be central to the discourse in this Chapter and elsewhere, it is worthwhile to illustrate the term. The term ‘human agencies’ refers to the capacities of human beings to make choices and to impose such choices on the world on a collective basis, usually through democratic means. While investigating the interoperability between human agency and development, Anand and Sen (1994) do not draw a boundary between personal agency and social institutions,⁴³ as they observed, “In analysing the complementarity between personal agency and social institutions, it is also important to note the different levels at which this complementarity works. Institutional changes themselves are dependent on human agency, even when the changes result from evolution rather than conscious selection”⁴⁴ For this discourse, such complementarity is useful as individuals and institutions in rural societies – human beings, families, social and cultural groups, cooperatives, local self-help groups, local governments, etc. – are collectively responsible to decide on appropriation and exploitation of assets. Moreover, we recognise individuals as decisive ‘human agencies,’ because in rural India, an individual often functions as an institution – the *sarpanch*, postmaster or local schoolteacher. Similarly, each rural citizen is recognised and valued by his fellow citizen for his unique capabilities, which may range from his productivity capabilities reflected in farming produces to immaculate singing capabilities. Anand and Sen (1994) further commented, “One of the characteristics of human agency - as opposed to the agency of other animals - is the ability to scrutinize and re-examine our values and priorities in the light of fresh information and new understanding.”⁴⁵

If ‘knowledge’ is an essential ingredient for effectiveness of human functioning and enhancement of human capabilities, it is imperative that we attempt to ensure all human agencies are equipped with necessary and appropriate knowledge that empowers them in advancing their capabilities and making well-informed choices about their well being. Our societies have devised mechanisms to deliver healthcare services, shelter, food, electricity, education, and emergency solutions and rescue services that can meet basic capabilities deprivation of high morbidity, low educational attainment, disease proneness and lack of healthcare, hunger, lack of housing and insecurity of life due to criminal violence, disaster, etc. In India and elsewhere, public services have been made available to citizens at large to fulfil their basic needs. Considering that information and knowledge is synonymous for our argument, we have witnessed, in India, proliferation of numerous education and research organisations imparting scientific knowledge to wider masses; extension work particularly in the field of livelihoods business undertaken mainly by agricultural institutions, banking and insurance agencies; public consultations in state policy making processes, information services by state-sponsored administrative offices, public libraries and information centres

⁴³ Anand, Sudhir and Amartya Sen (1994).

⁴⁴ Ibid.

⁴⁵ Ibid.

and public broadcasting through radio and television. Flow of knowledge as part of educational services, extension work or mass media is characteristically limited to few target population clusters (e.g. Educational services to student community, extension services to self-help groups, etc.), one-way (e.g. Mass media disseminates audio or multimedia programmes to masses) and top down. As a result, knowledge disseminated by state or private sectors remains unsuitable to local environment and unusable to populations diversified by language, ethnicity, religion, cultural, economic, and others human capabilities. Even though knowledge becomes suitable and usable, human agencies lack the means to provide their feedback to the knowledge providers. Moreover, knowledge that is culturally rich, inherited, traditional, diverse and intuitive possessed by local people themselves are largely ignored by these knowledge delivery mechanisms. Such mechanism fails to exploit knowledge to inspire and include human agencies to participate in collective actions that lead to social development.

Besides drawing knowledge and learning from the corpus of scientific knowledge brought out by learned communities, local human agencies also want to reflect their own knowledge, own views and perspectives. By communicating their own views, beliefs and perspectives, individuals exercise their right to voice their opinions in public space, to impose their own choices on the world through democratic means, to participate in political decision-making processes and, last but not the least, to take or help in taking appropriate decisions on judicious appropriation and sustainable exploitations of capitals. All such functionings lead to social, economic, cultural and political empowerment of local citizens. Since central or provincial-level knowledge delivery mechanisms fail to address the issue of local people's participation, it is imperative that such mechanisms also exist at the grassroots. ICT-enabled grassroots knowledge gateways – which can both capture and deliver knowledge – are indeed necessary not only to amplify people's voices, but also to ensure public accountability and effective functioning of state machinery. To be able to execute desired knowledge functionalities, a local knowledge gateway unavoidably needs to be ICT equipped. A rural post office is also a knowledge gateway since it amasses postcards containing messages from rural citizens to distribute to neighbouring citizens and institutions in villages and cities. Yet, knowledge contained in a postcard is subjected to single individual – hence it does not possess the capabilities of communicating knowledge to large masses generating an awareness around that knowledge object. ICT can create and distribute a postcard to millions of citizens consuming only a fraction of time, money and energy that is to be spent on an ordinary handwritten postcard. The argument, however, does not negate the importance of ordinary postcards in our lives – for postcards are invaluable communication asset for millions of citizens; postcards are used to complain about negligence, misbehaviour, arbitrariness and corruption on the part of government officials to supervisory authorities. Nevertheless, the postcard analogy allows us to imagine the possibility of engaging those millions of unheard, voiceless citizens who want to speak their minds, communicate with their peers, voice their concerns to law enforcing agencies or opine on community decision-making using ICT. ICT facilitates management of information and aids varied forms of communication between human beings, between human beings and electronic systems, and within the electronic systems themselves through capturing, storage, processing, communication and display technologies.⁴⁶ ICT enables knowledge gateways to act smart, intelligent and dynamic enough to package knowledge specific to locale environment.

⁴⁶ Hamelink, Cees J. (1997: 9).

Solution for red blight for a specific variety of potato grown in the hilly areas of Himachal Pradesh might be different from that of West Bengal. Or, knowledge and experience of communities belong to *Tarai* in the hilly areas of West Bengal who catch and domesticate snakes can be useful for the tea garden workers who retard from work for weeks because of snake intrusion in tea gardens in Assam valley. Globalisation, marketisation and increasing competitiveness warrant citizens to be knowledge resourceful especially in livelihoods enterprises - to be able to connect to institutions for seeking solutions irrespective of their locations, and to be able to cultivate knowledge in their cultural, social, economic and political practices. We recognise that literacy is not necessarily a barrier in harnessing and cultivating knowledge, because ICT allows less educated to perform those activities. Or, the promise of adaptive technologies in accommodating other access barriers similar to low educational attainment unfolds opportunities for human agencies to adopt ICT.

ICT runs the knowledge gateways for the simple reason that it is not humanly possible to perform all those functionalities. It is to be noted that knowledge gateways - human or technology-enabled – existed in Indian villages for centuries. We have given an example of human knowledge gatekeeper - the village woman who serves as the ‘genealogy librarian’ for the villagers; and till now, we may find one such old ‘genealogy librarian’ existing in each of India’s six million-plus villages. Evolution of ICT-enabled knowledge gateway occurred in last few decades. The use of radio for disseminating information on social issues predates India’s independence in 1947. Radio as India’s most popular broadcasting media started its journey in 1927. With the proliferation of private radio clubs and subsequently with the formal launch of All India Radio as a state media in 1936, radio started to play its role “to inform, educate and entertain the masses.”⁴⁷ With a network of 215 broadcasting centres with 144 medium frequency (MW), 54 high frequency (SW) and 139 FM transmitters, AIR covers 91.42% of India, serving 99.13% of the total population. Within India, it broadcasts in 24 languages and 146 dialects; and abroad, in 17 national and 10 foreign languages. AIR disseminates information through news and current affairs programmes and education through extension programmes for specific audience including farmers, women, children, youth, troops, besides, providing formal and non formal education, adult education for IGNOU and UGC.⁴⁸ The reach of television, compared to radio, is significantly low. The Doordarshan, the national state television broadcaster, has a network of 1314 terrestrial transmitters covering more than 89.6% of population.⁴⁹ Television programmes like news, sports, films and serials attract large rural population; and telecast of socially relevant messages is less visible through this media.

Both radio and television have been very popular and affordable mass media in villages and their contribution towards village development by disseminating information to the masses is widely recognised. The trend of sharing single ICT facility can be traced back to the period when radio was introduced in rural India for the first time. Singhal and Rogers (2001) illustrate how people used to gather in the house, which owned a radio to listen to their favourite programmes like sports coverage, a speech by famous politician like Gandhi or Nehru or news.⁵⁰ This trend continued further as television was making its inroad to remote

⁴⁷ All India Radio (2005).

⁴⁸ Ministry of Information & Broadcasting.

⁴⁹ Doordarshan (2005).

⁵⁰ Singhal, Arvind & Everett M. Rogers (2001).

villages in India in late 70s. Community clubs subscribed to cable television attract young and elders alike to live coverage of cricket matches between India and Pakistan. Communities in many villages watch popular TV programmes like news and weekend cinemas together. Telecast of two most popular epic serials in India since mid 80s - *Ramayana* (1987-88) and *Mahabharata* (1988-89) - attracted all the villagers in a single place. Popular serials like 'Hamlog' (1984) were most favourite topic of gossips among the villagers. Television gained wide popularity among the masses during the last two decades. Researchers attribute two landmark developments that led to sudden popularity of television: first, the national telecast of 1982 Asian Games by Doordarshan (DD) over colour TV which was made available for the first time; secondly, the nationwide installation of transmitters for terrestrial broadcasting. Foreign satellite television invaded India at the beginning of nineties and cable TV started to operate first in large metros, then in smaller towns and finally in villages. By 1995 – 1996, about 60000 cable operators existed in the country, which was to grow exponentially in the coming years. The establishment of Centre for Development of Telematics (C-DOT) in 1984 under the auspices of the Indian Government ushered a new era of telecom connectivity in India. Indigenous developments of small capacity rural automatic exchange dramatically reduced the telephony infrastructure cost. C-DOT's cost-effective, modular, low-maintenance technology solutions helped rapid proliferation of telephone exchanges at the *taluka* level, and subsequently facilitated the rapid growth of PCOs in rural areas. Late nineties saw the emergence of truly functional, yet commercial, public access points that provided millions of rural citizens shared access to telephony. Decreasing call charges and lowering of infrastructure maintenance cost fuelled the growth of ubiquitous entrepreneur-run PCOs in large cities, mufassils, villages, *mandis* and *bazaars*. In the last few years, number of PCOs in India has multiplied many times, contributing towards rural development through facilitating business communications for trading and marketing of agri-based products.⁵¹ Though community centres existed in India since historical times, ICT media like telephone, radio and television have accentuated the emergence of a new type of cohesive, functional community centres in rural India.⁵² Except telephony, radio, television and cable TV function as a top-down, one-way knowledge delivery system in rural India.

Internet enables citizens to interact with governments, conduct businesses, communicate with peers, innovate, inculcate novel practices into daily lives and reflect their opinions in knowledge societies. Developing economies, especially the cities in Asia, Africa and Latin America have witnessed rapid proliferation of internet cafes with reduction of access charges. Governments, multilateral agencies, private and civil society organisations have established infokiosks, modelled on the urban cyber cafes, in rural and remote areas in these countries.⁵³ Grassroots citizens can access ICT through the infokiosks - also termed as Community Multimedia Centre (CMC), telecentre, telecottage, Multipurpose Community Telecentre (MCT), Village Knowledge Centre (VKC). Infokiosks are generally equipped with networked computers, connected to internet and landline and mobile telephony services, besides other office peripherals used for document processing. Integrating community broadcasting facilities to infokiosks enhances further its capacity of capturing and amplifying

⁵¹ As of 30.11.2004, 2023923 PCOs have been installed. See, Department of Telecommunication (2005).

⁵² Singhal, Arvind & Everett M. Rogers (2001: 34-40).

⁵³ Digital Dividend documents thousands of such experiments being conducted worldwide. The searchable database is available at: <http://www.digitaldividend.org>.

local voices. A wide range of ICT utilities, however, can be attached to the infokiosk infrastructure. It is hard to overlook the impact of growth of infokiosks as knowledge gateways in rural India. Gigler (2004) argues that “improved access to information and ICT skills, similar to the enhancement of a person’s writing and reading skills can enhance poor peoples’ capabilities to make strategic life choices and to achieve the lifestyle they value.”⁵⁴

VII. ICT for sustainable human development

The notion of sustainable human development is neither an abstract nor unachievable one, as many of development practitioners think. Globally, for many decades we have experienced emergence of numerous treaties, instruments and principles on development issues. Nevertheless, evolutions of Agenda 21, Millennium Development Goals, World Summit on Sustainable Development and the World Summit on the Information Society over last two decades have set standards for sustainable human development. While Agenda 21, with its predecessor the Stockholm Conference in 1972, and WSSD focused on sustainable development; WSIS focuses on bridging the digital divide to further human development. Corroborating the need to integrate sustainability element as advocated in Bruntland Report (1987)⁵⁵ is reiterated by Sen (2002), who says, “It can not be doubted that the concept of sustainable development, pioneered by Bruntland, has served as an illuminating and powerful starting point for simultaneously considering the future and the present.”⁵⁶ Though the constituencies of sustainable human development are understandable, lack of informational data and functional relationship between data sets poses challenges to contextualising to the ground realities. Grasso and Giulio (2003), in an attempt to pronounce how individual choice and freedom is resonated in institutional freedom (called the IF Vortex), explore backward and forward linkages existing within social and political institutions - institutes that act coherently in poverty alleviation efforts by maximising the effective optimisation of conditionalites (e.g. international economic climate, labour market structure, public actions, etc.) against a wide variety of structural variables (e.g. employers' association, monetary authority, government and local agencies, regulation and law, etc.).⁵⁷ Figure 1.1 depicts the action and reactions arising out of efforts towards poverty alleviation as a result of optimisation of conditionalites; while the same can be found in the structural variables in Figure 1.2 for the IF vortex.⁵⁸

⁵⁴ Björn-Sören Gigler (2004).

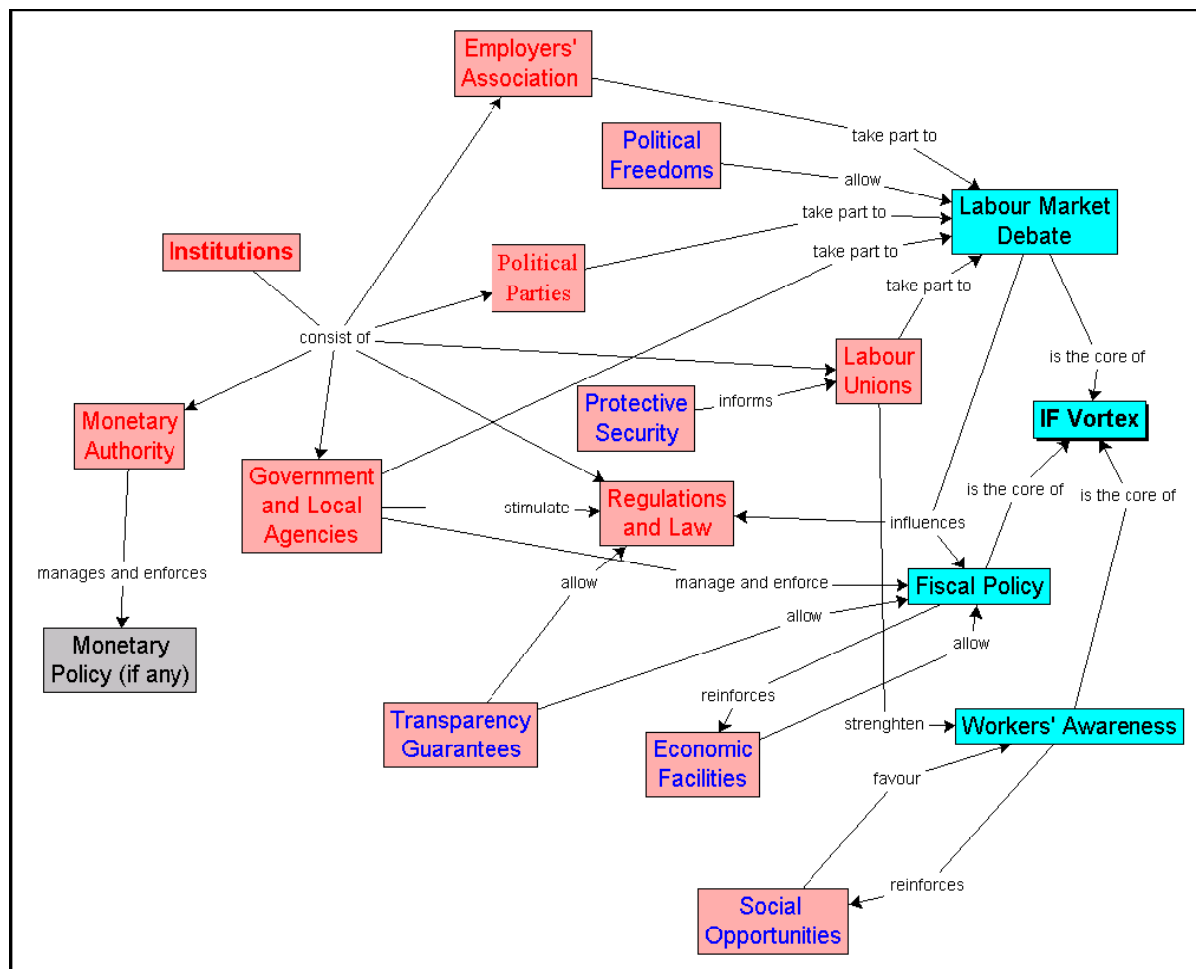
⁵⁵ World Commission on Environment and Development (1987).

⁵⁶ Sen, Amartya (2002:1).

⁵⁷ Grasso, Marco and Enzo Di Giulio (2003: 18).

⁵⁸ Ibid, p. 18 – 19.

Figure 1: Poverty – the IF vortex map



Source: Grasso, Marco and Enzo Di Giulio (2003: 18).⁵⁹

The Millennium Development Goals, emerged out of Millennium Declaration in September 2000, serves as the achievable development targets adopted by UN Member States. Localised versions of MDG can be found in national planning documents of many countries and progress towards achieving MDG is periodically monitored and measured nationally and globally. A resemblance to MDG in India's Tenth Five Year Plan, which articulates the country's development strategy for 2002 – 2007, can be found, as India is a signatory along with other countries to undertake appropriate plan of action to meet the MDG targets. (Table 2).

⁵⁹ Ibid, p. 18.

Table 2: Millennium Development Goals and Monitorable Tenth Plan (2002-07) Targets

Millennium Development Goals	Monitorable Tenth Plan (2002-07) Targets
<p>1. Eradicate extreme poverty and hunger Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day Halve, between 1990 and 2015, the proportion of people who suffer from hunger</p> <p>2. Achieve universal primary education Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling</p> <p>3. Promote gender equality and empower women</p> <p>4. Reduce child mortality</p> <p>5. Improve maternal health</p> <p>6. Combat HIV/ AIDS, malaria, and other diseases Reduce infant and child mortality rates by two-thirds between 1990 and 2015 Reduce maternal mortality rates by three-quarters between 1990 and 2015 Provide access to all who need reproductive health services by 2015</p> <p>7. Ensure environmental sustainability Implement national strategies for sustainable development by 2005 so as to reverse the loss of environmental resources by 2015 Halve, by 2015, the proportion of people without sustainable access to safe drinking water Have achieved, by 2020, a significant improvement in the lives of at least 100 million slum dwellers</p>	<p>Reduction of poverty ratio by 5 percentage points by 2007 and by 15 percentage points by 2012; Providing gainful and high-quality employment at least to addition to the labour force over the Tenth Plan period; All children in school by 2003; all children to complete 5 years of schooling by 2007; Reduction in gender gaps in literacy and wage rates by at least 50 percent by 2007; Reduction in the decadal rate of population growth between 2001 and 2011 to 16.2 per cent; Increase in literacy rates to 75 percent within the Plan period; Reduction of infant mortality rate (IMR) to 45 per 1000 live births by 2007 and to 28 by 2012; Reduction of Maternal mortality ratio (MMR) to 2 per 1000 live births by 2007 and to 1 by 2012; Increase in forest and tree cover to 25 percent by 2007 and 33 percent by 2012; All villages to have sustained access to potable drinking water within the Plan period; Cleaning of all major polluted rivers by 2007 and other notified stretches by 2012.</p>

Achieving these development targets means, thus, ensuring what is the human rights for majority of the populations. Even though the goals are set by agencies - external and distant from the daily lives of rural communities - MDG and Tenth Plan targets mirror basic human needs, hence onus of materialisation of these development targets remains on the citizens themselves – who will be the principal actors of development, rather than any state-sponsored agency. Governments – national, provincial or local – at best can provide finance and technical expertise to undertake infrastructure building, it is the duty of ordinary citizens to ensure that the infrastructure building is conducive to their needs, the services promised by the state have reached to them.

VIII. Voice in human development

We have introduced the concept of *voice* in our discussion. The issue of 'voice' bears substantial developmental consequences for rural communities - who are economically poor and less privileged, socially vulnerable and politically marginalised - as eliciting unheard marginalised voice to the mainstream is one of the critical instruments to impose a check on the widespread corruption among service delivery agencies, where even local human agencies tend to be susceptible to corruption. The philosophy of *Voice*, notwithstanding its political underpinnings in local partisan systems, encapsulates the knowledge cultivation process in socio-cultural roots of grassroots communities. Voice, as glimpses from rural communities display, act well beyond simply resonating knowledge functionings practised as part of the planned, measurable and time-bound developmental interventions prompted by agencies external to the local communities. Voice represents oral communications that take place within a family – constituted of men and women and their various relationships. It is interesting to note that elements of voice among man (as son, brother, husband, etc.) and woman (as daughter, sister, wife etc.) differ according to the relationship, distance and power structure within the family. Human development depends on such oral communication which expresses human emotions of love, affection, and tenderness at the one hand, or even, hate, betrayal and violence on the other. Love, affection and tenderness lead to development (mother's love to her child is a necessary precondition for latter's development, for instance); while hate, betrayal and violence, on the contrary, result in destruction.

Dreze and Sen (2002) observe, “Local democracy is also essential as a basis of public accountability, particularly in the context of the need for effective and equitable management of local public services. These services – from schools and health centres to fair price shops and drinking-water facilities – are often crucial for the quality of life. Their effective functioning, however, depends a great deal on the responsiveness of the concerned authorities to popular demands. To illustrate, it is difficult to see how the endemic problem of teacher absenteeism in rural India can be successfully tackled without involving the proximate and informed agency of village communities in general and parental groups in particular. As things stand, there is no mechanism to ensure any kind of accountability of village teachers to the local community or to the parents in large parts of India, and this is an important factor in the persistence dereliction of duty.”⁶⁰ Commenting on the local governance system in India, Rao (2005) states, “Strategies in India for manipulating power come via control of the political process. Therefore, electoral turnout is very high –about 70 percent for village *panchayats* elections. Public goods are almost entirely centrally funded – with only 24 percent of households claiming that have made any contribution towards their provision (about half the percentage in Indonesia). Public goods, such as schools, roads and clinics, are therefore hybrid SPGs – symbols of the largesse of the state rather than “owned” by the community. As a result, they represent opportunities for private appropriation manifested in high levels of absenteeism by schoolteachers, medical workers, and other state employees, and in corruption by panchayats when giving contracts. With the exception of Kerala, panchayats have very small budgets. Their funds are largely acquired from a small house tax, and petty taxes, which validate transactions such as, land sales. Most of a *panchayats*' budget is currently derived from programs with targeted beneficiaries—such as housing for SC/STs and food for work programs—over which *pradhans* have very little discretion. Yet, success

⁶⁰ Dreze, Jean and Amartya Sen. (2002).

in *panchayat* elections is a stepping-stone to higher elected office, and pradhans can control relatively lucrative contracts for village public goods. High positions in panchayats are, therefore, rather highly valued, and panchayat elections are often very competitive, being structured around the same party-based competition prevalent in state and national elections (even though some states officially ban party affiliations in panchayat elections). Despite this, panchayats do manage to get things done, often by acting as intermediaries to divert state government projects and funds to their villages. And pradhans provide public goods in a manner entirely consistent with the incentives of electoral competition – tending to take more care of their own constituents, their home village, and their caste.”⁶¹

How do we ensure that village teachers not only teach their students according to the schedule prescribed by the provincial education administration, but also be motivated enough to impart quality learning to rural youth, innovate novel techniques of teaching adopting from learning experiments from other parts of the world and converse with their parents for creating better learning environment for their pupils? How do we ensure that the benefits of state-sponsored village public goods reach the intended recipients without any prejudices of kinship, caste, religion, political affiliations, economic status and so on? Governance of village public goods is, thus, extremely complex, dynamic and variable in nature. A national, or even provincial, legislation or law-enforcement agency might not be able to ensure judicious appropriation and sustainable exploitation of village public goods simply because of the reason that conditionality that affects such decision-making process may varies from village to village. Moreover, law-enforcement agencies, such as the district school inspector or even the village *sarpanch* can prevent teacher absenteeism in rural India, but they are handicapped to engage, motivate and inspire the absentee teacher to provide quality learning to students. Therefore, governments can build school infrastructure, train and recruit teachers in partnership with the local community, private sector and civil society organisations, but building a learning community depends on the teachers, students and their parents and the village communities as a whole. In this connection, the story of corruption in regulating rickshaw pulling in Delhi illustrated by Goetz and Jenkins (2002) worth mentioning. (Box 3)

Goetz and Jenkins (2002) further note, “The fact is that voice and accountability are conceptually distinguishable, but inseparable in practice. For there to be answerability – the obligation of power-holders to justify their decisions and actions – someone has to be asking the questions. And if these questioners are to be drawn from beyond the ranks of government itself, then ordinary people must be endowed with voice. But the voice presumed in accountability relationships is very different from that of the irate but passive focus-group participant. The genuinely 'questioning voice' has access to information about the context in which decisions were taken, including the legal requirements governing the actions of power-holders and the public promises made prior to action.”⁶²

⁶¹ Rao, Vijayendra (2005: 20-21).

⁶² Goetz, Anne Marie and Rob Jenkins (2002: 10).

Box 3: Regulation of rickshaw pulling in Delhi

Making a tough job much tougher: Corruption in regulating rickshaw-pulling in Delhi

Rickshaw-peddling is a physically demanding, dangerous, and poorly-paid job. The dangers and low rewards to this work are exacerbated by the failure of official regulatory systems to uphold safety regulations and limit the numbers of cycle rickshaws on the roads. In Delhi, for instance, there are simply too many rickshaws on the streets – at least twice the legally sanctioned number of 50,000 choke the roads. Most are in poor repair, to the point of making the job of rickshaw-pulling thoroughly dehumanizing. In spite of the fact that there are simple, cheap and accessible technologies available for upgrading cycle rickshaws and making the job of pulling them less physically depleting, rickshaw wallas do not invest in these because they do not own their rickshaws. Instead, they pay over double the value of a new rickshaw every year in rents to rickshaw contractors. A new rickshaw costs between Rs. 2,500 – 3000, and the daily rent paid by a rickshaw-walla is Rs 17 – 20, or Rs 7,200 a year.

Why do rickshaw-wallas not buy their own rickshaws in order to make bigger profits, and use some of that money for rickshaw-upkeep? Why does the state not support this by better regulating the number and quality of rickshaws on the roads? In fact, regulations do exist to control the number of rickshaws and to ensure that they meet safety standards, and this is done primarily by licensing rickshaws for the low cost of Rs 27 per year. In practice, this licensing system is the starting-point for municipal officials and police to extract, on an arbitrary basis, rents from rickshaw-pullers. For instance, to obtain a license in the first place, at least Rs 500-600 of ‘speed money’ per rickshaw must be paid. This license, however, does not guarantee immunity from police harassment. The Municipal Corporation of Delhi frequently rounds up rickshaws, ostensibly to check their legal status, yet even owners of those that are licensed must pay a bribe of between Rs 30 and Rs 300 to have their vehicles released, over and above the daily storage fees charged while they are held by the Corporation. In addition, the Corporation can fine even license-holding rickshaws for a number of violations, such as missing accessories like reflectors or mud-guards. Fines are Rs 100 per vehicle. The raids are a pretext for bribery, not a means of improving road safety. The unsurprising consequence of this system of arbitrary capture and charging of rickshaws is an erosion of any incentive to invest in safe and efficient cycle rickshaws, let alone to pay for a license. Large contractors operating fleets of extremely poor-quality rickshaws arrange to bypass some of this police predation by purchasing licenses in bulk, paying hefty monthly haftas to the police, and recovering those costs from the daily rent paid by rickshaw-wallas.

Source: Madhu Kishwar, ‘A Half Step Forward: The Thwarting of Economic Reforms in India’ Manushi, nos. 92-93 (Jan-April 1996), pp. 58-59.

Source: Goetz and Jenkins (2002: 16).

A careful analysis of the observation made by Goetz and Jenkins (2002) indicates towards the need for a novel mechanism at the village level that will help the voiceless citizens to vindicate their voices being knowledgeable about the internal and external conditionality. The role of mass media in promoting public voice has been recognised – an accessible, widely diffused, free and independent mass media accentuates good governance implementation,⁶³

⁶³ Norris, Pippa and Dieter Zinnabauer (2002: 43).

though the capacity of mass media in promoting grassroots voices is rather limited. In these observations, the need to ensure public accountability in delivering village public good is underlined, though a mechanism to do so has not been proposed. If traditional social institutions and personal agencies are not capable of acting as knowledge gateways, what mechanism can fulfil the functionalities of knowledge gateway? The functionalities of local knowledge gateways, thus, encompass - a) capture, document, amplify, broadcast and disseminate local knowledge elicited by human agencies across the vicinity of knowledge gateways and within and beyond the villages – locally and globally; while harnessing customised, appropriate, contextual, need-based scientific knowledge from the learned communities such that human capabilities can be enhanced; and, b) participate in local, provincial and national political processes to ensure state accountability and to exercise democratic rights. Empirical evidences suggest that through performing functions (a), human agencies exploit knowledge for fulfilling their basic needs of healthcare services, educational attainment and economic growth. Voice is an important instrument in ensuring pro-poor governance policy that creates conducive environment for reaching the developmental efforts to the less privileged and marginalised citizens.

ICT enables local citizens and institutions participate in the governance and decision-making processes through exchange of information and communication between state authorities and the citizens. Using ICT, governments improve the quality and responsiveness of their services delivery to the citizens and expand the reach and accessibility of services and public infrastructure. Developments in spatial technologies like GIS and remote sensing allow communities to participate, discuss and take decision in local planning.⁶⁴ Various e-governance processes have been developed to automatise citizen services. Madon (2004) chronicles the historiography of e-governance evolution and maturity in India.⁶⁵ In the first phase, which runs from late 1960s till late 1990s, the efforts were concentrated on development of IT infrastructures and applications in the central government offices and in the second phase, in the post 2000 scenario, vigorous use of IT applications in a wide range of sectors resulted into reaching out to a larger citizens belonging to both rural and urban India with greater amount of private and civil society involvements.⁶⁶ It is only in the second phase when pilot e-governance initiative like rural e-*seva*, internet-enabled integrated service centres, have started functioning in Andhra Pradesh for providing access to different types of government services.⁶⁷ In rural e-*seva*, ICT catalyses the delivery of village public goods, monitors state services and enables people to provide voice their opinions to state.

IX. ICT for quality health services

That health care services in rural and urban India needs immediate infrastructural reform is long felt and well articulated in Five Year Plan (2002-07). Despite progress in health sector, it is unlikely that India can meet any of the health related targets stipulated by MDG by the year 2015. It is estimated that as much as 75% of a total 100,000 maternal deaths occurring every year in India, amounting to one maternal death every 5 minutes, is preventable if proper medical attention can be provided on time. Moreover, lack of medical attention results

⁶⁴ Craig W.J., T.M. Harris, & D. Weiner, Eds. (2002).

⁶⁵ Madon, Shirin. (2004: 3).

⁶⁶ Ibid.

⁶⁷ See, eSevaOnline.

in 10-15 maternal disabilities for every maternal death. An IMR of 70 per 1000 live births and a CMR of 95 per 1000 live births are very high compared to that of 5-6 CMR in developed nations. With 5.1 million of HIV/ AIDS patients, India has the highest number of HIV/ AIDS cases as a country outside Africa. Incidences of non-communicable diseases are increasing – 25 million cardio-vascular diseases, 25 million diabetes patients, 2.4 million cases of cancer, to cite a few. Water contamination, poor sanitation and hygiene cause as much as 9% of all deaths; and an estimated 24.7 million years of life are lost every year. The situation is more aggravated because of the lack of toilet facilities in rural India – currently only about 20% of rural household own a toilet; and with the current rate of increase in toilet, it will take 80 years for 100% coverage of toilet facilities in rural areas. Recent estimate shows that the governmental contribution towards total health care expenditure comprises only 20% while the rest 80% is incurred by the patients. With the cost of health care increasing dramatically, a majority of population is not in a situation to afford health care services. Health insurance - which is available as private insurance, social insurance, employer-provided cover, community insurance schemes and governmental contribution – cover only 3-4% of the population. Despite 100% of growth in insurance cover in the last 2 years, it is estimated that only 160 million or 15% of population will be protected by any kind of insurance by the year 2010.⁶⁸

The impact of ICT in the health sector has been phenomenal, as it transforms the delivery of public and private healthcare services in the developed countries, particularly in the OECD nations.⁶⁹ For rural areas in developing countries, ICT brings expert medical advice and emergency health care though remote consultation, diagnosis and treatment. Remote consultations using telemedicine facilities are widely practised in Europe and North America; and in India, indigenous telemedicine tools have yielded with satisfactory results.⁷⁰ ICT empowers the rural health workers with in-service education and training and orientation to latest developments in medicine. Intergovernmental organizations such as the World Health Organization, as well as other professional medical organizations have developed disease specific websites that provide access to medical knowledge to trained and paramedical health workers. Innovative e-learning packages along with self-assessment modules are available through interactive and multimedia portals and optical discs like CD-ROM. Dissemination of knowledge (termed 'information, education and communications' in health extension services) for promoting nation-wide family planning has been imminent to control rapid population growth and ensuring better administration of reproductive and child health programme. National Family Health Survey, 1998 – 99 (2000) posits that, “The new National Population Policy, 2000, adopted by the Government of India has set as the immediate objective of the task of addressing unmet need for contraception in order to achieve the medium-term objective of bringing the total fertility rate down to replacement level by the

⁶⁸ These statistics are taken from Ramani K V and Mavalankar Dileep (2005: 2-3).

⁶⁹ OECD (2003: 204-211).

⁷⁰ “Bangalore-based Neurosynaptic Communications Pvt Ltd and the TeNeT (The Telecommunication and Computer Networks) Group at Indian Institute of Technology, Madras, have developed a low-cost telemedicine solution for rural areas. It includes a remote diagnostic kit and a personal computer to provide basic healthcare infrastructure in rural areas, and help people like Ethiraj sitting in villages get advice from doctors in urban areas. The Rs 10,000-kit can be installed at villages having Internet connection. It can measure basic physiological parameters like temperature, blood pressure, pulse rate and multi-channel ECG (electrocardiogram). It also has an electronic stethoscope, said Mr Sameer S. Sawarkar, Chief Executive Officer, Neurosynaptic Communications.” Raja (2005).

year 2010. One of the 14 national socio-demographic goals identified for this purpose is to achieve universal access to information/ counselling and services for fertility regulation and contraception with a wide range of choices.”⁷¹

ICT-enabled local knowledge gateways have already started providing personalised counselling services using remote counselling methods. Formation of email and web-based virtual knowledge communities equipped the medical and development communities with knowledge-sharing facilities to deal with health-related problems. The recent launch of the National AIDS Control Programme Phase III (NACP III) e –consultation is one such instance where the United Nations Country Team has partnered with the NACO to elicit public opinions for formulating appropriate strategies to combat the menace of HIV/AIDS.⁷² Online repository of latest medical journals through open access enables health professionals to access costly medical journals free of charge.⁷³ In the outbreak of epidemics, ICT - especially the public broadcast media such as radio and television, or other radio communication utilities such as HAM radio and walky-talkies - come to the rescue by disseminating public health messages and emergency disease prevention techniques. In many instances, internet is used for monitoring and response mechanisms of disease prevention exercises. World Health Organization (WHO), as part of its global Communicable Disease Surveillance & Response (CSR) programme, has developed the Meningitis Monitoring System that monitors daily cases of meningitis across Sub-Saharan Africa using internet to help coordinate mass vaccination programs when the diseases reaches its threshold level.⁷⁴

X. ICT for promoting quality education for all

Developed economies have long been testing the efficacy of education technology in their teaching and learning environments. Most of the OECD nations have adopted long- term national plans of actions to stimulate ICT-assisted learning in their educational settings. That ICT improves the teaching and learning outcomes in various disciplines, especially in the sciences and social sciences have been well documented.⁷⁵ The No Child Left Behind Act (NCLB) in the US accords funds to the provincial governments to increase ICT use in schools.⁷⁶ In developing countries, likewise, computer labs have been set up in many primary, secondary and higher education institutions. In some instances, limited Internet connectivity is provided to the computer labs, as well. In primary and secondary schools, computers are used to teach and learn almost every subject in humanities, social sciences and sciences. Computers are used in practicing skills, solving problems, learning course materials, working collaboratively, producing multimedia projects or corresponding with

⁷¹ Ministry of Health and Family Welfare (2000).

⁷² Solution Exchange (2005).

⁷³ India’s National Informatics Centre, through its MEDLARS programme, provides access to bibliographic records of millions of medical articles. NIC has recently launched OpenMED (<http://openmed.nic.in>), an open access archive for Medical and Allied Sciences. Here authors / owners can self-archive their scientific and technical documents. The aim of OpenMED is to provide free service to academics, researchers, and students working in the area of Medical and Allied Sciences.

⁷⁴ World Health Organization (2005).

⁷⁵ Science and Engineering Indicators 2004 monitors ICT usage statistics in US. See, National Science Board (2004: 40-43).

⁷⁶ US Department of Education.

experts, peers and mentors. Teacher training is another area of ICT usage, where the later supports in the professional development of the teaching community and ensures timely, uninterrupted and peer-to-peer support as part of the in-service training. ICT has given a new meaning to distance education, as courses are delivered to remote locations through synchronous or asynchronous means. Nowadays, distance education course materials include written correspondence, text, graphics, audio-and videotape, CD-ROM, online learning, audio- and videoconferencing, interactive TV and facsimile.⁷⁷ E-learning, a method of transmitting learning instructions, runs over a broad set of applications and processes - including web-based learning, computer-based learning, virtual classrooms, virtual high schools, and digital collaboratory. The modules are delivered through internet, intranet, audio- and videotape, satellite broadcast, interactive TV, or CD-ROM.

XI. ICT for promoting livelihoods opportunities for all

Increasing food security and livelihoods opportunities form the key trajectories to enhancing people's economic opportunities in developing economies.⁷⁸ In urban areas, ICT is largely employed to enhance industrial and services productivity; while in rural areas, ICT is used for expanding income generating options through facilitating local trade, enhancing market opportunities and competitiveness and providing access to information on livelihoods. Access to information on weather trends, improved farm practises, credit availability, market prices of various commodities increases livelihoods opportunities of the rural poor. Meera, Jhamtani and Rao (2004) provide a list of ICT-enabled agricultural development services suitable for the developing world.⁷⁹ (Box 1.1)

Analysing the positive impacts of three ICT projects in India – Gyandoot, Warana and iKisan, Meera, Jhamtani and Rao (2004) recommended that: a) efforts should be made to incorporate ICT in all endeavours related to agricultural development; b) the organisations and departments concerned with agricultural development need to realise the potential of ICT for the speedy dissemination of information to farmers; and c) government at national and state level in India has to reorient agricultural policies so that a fully-fledged strategy is formed to harness ICT's potential for assisting overall agricultural development. In Bangladesh, Grameen Bank's Village Pay Phone project operates on the GSM network and lends money to rural women to purchase GSM cellular phones. Phone owners rent the phones out to village farmers and other community members for a fee and provide messaging and incoming call services.⁸⁰

ICT helps in micro finance administration, as evident in Grameen Bank's work, enabling the rural communities to access to small credit easily. Rural SMEs engaged in agri-based and non-farm productions leverage ICT for reducing operational costs by decreasing material, procurement and transaction costs, resulting in lower prices for intermediate and finished goods.

⁷⁷ Bates (2001).

⁷⁸ Jaggi (2003: 4); World Bank (2002); Cecchini and Scott (2003: 74-84).

⁷⁹ Meera, Shaik. N. Anita Jhamtani, and D.U.M. Rao. (2004: 6).

⁸⁰ Grameen Telecom.

Box 4: ICT-enabled agricultural development services

- Online services for information, education and training, monitoring and consultation, diagnosis and monitoring, and transaction and processing;
- E-commerce for direct linkages between local producers, traders, retailers and suppliers;
- The facilitation of interaction among researchers, extension (knowledge) workers, and farmers;
- Question-and-answer services where experts respond to queries on specialised subjects ICT services to block- and district-level developmental officials for greater efficiency in delivering services for overall agricultural development;
- Up-to-date information, supplied to farmers as early as possible, about subjects such as packages of practices, market information, weather forecasting, input supplies, credit availability, etc.;
- Creation of databases with details of the resources of local villages and villagers, site-specific information systems, expert systems, etc.;
- Provision of early warning systems about disease/ pest problems, information regarding rural development programmes and crop insurances, post harvest technology, etc.;
- Facilitation of land records and online registration services;
- Improved marketing of milk and milk products;
- Services providing information to farmers regarding farm business and management;
- Increased efficiency and productivity of cooperative societies through the computer communication network and the latest database technology;
- Tele-education for farmers;
- Websites established by agricultural research institutes, making the latest information available to extension (knowledge) workers and obtaining their feedback.

Source: Meera, Jhamtani and Rao (2004: 6)

Internet facilitates creation of business process outsourcing jobs, global market for local handicrafts that can be merchandised through e-commerce and numerous other ways of creating opportunities for rural citizens. Recent scientific and technological researches have advanced the use of ICT in environmental protection and natural resource management. In natural disasters, ICT is widely used for monitoring and rescue operations. It helps in the reduction of energy consumption, water and other essential natural resources through adoption of agricultural and industrial procedures that are more efficient. To illustrate, precision agriculture techniques, an information-based initiative developed by the Ohio State University,⁸¹ which uses sensors, digital application controllers, communication links, global positioning systems (GPS), computers and innovative software solutions to automatically match agricultural inputs and practices to variable local conditions within an agricultural field, optimise farm return on investment ensuring more efficient use of scarce resources. Satellite-based monitoring systems detect changes in climatic conditions and help in fight against pollution and ozone layer depletion. Spread of ICT limits the rural to urban migration while promoting the habits of telework among citizen. Table 3 highlights some of the most used ICT applications in rural development practices in the developing nations.

⁸¹ Ohio State University (2001).

Table 3: Examples of ICT applications in rural contexts⁸²

Education	Agriculture,	Sustainable livelihoods
Offline multimedia e-learning tools in CD-ROMs etc	Access to market information through portals, radio, mobile phones	Exploring employment opportunities
E-learning using chat and video-conferencing facility	Expert advice on farming, animal husbandry, fishing, dairying etc.	Income opportunities for infokiosk entrepreneurs
Distance education through internet; capacity building of rural teachers	Detection of catch fish zone using satellite tracking systems	Payment of bills through infokiosk
Radio broadcast for educational contents	Knowledge sharing of indigenous farming practices	Money transactions with non-resident Indians
Health	Community development	Small business development
Telemedicine applications e.g. remote diagnosis and expert medical consultations	Interactive portals with local content in native languages, web-based newspaper	Micro-credit financing
Improved health recording system	Local culture preserved and flourished through community radio	E-commerce for local artisans
Better delivery of training modules for In-service training of semi-skilled health workers using ICT	Local jobs, matrimonial portals, Interaction with family members living in cities, abroad	Improving logistics, e.g. pre-arranging payment and delivery details before transactions
Better monitoring and knowledge sharing on disease and famine	Facilitate knowledge sharing among community, local government and grassroots NGOs	Market information, marketing of products
Governance	Emergency Situations	Environmental
Lodging complaints and grievances to state and redressal	Calling police, fire, and ambulance and location and rescue of victims in emergency	Weather forecast
Payment of state services	Emergency assistance in vehicle breakdown	Neighbourhood mapping, natural resource management
Applications for certificates, Copy of land records	Radio broadcasts (esp. using ham radio) in natural calamities	Satellite based tracking of bush fires
Information on state schemes e.g. credit and below poverty line amenities	Disseminating early warning from national and international disaster warning systems via local infokiosks	Local planning using GIS

XII. Realising the potentials of ICT

Promises of ICT in enhancing citizen's capacities remain unmet so far largely because ICT infrastructure is lacking in rural areas. India lags far behind other Asian developing economies like China, Korea and Malaysia in the usage of computer, cable TV, fixed telephony and mobile phones. A recent estimate shows that per 100 people, rate of PC usage in Korea, Malaysia and China is as high as 78.6, 15 and 2.8 respectively, compared to only 0.8 in India. Similarly, in mobile telephony, India's rate of usage stands at 2.6 per 100 persons, compared to that of China's 18.3, Korea's 75 and Malaysia's 43.9. (Table 4)

⁸² ITU (2000: 21); Senthilkumaran (2002); Rajora (2001).

Table 4: *ICT usage comparison among Asian economies*

Parameters	Korea	Malaysia	China	India
No of PCs per 100	78.6	15	2.8	0.8
No of cable TVs per 100 persons	43	0	9	6
No of fixed telephone lines per 100 persons	51	18.5	18.0	3.9
No of mobile phones per 100 persons	75	43.9	18.3	2.6
GDP (US \$ per capita)	10,000	4,000	965	465
No of internet connections per 100 persons	26	12	2.5	0.4
No of users per 100 persons	65.5	34	6.2	1
No of broadband connections per 100 persons	25	0.4	1.4	0.02

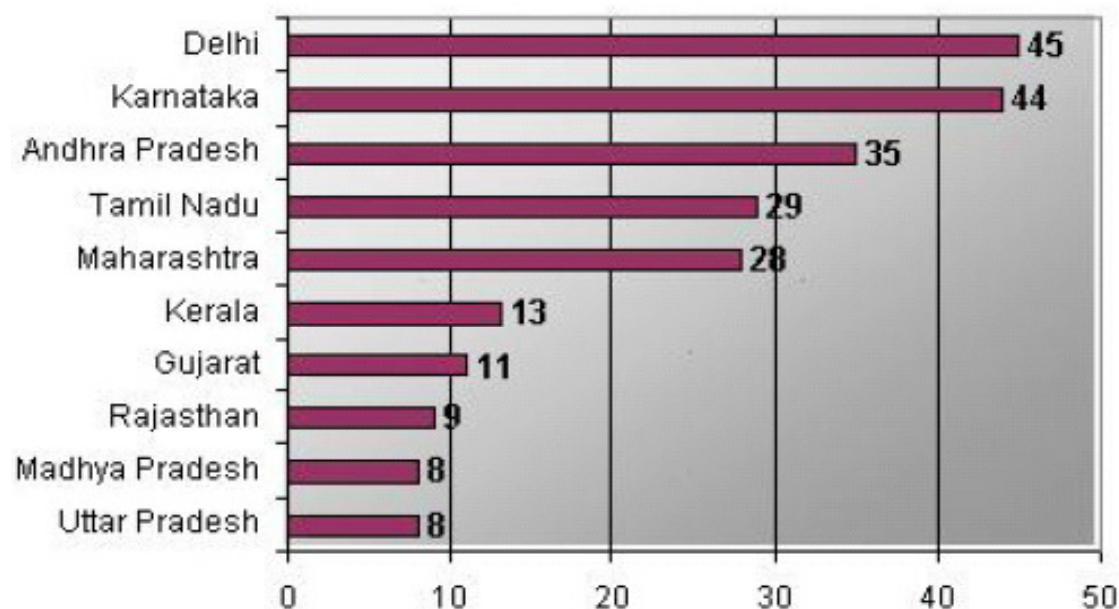
Source: Telecommunication Regulatory Authority of India (2004:10).

Digital Dividend (2003) shows that 33 and 37 per cent of world's infokiosk projects are concentrated in Africa and Asia respectively. A survey of the projects submitted to the Digital Dividend database shows that most of the ICT-enabled development projects are concentrated only in 10 states in North and South India – Delhi, Karnataka, Andhra Pradesh, Tamil Nadu, Maharashtra, Kerala, Gujrat, Rajasthan, Madhya Pradesh and Uttar Pradesh. Paul, Katz and Gallagher (2004) observed that, “Almost half of all projects in India are located in the southern states of Tamil Nadu, Karnataka, Andhra Pradesh and Kerala. Together, these states account for just 22% of the country's total population. A fifth of Indian projects are located in the capital city of New Delhi. Another 15% are found in the western states of Gujarat and Maharashtra.”⁸³ (Chart 1.1)

Inter-regional disparity, limited computerisation of line departments in government agencies further undermine citizen's access to infokiosks infrastructure to fully leverage the benefits of ICT. It is envisioned that infokiosks need to be established in India's 600,000 plus villages to enable effective reach and monitoring of state-sponsored poverty alleviation programmes across the political boundaries of the states, allowing direct citizen's participation in such programmes. Infokiosk services, however, go well beyond the ambit of state development interventions, as it functions as the knowledge hub in the villages in its own right. We observe that the limited access to ICT itself is an inhibiting factor for furthering the ICT-enabled development agenda. In addition to limited access, there are disparities in access to ICT infrastructure within rural-urban areas, regions, gender, social, economic, and cultural strata.

⁸³ Paul, et al. (2004: 5-11).

Figure 2: Spread of ICT projects in India across selected states



Source: Paul, et al. (2004: 6).

Moreover, selective ICT pilots accentuate social and economic disparities further within rural population clusters. Motivation for providing access to all was first enunciated in the recommendations of the National Taskforce on Information Technology and Software Development, set up in May 1998, to draft a National Informatics Policy. The impetus for rolling out citizen-centric ICT services thus emerged out of the 'Information Technology Action Plan' by the National Taskforce in 2001.⁸⁴ Limited progress has been made until 2004 July when a national level policy consultation was convened to formulate an action plan for 'taking ICT to every Indian village by 2007,' initiated by civil society organisations. The July 2004 consultation led to the formation of the 'National Alliance on ICT for Basic Human Needs,' a consortium comprising more than 120 organisations representing government, private and civil society sectors. The Second Convention of the National Alliance also provided further boost to this idea.

XIII. Conclusion

The foregoing discussion shows that knowledge is a key ingredient for sustainable human development – hence, for furthering human development access to knowledge shall be provided to Indian citizens. While urban India is well connected to multiple knowledge gateways, rural India lags far behind. Connecting rural India with ICT-enabled knowledge gateways, thus, will energise rural development process by infusing knowledge connectivity to human agencies while smoothening the nation's migration from an agrarian society to a

⁸⁴ National Taskforce on Information Technology and Software Development (1998).

knowledge society, as envisioned in India Vision 2020 that “The pace of India’s future progress will depend to a large extent on its ability to make available the latest and most useful knowledge to vast sections of the population.”⁸⁵ Experiences with infokiosks at different parts of the world show their effectiveness as knowledge gateways for rural areas. The landmark departure towards the journey of ‘taking ICTs to every Indian village’ undertaken in Mission 2007 Consultation in July 2004 is thus a necessary step towards creating an Indian knowledge society. The consultation targets connecting 25000 villages as the immediate step of action. (Box 1.1).

Box 5: Targets set National Policy Makers’ Workshop at the Mission 2007 in July 2004

- Connecting 25,000 villages as the next step
- Identifying, recognizing and creating incentives and enabling conditions for RSPs. Software application and user interface development in local languages for local entrepreneurship and fulfillment objectives
- NGOs’ role in recruiting 1 million village academicians, especially women
- Empowering and recognizing local communities as collators of local data and users of spatial data for local planning. Two-way content and services flow – bringing content providers to collaborate and ride on the infrastructure
- Legitimising the Alliance to take on the mandate of a national level ICT commission
- Assessing the needs and perceptions of target groups and beneficiaries. This would be important in ‘humanising the technology’ – a critical sufficiency condition for the success of the knowledge revolution in India
- If we agree to go ahead with expanding the usage of ICTs (particularly the infokiosks) in enabling the proposed knowledge revolution in the country, it would be important to address the issue of resources (both manpower and financial) required for supporting the machines
- While the creation of new information should be an important component of the knowledge revolution, documenting and archiving existing knowledge and experiments (both successes and failures) should be equally important
- Radios, particularly FM radios, have the potential of bringing about a knowledge revolution in the country
- Policy recommendations are required in this area to free radio from strict airwave related regulatory issues

Progress towards achieving the goal has already been started. In May 2005, NASSCOM Foundation and UNDP along with government and NGO partners launched a Knowledge Centre programme in Orissa as the first phase of the coastal knowledge network. The Network will comprise multipurpose resource centres and single window service delivery mechanisms for training and capacity building, knowledge and information systems, linked to life skill education, livelihoods, e-learning, community based disaster preparedness activities targeting women, children and young people for serving a cluster of villages in identified areas. During the financial year 2005-06, Mission 2007 secured the token financial support in the tune of Rs 100 crore to be channelised through NABARD for establishing rural ICT self-

⁸⁵ Gupta, S. P. (2002: 34).

help groups. In the Budget for 2005-06, the target of connecting the remaining 125,000 villages to the electrical grid and 66,882 villages to telecom network has been set up. Formulation of a job-led growth strategy has been the mandate of the current UPA government, and the creation of about additional 7 million jobs is in the IT sector by the year 2009 is envisaged. Building basic infrastructure especially in rural areas and urban slums will be supported by the revival of the Rural Infrastructure Development Fund (RIDF) through infusing a corpus fund of Rs. 8000 crore for this fiscal year. The Mission 2007 initiative, aiming towards setting up Village Knowledge Centre in every village by India's 60th independence anniversary, will also be financed by the RIDF. The Bharat Nirman proposal proposes a four-year business plan for building the infrastructure in rural India in the areas of irrigation, roads, water supply, housing, rural electrification and rural telecom connectivity. In addition, removal of customs duty on specified capital goods as stipulated in the recent Information Technology Agreement (ITA) is major development proposed in this budget.⁸⁶ In his budget speech on February 28, 2005, P Chidambaram, the Union Finance Minister of India, said that, "The National Commission on Farmers has recommended the establishment of Village Knowledge Centres (VKCs) all over the country using modern Information and Communication Technology (ICT). Mission 2007 is a national initiative launched by an alliance comprising nearly 80 organisations including civil society organisations. Their goal is to set up a Knowledge Centre in every village by the 60th anniversary of Independence Day. The Government supports the goal, and I am glad to announce that the government has decided to join the alliance and route its support through the National Bank for Agriculture and Rural Development (NABARD). I propose to allow NABARD to provide Rs. 100 crore out of the Rural Infrastructure Development Fund (RIDF)."⁸⁷

While Mission 2007 has succeeded in securing multi-stakeholder support, the progression towards establishing infokiosks in 600,000 plus Indian villages largely is yet to commence. To be able to ignite the rural development process with knowledge revolution, infokiosks need to be equipped with not only robust and reliable connectivity and electrification, but also with killer content and applications, efficient human resources and creative management to be able to attract dynamic community participation. Both data and voice connectivity in conjunction with the power supply system constitute the basic infrastructure in the infokiosks - and analyses in the following chapters will show that such functionalities remain the key barriers in successful operation for majority of pilot infokiosk interventions. Development practitioners have underlined the need to develop appropriate content and applications that will energise the rural development process and transform the lives of millions of rural inhabitants.⁸⁸ Unlike provisioning telecom and internet connectivity in rural areas, content and applications development appropriate to rural population clusters that belong to diverse socio-economic milieu, speak in at least 18 major languages and 844 dialects, inherit diverse religious and ethnic beliefs and customs is a major challenge. It is imperative that the infrastructure building, content development and community-centric management of infokiosks exercises being undertaken in millions of Indian villages envisaged as part of the Mission 2007 initiative shall encompass locale-specific services delivery so that socio-economic development takes place in those villages.

⁸⁶ Digital Opportunity Channel (2005).

⁸⁷ Quoted in, OneWorld South Asia (2005: 2).

⁸⁸ OneWorld South Asia (2004: 37-39).

XIV. References (Draft)

1. Alkire, Sabina. Valuing freedoms: Sen's capability approach and poverty reduction. New Delhi: Oxford University Press, 2002. 340 p.
2. All India Radio (2005). About Us. Online: <http://allindiaradio.org/about1.html>
3. Allardt, E. 1993. 'Having, loving, being: An alternative to the Swedish model of welfare research'. In, Nassbaum and Sen.1993: 88-94.
4. Andrews, Frank M., and Stephen B. Withey. 1976. Social indicators of well-being: American's perceptions of life quality. New York: Plenum Press.
5. Antweiler, C. 1998. Local knowledge and local knowing: An anthropological analysis of contested 'cultural products' in the context of development. *Anthropos* 93: 469-494.
6. Argyle, Michael, and Maryanne Martin. 1991. 'The psychological causes of happiness'. In Argyle et al. 1991.
7. Björn-Sören Gigler. Including the Excluded- Can ICTs empower poor communities? Towards an alternative evaluation framework based on the capability approach. Braybrooke, David. 1987. Meeting needs. Princeton: Princeton University Press.
8. Brentano, Franz. 1973. Psychology from an empirical standpoint, trans. Antos C. Rancurello, D. B. Terrel, and Linda McAlister. New York: Humanities Press.
9. Carson, Rachel. Silent Spring (Boston: Houghton Mifflin, 1962
10. Chambers, Robert. 1995. 'Poverty and reality: whose reality counts?' IDS Discussion Paper 347.
11. Chowdhury, N. (2000) 'Information and Communications Technologies and IFPRI's Mandate: A Conceptual Framework.' Sept. 18, 2000. <http://www.ifpri.org/divs/cd/dp/ictdp01.pdf>
12. Club of Rome: 1972. Limits to growth.
13. Craig W.J., T.M. Harris, & D. Weiner (Eds., 2002): Community Participation and Geographic Information Systems, Taylor & Francis, London.
14. Cummins, Robert A. 1996. 'The domains of life satisfaction: An attempt to order chaos'. *Social Indicators Research*. 38/3: 303-28.
15. Davitt, T. E. 1968. 'The basic values in laws: A study of the Ethico-legal implications: of psychology and anthropology.' *Transactions of the American Philosophical*.

16. Department of Telecommunication. Annual report 2004 – 05. new Delhi: the Department, p. 5. Online: <http://www.dot.gov.in/annualreport/english.pdf>
17. Diener, Ed and Robert Biswas-Diener. 2000. 'New directions in subjective well-being research: The cutting edge'. Draft.
18. Digital Dividend website. Online: <http://www.digitaldividend.org>
19. Doordarshan. (2005). About DD. Online: <http://www.ddindia.gov.in/>
19. Doyal, Len and Ian Gough. 1993. 'Need satisfaction as a measure of human welfare'. In Wolfgang Blass and John Foster, eds. *Mixed Economies in Europe*.
20. Drew, E., and F. G. Foster (eds.) (1994) *Information Technology in Selected Countries*. Tokyo: United Nations University Press. <http://www.unu.edu/unupress/unupbooks/uu19ie/uu19ie00.htm>
21. Dreze, Jean and Amartya Sen. *Development and participation*. New Delhi: Oxford University Press, 2002. p. 359.
22. Dubos, Rene and Barbara Ward. 1971. *Only one earth*.
23. Duncombe R. and R. Heeks (1999) 'Information, ICTs and Small Enterprise: Findings from Botswana', IDPM Manchester Working Paper No. 7
24. Goetz, Anne Marie and Rob Jenkins. *Voice, accountability and human development: The emergence of a new agenda*. Occasional paper for HDR 2002.
25. Economic Commission for Africa (1999) 'An Overview of ICT Trends and Policy in Africa.' May 1999, UNECA, Addis Ababa <http://www.un.org/Depts/eca/adf>
26. *Economics*, 2004. p. 3. Online: <http://is.lse.ac.uk/wp/pdf/WP124.PDF>
27. Ehrlich, Paul R. *The population bomb*. New York: Ballantine Books, 1971, p.152.
28. EsevaOnline Website. Online: <http://www.esevaonline.com/>
29. Fromm, Erich. 1949. *Man for himself, an Enquiry into the psychology of ethics*. London: Routledge & Kegan Paul.
30. Galtung, Johan. 1980. *The true worlds: A transnational perspective*. New York: Free Press.
31. Goulet, Denis. 1995. *Development ethics: A guide to theory and practice*. London: Zed Books.
32. Grace, Jeremy, Kenny, Charles, & Qiang, Christine. 2001. *ICT and broad-based development*. World Bank Global Information and Communications Technology Department, Washington, D.C.

33. Grasso, Marco and Enzo Di Giulio. Mapping sustainable development in a capability perspective. p. 17 – 19. 2003
34. Grenier, Louise. (1998). Working with indigenous knowledge: A Guide for Researchers. Ottawa: IDRC. 100p.
35. Griffin, James. 1996. Value judgement: Improving our ethical values. Oxford: Clarendon Press.
36. Grisez, Germain and John Boyle and John Finnis. 1987. 'Practical principles, moral truth and ultimate ends'. American Journal of Jurisprudence. 32: 99-151.
37. Grisez, Germain and Joseph Boyle and John Finnis (1987). 'Practical principles, moral truth and ultimate ends'. American Journal of Jurisprudence. 32: 99-151.
38. Guha, Ramchandra. Savaging the civilized: Varrier Elwin, his tribals, and India. In, The Ramachandra Guha Omnibus. New Delhi: Oxford University Press, 2005. p. 334-339.
39. Hamelink, Cees J. New information and communication technologies, social development and cultural change. Geneva: UNRISD, 1997. p. 9
40. IIRR. (1966) Recording and using indigenous knowledge: A manual. Silang, Cavite, Philippines: REPPIKA, International Institute of Rural Reconstruction.
41. Jean Dreze, Amartya Sen 2002. India : Development and Participation. New Delhi, OUP.
42. Krech, David, Richard S. Crutchfield and Norman Livson. 1969. Elements of psychology. 2 nd Ed. New York: Alfred Knopf.
43. Lane, Robert E. 1969. Political thinking and consciousness. Chicago: Markham Publishers.
44. Lasswell, Harold D., and Allan R. Holmberg (1969). 'Towards a general theory of directed value accumulation and institutional development.' In Ralph Braibanti, ed.
45. Madon, Shirin. Evaluating e-governance projects in India: A focus on micro-level implementation. Working Paper Series, 124. London: London School of
46. Mansell, R. and R. Silverstone (1996) Communication by Design: The Politics of Information and Communication Technologies. Oxford: OUP.
47. Manuel, Castells. Information technology, globalization and social development. Geneva: UNRISD. Discussion Paper No. 114. 1999. 23p.
48. Max-Neef, Manfred. 1993. Human scale development: Conception, application and further reflections. London: Apex Press.

49. Ministry of Health and Family Welfare, 2000. Quoted in International Institute of Population Sciences. 2000. National Family Health Survey 1998 – 99 (NFHS – 2). Mumbai: IIPS, 2000.
50. Ministry of Information & Broadcasting. About us.
51. Murray, H. A. 1938. Explorations in personality. New York: Oxford University Press.
52. Myers, David G. and Ed Diener. 1995. Psychological science. 6/1 (Jan.): 10-19.
53. Narayan, Deepa et al. 2000. Voices of the poor: Can anyone hear us? New York: Oxford University Press.
54. Nielson, Kai. 1977. 'True needs, rationality and emancipation'. In Ross Fitzgerald. Human needs and politics. Oxford: Pergamon Press.
55. Nonaka, I. And H. Takeuchi (1995). The knowledge-creating company: how Japanese companies create the4 dynamics of innovation. Oxford: Oxford University Press 1995.
56. Norris, Pippa and Dieter Zinnabauer. Giving voice to the voiceless: Good governance, human development and mass communcation. Background paper for HDR
57. Nussbaum, Martha and Jonathan Glover, eds. (1995). Women culture and development: A study of human capabilities. Oxford: Clarendon Press.
58. Nussbaum, Martha C. Women and human development: The capabilities approach. Cambridge: Cambridge University Press, 2000. p. 78-80.
59. Nussbaum, Martha. Women and human development: The capability approach. Cambridge: Cambridge University Press. 2000
60. Occassional Paper No. 8. Human Development Report Office. New York: UNDP.
61. OECD. Digital delivery of healthcare. In, OECD Information technology outlook 2004. Paris: OECD, 2003. p. 204-211.
62. Packard, Vance. 1960. The Wastemaker. New York: D. McKay Co.
63. Qizilbash, Muzaffar. 1996. 'Capabilities, well-being and human development: A survey' Journal of Development Studies. 33/2: 143-62.
64. Ramani K V and Mavalankar Dileep. Health systems in India: Opportunites and challenges for improvements. Working Paper No. 2005-07-03. Ahmedabad: Indian Institute of Management, 2005. p. 2-3.
65. Ramsay, Maureen. 1992. Human needs and the market. Aldershot: Avebury.

66. Rao, Vijayendra. Symbolic Public Goods and the Coordination of Collective Action: A Comparison of Local Development in India and Indonesia. World Bank
67. Rawls, John. 1971. A theory of justice. Cambridge, Mass.: Harvard University Press; Political liberalism. New York: Columbia University Press.
68. Rokeach, Milton. 1969. The nature of human values. New York: Free Press.
Rowland and Molina. 1974. Change of atmosphere
<http://www.ourplanet.com/imgversn/92/rowland.html>
69. Ryff, Carol D. 1989. 'Happiness is everything, or is it? Explorations on the meaning of psychological well-being'. Journal of Personality and Social Psychology. 57/6:
70. Schwartz, S. H. 1992. 'Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries'. Advances in Experimental Social
71. Sen, Amartya and S. Anand. 1994. Sustainable human development: Concepts and priorities.
72. Sen, Amartya. (1999b), Development as Freedom, New York: Knopf Press. P. 75
73. Sen, Amartya. "Rational fools. A critique of the behavioural foundations of economic theory" Philosophy and public affairs. 6, 317-344. reprinted in Sen, 1982.
74. Sen, Amartya. 1999. Development as freedom. New York: Knopf Press
75. Sen, Amartya. What can Johannesburg achieve? Mimeo. WSSD. 2002. P. 1.
76. - 1982. Choice, welfare and measurement. Oxford: Basil Blackwell.
77. - 1987. The standard of living. Cambridge: Cambridge University Press.
78. 1999a. Commodities and capabilities. New Delhi: Oxford University Press.
79. - 1990. 'Development as capability extension'. In, K. Griffin and J. Knight, eds. Human development and the international development strategy for the 1990s. London: Macmillan, 1990.
80. Sillitoe, P., Dixon, P-J. and Barr, J.J.F. (2000). Indigenous Knowledge Methodology. A Discussion Paper. pp.303. Department of Anthropology, University of Durham and Centre for Land Use & Water Resources Research, University of Newcastle.
81. Simhan T E, Raja. A low cost telemedicine kit for rural areas. Online: <http://www.thehindubusinessline.com/2004/05/19/stories/2004051902011900.htm>
82. Singhal, Arvind & Everett M. Rogers. India's Communication Revolution: From Bullock Carts to Cyber Marts, Delhi: Sage, 2001. 300p.

83. Solution Exchange Website. Online: <http://www.solutionexchange-un.net.in/>
84. Sudhir Anand and Amartya Sen 1994. Sustainable Human Development: Concepts and Priorities.. Online: http://hdr.undp.org/docs/publications/ocational_papers/Oc8c.htm
85. UNDP. Human development report 1990. p. 10
86. UNDP 2002,11. 2002. Human Development Report Office. UNDP. 43p.
87. UNDP. Human Development Report. Online: <http://hdr.undp.org>
88. Warren, D; Slikerveer, L. & Brokensha, D. (1995). 'Introduction' (Eds). The cultural dimension of development: Indigenous knowledge systems. London: Intermediate Technology Publications.
89. Wigand, Rolf, T., A. Picot, et al. (1997). Information, organization and management: expanding markets and corporate boundaries. Chichester, Wiley. 1997. Quoted in, Yudong,
90. Yang. ICT and information flow theory. P. 5
91. Wilson, W. 1967. 'Correlates of avowed happiness'. Psychological Bulletin. 67: 294-306.
92. World Bank. <http://www.worldbank.org/afr/ik/>
93. World Commission on Environment and Development: 1987. Our common future (Bruntland Report). WCED, New York.

About OneWorld South Asia

Working closely with NGOs, donors, multilateral organisations, private sector, media, academicians and governments as its partners, OneWorld South Asia (OWSA) is dedicated to “voicing the voiceless” and positioning of ICTs towards realisation of Millennium Development Goals (MDGs). OWSA focuses on developing appropriate programmes and projects, which would enhance communication opportunities, build capacities and explore alternative tools and techniques for empowering the grassroots. Besides, OWSA undertakes several initiatives to build and strengthen Communities of Practice (CoPs) around the MDGs to facilitate knowledge and information sharing in the region through a bouquet of on-line and off-line methods. OWSA’s key programmes include Grassroots Communication, Knowledge for Development, Research and Analysis, and Policy Advocacy supported by Capacity Building & Technical Services and Partnerships & Networking.

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