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Technology and Poverty – Some Insights from India

Vinnie Jauhari

Edson Kenji Kondo

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ABSTRACT

Poverty is a multidimensional concept, which is intricately linked with a lot of other factors. This paper analyses some of the causes of poverty and its manifestation in various forms. It tries to then look at some sector specific cases wherein the interventions have made some difference to the lives of the people. Some of the successful cases from India have been discussed in the area of agriculture, water, health and shelter. The lessons derived from these cases have been discussed in terms of technology application, sustainability, participation and empowerment of people. The conclusions touch upon the importance of indigenous knowledge, transparency, participation of people and simultaneous interventions from a number of quarters.
INTRODUCTION

It is a paradoxical world. On one hand, we have spectacular advancements in the area of science and technology and on the other hand, we have millions of people who have no access to food and basic essentials to survive. Today’s globalized economy has led to a sixteen-fold increase in world trade since World War II, worth over US$ 4 trillion per year (some 15 to 20 per cent of measured global GDP). The global economy of flows in these markets is increasingly abstract and divorced from national policy makers and local affairs, grassroots lives and livelihoods as well as natural ecosystem (Henderson, 1999). Technology as a tool on one hand has led to improvement of plight of large number of people and on the other hand it has led to marginalisation of large segments of society. Almost the entire continent of Africa (except for South Africa) has been bypassed by the flows of the global economy as described by Yash Tandon (Economist, 1999). According to the Human Development Report (HDR) (1997, pp2), although poverty has been dramatically reduced in many parts of the world, a quarter of the world’s people remain in severe poverty. In a global economy of $25 trillion, this is a scandal - reflecting shameful inequalities and inexcusable failures of national and international policies. The same report also mentions that in some industrial countries, such as the United Kingdom and the US, poverty has risen considerably (HDR, 1997, pp.5). So technology has the strength to make a difference to this world. The problem is not the tool but the direction in which it can be utilized. There is a need to evolve a new paradigm in which technology not only produces increases in manufacturing productivity but also touches the lives of down trodden and those living in the abyss of poverty.
DEFINITION OF POVERTY

The World Development Report 2000/2001 states that poverty is a pronounced deprivation in well-being. The voices of poor people bear eloquent testimony to its meaning. To be poor is to be hungry, to lack shelter and clothing, to be sick and not to be cared for, to be illiterate and not schooled. The report accepts the now traditional view of poverty as encompassing not only material deprivation (measured by an appropriate concept of income or consumption) but also low achievements in education and health. The report also broadens the notion of poverty to include vulnerability and exposure to risk – and – voicelessness and powerlessness. All these forms of deprivation severely restrict what Amartya Sen. calls the capabilities that a person has, that is, the substantive freedom he or she enjoys to lead the kind of life he or she values. This broader approach to deprivation, by giving a better characterization of the experience of poverty, increases understanding of its causes. This deeper understanding brings to the fore more areas of action and policy on the poverty reduction agenda.

WHY SHOULD POVERTY BE A UNIVERSAL CONCERN?

Poverty cannot be a concern for only the government. It is an issue, which deserves attention of the entire society at large. Poverty needs to be a universal concern on account of the following considerations:

If the disparity between the haves and have-nots exceeds a minimum level, it could create a social unrest. There is evidence in history to this effect.
The Human Development Report (1997) states,

“The progress in human development and in eradicating poverty has often been won through uprisings and rebellions against states that have advanced the interests of the economically powerful while tolerating rigid class divisions, unbearable economic conditions and human suffering and poverty. History is marked by uprisings and rebellions sparked by poverty. English peasants revolted against an impoverishing poll tax in 1381. German peasants rose up against their feudal overlords in opposition to the serfdom. In 1524. Among developing countries, India has a long tradition of peasants movement. As far back as the 17\textsuperscript{th} and 18\textsuperscript{th} centuries, when the British East India Company ruled India, peasants rose up against their British landlords. Full-scale revolutions have their roots in people’s reaction to poverty and economic injustice. Spontaneous uprisings instigated the French revolution in 1789, the revolutionary movements throughout Europe in 1848 and the Bolshevik Revolution in 1917. The wars of independence in Africa and Asia in the 19\textsuperscript{th} and 20\textsuperscript{th} centuries were not only an expression of nationalism- they were also a struggle against economic and social injustice. The civil rights movement in the United States in the 1960’s too was a struggle for economic and social emancipation - at times resulting in violence despite the pacifist philosophy of its leader, Martin Luther King, Jr. Some strides in reducing poverty since 1960, have been gradual and peaceful as with the formation of welfare states in industrial countries and the reduction of infant mortality, the increase in life expectancy and other achievements in developing countries.” History provides evidence enough to deduce that any society should not be stretched beyond limits that it reaches a point where only a revolution could bring about a change. Such a stage is accompanied by violence, turbulence and lot of social unrest. If the entire social fabric
decays, then what good are the scientific achievements and material wealth if the very survival of life becomes questionable?

To promote social progress and raise the standard of living within the wider concept of freedom, international human rights law - as enshrined in the UN charter, the Universal Declaration of Human Rights and other treaties and declarations, recognizes economic and social rights, with the aim of attacking poverty and its consequences. Among these rights are an adequate standard of living, food, housing, education, health, work, social security and a share in the benefits of social progress (www.un.org/overview).

OBJECTIVES
This paper attempts to put forth a model of the causes of poverty and its manifestation. It also tries to highlight the cases in different sectors such as drinking water availability, empowerment of people, education, health, and shelter in India where the grassroot interventions have succeeded. It tries to derive the lessons in terms of use of technology, the sustainability aspect, empowerment and participation of the communities. The cases from these sectors have been chosen as poverty is not only linked with lack of income but also lack of fulfillment of basic needs such as water, shelter, food and clothing. As postulated by the World Bank it also gets manifested in powerlessness and lack of hope.

METHODOLOGY
This paper relies on cases documented by various agencies. A model of poverty determining its causes has been proposed through exhaustive review of literature. The
model has been discussed extensively as another working paper. This paper just summarizes the model here as a diagram. The model has its roots in the review of literature done in the area of poverty. The cases have been derived from the websites of various organizations from India and have been supplemented with material from other published sources. These cases have been chosen in the area of water management, food availability, shelter, empowerment of people, education. Some of the organizations that have been taken up for the study are – SWRC, SEWA, SPARC, YUVA, SAMBHAV among others. These cases have been analyzed by looking at the kind of technologies used by them, involvement of communities, empowerment and sustainability in terms of ability for continuation. In case of Barefoot College, lot of research reports have been referred and permission was sought to analyze the case. Morgan (1996) mentions that poverty may also be seen as a many dimensional state in which a multidisciplinary approach to research into the processes that create or maintain it is essential. A case study approach has been used as it gives qualitative insights into the dynamics of multitude of interventions, which have been used, at the grass root levels.

POVERTY IN INDIA

Despite splendid achievements, India is still among the poorest nations in the world in per capita terms. Almost 30 per cent of the population still lives below the poverty line of less than 100 US$ per capita annually (Sengupta, 1992). The NSS 55th round in 2000 indicates that for the year 1999-2000, 23.10 per cent of the people are below the poverty line In absolute numbers it is 2,602,500,000 people. 23.62 per cent i.e. 670.07 lakh persons are urban poor and 27.09 per cent, i.e. 1932.43 lakh persons are rural poor
Bhagwati (2000) contends that economic growth improves incomes, pulls up people out of poverty, improves literacy, helps spend more on public health and does much more along these lines. He attributes an annual growth rate of 3.5 per cent for almost a quarter century upto the early 1980’s to the following set of policies:

- Anti globalization policies which restricted foreign direct investment
- Off the charts reliance on public sector enterprises characterized by overstaffing and lack of incentives
- Defense of capital intensive choice of techniques which led to tolerance of huge public sector performing badly
- An overwhelming expansion of direct controls

The poverty alleviation in India leaves a lot to be desired. As Kothari (1993, pp147) aptly puts across, “Laws have been enacted but rarely implanted. Policies have remained on paper, as collection of pious intentions without workable action plans. Few programs that have been implemented have rarely reached the intended beneficiaries, especially in the manner required. Reservations, representations and various fiscal benefits have either been fraudulently diverted to ineligible individuals or have been restricted to very narrow elites of the economically weaker and minority communities.”

In India, poverty is officially linked to a nutritional baseline measured in calories (food energy method). The Planning Commission defines poverty lines as a per capita monthly expenditure of Rs 49 for the rural areas and Rs 57 in urban areas at 1973-74 all
India prices. These poverty lines correspond to a total household per capita expenditure sufficient to provide, in addition to basic non-food items – clothing, transport – a daily intake of 2,400 calories per person in rural areas and 2,100 in urban areas. Individuals who do not meet these calorie norms fall below the poverty line (www.wnln0018.worldbank.org).

Despite a high GDP growth in mid nineties in India poverty reduction has been sluggish in India. The poor states in the north and east, containing 40 per cent of India’s population have lagged in reducing poverty since the late 1970s (World Bank Report 2000). A report from World Bank (2000) that,

“Institutional weaknesses and governance issues exacerbate the lack of funds. Numbers working in employment programs or attending school appear to be much less than in official statistics. For example in 1995-96, the NSS showed gross attendance ratios of 85 per cent versus the Department of Education’s gross ratio of 104 per cent. Large fractions of poverty funds go to administrative costs or are diverted, leaving less for the poor. A study in Uttar Pradesh suggests that under the new targeted public distribution system, much of the grain that reached the public distribution centers went to the poor, but there was a 40 per cent shortfall between off take and what reached the distribution centers.”

Concerted policy action is required to lift more than 300 million poor out of poverty. India’s anti poverty strategy comprises of a wide range of poverty alleviation and employment generation programmes, many of which have been in operation for several years. Some of the anti poverty programmes operational in India are:
Integrated rural Development Programme (IRDP)
Training of Rural Youth for Self Employment (TRYSEM)
The Programme of Development of Women and Children in Rural Areas (DWRCA)
Jawahar Rozgar Yojana (JRY)
Employment Assurance Scheme (EAS)
Million Wells Scheme(MWS)
National Social Assistance Programme
Swarna Jayanti Shahari Rozgar Yojana (SJSRY)
Prime Minister’s Rozgar Yojana (PMRY)

The data drawn from the Ministry of Rural Areas and Employment and other concerned departments (Economic Survey 1998-99, Ministry of Industry, Govt. of India) indicates a large gap between targets set for various schemes and the achievement. In many cases it is even less than 50 per cent. In such a state of affairs, the desired objectives are difficult to achieve. Hence there is a need for people themselves getting involved in the poverty alleviation programs.

A look at the education and health sector yields some interesting insights into the Indian scenario. The health services in India indicate that there is a huge gap in the facilities and the numbers who need help. The data from Ministry of Health and Family Welfare as quoted in Economic Survey (Ministry of Industry 1998-99) indicates the following:
The number of medical colleges in India has grown from 28 in 1951 to 165 in 1997. The number of hospitals has grown from 2,694 in 1951 to 15,097 in 1996. The number
of dispensaries has grown from 6,515 in 1951 to 28,225 in 1996, community health centres from nil in 1951 to 22,446 in 1997. The number of hospital beds has grown from 117,178 in 1951 to 870,161 in 1996. The numbers of doctors have grown from 61,840 in 1951 to 484,410 in 1997 and nurses from 16,550 in 1951 to 565,696 in 1996. As per the Human Development Report (HDR) 2001(p 48) the number of physicians in India for the period between 1990-99 was 48 per 100,000 persons. Only 35 per cent of the population had access to essential drugs (HDR, 2001, p160). Only 31 per cent of the population in India had access to adequate sanitation (HDR, 2001, p 160). The data on Indian education scenario has been mentioned later in the paper.

**MODEL OF POVERTY – CAUSES AND MANIFESTATION**

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- Malnutrition
- Ill – health
- Low self esteem
- Powerlessness
- Illiteracy
- Humiliation
- Related social problems
  - Child labor
  - Drugs
  - Prostitution
  - Breaking of family bonds
  - Delinquency
  - Lack of hope
MODEL OF POVERTY – CAUSES AND MANIFESTATION

The model presented above attempts to identify the causes of poverty and the manifestation in the real world. As can be seen from the figure it attempts to segregate the causes as internal and external causes and these are also related to each other. The manifestation of poverty in various forms is also indicated. To eliminate poverty, it is necessary to understand the causes of poverty. Only when the cause is known, can the issues be addressed in a right manner. All the causes and manifestation factors are routed in the literature and for detailed evidence for these factors kindly refer to the Working Paper on Technology and Poverty – The Missing Link. (Co-authored by Kondo & Jauhari, 2001).

SECTOR WISE CASES

The following paragraphs highlight the interventions taken at the grassroots levels. These cases pertain to the education, provision of employment, housing, water, health and empowerment of people, also reflecting specific cases on empowerment of women. The Social Work Research Center (SWRC) through its Barefoot College is an example of how a local community which is completely illiterate, could be used for employment, can be educated, could use local knowledge and technology for water and food, can manage itself as a sustainable unit. Similarly, SEWA is another case which empowers the poor self-employed people and the interventions cut across different sectors such as shelter, employment, health, education, crèches, standing up for the cause of self-employed workers and raising issues on their behalf. The case study on SPARC focuses on the use of local technology in the area of shelter and empowerment of women. The Building Center Movement also focuses on the provision often shelter
to the poor communities. The case of Sambhav highlights the use of local seeds and indigenous knowledge in converting a barren land for creating sustainable livelihoods. The Barefoot College exemplifies how education has to be rooted into the ground reality of working children who have to support their parents for livelihood. It runs night schools and also empowers children by giving them responsibility for various tasks.

SOCIAL WORK RESEARCH CENTRE (SWRC) – INTERVENTIONS IN EMPLOYMENT, EDUCATION, HEALTH AND WATER

The Social Work Research Centre (SWRC) has been working in rural communities in India to improve the quality of life of the rural poor. SWRC has worked to address basic needs: water, health, education, employment, social awareness and conservation of ecological system. while enrolling individuals in the processes that govern their lives. A voluntary agency, SWRC’s main center is in the village of Tilonia in the Silora Block in the Ajmer district of Rajasthan. The organization began its work in 1972 in Tilonia, by opening a Barefoot College, because a rural development agency could and should not work from a village. Rural development required living among those people who would effect and be affected by that development process. SWRC programs were initially started with urban expertise from outside the area.

The College benefits the poorest of the poor who have no alternatives. It encourages practical knowledge and skills rather than paper qualifications through learning by doing process of education. The College spread over a 60,000 square feet consisting of
residences, a library, dining room, meeting halls, marketing outlets, an open theatre, a blacksmiths workshop, solar fabrication workshop, water testing laboratory, an audio visual unit, handicraft production centre, a puppet workshop and a 400,000 litre rain water harvesting tank entirely built and supervised by the local people. The College serves a population of over 100,000 people both in immediate as well as distant areas.

**Philosophy**

The philosophy at the Barefoot College is that people are encouraged to make mistakes so that they can learn humility, curiosity, the courage to take risks, to innovate, to improvise and to constantly EXPERIMENT. It is a place where all are treated as equals and there is no hierarchy. The Barefoot College believes that development programs do not need urban-based professionals because para professionals already exist in the villages whose wisdom; knowledge and skills are neither identified, mobilized nor applied just because they do not have an educational qualification.

The Barefoot College is developed in the following manner:

- First by reposing faith in the competencies of rural poor community anywhere in the world that the community has members who have the knowledge, the skills, the wisdom and the faith to identify and solve their own problems
- Second by creating an environment and a situation where these skills and knowledge can be applied for the community’s own development.
- Third by informal, non structured, on the job practical training until such time as the person has acquired the confidence, the competence and the capacity to provide the service without any help from outside.
• Fourth, by choosing an area, which is remote, inaccessible and very difficult physically, to reach so that there is peace, mental space and non-interference from the so-called experts who are dying to make sure you fail.

People who have no formal educational or professional degree run today all the programs. An individual’s will to learn and aptitude for learning is more important than any formal degree or paper qualification. The new campus at Tilonia was designed and built by one of the villagers, who can barely sign his own name. The campus itself reflects the adaptation of both traditional as well as new methods and technologies. Old traditional methods have been used to keep the buildings cool while solar energy is used to provide electrical power to the campus. People with minimum paper qualifications work as- night school teachers, health workers, computer operators, solar engineers or hand pump mechanics. Basic literacy, health and first aid skills are also taught. In this way each individual learns about the entire organization, its mission and it’s functioning.

**Sustainability**

• It generates employment
• It involves people in the process
• It helps to take care of the basic minimum needs

The Centre does not provide free services. A nominal fee is charged for all services including health services, training, and installation of hand pumps or solar
electrification for lighting. Almost 98 per cent of the workers are from neighboring rural areas.

**Technology Orientation**

SWRC believes that new trends in technology and high tech machines are not always synonymous with development. SWRC does not believe in imposing technology on people in rural villages or using technology, which deprives people of employment. Adapting and improving on pre-existing, traditional ways is often more effective than using newer technologies.

**Replicability of the Barefoot Concept**

- It will work anywhere in any poor rural community anywhere in the world where there is extreme poverty.
- The rural communities are neglected, deprived and forgotten so they have no choice but to develop and depend on each other and not on people from outside—thus all knowledge and all skills are useful, necessary and respected
- Where the percentage of ILLITERACY is high so the oral tradition is rich and knowledge skills are traditionally passed down from one generation to another.

The Barefoot College encourages the following people to participate:

- Those who are dropouts, cop-outs, washouts and who are rejected by the society because they cannot pass the exam and have a degree.
- Those who have no possibility of getting the lowest of the low government job. They have no choice but to stay and the investment in the training is not wasted.
They will earn the respect of the communities they serve because of the service they will provide.

**Organization**

The Barefoot College concept is percolated to the communities in the 110 villages of the Silora block through the 12 SWRC field centers. The field centers have the freedom to decide their own course of action. Each serves between 9 and 35 villages. The College has over 400 staff members working full time in various activities related to basic services. They have no formal qualifications for the job they are doing. With the help of a cadre of barefoot engineers, doctors, teachers, designers, chemists, accountants and traditional communicators, communities are using expertise they acquired from their ancestors. The concept of communities depending on themselves has revived. Indigenous institutions and decision-making processes have been activated and villagers have gained new confidence. They increasingly recognize their own strengths and assign value to their own skills—something that was never felt before.

The Barefoot College and Children’s Parliament of Tilonia, Rajasthan has won the Children’s World Award (Sharma, 2001). The award, considered the “Children’s Nobel Prize” is a unique global award for organizations that champion the rights of children through their activities. Queen Silvia of Sweden at Grips holms Castle in Marie Fred presented the award on April 18, 2001. The award carries a prize of $12,500. The prize money is to be spent on activities conducted by the College for the rights of the children.
UNIQUENESS AND IMPORTANCE OF BAREFOOT’S EDUCATION INITIATIVE

The efforts of the Barefoot College are commendable as the education infrastructure is in a deplorable state. The quality of school infrastructure leaves a lot to be desired. The fifth All India Educational Survey conducted in 1986 found that 40 per cent of schools did not have a permanent building and 9 per cent did not have any building at all (NCERT, 1992). As far as the availability of other basic facilities was concerned, 60 per cent of schools had no drinking water, 89 per cent did not have toilets, 40 per cent had no blackboards and 70 per cent had no library. Six years later there is little change (NCERT, 1977). As government and local bodies run the majority of the schools (92 per cent), the state has primary responsibility for bettering the quantity and quality of schools. The problems of physical distance for children from a school are exacerbated by problems of social distance for children from underprivileged households (Probe Team, 1999).

Swaminathan and Rawal (1999) highlight the case of an experiment taken up in Madhya Pradesh where an Education Guarantee Scheme was introduced in 1997. They quote Gopalakrishnan & Sharma (1998) wherein they mention that the government guaranteed the provision of a teacher, teacher training and basic materials within 90 days of a request from a community for a primary school as long as there were a minimum of 40 children (25 in tribal areas). It led to setting up of 15,568 schools in one year. On the negative side, the measly expenditure on the scheme (teachers monthly salary of $10 a month and children given free books worth half a dollar). Swaminathan & Rawal (2000) point that there were two major reasons for failure of
this scheme. There was no commitment of additional financial resources for the scheme. Second it required a local community start a school and run it successfully for two years, with some minimal help from the government in terms of teaching materials and other unspecified assistance before the government upgraded it on a permanent basis. It is not clear if other assistance includes even basic salary for teachers and some teacher training.

Nearly 38,000 additional teachers’ posts are lying vacant in primary and upper primary schools in various states with hundreds of crores of rupees remaining unutilized (Hindustan Times, 2000). Against 83,045 sanctioned posts for third teacher in primary schools, the States have so far appointed only 74,463 teachers. Till March 10, 1999 as much as Rs 37,869,000 out of Rs 25,901,600,000 under Operation Black Board scheme were lying unutilized. The Parliamentary Committee says that this situation calls for a serious review.

In light of the above mentioned facts, the interventions initiated by Barefoot College hold a lot of merit as they involve local community, are flexible keeping in mind their commitments to generate food for themselves. It also gives them practical knowledge, which helps them use it on the job.

INTERVENTIONS IN EDUCATION
The College runs a series of night schools in several villages in and around Tilonia where children are taught in the evenings, after they finish their day’s work. The
college students have their own parliament, the representatives to which are elected from amongst the boys and girls attending the different night schools.

**Night Schools**

More than 80 night schools have been set up for the benefit of working children. Nearly 1,200 girls and over 1,500 boys who tend cattle during the day attend these schools after dark. Solar lanterns maintained by rural solar engineers power more than 68 per cent of these institutions. All teaching aids and learning materials used in the night schools are made from waste materials. Instruction is informal and curriculum is focused on practical knowledge and experience. Since most children tend cattle, they learn basic husbandry along with reading maths. Cattle attend night schools for five years. Children monitor their own schools by electing their own representatives.

**Childrens’ Parliament**

The childrens’ parliament controls and supervises the night schools. It is based on the belief that giving power to the people who have a vested interest in the school is the best way of ensuring its success – as well as making the children aware of political structure and processes. This form of education related activism provides a heightened awareness of the system, its workings and avenues for readdressal of local grievances. There is also a provision for teacher training and there is a mobile library which goes from village to village and from where the children from the night school can borrow books.
Concrete Outcomes

Hand Pumps

More than 1,500 India Mark II hand pumps were installed between 1979 and 1995. Over 300,000 people continue to benefit from these hand pumps. Despite claims by the government that it was technically impossible 28 hand pumps were installed at 15,000 ft above sea level in Ladakh and operate at –40 degree centigrade.

Since 1993, the College has focused on water harvesting and dipped water systems as the emphasis has moved beyond providing clean water to provide easy access to drinking water. 12 villages, 12,000 connections and 15,000 people now benefit from community piped water systems, designed, planned and implemented entirely by the village people. These communities pay Rs 20 per month for two hours of water per day (http://www.barefootcollege.org/html/water.htm).

Other water initiatives include:

- 12 million liters of rainwater collected in 155 schools and community centers. This water is the only safe option in areas of brackish water with high iron and fluoride content.
- 1,400 samples of drinking water covering 78 villages in 8 states tested using mobile testing kits
- 35 rural youth trained as barefoot chemists in 8 states
- 753 hand pump mechanics trained to carry out all repairs for the 45,000 hand pumps in Rajasthan, 40 of these mechanics are women.
CONTRIBUTION TO EDUCATION

Health

Barefoot College has remarkable achievements in the health sector too. Begun in 1973, the health center served as a small dispensary. Villagers are now charged a nominal amount for medicines. A team of doctors pays regular visits to villages for routine health examinations. Today more than 200 health centers serve villages throughout India. Since 1986, the Barefoot College has been using biochemic medicines. Biochemic medicines are a set of 12 medicines, which can be combined and used for different ailments. The college has developed 28 medicines using the twelve root medicines; at least one field staff member in every village has been trained in this alternate system of medicine and serves as the field center’s svasthya karyakartas or health workers.

Today more than 200 health workers serve a network of Indian villages trained to tackle the health issues and minor injuries. The health workers can give artificial respiration in emergencies and take a patient to the nearest government hospital when necessary. Health workers also teach villagers about basic health issues including hygiene, the importance of vaccinations and other preventive measures. Barefoot midwives are trained in proper delivery methods as well as pre and post natal care of the mother and the child. In case of birth complications that cannot be tackled in the village, the dai escorts the expectant mother to the nearest hospital.
ENVIRONMENTAL INITIATIVES

Barefoot solar engineers have installed solar photovoltaic units across 10 states of India in 300 adult education centers. The results include:

- 500 solar lanterns manufactured at the college for 200 night schools across the country
- 104 fixed solar units for night schools to replace kerosene lamps which have a negative impact on children’s eyesight
- 25 remote and inaccessible villages in Ladakh have 36 kws of solar panels that provide three hours of light in the bleakest winter to 930 families.
- In Leh and Kargil districts, solar energy initiatives have saved a total of 59,000 liters of kerosene.
- 79 rural youth as barefoot solar mechanics with absolutely no aid from urban professionals
- 130,000 liters of kerosene saved, by replacing generators and oil lanterns with solar power

Funded by the European Commission, the College is working with Programme Asvin to develop and disseminate solar energy systems for villages in the Himalayan region of India. The project is bringing solar powered lighting to 30 villages in Sikkim, Uttar Pradesh and Ladakh- as well as demonstrating how local knowledge and practical skills can make these villages completely self sufficient technically and financially.
WASTELAND DEVELOPMENT

Most of the land owned by the government or village and reserved as fodder ground is wasteland. Most of the wasteland in Rajasthan is barren because of overgrazing and desert like conditions. The Barefoot College helps rural communities to regenerate this land. The College provides seedlings from its nursery of draught resistant trees, shrubs and grasses. The villagers themselves plant the trees and shrubs, which will become a source for fuel and fodder. Every wasteland has a watchman who prevents trespassing or misuse.

The Barefoot College aims to drought proof these areas by employing various strategies:

- Wasteland development
- Popularizing traditional systems of water storage
- Recharging old wells from rain harvesting units
- Preserving desert culture and mobilizing people’s actions

The rain harvesting initiatives have achieved:

- 207 underground tanks with a total capacity of 11.5 lakh liters built for rain water collection in Rajasthan thereby employing 4,000 persons
- 12 million liters of water collected in 1996-97 in rural schools and centers where rain water harvesting units have been installed
- Because of the availability of potable water the attendance of girls in these schools have increased significantly
• 2,325 landless laborers have given 93,500 days of employment to build these tanks
• 90 lakh liters of water was collected at Re 0.25 per liter in 1996-97 with individuals contributing over 5 lakhs worth of their labor.

WATER
Lack of access to clean water and sanitation is a problem that affects large number of people. Water is a wholly renewable resource. This may be true in a geological time scale but in a yearly or even centennial cycle this is not necessarily the case. Most surface water does replenish itself on a weekly to yearly basis but ground water, which is a major source of fresh water, has an average renewal cycle of 1,400 years (UNEP/GEMS, 1991). Without artificial aquifer recharge ground water reserves cannot be considered completely renewable and the use of water from them reduces the overall supply. The increase in demand for freshwater has resulted from a rapid growth in urbanization and industrialization combined with an overall increase in population, both rural and urban (Martin and Martin, 1991). In many countries agriculture can account for upto two thirds of human water demand. India is reported use 97 per cent of its fresh water supplies for irrigation (UNEP/GEMS, 1991). With 21 per cent of the world’s population, China has to survive on only 7 per cent of the world’s total fresh water resources. Some 300 major Chinese cities face water shortages (Glenn & Gordon, 2000). Japan changes seawater into drinking water and exports that technology to the Middle East (Glenn & Gordon, 2000).
Water is a public good, which if maintained unspoiled and vital free good for all human beings. Well known in the economic literature, the main cause of pollution in general is the fact that the industrial processes are not based on full cost pricing (Henderson, 1999) including environmental and social costs of the industrial activity in the production of a private good. There is no doubt that if we can create new institutional designs that can bring the right incentives for industry to develop technologies that conserve this vital public good, technology may have a huge impact on the well being of the poor.

The technological advances need to be channelised in a manner that it ensures safe drinking water for the masses. Water is a natural product. It cannot be a monopoly for only rich. Do as individuals we have no obligation to ensure that everyone gets his share of water and clean air.

About 70 per cent of the world’s fresh water supply goes to the agriculture, a figure that approaches 90 per cent in highly productive Asian Countries such as China and India, which rely on extensive irrigation (Shah & Strong, 2000). The shortage of fresh water is looming as a serious obstacle to food security, poverty reduction and protection of environment. Eventually, the shortfall could reduce India’s harvests by as much as 25 per cent. Reduction on morbidity from better water supply and sanitation is estimated to be 26 per cent for diarrhea, 27 per cent for trachoma, 29 per cent ascariasis, 77 per cent for schistosomiasis and 78 per cent for dracunculiasis. Mean reduction is diarrhea-specific mortality can be 65 per cent, while overall child mortality can be reduced by 55 per cent.
CASE OF RAJASTHAN FOR WATER INTERVENTION: THE BAREFOOT MECHANICS (Prayatna Sansthan, Solvta, 2001)

In Rajasthan more than 30,000 hand pumps are being maintained by over 1,000 Hand Pump Mechanics (HPM’s) who have replaced government caretakers, block mechanics and the mobile maintenance unit. This decision to scrap the top heavy, prohibitively expensive, three tier system (designed originally by UNICEF) in favor of an entirely community based repair and maintenance system, was taken years ago by the State Government of Rajasthan. The idea of barefoot mechanics - who have been given adequate training in repairing and maintaining hand pumps in their own villages - appealed immensely to the Indian government. It is the only system recommended by the Prime Minister’s Technology Mission. The initiative for the HPM scheme came from the villagers themselves. The question was what was so special about the hand pumps that they require an entire government department and a battery of personnel and equipment to repair it. So the use of the Training of Rural Youth for Self Employment (TRYSEM) was made to train. THE HPM’s chosen under the TRYSEM program were mostly semi literate and landless youth. The majority being agricultural laborers from the poorest families in the villages. What they possess are practical skills picked up from working and improvising in the village. Unlike the engineer, who does not really suffer if the handpump is out of order, the HPM has a stake in the efficient working of this scheme. He is answerable to the community and earns respect by providing a vital service. He is not a government servant but has his roots in the village and has no choices but to stay.
As contrast to this in the government run three tier system the caretaker provides a free service and depends on the block mechanic who in turn depends upon on the mobile maintenance unit. The fact that the caretaker has only a limited function while the others draw large salaries reflects the fact that there is a total ignorance of the availability of the skills in the rural area.

Another case of water management gives insight into the management of the local technologies. In Dadu Block (in Ajmer district) around the Sambhar Lake, the largest salt-water lake in Asia, the water is at a depth of more than 40-50 feet, is saline and therefore unfit for human consumption and irrigation purpose. The entire land is barren but the forest cover is very marginal. The only source of water are open ponds and shallow wells that get filled during the rainy season between July and September. The average rainfall is merely 200 to 400 mm per year. By April the ponds are virtually dry and women have to walk 4 kms to fetch water. Animals and human beings are forced to drink water from the source there by leading to cause of infections.

Collection of rainwater off the roofs, to be stored and used for drinking water purposes seemed the only solution to the drinking water problem in this harsh terrain. This was an option, which could be easily managed and controlled by the village communities themselves. So Prayatna Sansthan began constructing roof water harvesting tanks in 1986. They were first built in schools in order to provide the children with safe drinking water. The attendance in these schools better because there was now clean water available freely. The tanks constructed as of 1992 have an average capacity of
30,000 liters and are used not only by the children but by the rest of the village community too.

The run off water from the roofs drains via pipes, which, in turn, are connected, to an underground tank. The roof and its walls are repaired and made waterproof and are kept clean. There is a hand pump attached to the top of the tank to prevent contamination by dirty unhygienic buckets being dipped inside. Five hours of heavy rain on 600 square feet of catchment area is adequate to fill a 40,000-liter tank. The experience of the schools has been that this volume provides enough drinking water for 50 children over 12 months.

The tanks are constructed using limestone, bricks, stones and cement. The cost of construction is under Re1 per liter. Skilled masons, to be found in almost every village are the only experts who are required. Over a period of three years, the workers of Prayatna Sansthan have overseen the construction of over 30 tankas in as many village schools. They harvest 1,500,000 liters of rain water in a year.

THE CASE FROM ORISSA ON ORGANIC FARMING
This case illustrates how communities can be self sufficient on the food aspect. The organic farming, soil and water conservation models demonstrated by Sambhav are remarkably low on cost with the simplest of the techniques. The farming can be done with the help of materials that are freely and abundantly available to any farmer anywhere. In the 90 acre, Sambhav farm near Odogaon in Orissa, economist and environmentalist, Prof. Radha Mohan has shown to the world that it is possible to make
degraded soil yield gold without the help of irrigation, chemical fertilizers or pesticides or machines and with little resources that are available to small and marginal farmers. The soil in Odogaon was most eroded, highly degraded and topsoil was totally washed. So he took up a challenge that if the experiment would succeed here, it could succeed anywhere. The first task was to plant huge quantities of weeds like Sabai grass in the area for soil and water conservation. The vegetative bunds gave a healing touch and the shallow channels; trays and pits dug around the plantation area ensured that the trees absorbed each raindrop. Percolation tanks ensured that rain or no rain; the soil would not go thirsty. Also there are a series of percolation tanks. So whatever water is collected there, it seeps through the ground providing moisture to the root zones of the plant. So, instead of water flowing on the surface removing soil, water flows under the ground. To keep a tree alive during peak summer, Prof. Radhamohan would use an earthen pot half buried in soil and with a small hole at its bottom. When water is poured into it, it supplies water to the thirsty roots drop by drop for seven days. Even the weeds that grow can be cut and dried and used as mulch, a source of manure and moisture. Cutting weeds, putting them as mulch, using compost and using green manure – these are within the reach of the poor ordinary people. This technique is capable of being replicable and can be adopted by ordinary people. Because of this experiment, the farmers have stopped selling their land. The experiment has been sustained without any major funding. The land for the 90-acre farm was bought for only Rs 90,000 ten years ago. Sambhav has been able to generate revenue for the sale of its products and saplings.
HOUSING

Shelter is a basic human need, which needs to be fulfilled. Almost half of Bombay’s 8.7 million people live in dirty slums. About 300 families are added to the city’s population everyday. Despite the fact that an average of 20,000 to 25,000 housing units are built every year by public and private housing agencies, it is not possible to provide houses for 4 million slum dwellers because the system does not provide the resources required to build for those with limited income and little or no savings at all (Anzorena, 1994).

As shelter is a basic need, it therefore becomes important for cost effective housing technologies. In the level of low income there is a need for appropriate and cost effective technologies. There are problems of:

- Rising costs
- Access to materials
- Lack of reach of innovations to the common man
- Awareness of these innovations to the professionals
- Lack of exposure to the construction workers and artisans who are the main link in utilizing these options
- Lopsided impact on environment in terms of depletion of natural resources
- Lack of support through building regulatory media, codes and schedule of rates

The Building Center Movement in India has emerged as a grass root level intervention with the objectives of:

- Transfer of technology
- Training of artisans
- Production of elements
- Construction and guidance
- The building center movement has taken long strides. From Nirmithi Kendra in Quilon in 1986 in Kerala to Jammu in 1995, there have been 385 building centres.

The Government of India launched the National Network of Building Centres. The case of Nirmithi Kendra in India will exemplify how shelter technologies made a difference to the lives of the people who live at the margins. The case is derived from the MOST Clearing House. Best Practices.

In 1985, for providing affordable solutions to housing, India’s first “Nirmithi Kendra” was set up in the Quilon District of Kerala by the then District Collector. This was a trendsetter in cost effective and environment friendly (CEEF) building technology saving about 30 per cent of the cost. The movement succeeded in technology transfer from R&D institutions, in training and employment generation and in developing new educational programmers. The achievement of this project is that in 1985, this enabled in providing shelter to thousands rendered homeless due to calamities by integrating beneficiary participation with appropriate technology and resources available with the district administration.

The factors contributing towards its success are:
- Beneficiary involvement in the process
• Delinking developmental task from government rigidities
• Establishing linkages with the R&D institutions for technology selection and transfer
• Effective co ordination of tasks and related agencies
• Use of locally available and innovative materials
• Cutting down the consumption of energy intensive materials (cement steel) using appropriate technology
• Ensuring local participation in construction activities
• Blending new styles with traditional ones

The Nirmithi concept soon spread across the state and the Government of India recognized the concept by including it in the Union Budget and the National Housing Policy saw the growth of the movement at the national level by setting up Building Centers in the country. A Special Habitat Award was given to the progenitor of the movement and the Kollam Center gave further impetus to the spread of the Movement. International recognition was awarded to Nirmithi when the United Nations Commission for Human Settlements at its 14th session in Nairobi (May 1993) adopted a resolution recommending governments to set up institutions modeled on the Building Centers at the national, provincial and grass roots levels. Nirmithi has become synonymous with cost effective environment friendly building technology. To ensure quality criteria, Nirmithi in collaboration with the Bureau of Indian Standards, compiled standards and specifications for cost effective building materials and techniques.
Lack of adequate skills for the new technology used led to investments in skill upgradation programs in masonry, carpentry, plumbing, landscaping and such other skills related to housing and habitat. The training activities of Nirmithi include the revival of traditional architecture with its blending with the modern. Young carpenters and craftsmen are trained in dying arts such as hand carving and traditional roofing with stylistic features. A considerable portion of Nirmithi efforts lies in the propagation of CEEF technology by setting up of Nirmithi Clubs in educational institutions. About 2,500 students in 25 colleges are setting up Nirmithi club activities. These clubs aim to generate the right attitude towards cost effectiveness and environment friendliness through the use of poster campaigns, demonstration programs, seminars and workshops for generating awareness among the students, study tours and field visits, career guidance, entrepreneurial development and various short duration skill development training programs.

The training centers have contributed considerably to alleviate poverty. The hundreds of youth and women trained in building material production were productively utilized at these centers. Employment generation through these production centers in rural areas has helped to arrest rural migration. For common man needing guidance and information pertaining to CEEF technology, Housing Guidance Centers were set up by way of consultancy, design, estimation and execution as required by the client.

The efforts of the institute have been lauded through tax waivers by the government on Nirmithi buildings and industrial estates. Central government issued orders to waive excise duty for cost effective materials and instructing state governments to execute 20 per cent of public works through Nirmithi Kendras. Accreditation and incentives being
given to industries using Nirmithi materials. TamilNadu state government issuing orders to execute all construction works under the District Administration through Nirmithi Kendras.

Concrete Outcomes

- 30 per cent reduction in construction cost
- From 14 building centers in Kerala to 350 building centers in the country
- In Kerala alone, 38.58 man years of onsite employment and 61.74 man years of offsite employment generated
- Targeted different groups such as scheduled castes and scheduled tribes and women
- Educational programs such as Masters and Diplomas in Habitat Technology
- The Nirmithi Eco Village at Mannanam, Kerala demonstrates the possibility of living in harmony with nature. Environment friendly houses, non-conventional energy generation using biogas, solar and wind energy, cultivation using organic manures and herbal pesticides are being practiced here. Eco friendly income generating programs give thrust too the idea of sustainable development.
- Another demonstration of the Nirmithi activity has been the rehabilitation of an entire community in the coastal area of south Kerala whose main activity was the brewing of illicit liquor has been rehabilitated through concerted action including training programs in building material production and the eventual involvement of these people in Nirmithi production units for actual production –
thus empowering a whole community towards positive action and meaningful integration into society.

**SPARC** (Source SPARC, 2001),

SPARC is a Bombay based voluntary organization working with slum and pavement dwellers. The real challenge in documenting the experiences of women seeking shelter, which can survive delays, long waiting periods and prolonged negotiations. A movement, which ensures that women are in the center, stage and fully involved in the process that educates and trains the people in the process. The model process started in Bombay in 1984, initiated by a group of poor women in Byculla. SPARC was set up to explore ways by which a group of professionals could work along with poor community to resolve problems they felt were critical. It was intrinsic in this aspiration that women would be central to the process. SPARC began to work with women who resided on pavements in central Bombay seeing them as the most vulnerable group in the city. Along with 600 women residing in five settlements, SPARC explored why poor people can never get secure housing in the city and despite the evidence to the contrary designed a training programme which equipped women to create human and financial resources to make an alternative possible. In this exploratory process an organization called Mahila Milan was formed and a three way alliance with SPARC, an NGO, and National Slum Dwellers Federation (NSDF), a federation of dwellers across India. It began to provide exposure and training to communities who were members in the federations, also assisting women in these settlements to form Mahila Milan collectives and negotiate space for participation in community matters. The process required constant dialogue with the state officials preparing them to understand the
value and advantage of dialogue to the achievement of their work goals rather than as a favor to poor communities. It also meant tremendous participation in the dialogue with confidence. There is a need for a change, which not only emancipates the woman but the entire family. The NGO is a facilitator, while it never withdraws, it transforms its relationship with communities and increasing responsibility of training and capacity building, planning projects and executing them is undertaken by the community leadership, never on SPARC. And most important most of these trainers are women.

Impact

- Mahila Milan has a standardized shelter training process and trains communities all over the country.
- Women in small communities are running credit and saving groups, which have convinced banks to lend them money on easy credit.
- Mahila Milan has undertaken construction in all sites where communities get land tenure and trains women to undertake construction management.
- Community sanitation designed and developed by Mahila Milan, which creates space for children, women and men for toilets and is managed by women is now the basis for the design of sanitation being developed in Bombay, Lucknow and any cities.

Uniqueness of the Intervention

The process is sustainable as it involves women centrally from the beginning, creating an agenda for change based on their needs. It moves at a pace they can manage and see solutions, which satisfy them and ensures that they can undertake those solutions on
their own. Communities support these processes as women are assisted to negotiate power sharing with men in a manner which is useful for the relationships of men and women and which benefits the family and community. The problem is identified and evaluated to identify its causes and factors restricting in generating the solution. Small pilot projects are undertaken to test the alternatives, resources, which they do not have, are supplied by SPARC through development assistance. This demonstrates what is possible, quantifies what women can do and forms the basis of standardization essential for large-scale solution. Mahila Milan have undertaken these initiatives in house construction, sanitation etc.

EMPOWERMENT

Glenn & Gordon (2000) remark that violence against females between 15 and 44 years old causes more death and disability than cancer, malaria, traffic accidents and even war. And 70 per cent of the world’s 1.3 billion poor are female. The survival of the children is related to women’s economic power and to their role in society. Improving the status of women could be the most cost effective strategy for addressing most of the challenges we face at the millennium. Sen (1997) mentions that empowerment starts with changes in consciousness and in self-perception. This can be the most explosively created, energy releasing transformation, one from which there is no looking back. Empowerment taps powerful reservoirs of hope and enthusiasm among people used to viewing themselves negatively.

YUVA- Youth for Unity and Voluntary Action – is one of the many NGO’s working in Mumbai for the rights of the urban poor. It organizes youth and women for social
action in housing, health, education and judicial system and offers counseling. YUVA is also active in policy advocacy. It for instance provides support to pavement dwellers in Mumbai who are under constant threat of being evicted and of having their makeshift homes bulldozed by the municipal authorities. Often when people are evicted, the authorities are offer to relocate them to the outskirts of the city, far from their work and from their children’s schools. Most soon trickle back to their old locations and then the cycle starts again. YUVA educates people about their rights- with respect to housing, employment and schooling for their children. Recognizing that, as elsewhere, most responsibility for household survival falls on women, YUVA also supports such activities as women’s savings funds. Similarly there are other forms of support to the people from initiatives taken by different agencies.

SEWA
The Self Employed Women’s Association, SEWA was born in 1972 as a trade union of self-employed women. It grew out of the Textile Labor Association, TLA. India’s oldest and largest union of textile workers in 1920 by a woman, Anasuya Sarabhai. SEWA ‘s predominant goals are Full Employment and Self Reliance. It believes that poor women’s growth, development and employment occurs when they have work, income and food security. It’s the member’s needs and priorities, which shape the needs and priorities of the organization. There are certain questions related to its own operations on which the performance of the organization is monitored. These are related to enhanced employment, income, food and nutrition, health, child care, housing, increase in assets, workers organizational skills, leadership, more self reliance collectively and individually.
The organization is registered as a trade union under the Indian Trade Unions Act of 1926. The Union is open for membership to self employed women workers all over India.

SEWA members are workers who have no fixed employee-employer relationship and depend on their own labor for survival. They are poor, illiterate and vulnerable. They barely have any assets or working capital. But they are extremely economically active, contributing very significantly to the economy and society with their labour. Infact 64 per cent of GDP is accounted for by the self-employed of our country. There are three types of self-employed women:

- Hawkers, vendors and small business women like vegetable, fruit, fish, egg and other vendors of food items, household goods and clothes vendors
- Home based workers like weavers, potters, bidi and agarbatti workers, papad rollers, ready made garment workers, women who process agricultural products and artisans
- Manual laborers and service providers like agricultural labourers, construction workers, contract laborers, handcart pullers, head loaders, domestic workers and laundry workers.

The association has 318, 527 members and Gujarat membership is 205, 985.

Membership Pattern:

<table>
<thead>
<tr>
<th>Category of Workers</th>
<th>No. of Women</th>
<th>Percentage of Total Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>79,008</td>
<td>38.36</td>
</tr>
<tr>
<td>Rural</td>
<td>126,977</td>
<td>61.64</td>
</tr>
</tbody>
</table>
Gujarat Membership by Trade:

<table>
<thead>
<tr>
<th>Main Categories of Members</th>
<th>No. of Women</th>
<th>Percentage of Total Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Based Workers</td>
<td>72,156</td>
<td>35.03</td>
</tr>
<tr>
<td>Hawkers &amp; Vendors</td>
<td>18,759</td>
<td>9.11</td>
</tr>
<tr>
<td>Manual Laborers &amp; Service Providers</td>
<td>115,070</td>
<td>55.86</td>
</tr>
</tbody>
</table>

In Gujarat, the SEWA movement comprises of:

- Co-operatives
- Rural Producers (DWCRA) groups
- Social Security Organizations
- Savings and Credit Groups
- Federations which comprise of arts and crafts, vegetables, savings and credit associations

At the National level:

1. National Center for Labor
2. National Alliance of Street Vendors of India (NASVI)

At the International level, SEWA has presence in South Africa, Yemen and Turkey.

SEWA began organizing workers in the villages in 1979. SEWA believes that the basis of obtaining higher wages is the capacity and power to bargain. However, the workers in these areas had neither the capacity nor the power to bargain because they were weak
and vulnerable due to their lack of employment. In a situation where there is an almost unending supply of labor and limited employment, the workers are unable to negotiate for themselves.

Rural organizing has focused on:

- Increasing employment opportunities
- For women and thus increasing women’s bargaining power
- Developing women’s assets
- Capacity building and leadership development of rural women
- Providing food and social security
- Becoming self reliant both in economic terms and in terms of running their own economic organizations
- Eco regeneration through employment for rural women
- Collaborating with government’s rural development programmes

The role of SEWA can be envisioned by how it worked for the agarbatti making workers. There are 20,000 agarbatti rollers in Ahmedabad city. About 70 per cent of them are home-based workers and the remainder work in factories. Agarbatti workers roll incense sticks for 8 to 10 hours a day so as to make 5,000 sticks. They get their raw materials from contractors or local employers. Women whose husbands or other male family members are laid off from the city textile mills obtain employment in this industry. For the first time ever, thirty agarbatti workers held negotiations at SEWA with fifteen of their employers. They demanded that employers contribute 75 per cent
of the insurance premium and workers would provide the rest. They also asked for the appropriate work tools, especially a proper worktable to prevent occupational health problems like back strain. The employers have promised to consider these demands and fixed a follow up meeting.

MAZDOOR KISAN SHAKTI SANGATHAN

The case of Mazdoor Kisan Shakti Sangathan (MKSS) illustrates the strength of the collective group. It is more powerful than the legal mandate and can turn around the situation if people collectively stand up for their rights. Aruna Roy quit IAS in 1974 to work with the Social Work Research Centre (SWRC). She set up the Mazdoor Kisan Shakti Sangathan (MKSS), spurring a people’s movement for citizen’s empowerment and right to information. Ramon Magsaysay award for Community Leadership. She was instrumental in launching Jan Sunvai, which is a people’s court where people can come together at a place and air their grievances in the presence of officialdom. This gives them an opportunity to know what is being done for them or not being done by them by those who are in power. It is also a forum for public audit to know from the authorities how much was spent. Jun Sunvai has given an opportunity for ordinary citizen’s to interact with officialdom and people’s representatives. The demand for information has a bearing on public ethics, accountability and democracy. Without critical control over these, the poor cannot change the world they live in to bring in a more egalitarian socio-political system.

In the early 90’s the Mazdoor (Labor) Kisan (Farmer) Shakti (Strength) Sangathan (Organization) (MKSS) started working in the Rajsamand District of Rajasthan. The
MKSS prepared no project proposals, had no registered society, took no foreign funds and recruited no staff. All they did was walk from village to village asking simple questions – did the people know how much money was coming to their village for development and where is it spent (http://www.barefootcollege.org/html/action.htm). MKSS launched a people’s campaign- including public hearings of misappropriation and corruption of public funds and a 53 day strike in Jaipur in front of the State Assembly. The strike ended when a gazette of the State Government (a written government order) more than meeting the MKSS demands was made public.

CONCLUSIONS
The lessons that can be derived from the analysis of these cases are as elaborated below:

Simple Technologies
Infusion of capital or technology alone is not a solution to the problem of poverty. It is a multifaceted issue and requires interventions at various levels. Merely putting in computers in the villages is not a solution. The reality is that there are large number of people who are illiterate, are unemployed and need to be employed meaningfully so that they could earn their livelihoods. In the cases seen above in various sectors it has been observed that the technologies which were used very basic, were easy to understand and people have been knowing these for long times. So the solutions were not imposed from outside but were generated by the communities themselves. The case of the Barefoot College at Tilonia indicates that even the illiterate people can be trained
if the technology is easy to understand. Simpler the technology is, higher would be its acceptability by the people.

**Documentation of Indigenous Technologies**

This points to the understanding of the importance of the indigenous knowledge. Despite technology advances, the problem of drinking water and sanitation is still prevalent. In the olden days, they did not have trained doctors, architects or biologists. They did not depend on theory but applied the wisdom they had acquired over the centuries. Many communities are so fed up with the current state of affairs that they demand they be left alone to identify and solve their own problems (Roy, 1999). The indigenous knowledge helps to arrive at solutions. Greiner (1998) defines indigenous knowledge (IK) as ‘the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area.’ Indigenous knowledge can provide insights into the area of food security, health, education, natural ecological initiatives. The advantage of the indigenous knowledge is that it is dynamic in character, as it has the capacity to evolve since people have been using them in the past for surviving through centuries. It needs documentation and stored in systematic manner as it has been passed on from generation to generation. The solution does not lie in inflicting western solutions on communities. Interventions fail to induce people to participate because of the absence of instruments and mechanisms that enable them to use their own knowledge.

The use of traditional knowledge, skills and wisdom promotes active community involvement because people depend more on each other. The use of traditional
knowledge demystifies the local technologies that will be the basis for sustainable solutions in the future. The more people who understand and try out a technology, the greater the chance of the technology getting accepted. In 1997-98, through the use of centuries old technologies, a total of 12 million liters of rainwater was collected in 100 schools attended by 3,000 children at the Barefoot Schools. The cost was a mere USD 0.10 a liter. The schools have teachers with no qualifications. Over 150 young people from nine states of India have been trained as barefoot solar engineers. They have equipped over 2,000 houses in the Himalayas with solar electricity. The practice could be transferred to other places and situations, but it is essential that several conditions be met (www.unesco.org/most/bpik16.htm), The Barefoot College – Promoting Productive Employment for Youth).

The characteristics of these solutions have to be:

- The technology solutions have to be rooted in the ground realities.
- They have to be sustainable.
- They have to accommodate the huge numbers.
- They have to trap investments.

Solutions to Be Built Around the People through Their Involvement

The people need to be kept in mind for whom the solutions are being generated. Another important aspect that is important is the total involvement of the people at the grass root levels. No external agent can bring about the change in the community externally. Unless the people stand up for themselves, nothing can change. They would have to be united together to stand up for their rights and there is a need for facilitators rather than consultants. These should be the people who can identify themselves with
these people and live with them so as to experience what it means to live a life these people live. The solution for any community has to be a sustainable solution that leads to a process, which is self-sustaining. It can only happen if the use of the local know how is usefully channelised so that it can be sustained in the long run. The case of Tilonia as discussed in the paper is an example of the same. The people need to be sensitized to the change. Acceptance of change is far easier when there is a suitable climate created for the same.

**Dissemination of Information to the Poor**

The biggest problem of the poor people is the lack of information on what is happening around them. The government starts so many programs for the poor people but the benefits never reach down to the poor people. The government needs to communicate the information to the poor about the programs and most important monitor the implementation of the same. For example the much hyped Swarna Jayanti Sahari Yojana and Swarn Jayanti Swarojgar Yojana, which was launched in April 1999, have failed to benefit even 5 per cent of the target in Orissa. Bamboo craftspersons in Bhubaneshwar who were supposed to be the beneficiaries of the Swarna Jayanti Sahari Yojana was meant to help people rise above the poverty line. In the last two years, since the scheme began, not a single person received even a rupee as a loan (www.ndtv.com, 1 Mar, 2001), Pro poor Policies let down by the lack of reform). In Khurda district, out of a total of 20,000 families living below the poverty line, only 4,500 of them were sponsored for loans by the government. The bank sanctioned 1,273 loans out of which only 904 people have so far received the money.
Better Management of Resources

Recent news reported in the press is an eye opener. The drought affected people in ten districts of Rajas than protested to highlight that though the Food Corporation of India godowns were bursting with food grains, people remain hungry. In godowns in India, the FCI has nearly 410 lakh tonnes of food grains, nearly an estimated 139 lakh tones is in excess. It costs the government Rs 420,000 lakhs just to store these food grains in Rajas than (www.ndtv.com, 17 May, 2001). The Food Corporation of India has in recent years been grappling with the problem of how to take care of the huge surplus food grain which is fattening ever growing army of rodents or simply rotting away in its badly managed warehouses. (Times of India, 11 May, 2001). So there is a need for a better management of the resources. With little changes in the way things are operated, it becomes quite easy.

Political Will to Take Pragmatic Decisions

The income and consumption patterns of the poor are changing. The shift is away from course grains to wheat, paddy and oilseeds. Singh (2001) has analyzed the dynamics of the cropping patterns. A drop of 50 per cent in the cultivated area of sorghum, little millet and finger millet has come about just in the past decade. It was in the 1980’s that the Public Distribution System (PDS) became a welfare instrument to provide essential items at nearly half the market price. Neither crop loans nor crop insurance are available for these groups. Also there are no subsidies. The promised minimum support price of coarse grains is denied to farmers due to government non-intervention. The chemical composition of course grains is better than rice and wheat in many cases.
Pearl millets have a higher concentration of protein, fat and minerals particularly calcium.

The 1999-2000 Union budget projected a cut in the central deficit of 0.9 per cent of GDP. Achieving this target depends on substantial rise in tax revenue and containing revenue expenditure growth to only 9 per cent. The interest costs of the debt have increasingly crowded out infrastructure, maintenance and social spending in central and state budgets. Implicit and explicit subsidies at the center and especially at the state levels are a major factor in the deficit (World Bank Report, 2000). The Ministry of Finance estimated these subsidies at over 14 per cent of GDP in 1994-95. In addition to increasing the deficit, they are distortionary, non transparent and at best have uncertain equity consequences. At worst they are anti equity. Another structural factor is the deficit in the tax system, which is declining by over 1.5 per cent of GDP over 1991-98. The tax base is narrow with 15 million taxpayers.

TRANSPARENCY

Transparency in operations is required. A review of literature suggests that poverty has a relationship with political corruption. Oyen (1997) in Human Development Report (1997) pp95 mentions that poverty often serves the vested interests of the economically powerful, who may depend on the poverty stricken to ensure that their societies run smoothly. A mobile pool of low paid and unorganized workers is useful for doing the “dirty, dangerous and difficult” work that others refuse to do. Corruption in government increases poverty in many ways. Most directly, it diverts resources to the rich people who can afford to pay bribes and away from the poor people who cannot (Transparency
International, 1996). Corruption also skews decisions in favor of capital-intensive enterprise and away from labor-intensive activities more likely to benefit the poor. Corruption also weakens the government and lessens their ability to fight poverty. It reduces tax revenues and thus the sources for public services. Most generally, corruption eats away at the fabric of public life – leading to increased lawlessness and undermining social and political stability.

Where corruption is rampant and evidence is in place that development funds have never reached the target segment, it is all the more required. The Barefoot College is evidence where through the Jansunwai; it shared all the financial details with the people for whom the development work is being done. It must involve participation by the poor if it were to yield meaningful inputs. It is necessary to vitalize the community media with the involvement of people. (Sharma, 2000). It is important to bring information to the doorsteps of the poor people. There is an urgent need to ensure access to modern information technology in rural areas or disadvantaged communities to disseminate simple, practical knowledge which will save their lives, increase awareness and stimulate development. Properly used, media can help reduce the conflict and strengthen local organization. It can help reduce poverty through providing information on how people of their type somewhere else are handling their situation. The poor have inadequate access to information, technology, expertise and resources.

**LINKAGES BETWEEN DIFFERENT SECTORS**

Interventions taken in one sector have an impact on the other sector and there are strong inter linkages between the same. Improving health outcomes not only improves well-
being but also increases income-earning potential. Increasing education not only improves well-being but also leads to better health outcomes and to higher incomes. Providing protection for poor people not only makes them feel less vulnerable – it also allows them to take advantage of higher risk, higher return opportunities. Increasing poor peoples voice and participation not only addresses their sense of exclusion – it also leads to better targeting of health and education services to their needs.

Survival within poverty includes many strategies, which are combined in a process aimed not just at income in the broadest sense but also at assurance against the stresses and shocks to which poor people are particularly vulnerable. One such strategy is a mixture of jobs, some temporary, some full time, some self employed, some working for others. Technology could play a vital role in the elimination of illiteracy. For example, the information technology could be utilized to make the education reach to the most distant location. It could create a difference by dissemination of information using various means in the rural areas. It could address concerns like addressing the problems faced by craftsmen, a farmer or a person who runs a leather tannery among others. Another important aspect that can be addressed by the IT could be converting entire literature in a language, which the masses understand. But IT alone cannot be a solution. The solution has to be rooted into the reality of the situation.
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