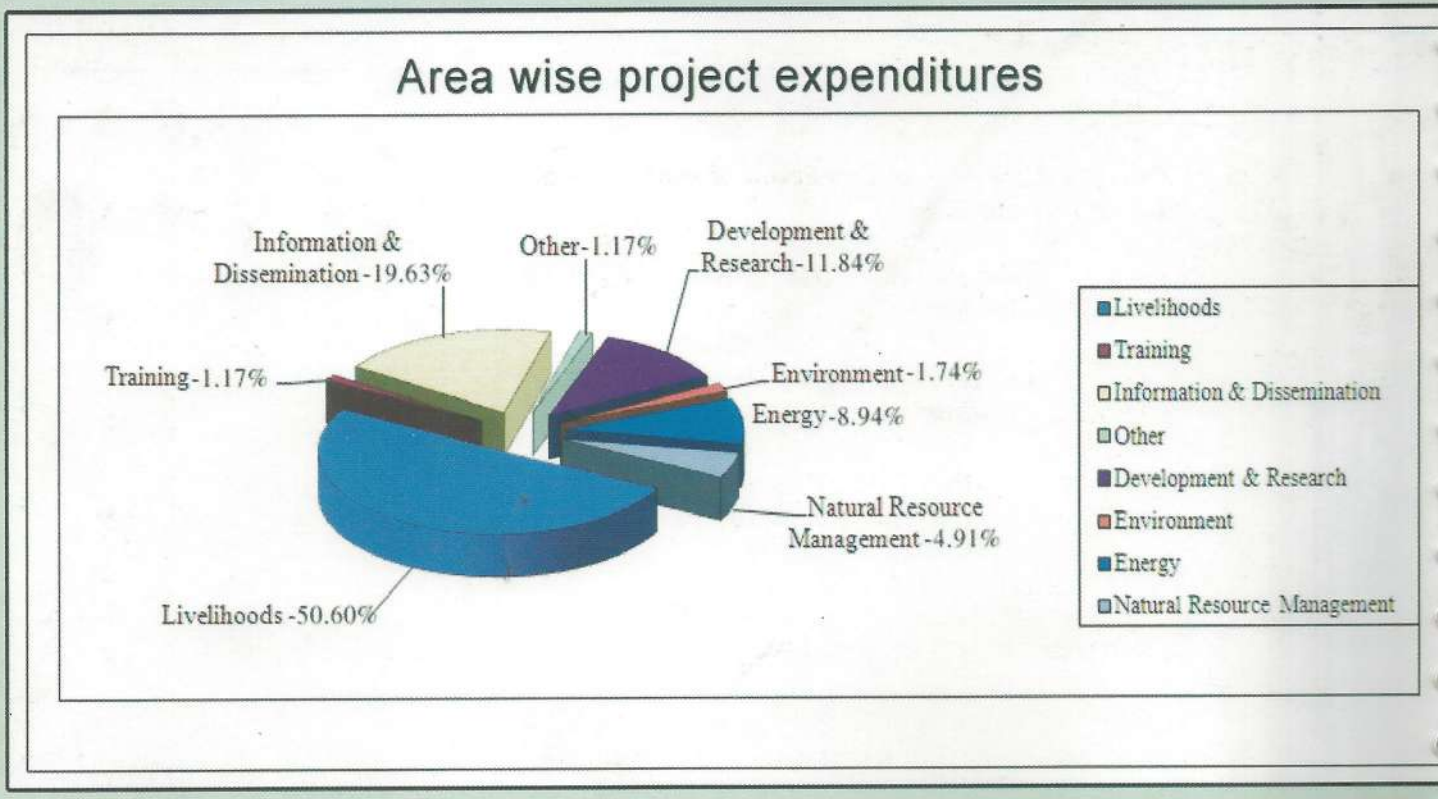
REPORT 2007

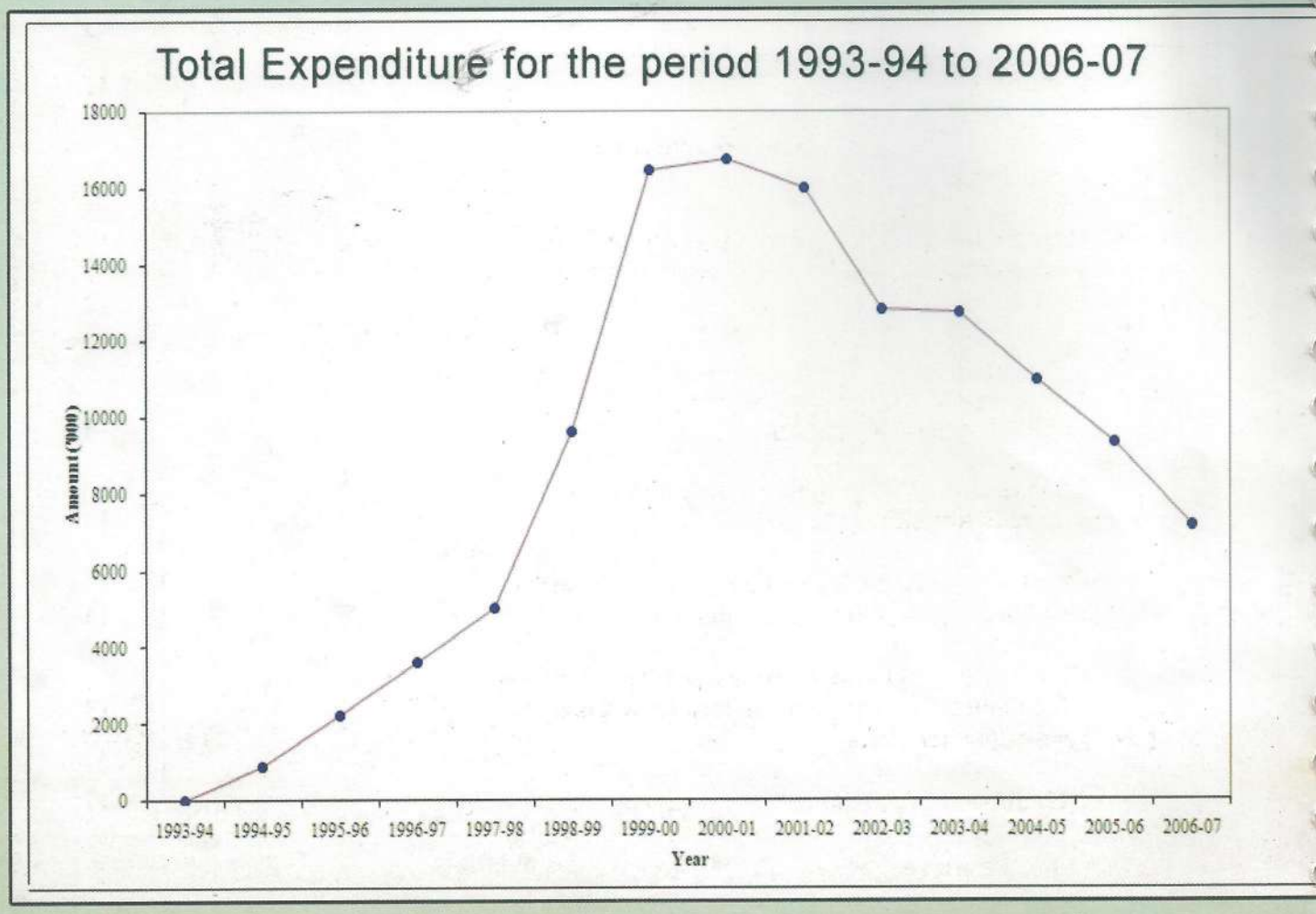
TIDE

Technology Informatics Design Endeavour

Catalysing Change Through Technological Interventions

TIDE AT A GLANCE





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ANNUAL REPORT 2007

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TIDE - An Overview

It is my privilege to write this overview for Report 2007 of TIDE for the first time. TIDE was registered as a not for profit society a little over 15 years ago. The objectives of TIDE were (i) to identify scientific concepts and prototype technologies having potential for large scale replication and to undertake their product development and evaluation (ii) to carry out activities for propagation of technologies (iii) to promote application of design concepts in product, process and technique development.

We at TIDE have put in relentless effort to adapt technology emanating from research institutions to suit the needs of rural communities and demonstrating their commercial viability. We have over the years identified over 50 ideas for further development and have succeeded in demonstrating technical and commercial viability for about 15 of them. Rural entrepreneurs are engaged in the dissemination of these products. We estimate that the total turnover of TIDE entrepreneurs is Rs 70 million and the entrepreneurs have made profits of about 10 million. We also have reason to believe that there are about 10,000 users of TIDE products. Stoves installed by TIDE are annually conserving 29,000 tons of biomass and have prevented the release of 52,200 tons of CO2 per year.

We are also constantly innovating and continue to develop new products that we believe would also have user acceptability. However we have reached out to a very small percentage of potential users (perhaps even less than 3%). As the work of TIDE is attracting attention, we are under increasing pressure to evolve strategies for rapid and large scale replication, an activity that we had consciously stayed away from. But we feel that the time had now come to do so. With more than 10,000 devices in the field, the risks associated with new technology are now largely abated, It is time to move to a franchisee model of technology dissemination to expand product reach and further enhance the economic and environmental benefits. We would need to work towards the development of a business plan, slight re-engineering of the equipment (for on site assembly instead of onsite construction), identifying production centres, defining quality control parameters and their capacity building, evolving a new organisation structure, facilitating loans for production centres. Additionally we would also initiate brand building for our product range

In addition to these ambitious plans TIDE continues to attract project funding for projects that require technology development, demonstration and dissemination. This year we have been working on projects that would demonstrate the utility and explore replication strategies of three new products that we had developed last year - the fuel efficient jaggery stove, the low capacity brick kiln and the fuel efficient textile stove. We have also committed to field testing a cross flow turbine in a remote village electrification project in the western ghats.

For the first time this year we have moved slightly away from our core competence of biomass combustion technologies and water harvesting and ventured out to explore technology issues in sustainable agriculture. The YSEI project supported by the Global

Knowledge Partnership showed that women self help groups willingly come forward to donate a part of their produce (grown using precision farming techniques in green houses) for enhancing the nutrition content in school mid day meal schemes. The potential for social transformation and scope for replication of this project is very high.

TIDE is also gaining competence in training and I am confident that in the course of the next couple of years it would emerge as a competent organization to impart training in energy technologies, rural entrepreneurship and gender & livelihoods.

The 5 member Council of Management of TIDE has three new members with Dr. Sharadchandra Lele of CISED and Dr. R. Shailaja Co-ordinator CEE south actively participating in the new direction that TIDE has committed itself to. I wish to acknowledge the great contribution of the Founder Chairman Dr. S. Rajagopalan who has steered TIDE through 15 eventful years. We have profited enormously from his vision and the direction in which he has taken the organization

The future is full of excitement, promise, some amount of stress and a lot of hard work and we look forward to it.

N V Krishna

Chairman

Community based sustainable water management in a micro-watershed

(Supported by Science & Society Division, Department of Science & Technology, Government of India)

The attempt of this project was to understand the water demand in a peri-urban area, its changing nature from rural agricultural based demand to one of urban residential/commercial demand and to put in place strategies of managing water in a decentralized, participatory manner so as to make the natural resource available in a sustainable fashion especially to a section of society that has suffered from the effects of urbanization without the advantages of the same.

The project area is spread in two villages namely Nimbekayapura and Bendiganahalli, Bangalore East taluk in Bangalore Urban district. These two villages are in different stages of transition from rural to urban and therefore the water consumption patterns were different. Nimbekayapura village was experiencing drinking water scarcity. Most of the hand pumps (borewells) were not working, some due to the lowering of water table and a few due to mechanical problems. In addition, the geo-electrical survey data showed the groundwater conditions in the village are poor. Also the rainwater falling on the roof area was flowing into the drain. In Bendiganalli village, there were more than 100 agriculture borewells being used for irrigation. The water level has gone down in the area due to unscientific methods of exploitation of groundwater, interference of the wells (in some cases the distance is less than 10 feet), poor recharge conditions, poor management of water resources. This has led to drying up of several shallow borewells. Also, further drilling of

new borewells is adding to the problem. These problems have created the scarcity of water and also affecting the livelihood.

In this scenario of livelihood insecurity and scarcity of natural resources, there is a need for utilizing existing occupational skill sets while at the same time providing options for optimum usage of available cultivable land and conservation of precious water resources. Rainwater harvesting, groundwater recharging, greenhouse horticulture and treating / recycling or reusing wastewater provides a viable solution to this pressing need.

Rooftop rainwater harvesting systems were introduced and installed in 12 locations including the school building, community hall, Anganwadi and 9 individual houses. The school students and village community are using harvested water for non-potable purposes. The local people have been trained in designing and implementing rooftop rainwater harvesting systems. The other houses are also harvesting rainwater from the roof area. The individual houses were able to harvest rainwater more than 50,000 liters per year. The project study reveals that rooftop RWH system is the most preferable source of water for communities. As per the discussion with villagers, they expressed satisfaction with RWH system, this clearly indicates the acceptance of the system. The important benefit of the system to the users is water availability at their doorstep with safe water supplies close to the house, women & children are able to spend less time in collecting or queuing for water. Women have benefited the most with less physical stress of fetching water from distance source day and night. Thus the saved time can be used in caring their children and for other economic activities. The rooftop RWH system reveals that poor people get more water in less time, better health, income and sense of social empowerment. A comparative analysis of rainwater and groundwater indicates harvested rainwater is better than the groundwater. Awareness on water utilization, conservation, and management was done through display of posters, street play and distribution of pamphlets in the project area.

The project intervention including construction of water harvesting structures such as farm pond, recharge well, borewell recharging etc - in Bendiganahalli village has shown that there is an increase in the groundwater level and also improvement in the groundwater quality.

The project has demonstrated rooftop rainwater harvesting and groundwater recharging as important methods in augmenting the groundwater resources. Greenhouse cultivation has shown the new method of cultivation and helped farmers in enhancing their economic status in small and marginal lands. The greenhouse with rainwater harvesting and drip irrigation system has created a demonstration site for other farmers to take up improved agriculture practices.

TIDE has carried out the experimental studies on grey water treatment options and collected relevant data. The study shows that the treated water can be used for irrigation and needs further research to finalize the technology.

Low cost charcoal making from waste biomass and its effective utilization

(Young scientist scheme of the Science and Society division of the Department of Science and Technology)

The project was conceived as an R & D project for local level value addition to biomass which is the major source of energy and abundantly available in rural areas. The energy

potential of the biomass remains largely untapped. The project developed charcoal makers that cleanly and efficiently convert biomass into useful clean commercial energy (charcoal). Considering the gradual acceptance of biomass gasifiers the project also developed designs for charcoal gasifiers anticipating their acceptance as well. If biomass is converted to producer gas in a two step process - conversion to charcoal in the first step and its gasification in the second step then the gasification process becomes simplified and the size, complexity and cost of gasification equipment would come down. Several new applications for gasifiers could thus be conceptualized.

The charcoal making experiments were conducted in the premises of Gramavidya, a partner NGO of the project, NGO located at Sidaganahally village in Bangalore rural district. The charcoal making demonstration unit was set up in a sericulture site in Vijayapura, Bangalore rural district. The charcoal gasifier was tested in the premises of R.V. Engineering College, Bangalore. The following were the prototypes developed under the project:

- Charcoal kiln (8 kg of wood per batch)
- Charcoal kiln (40 kg of wood per batch)
- Charcoal kiln (80 kg of wood per batch)
- Charcoal Gasifier (1 kg / batch)
- Charcoal Gasifier (6 kg / hr)

The technology development phase consisted of developing designs of charcoal kilns of different capacities, finding productive use of the energy content in the volatiles and developing & testing the designs of charcoal gasifiers. Considering the limited budget of the project, further work would have to be done to adapt the prototypes to specific applications. The charcoal kiln was field tested in a silk reeling site where there is need for process heat for stifling of cocoons (which is provided by the burning volatiles) and for charcoal (for drying the freshly reeled silk yarn).

The project was done under the supervision and active involvement of Prof K S Jagadish, Co-Investigator, Professor, PG studies, Department of Civil Engineering, RV College of Engineering, Bangalore and Chairman of Gramavidya, a NGO located near Bangalore. The charcoal gasifier was tested by final year engineering students as a part of their project work. Technical support and linkages were also forged with Dr. Sree Kumar, faculty Chemical Engineering department Karnataka Regional Engineering College (KREC).

The special features of the project are:

The development and testing of new designs of charcoal kilns. Charcoal has conventionally been made in large kilns where about 2 tons of wood is converted into charcoal. This leads to deforestation, poor quality of charcoal and air pollution because of release of unburned volatiles and carbon monoxide. The adoption of the new designs of charcoal kilns would enable charcoal making in small lots from twigs and other agro residues by small users of charcoal themselves. This would result in a lower cost of charcoal to the small users of charcoal. It would also create a new livelihood opportunity in rural areas especially in cold hilly regions where charcoal is used for room heating. The quality and calorific value of the charcoal produced in these kilns is also good.

The charcoal kilns have demonstrated that it is possible to productively utilize the heat content in the volatiles. New applications for utilization of thermal heat can thus be conceived. Additionally the provision of the heat exchanger in the charcoal kiln would ensure extraction of the maximum amount of heat, thus increasing the heat utilization efficiency of the operations.

The design of a charcoal gasifier is an important development currently for rural thermal energy applications. In course of time, with further developments when the producer gas obtained would be of engine quality, the charcoal gasifier would be a clean and useful equipment for several electrical applications as well. Some of the applications that can be conceptualized at this stage are (i) charcoal made from bagasse could be used for powering crushing units (ii) charcoal made from agro residues could be coupled with IP sets and used for water lifting. Several operations could thus be made grid free

Energy conservation in small sector tea processing units in south India

(A PDF phase of the medium sized project of the UNDP-GEF)

This year saw the completion of the project development fund phase of the project and its approval by the GEFCEO. The procedure for project approval was long and required a country endorsement from the MoEF, Govt. of India, technical clearance under GEF-3, re-endorsement by the GEF empowered committee, clearance by GEF Secretariat and GEF CEO approval.

The implementation arrangements for the project have been worked out. The Tea Board under the Ministry of Commerce would be the executing agency of the project and TIDE would be the implementing agency. After the project approval, the detailed project document and plan for the first year of the project has been developed. The project is awaiting signatures from relevant Ministries for its commencement.

The objective of the project is to reduce energy consumption in small sector tea processing units in south India thereby restricting GHG emissions. It also aims at removing barriers and developing replicable strategies for energy efficiency through (i) awareness creation among the target sector (ii) elimination of financial barriers (iii) adoption of EE / RE equipment and (iv) sharing and replicating knowledge and learning. The project would establish that 30 factories in south India would have adopted energy efficient equipment and practices and would cumulatively save 55,800 tons of direct CO2.

Fluorosis mitigation through technical intervention and community participation in Karnataka

(Woman scientist scheme of the Department of Science and Technology)

Secondary data collected from the Public Health and Engineering Department, Karnataka showed that about 1594 taluks in 23 districts of Karnataka are affected by excess fluoride (more than 1.5 mg / liter) in drinking water. Consumption of fluoride contaminated water causes fluorosis, a disease manifested by mottling of teeth (dental fluorosis) in mild cases

and changes in bone structure (skeletal fluorisis), ossification of tendons and ligaments and neurological damage in severe cases.

This project of TIDE sought to study the effect of technical interventions for fluoride mitigation. Kittapanadoddi villages, Kanakpura taluk, Bangalore rural district was identified as the project area. A baseline survey conducted to collect population and land profile data showed that the village had a population of 278 mainly belonged to the scheduled caste and other weaker sections. The main occupation of the people was agriculture and silk reeling. Geologically the region consisted of peninsular gneiss and granites. The only drinking water source in the village - a borewell, had fluoride level in the range of 2.45 mg / litre. The average water consumption per capita per day was 42 litres.

The project began with a societal intervention. An awareness campaign on fluorosis was conducted using posters, banners, cultural events etc where every one including the panchayat member participated. A dental check up was conducted in the village and this showed that 93% of the male population, 79% of the female population and 86% of children below 10 years were affected.

The technical intervention in the project was the introduction of activated alumina filters in 50 households. The filter consisted of 3 kg of activated alumina and a micro filter in the top container with a perforated plate. The bottom container collected the filtered water. The storage capacity of the filter was 10 liters. Water samples before and after filtration were collected fortnightly and analyzed for fluoride content. Data about the daily water flow through the filter was also collected. The life of the filter was thus established. Local women were trained in backwashing of the filter. Linkages for regular filter recharge were also established with MYTRY the organization that provided the filters

An alternate technique for reducing the fluoride content was artificial recharge of borewells by roof top water harvesting. This was demonstrated in the village school building as an option for fluoride mitigation. The project has shown that there are techniques for overcoming consumption of fluoride contaminated drinking water which however should be carefully strategized and introduced.

Core support

(Science and Society division of the Department of Science and Technology)

The core support is a grant that has been given to TIDE to explore new ideas and carry out research in the areas of relevance to rural areas. In the past years TIDE has successfully used the core grant to develop new products. The Low Capacity Brick Kiln, fuel efficient jaggery making were some of the new products developed in the core grant. Their dissemination is being studied through different projects. This year also saw TIDE developing new products. The products that TIDE developed this year wear the tava stove and the large water heater. Additionally TIDE used the core support to understand issues relating to women, energy and livelihoods and for capacity building of TIDE staff.

During field visits to various project sites TIDE realized that street food was a big business in small towns and along highways and these units normally used firewood as their energy source. Newspaper articles reported that in the state of Tamil Nadu there were about 3 lakh

road side eateries. Many of them used prepared dosas, kerala parottas and omlettes throughout the day and used dedicated stoves for the same. TIDE developed designs of tava stoves and field tested them in Kumarapalyam district of Tamil Nadu. The stove is working satisfactorily with uniform temperature throughout the tava and the dosas are coming out uniformly crisp. In the demo unit site dosa making consumed 82 kg of firewood everyday. The new design has reduced the firewood consumption to 43 kg for the same delivery. TIDE is now engaged in the standardization of the design.

Another new product that TIDE is developing is the fuel efficient biomass fired 450 liter water heater. In the past TIDE had developed designs of the 100 liter water heater and there are over 1000 users of the same. There has been a request for increasing the capacity of the same and it is expected that hotels, marriage halls hostels and other institutions would use the same. TIDE has developed a design and the same is under fabrication.

In addition to developing new products, TIDE focused its attention on interacting with women's groups to understand their hesitation and problems associated with livelihood activities especially concerning energy and livelihoods. TIDE conducted unstructured meetings with women to understand why training programs meant for livelihoods are very well attended but these trainings are never followed up with initiating income generation activities. Several issues came up in the discussion and more follow up meetings and documentation of the same has been planned. With regard to women's energy needs discussions were held around the theme of practical energy needs, productive energy needs and energy needs to safeguard women's strategic interests. The women rated their practical energy needs (access to lighting, domestic appliances, TVs, fans etc.) as their greatest need. There was inadequate understanding of energy as a facility that can safeguard their strategic interests (safety, education etc.)

TIDE also used the core grant to build capacity of their staff. Staff of TIDE were deputed for training programs on methods for testing the indoor air pollution loads, water harvesting methods and processes, women's entrepreneurship and developing communication skills for communicating with grass root women.

School and community horticulture enterprise

(Supported by Youth Social Enterprise Initiative)

The School and Community Horticulture enterprise, using a participative implementation model facilitates an innovative process in which the school and the local community, will ensure in a self -sustainable manner, the provision of the required vegetable nutrition for the mid-day meal scheme through local horticulture in green-house while at the same time creating an alternate source of income through sale of high value horticultural produce in urban markets.

The Hindiskere government primary school in Tiptur taluk was identified to implement the pilot project. There are approximately 85-90 students form classes 1 to 6. The school and SDMC members were willing to buy the vegetables from the enterprise. An existing Sreelakshmidevi Swa Sahaya Sangh – women's Self Help Group (SHG) in the village was ready to participate in the project and run the polyhouse enterprise. Land for the poly house

(200 Sq.m) has been identified 2 km away from the school in an adjoining Shantanhalli village.

The design and cultivation plan of a polyhouse was developed in consultation with PI of PFDC, GKVK, UAS, Bangalore. A polyhouse with 20 m length and 11 m width covering an area of 200 sq m. was constructed Roof of the structure is covered with polyethylene film, and sides are covered with insect net. The roof of the polyhouse was used for harvesting rainwater and later used for irrigation. The drip irrigation system was installed in the polyhouse. One hp motor is being used for irrigation.

At present the group is supplying about 70 gm of vegetables per day per child to the GHPS, Hindiskere from June 2007 onwards. The school has been paying an amount equal to the budget allotted by the Government for vegetables to the enterprise. It however falls short of the requirement and additional amount Rs 35 - 40 /- is being spent for the purchase of required quantity of vegetables (about 6 Kg / day).

Red and Yellow capsicum were grown in 100 Sq.m area and Tomato were grown in another 100 Sq.m area in the greenhouse. Market linkages for the sale of high value horticulture produce have been explored. The capsicum was sold to Reliance outlet in Bangalore. The total yield of tomato was about 1600 Kg and Capsicum was about 600 Kg. The harvesting of capsicum and tomato generated an income of about Rs 26,000 in six month period. The project has generated scientific, engineering and economic data.

The pilot project of the School and Community Horticulture Enterprise has created interest among other schools in the region, after the awareness meetings. Farmers from the neighbouring villages have shown interest in replicating the greenhouse cultivation.

Software (ICT component) has been developed to generate a horticultural plan in a polyhouse for the supply of vegetables for school children. The software enables this planning using data on rainfall, harvested rainfall, crop water requirements, crop yield, duration etc, as well as information of the school (school location, strength). The present version of the software is basic in nature. As more empirical data is generated from the project, it will be used to further build and enhance the software.

There has not been any significant increase in attendance in the school. However, there have been positive social impacts of this project. The project has resulted in activating a sense of social responsibility in the village community. Parents of the school children have begun to contribute some part of their farm produce to the school for the mid-day meals. Thus, while increasing the nutrition for children, the SHG is simultaneously earning income.

GHG emission reductions through use of energy efficient technologies by textile processing units in Tamilnadu

(Supported by UNDP-GEF under its Small Grants Program)

The textile processing units located in seven districts of Tamilnadu use firewood and fossil fuels for meeting their thermal energy requirements. Most of the small and medium industries use firewood that is harvested in an unsustainable manner. The units burn the wood in conventional stoves that are energy inefficient. This results in higher consumption

of wood, higher quantity of GHG emissions and an unhealthy working environment. This project has the goal of creating sustainable mechanisms for the reduction of GHG emissions from textile processing units in Tamilnadu. The expected project outputs include the development of a sustainable network to promote and disseminate energy efficient technologies for the textile processing units, and installing energy efficient stoves and solar systems.

The project activities focused on demonstrating the improved devices, developing an entrepreneurial network and implementing market development activities for generating demand. A project information centre was opened in Komarapalayam (Namakkal District), market development personnel and technical staff recruited. Improved, energy-efficient stoves were installed in three units and the local entrepreneur trained in construction. Market development activities were carried out by organizing meetings with the dyeing and bleaching associations at Erode and Komarapalayam. Personal visits were made by the market development personnel to meet prospective clients and obtain orders. Advertisements were placed in local newspapers to provide information and generate enquiries. Consequently, by December 2007, 26 improved stoves have been installed during the project with client contribution.

The business environment in the project area has not been congenial for investment in non-movable, high-value assets such as solar water heating systems. Therefore, the project has explored alternate renewable energy solutions to reduce emissions from the dyeing units. The project has developed energy efficient, biomass-fired water heaters for heating of water to temperatures that are required by the dyeing units. These water heaters are movable from one location to another. They save about 60% of biomass (as compared to consumption levels in conventional stoves) and are compatible with the operations of the units. We have demonstrated 100 litres and 500 litres water heaters in the project area and the response has been encouraging. The improved water heaters would reduce emissions by atleast 60% as compared to emissions from the existing stoves.

The successful activities under the project have encouraged us to promote our products in the neighbouring district of Karur. The project is highly replicable in other regions of the state and country due to the prevalence of biomass-burning devices for water heating.

Case study on Wastewater disposal practices and likely treatment options in Textile processing units in Tamil Nadu

(Supported by Arghyam Foundation, Bangalore)

TIDE has carried out a detailed study on the effluent discharged by textile processing and to find economically viable options for treatment or safe disposal of the effluent in Coimbatore district. The main objectives of the study is to collect data on the effluent load being discharged from textile processing units for the various operations requiring water (bleaching & dyeing), to understand the current treatment and disposal practices and the implication of the same on ground and surface water. Also, to review the technology options for reduction of pollution load to the limits recommended by the Tamil Nadu Pollution Control Board and to document findings and share them among a larger audience so that recommendations and conclusions can be drawn from the case study.

TIDE interacted with various organizations like Tamil Nadu Pollution Control Board (TNPCB), Textiles Committee, Ministry of Textiles, in Tiruppur and Coimbatore, Dyers association for the problems envisaged by the industries. Subsequently, TIDE interacted with experts who have studied the problem over the years in the Madras School of Economics and technology providers in India.

There are 729 dyeing and bleaching units in Tiruppur generating 87 million liters of wastewater per day, 50 units in Coimbatore town generating 8 million liters of effluent per day, and around 10 units in Mettupalayam generating 7 million liters of effluent per day. High concentration of Total Dissolved Solids and Chlorides persist in ground and surface water in spite of having Common Effluent Treatment Plant and Individual Effluent Treatment Plant.

TIDE has studied the current practice of water usage, effluent treatment, sludge storage and disposal is not sustainable and would cause damage to the ecosystem while threatening the livelihoods of the farmers in the vicinity of the textile units. Reverse Osmosis, is the technology option recommended by the TNPCB for zero effluent discharge and recycling of water. The financial issues involved in its adoption need to be further understood. The problem of safe storage and disposal of sludge remains and has not been addressed adequately. If effective management of sludge is not practiced then the investment in effluent treatment and ensuring adherence to TNPCB would be nullified.

Reverse Osmosis has been identified as a technologically suitable option for treating textile industry effluent from large and medium sized units. Large units have invested in individual ETPs and medium scale units have invested in Common ETPs. However, no technology option seems to be forthcoming for effluent treatment from small units. This problem would become acute and there has to be technology development effort now for techno-economically viable options to emerge in the near future.

TIDE recommended options (like Reverse osmosis) have to be formed for safe reuse and recycle of sludge. Dyeing and bleaching units outside Tiruppur are also polluting ground and surface water. The TNPCB should address water pollution issues in smaller dyeing clusters as well as to ensure that a Tiruppur like situation is not created in other clusters.

Pilot project implementation & field testing of gasification stoves

(Supported by The Asia Regional Cook Stove Program (ARECOP))

The project involves the field implementation to evaluate the performance of the gasifier stoves.

The stove was initially tested at a hotel in Gudemaranahalli, near Bangalore. Though the stove was efficient, the user did not accept it, as it was not practical. The user did not prefer constantly feeding the fuel and also encountered problems in getting wood pieces the size required by the gasifier stove.

Discussions and demonstrations were done for institutions and large cook stove users in a number of identified locations in and around Bangalore. However, as these users were using LPG as fuel, which they can afford and is readily available, they were not willing to shift to cooking with wood. Since the wood had to be prepared, this was also seen as a drawback of the stove.

As LPG is easily available in Bangalore, it was decided that urban users would not be receptive to the stove. Hence, locations in semi-urban areas were considered. The stove is currently being tested at Kumarapalayam town in Tamilnadu in a factory mess. The owner is happy with the stove. The data is being collected for performance analysis and evaluation.

Bioreactors for Biogas from Organic Fraction of Canteen Waste

TIDE and Center for Sustainable Technologies (CST), IISC, Bangalore, have been involved in setting up bioreactors for canteen waste. TIDE has constructed bioreactors for canteen waste at various places.

The bioreactors operate by degrading the organic matter and thus producing biogas. It is a two-stage process where in the organic matter is broken down into simple organic substances with the release of carbon di oxide and methane. The bioreactor at ISTRAC is a 50 kg capacity with a floating type gasholder. Canteen waste that is fed is converted into biogas and this gas is used for heating milk, preparing tea and boiling water.

Lanco is a very environment conscious industry and wanted to create an infrastructure to treat their organic waste produced from the canteen. TIDE has constructed two identical bioreactors each of 50 kg capacity. The entire set up is ready and the production of gas has to be started for the use in kitchen.

Introduction of the improved jaggery-making stove to the jaggery-making clusters in North Karnataka.

(Supported by Deshpande Foundation)

Jaggery making is a major rural industry in three districts of north Karnataka, Belgaum, Bagalkot and parts of Bijapur. It is estimated that the present process of jaggery making consumes 500 kgs of bagasse or other biomass per ton of jaggery made. Conventional jaggery making is energy intensive and often the bagasse obtained after crushing sugarcane is inadequate for making jaggery. The gap in energy need is made up by burning other biomass fuels, often automobile tyres which is damaging to the environment and the health of the workers in jaggery making units.

There has been no successful, implementable research and development intervention in the sector in India other than the combined efforts of TIDE and the Centre for Sustainable Technologies, Indian Institute of Science. It has re-designed the conventional two pan jaggery making stoves in Mandya region for better fuel efficiency and bagasse conservation and the same needs to be done in the Belgaum region where the pan sizes are larger.

This project aims to introduce improved jaggery making stoves in the jaggery making clusters of North Karnataka and also capacity building of entrepreneurs.Introduction of the fuel efficient two pan jaggery making stove in the Belgaum region would conserve about 100 -140 kgs of bagasse per day (valued at Re 0.75 - Re 1 / kg) and improve the working environment. The jaggery making season lasts for about 150 days in a year and field data

has shown that it is possible to save 15 -20 tons of bagasse valued at Rs 15,000 -20,000 per season. The pay back period for the investment if a monetary value to bagasse is attributed is therefore 1-2 years.

The objectives of the project are

To demonstrate the improved jaggery making stoves (that save fuel and time) in jaggery making clusters of north Karnataka

To train local masons in the construction of two pan jaggery stoves

To identify, train and support local entrepreneurial networks with market development and awareness building for about a year when it is expected that this additional enterprise would become sustainable

Visits were conducted in the project area to get an understanding of the distribution of the jaggery units in each geographical cluster and the potential for the introduction of the new improved stove in these areas. Visits were carried out to the various clusters to meet the jaggery owners and to understand their problems and needs. The owners were informed of the availability of a better technology that saves more fuel. The interest levels of the owners were assessed to decide on the locations for the demo units.

An awareness cum marketing office has been opened at the APMC Yard at Gokak to serve as a contact point.

A construction manual for the construction of two-pan fuel-efficient stove has been developed. This manual is a step-by-step detailed construction manual in a pictorial format. A user manual for the effective use and maintenance has been of the improved stove has also been developed.

Demo sites have been put up at Parishwad and Nedagundi. The demo units are evincing a lot of interest in the neighbourhood.

Awareness among the jaggery unit owners towards the improved two-pan stoves is low and is slowly increasing. Efforts are on to increase the promotion of the stove. With the setting up of the information centre, the promotional activity has increased for the stove. Also awareness meetings at Gokak, Rayabag and Mugalkod evinced a lot of interest among the jaggery unit owners and brought out issues of concern, which will help us in marketing the stove.

The project further plans to install 3 more demo units and sell about 10 improved stoves and set up a super entrepreneur who would manage a team of 3-4 entrepreneurs to promote the improved jaggery stoves in the project area.

Field testing of low capacity brick kiln under different conditions

(Supported and catalyzed under the mission mode of SSD by the Department of Science and Technology)

This is a new project that has been recently sanctioned (November 2007). The technology of the low capacity brick kiln was developed jointly by Gramavidya and TIDE as a part of the core grant activities. DST wanted to assess the receptivity to the technology by brick makers in different parts of south India and obtain recommendations on its further dissemination. The rationale for the technology development and the project was that there exists a large segment of small unorganized brick makers who operate of slender margins because of high cost of fuel and poor quality of bricks. There has been no technology intervention that looks at upgrading the output or the facilities of small brick makers.

The objectives of the project were:

To install the low capacity brick kiln (LCBK) in 5 locations and obtain user response

To collect field data about performance of the kiln under different conditions

To identify target users of the LCBK and develop a dissemination plan

To identify potential lending agencies, develop draft loan documents for potential rural enterprises

The project activities would involve identification of sites for field testing the LCBK, field visits to Gramavidya by the identified brick makers, construction of the LCBK in field sites, supervised operation and data collection. Based on the user response the kiln design would be further modified, if required. This would be followed by an assessment of the suitability of the kiln for operation under different situations. The target users would be identified and a dissemination plan developed.

TIDE is currently interacting with a brick maker in Cuddalore district of Tamil Nadu for installation of a brick kiln.

Electrification of Shivapur village, Karnataka by demonstration of the Pico hydro power generation technology.

(Project supported by the Science and Society division of the Department of Science and Technology)

This project has recently been sanctioned (November 2007). The objective of the project is to provide adequate uninterrupted and reliable power to meet the requirements of all residents in an unelectrified village. A typical unelectrified village that has potential for hydro power is characterized by a hilly terrain with a perennial stream in its vicinity. A pre project village survey showed that the problems of the village are:

- Children studying in poor lighting from kerosene lamps
- Agriculture is the main occupation in the village. Although there is enough water, it cannot be utilized because the terrain is hilly and there is no power for water lifting.
- Safety and movement within the village at night is a concern because the village surrounding is highly wooded and there are chances of attack by animals at night.

- The village cannot use electrical appliances especially television

- There are limited opportunities for development and creation of local wealth

The suggested technological intervention is to use the untapped potential for hydro power. This would be done by installation of equipment for generation of 12 kw of uninterrupted and reliable hydro electric power. Simultaneously the community based organization would be empowered to manage the asset.

The S & T components envisaged under the project are the installation and testing of high efficiency cross flow turbine and data collection on the usage pattern of power in the village. Data collection is important because typically domestic requirement of electricity is mainly in the early morning and late evening. Instead of shutting down the pwer packs during the day time and late night houses the project would encourage the community to use energy during non lighting hours for income generation. Data could also be collected about changing life styles of people before and after availability of power.

Currently a technical and sociological survey in the village is in process

Development & introduction of training courses in biomass based drying technologies

(Supported by ETC, Netherlands)

This is a three-year project, which commenced in March 2007.

One of the objectives of the project is to build the capacity of TIDE staff in conducting training for the semi literate population. The project would then apply these skills in developing technical and enterprise building training materials and programmes for income generation using the technology of biomass based drying. The project would also enable the creation of 4 women's enterprises in biomass based drying. Enterprise using the technology of biomass based drying has been selected because TIDE has extensive knowledge of biomass based drying, and expects the training modules developed to find immediate application in other projects as well.

The focus of activities in the first year has been in capacity building. A team of seven persons of TIDE went through a 5-day training programme in micro-enterprise development conducted by IDPMS, Bangalore. The programme included methods to identify individuals and groups with entrepreneurial competencies, marketing, accounting, registrations etc. Three members of the project team also attended training courses conducted by other organisations (Train the Trainer programme conducted by Oscar Murphy Life Strategists, Bangalore; training on Gender and Energy conducted by Energia and Life Skills training in Kannada conducted jointly by three NGOs specialising in training) to understand how training can be made effective by developing appropriate skills. A workshop was held in which SHG women, field staff of five grassroots level NGOs, TIDE team and specialists in gender and livelihoods participated. Informal discussions were held on the aspects that have to be touched upon during interactions with the rural population, to make any communication regarding women and livelihoods effective.

Using the inputs gained during the training sessions, a questionnaire was developed to help the team in identification of SHGs as potential micro-entrepreneurs. The questionnaire guided the discussions that the team had with SHGs. Discussions were conducted with 24 SHGs. Four SHGs were identified based on the analysis of these discussions.

Training materials are being developed, which will be pilot tested during the training of he identified groups. The training materials that will be produced include a Technical training manual on using biomass dryers, hand outs on micro-enterprise development, posters and slide shows.

Contents of training programmes have also been developed. Two training modules have been planned- one on technical training and the second on micro-enterprise development. Both the modules have been planned to be participative. Inputs gained in the training programmes attended by the TIDE team will be used while preparing the training materials and while conducting the training.

Capacity Building for existing networks of NGOs / CBOs and SHGs for environment linked income generation activities

(Supported by the India Canada Environment Facility)

This 3 year project started in February 2004 and was completed in January 2007.

The goal of the project was to contribute to the capacity building of NGOs,CBOs and SHGs to improve the local environment. The project objectives included:

- To improve environmental awareness among 150 SHGs/ CBOs.
- Initiation of sustained income generation by 15 SHGs/CBOs through environment friendly services
- building the capacity of 30 SHGs to earn incomes through environment friendly activities.

All the objectives were achieved.

- Improve environmental awareness among SHGs: Awareness Campaigns on environment friendly technologies were completed for 1622 people belonging to 201 SHGs in Karnataka, Kerala and Madhya Pradesh on technologies relating to water, energy and livelihoods. The impact of the awareness campaigns was assessed. The campaigns helped to understand the attitudes of women in the regions, which further helped to identify suitable technologies to train them in.
- Initiation of sustained income generation by 15 SHGs: Twenty five SHGs were earning sustained incomes from the activities that they were trained in. They earned an income of more than Rs. 2 lakhs. Handholding for the groups was done to develop markets for their products/ services.
- Capacity Building of SHGs/CBOs: 17 SHGs were trained by the first level SHGs in the various technologies like household stove construction, household processing of cashew, vermicomposting of coconut waste, etc.

Technology Parks were set up in Bangalore and Kasargod. Working models and posters of the environment friendly technologies disseminated by TIDE that are income generating were demonstrated to SHG members when they visited the park.

As a pat of dissemination efforts, a national level workshop to discuss unsubsidised household stove dissemination was organised by ICEF and TIDE in October 2006 in Bangalore. Experiences of other organisations from other parts of India were shared. A detailed documentation of the workshop was generated and circulated among the participants.

Extensive documentation was generated under the project and included a film on household processing of cashew, a process documentation on dissemination of household stoves, process documentation on household processing of cashew, a training hand out on greenhouse cultivation, brochures on six of the technologies disseminated. A working model of rainwater harvesting was made. Posters and pamphlets on all the technologies were also generated. An end of project report was prepared and submitted to ICEF along with other documentation.

The project has led to the introduction and understanding of technologies that TIDE had not tried before,eg polyhouse with rainwater harvesting, cultivation within a polyhouse, two methods of charcoal production, household processing of cashew. The benefits of these technologies to the environment and their potential as income generating options, have been understood. The project has led to more proposals and projects on technologies and livelihoods.

The project was evaluated by an external evaluator appointed by ICEF, who reported that the project had been carried out well.