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ANNUAL REPORT 2005

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TIDE OVERVIEW

The year 2005 for TIDE can best be described as the year of consolidation of past efforts, standardization of products, processes, technologies and their dissemination models, documentation of past efforts and quiet introspection. TIDE projects have found new applications for the biomass dryers disseminated in earlier years, and have explored new income generation options for women's groups. We have made efforts to locate / develop technology that has positive impact of health and quality of life, and not only for economic gain. We have, through generation of case studies of past work understood the strengths and weaknesses of technology dissemination models adopted and obtained insights into technology dissemination to the poor and socially disadvantaged. We seek to learn from lessons of the past and experiment with technology dissemination models in the coming years as well

This year TIDE has worked extensively with rural women to create new income generation options through innovative use of technology. Projects supported by ICEF, ETC and DFID look at creating income generation options through use of environment friendly technologies. Construction of household smokeless stoves, charcoal making, production of dried figs & coconut products, cashew processing, vermicomposting of coconut waste are some technologies that have been used for income generation. These projects have exposed us to social barriers that need to be overcome, capacity building efforts that need to be in place before women can successfully manage micro enterprises in rural environments. The questions that we are now asking ourselves are Have we, over the years, developed adequate capacity to address technology issues in the field? And if yes, then how do we equip ourselves to overcoming non technology obstacles?

Continuing with the theme of technology for the needy and the deserving, we have tried to develop products that reduce exposure of silk reelers to harmful fumes released during stifling of cocoons in a project supported by Partners Forum (a forum of organizations working with SDC on sericulture projects). In this project as well the preliminary phase of the UNDP-GEF funded project that looks at energy efficiency in tea processing units we have sought technical assistance from innovative individuals in industry. This experience has exposed to us new options for technology sourcing.

TIDE had always positioned itself as a link organization between technology generating institutions and end users of technology and has not mandated for itself the task of technology development. However, through the core grant and other projects of DST we have embarked on a minor technology development exercise. We are implementing projects that look at developing charcoal makers and gasifiers, fuel efficient jaggery pans and low capacity brick kilns. The need for these products has emerged from extensive travel to rural

areas and understanding of needs of rural artisans. But introspection of our foray into technology development is required. Are we not able to enthuse technology generating institutions to work on these problems or is there a deficiency in our link with research institutions?

In the past year we have continued to explore and demonstrate innovative water related technologies. In a sponsored research project with UAS, Bangalore and Rainwater Club, we have demonstrated water harvesting for poly houses and are trying to show how small polyhouses can be used to grow vegetables that would supplement nutrition levels in mid day meals in primary schools. Projects of TIDE are also studying water quality issues and technology interventions for the same. Under a DST project we are studying the impact of technology intervention for water containing high fluoride content.

At the beginning of every year, we deliberate on the achievements of the past year and set for ourselves the tasks to be achieved and competencies to be built up in the coming year. For 2006 we need to strengthen our technology dissemination activity by greater understanding of how rural entrepreneurs and women's enterprises can access micro finance to sustain their enterprises. This crucial link would boost our technology dissemination efforts and build new competency in TIDE.

Every dynamic institution must have the ability to meet the expectations of its staff, create challenging situations for them resulting in the emergence of future leaders for the organization. If we have been able to meet the very modest staff expectations at all, it is because of their understanding of the challenges and their whole hearted participation in problem solving. We look forward to creating a more stimulating environment in TIDE as that would equip the young staff to independently manage the challenges ahead and in the process themselves grow as competent and concerned individuals and hopefully new leaders for TIDE.

Svati Bhogle

Secretary

WATER RESOURCE MANAGEMENT IN PERI-URBAN AREAS

(Supported by Science and Society Division, Department of Science & Technology, Govt. of India)

The project attempts to understand water demand in a peri-urban area, its changing nature from rural agricultural-based demand to urban residential/commercial demand and to put in place strategies for managing water in a sustainable, decentralized, participatory manner. In addition to the above the objectives of the project are to harness available rainwater through soil, land and crop management and water harvesting techniques, to facilitate community involvement in soil, land & water resource management and to train the community-based organization in managing regenerated soil, land and water.

TIDE initially carried out a primary household and village level baseline survey mainly to understand the pre-project water supply and usage patterns for domestic agriculture, industrial needs etc. Information on environmental sanitation was also collected as water and sanitation are irrevocably linked. The baseline study revealed the very poor level of access to basic services such as water and sanitation. The average availability of water per capita is only 44 LPCD while the access to household toilets is only 27%. The trend of urbanization was revealed as a shift in the occupational pattern from a primary agricultural system to secondary and tertiary occupations. The future water demand analysis showed that in an urbanizing scenario, local sources of water would not be adequate there was need to augment from other sources and techniques.

Rainwater and groundwater samples were analyzed for chemical constituents and biological parameters. The groundwater analysis data clearly shows that there is excess Calcium (180 mg/l), total hardness (300 mg/l), alkalinity (292 mg/l), total dissolved solids (480 mg/l), and magnesium (28 mg/l), presence of chlorides (127 mg/l), sulphates (30 mg/l) and nitrate (10 mg/l). The rainwater sample analysis data shows that all parameters are within the permissible limit of BIS standards and that harvested rain water was of a better quality than ground water but not potable quality.

Rooftop rainwater harvesting system was demonstrated at the school building of Nimbekayapura. Quantity of rainwater that could be harvested was estimated at 48,000 litres per year.

Water from the roof of the community hall in the village was used to demonstrate artificial recharge system for

indirect recharging of drinking water borewell. The technique involved excavation of a pit of depth 8 feet, diameter 6 feet, filled with different aggregates of jelly (60 mm, 40 mm and 20 mm) and sand. The overflow water from the rain barrel was diverted to this pit for indirect recharging of bore well. The artificial recharging is expected to result in increase in the water level after the monsoon.

During 2006, the project would implement water conservation activities such as partial desiltation of tank, rooftop rainwater harvesting structures for individual houses, rejuvenation / recharging of wells and identifying potential sites for bore well drilling and other recharge structures. The project would also conduct technical training in rooftop rainwater harvesting, especially on construction of low cost water storage structures, filter designs, plumbing and bore well recharging. Activities such as maintenance, repair and monitoring of the rain water harvesting system, imparting agriculture-related information on suitable cropping pattern to the farmers, conducting water-related awareness programme in the village shall also be implemented. Project documentation will include GIS database of the project and scope for replication of the project components in other part of the state and country.

RAINWATER HARVESTING PROJECTS DESIGNED / EXECUTED DURING THE YEAR 2005

During 2005, TIDE designed and executed rain water harvesting projects for residential apartments and for industrial units. Designs and implementation plans were also developed for different site conditions.

1. For Residential Apartments: TIDE had requests for implementation of rain water harvesting projects in apartments. A typical apartment complex in Bangalore wanted to extend the previous year's successful experience of rooftop rainwater collection system (constructed by TIDE) to other blocks. The new block had a roof area of 551 sq mts. TIDE estimated that the quantity of water that could be harvested would be 428 KL. TIDE designed a rainwater harvesting system for the apartment complex, after taking into account the existing infrastructure. The harvested water is stored in a rain barrel and the overflow has been connected to the existing sump. Water is being used for non-potable uses in the apartment.

2. For Industrial Units: A garment-exporting unit located in the outskirts of Bangalore adopted a rainwater harvesting system designed and implemented by TIDE. The factory decided to implement rain water harvesting for only part of the factory and total harvestable water was estimated to be 2327 Kiloliters. The rainwater is being collected in the existing sump through the filter unit. Overflow from sump is diverted to the newly constructed recharge wells and augmenting the groundwater resources. The water is then pumped to

overhead tanks for non-potable use. The present water requirement by the unit is 10 kiloliters per day. The harvested water should be self sufficient for 7 months for non-potable water use.

TIDE has provided design, implementation plan, and estimation to an Industrial unit located in Bommasandra industrial area. The industry has implemented rooftop rainwater harvesting system and groundwater recharging in the premises. TIDE is measuring monthly water level in the bore wells and groundwater quality. The data clearly shows that there is rise in the water level and improvement in the water quality.

TIDE is presently providing the designs for rooftop harvesting and groundwater recharging to many industries in Bangalore and other parts of Karnataka. TIDE also involved in creating the water awareness and water literacy to the various sections of the society.

INTEGRATED SOLID WASTE MANAGEMENT - CHIKMAGALUR AND RAICHUR

(Supported by Centre for Sustainable Technologies, Indian Institute of Science, Bangalore)

TIDE was asked to provide assistance to Centre for Sustainable Technologies (CST, IISc) in construction, commissioning and field testing of bioreactors developed at CST and construction of composting yards under their Integrated Solid Waste Management Project (ISWM) funded by INEP. TIDE had carried out all the activities for the completion and commissioning of the bioreactor and the windrow compost plant for treatment of the organic fraction of the municipal solid waste at Chikmagalur in 2004.

Bioreactor at Raichur

During the current year TIDE operated the plant for three months during which period data about the plant performance and waste inflows into the site were collected. It was observed that during the period of monitoring 1 ton of unsegregated waste was coming to the site every day. After segregation at the site, 0.5 tons of the organic component was fed to the bioreactor which was sufficient for feeding only one module of the bioreactor. Data on gas generation showed that the gas production was 30 cum/day which is as per expectations considering that the bioreactor was operating at 50% of its designed capacity. The compost yard was also operated for three months and compost produced.

TIDE also developed detailed project reports for replication of this technology so that a large percentage of the waste generated in Chikmagalur could be processed. Similarly all civil works for the bioreactor and the compost yard were carried out

for treatment of the municipal solid waste at Raichur. The bioreactor and the compost yard at Raichur are ready for commissioning.

ENERGY CONSERVATION IN SMALL SECTOR TEA PROCESSING UNITS IN SOUTH INDIA

(Supported by UNDP-GEF)

TIDE is currently in the PDF (Project development facility) phase of an UNDP-GEF project that seeks to create a positive environment for the introduction of renewable energy and energy efficiency products and processes into the tea factories in south India. The Climate Change Division of the Ministry of Environment and Forests, Government of India is the executing agency of the project. The aim of the pdf phase of the project was to understand the barriers to acceptance of energy efficient technology by the tea factories and to develop a project proposal that would be submitted to UNDP-GEF for the implementation phase of the project.

Mr. Allaudin, Chairman, TEDA at the stakeholders' meeting

TIDE carried out several activities before the project document could be prepared. It developed linkages with key stakeholders and ensured that the project proposal reflected the needs and concerns of all local institutions. Linkages were forged with Tea Board, who would be the executing agency of the project and TEDA (TamilNadu Energy Development Agency), the tea planters associations (NILMA and Bought leaf manufacturers association), research institutions engaged in tea research (Tea Research Institute under UPASI, PSG College of Technology, Anna University), technology providers (Planters Energy Network, Pandian Engg,.Teakrafts) and commercial banks (SBI, Central Bank, Union Bank of India, Indian Bank).

It collected data on electrical and thermal energy consumption by tea factories in Nilgiris district of Tamil Nadu. It tracked the firewood flow from the point of origin to the tea factories, it held group discussions with tea factories and conducted a widely attended stakeholder meeting. It interacted with banks and obtained letters of commitment from them for the project. It also obtained letters of commitment from industry associations. Besides the project proposal, it also produced a document "Summary of interactions with stakeholders in the PDF-A phase of the project".

The 7th Empowered Committee of GEF endorsed the project at its meeting in May 2005. TIDE is awaiting the early sanction of the project.

RURAL LIVELIHOODS CAPACITY BUILDING AMONG COMMUNITY BASED ORGANIZATIONS: HOUSEHOLD LEVEL CASHEW PROCESSING

(Supported by British High Commission, New Delhi)

This one-year project, funded by the Small Grants Scheme under the British High Commission, commenced in April 2005. The objectives of the project are to a) Develop capacity of three groups of women leading to the establishment of a sustainable household / neighbourhood level cashew processing industry and b) Develop awareness among women's groups about household cashew processing to motivate more groups to take up this activity in the following years.

With the assistance of Kudumbashree Poverty Alleviation Mission of the Government of Kerala, five Gram Panchayats were identified. The criterion for identifying these Panchayats was the location of cashew plantations in these areas. Meetings were held with the Village Extension Officers and Presidents of the Community Development Scheme of these Panchayats, who organized meetings with Neighbourhood Help Groups (NHG). The groups were taken to Amrutha Cashew Unit (successful cashew processing SHG developed by TIDE during 2004) to provide exposure to all enterprise-related activities. The three groups currently carrying out cashew processing are (a) Prateeksha Swa Sahaya Sangam, Nellikutty village, Kannur district. (b) Prateeksha NHG, Pallikere, Kasargod and (c) Sreyas NHG.

Women being trained in cashew cutting in the Pallikere training centre

The season for raw cashew commences around the middle of April and concludes towards the end of May. More than 6 tonnes of raw cashew were procured in the first ten days of May. The raw cashew procured was used for training and will be used for further processing by the three groups.

In order to ensure energy security for the groups, it was decided to install a small biomass fired dryer of capacity 10 kg per batch to dry cashew.

A training centre has also been set up in rented premises in Pallikere in Kasargod district with all processing and quality control equipment like steamers, cutters, dryers, moisture meters storage containers, sealing machines. After processing, cashew nuts are graded and packed in air tight plastic containers

A manual describing household processing of cashew as an income generating has been prepared. The manual contains information on manufacturers of equipment as well as other useful information. It will be translated into Malayalam and given to the three groups. Training has been completed for all the three groups. The trained groups are processing

cashew and are selling them in the retail markets in the towns near their villages. They have gained experience and the quality and yield has gone up. Marketing support is being given to the groups. Assistance is being given to the groups to prepare project reports to submit to the local banks for obtaining subsidized loans under the Kudumbashree scheme.

FLUOROSIS MITIGATION THROUGH TECHNICAL INTERVENTION AND COMMUNITY PARTICIPATION IN KARNATAKA

(Supported under Women's Fellowship scheme, Department of Science and Technology)

Problem of higher fluoride content is severe in rural areas where surface and ground water sources are limited. The fluoride content permissible in drinking water as per WHO standards is 1.5 ppm and fluoride content in some places has been measured to be as high as 30 ppm. Currently there is no option but to drink fluoride contaminated water for several rural communities living in fluoride affected areas. There is an urgent need to develop a long-term solution for defluoridation of fluoride contaminated groundwater.

Several water treatment procedures are being explored and data collected. For the environment for which the technology is needed, it must be simple, cost effective, easily transferable, use local resources and must be accessible to the rural community. Various conventional technologies like precipitation based Nalgonda technique offer little hope due to inherent drawbacks like complex set up, chemical consumption, need for skilled labor and cost associated with them.

The present study proposes to investigate Activated Alumina based household filters as a possible solution for fluorosis mitigation. Studies conducted by UNICEF in rural India have described activated alumina process as the most appropriate technology for defluoridation. The project proposes to study impact and acceptability of these filters in rural areas. The objectives of the project are: (a). To study impact of awareness creation about the harmful effects of fluoride in drinking water in the fluoride affected region (b). To generate micro-level data about fluoride content in ground water in a predefined fluoride affected region (c) To understand and assess the acceptance of the Activated Alumina technology for fluoride removal in the project area and (d) To develop and test a methodology for technology dissemination in the project area.

The project site selected for the study is Kabbal village in Kanakpura taluk about 80 km from Bangalore. Kabbal mainly consist of Peninsular Gneiss and granite. To understand the ground water quality, ground water samples were collected from the bore well and rural water supply cistern. Department of Mines and geology analyzed the samples. The water sample had been analyzed for fluoride content and results showed higher concentration fluoride in the region.

School children at the dental camp

A dental health camp organized in Kabbal showed that the most of the villagers were affected by dental fluorosis. The degree of fluorosis was more among school children compared to the older generation of the village and inference can be that the level of fluoride in the groundwater has been increasing in the past 3-4 years. An awareness camp was also conducted in this village on the harmful effects of drinking fluoride-contaminated water. Later household-based activated alumina filters were introduced in this region. Water samples are being collected every fortnight and analyzed to understand the regeneration period of the filters.

PROMOTING FISH DRYING USING EFFICIENT BIOMASS FIRED DRYERS

(Supported by Small Grants Program of UNDP-GEF)

The project aimed at creating enterprises (managed by women SHGs) that produced dry fish using energy efficient biomass dryers. By the end of the project, four enterprises were expected to operate on commercial modes with the women managing all activities relating to the enterprise. During 2003-2004, the project undertook a series of activities to develop drying protocols for various kinds of fish and also trained four women's' groups in the use of dryers. This project terminated in March 2005.

Activities during 2005 focused on the implementation of promotional activities leading to awareness and demand consolidation: The fish drying enterprises participated in various exhibitions/fairs that helped in better awareness about the product. Promotional campaigns were done for the product through print media, which helped in getting a wider market for the product. A common brand name, 'SAGAR SREE',was used for all the products produced by all the units. Towards assessing the metro/urban markets, dried products were exhibited and sold in various trade fairs including the India International Trade Fair, New Delhi.

A major challenge in this project was to penetrate markets with the product being positioned as a premium product with the enterprise being managed in a developmental setting by novice entrepreneurs. Handholding by the project was crucial in ensuring project success and enterprise viability. The linkage with the government Kudumbashree program also elicited invitations to women's groups to sell their products in sponsored exhibitions, trade fairs etc. The project's novelty resulted in frequent site visits by government and elected representatives. The project organized an interaction meet where the women narrated their experience to 50 other women's groups seeking ideas for entrepreneurship. NGOs working with the groups organized the dryer inauguration programs with good publicity.

The project strategically ensured that the press covered the project, reproduced press cuttings in pamphlets that were distributed outside supermarkets and branded the product. The selling price was fixed at lower than fish dried in electric dryers. The packaging highlighted the virtue of biomass drying. Interaction with Kudumbashree ensured that the project was discussed in the government. A double cover pack was provided for the dried fish, first with a plain plastic cover with a lower gauge and then with a higher gauge printed cover.

Pre-fabricated fish dryer

segments, the project Towards creating awareness among various consumer the better quality of printed pamphlets highlighting adopted in production dryer-dried fish, methods supplied along with the etc. This pamphlet was also staff and sales agents product to buyers. The project explained about the interacted with shopkeepers and enterprises participated product and its advantages. The in exhibitions and seminars where the product was introduced to a wider customer base. The project placed advertisements in leading Malayalam newspapers explaining about the product and also inviting local trade enquiries. A number of local and export trade enquiries were received and the project interacted with the interested agents. Two local marketing agents were subsequently identified along with one exporter. Samples of the dried products were sent abroad for quality verification. The domestic sales doubled due to finalization of commercial terms with the local marketing agents. However, in February 2005, a NGO-supported SHG indicated its intent from withdrawing from drying activities due to operational disagreements with the promoter NGO. Subsequently, the project has identified another group for shifting of the dryer. This group has initiated activities of drying of fish and selling of value added products.

Project activities have helped in creating marketing linkages to sell the products, and helped the women to concentrate on production. The project organized a training program for making value-added products from fish and other marine products leading to widening of the product range. The project designed plastic covers highlighting the features of the product and these are being used by the units. These covers provide product related information to the customers while also protecting the product from contamination.

ASSESSMENT OF POTENTIAL FOR REDUCTION OF GHG EMISSIONS FROM TEXTILE PROCESSING UNITS IN TAMILNADU

(Supported by the British High Commission, New Delhi)

The textile-processing cluster in southern Tamilnadu accounts for about 50% of Indian textile mills, 35% of Indian yarn production and about 19% of Indian textile workers. Textile processing is concentrated in a few districts of the state with cotton yarn and hosiery being the main outputs from the industrial units. Tirupur cluster in Tamilnadu is a major hub for cotton textile production and exports from India. At the generic level, textile-processing units include spinning mills, bleaching/dyeing units, sizing units, weaving units, ginning units and garment producers. A large number of dyeing and bleaching units are classified as household factories and are typically in the unorganized sector.

All types of textile processing units use electrical energy for their operations while the use of thermal energy is significant in bleaching, dyeing and sizing units. Textile processing, in relation to bleaching, dyeing and sizing units involves the processing of yarn or cloth to obtain yarn/cloth of desired colour and strength. The bleaching and dyeing units require large quantities of hot water in the process of cleaning the cloth/yarn and imparting the desired colour to the cloth/yarn. Hot water is obtained by the combustion of biomass fuels (primarily fuel wood) in stoves and boilers. The use of agro-residues and alternate fuels (such as briquettes) is negligible due to constraints of availability, cost and combustion technology. Most of the bleaching and dyeing units use conventional, energy inefficient stoves for combustion of fuel wood leading to consumption of large quantities of fuel wood. In some bleaching and dyeing clusters, direct heating of water is done using stoves while in a few other clusters, boilers are used to produce steam to heat water. The sizing units use boilers with a wide range of steam-producing boilers (in terms of technology, vintage etc) in use for combustion of wood. In sizing units, steam is produced and used in starch vats and in roller dryers to dry yarn. Wood is normally purchased from local markets at a cost of Rs.900–Rs.1400 per ton. Wood is the preferred fuel primarily due to economic reasons. Various studies have shown that in the medium and long term, considering the high rates of extraction, fuel wood may not be a sustainable option.

A typical bleaching stove

The combustion devices (stoves) in bleaching and dyeing units are highly inefficient with efficiency levels of about 10%-12%. The use of improved, energy efficient stoves or alternate technologies could result in reduction in the consumption/demand for fuel wood. The sizing units use boilers which are relatively more efficient but scope exists to improve the efficiencies by process improvements and by use of improved technologies such as wood gasifiers. Hybrid technological systems such as solar-biomass systems could lead to reduced demand for fuel wood. This study has attempted to assess the potential for reduction in fuel wood consumption by the use of improved technologies in biomass consuming textile units in Tamilnadu. This study has attempted to analyze the fuel usage patterns in the textile units and identify suitable technologies for adoption by the textile sector in Tamilnadu.

The survey had the objectives of a. To obtain a listing of the tiny, small and medium textile-processing units using wood / biomass as fuel and located in select districts b. To understand the fuel usage patterns of these industries and c. To recommend appropriate wood / biomass conserving technologies for these industries

The project was survey-based with broad-based surveys and technical surveys being undertaken to result in information leading to achievement of the objectives. The survey has attempted to estimate the quantity of fuel wood used by the textile processing units in Tamilnadu and the potential for reducing emissions. Total consumption of wood in bleaching, dyeing and sizing units is estimated at about 900000 tons per annum. The survey has assessed that with 60% of the units adopting improved technologies (such as improved stoves, gasification systems and solar water heating systems), about 156000 tons of fuel wood (about 280000 tons of emissions) can be conserved per annum. It was also assessed that with this quantum of savings, 650KLs of diesel (associated with transport of wood) could be conserved per annum. The survey also showed that reduction in wood consumption due to adoption of improved technologies would lead to savings of Rs.21.84 crores per annum by the industry.

Subsequent to the survey, TIDE has attempted to source resource support to develop entrepreneurial networks to promote renewable energy technologies in the textile-processing sector in Tamilnadu.

PROCESS DOCUMENTATION OF THE PROJECT TO PROMOTE IMPROVED CHARAKA OVENS

(Supported by SERI Partners Forum of the Swiss Agency for Development & Cooperation)

From February 1998, TIDE carried out a project 'Diffusion of efficient biomass utilization technologies in non formal industries in Karnataka and Kerala' supported by India Canada Environment Facility (ICEF), New Delhi. The silk reeling industry (mulberry silk, multivoltine) was identified as one of the 14 non-formal industries in Karnataka wherein biomass fuels were used during post cocoon processing. The silk reeling industry (mulberry silk, multivoltine) in Karnataka uses about 102000 MTs of biomass fuels were annually used for silk reeling in about 17900 silk reeling units. About 20,000 charaka silk reeling stoves and about 14000 cottage stoves operate in the silk reeling clusters of Karnataka for about 250 days in a year. Technical monitoring conducted by TIDE has shown that the average efficiency of the conventional stoves is about 10% - 14%. Apart from the low efficiencies, the conventional stoves emit smoke in the working environment causing serious respiratory related problems to the reelers and affecting the quality of silk. Detailed performance analyses by TIDE revealed that the efficiency of the conventional stoves could be improved to about 25%, by implementing certain changes in the design of the combustion chamber, placement of chimney and grate in the stove.

Mobile display of charaka stoves in a silk reeling cluster

Realizing the immense potential for conserving biomass fuels used for silk reeling, TIDE undertook activities to develop energy efficient stoves for silk reeling in each of the three types of silk reeling units. In October 2000, the first demonstration unit of the charaka stove was installed in a reeling unit located in Ramanagaram, Bangalore Rural District. The performance of the improved charaka stoves and the conventional charaka stoves were assessed for various biofuels used for processing in silk reeling and was monitored at client locations. The results indicated that the quantity of biofuels consumed in improved charaka stoves was at least 30% less than the biofuels consumed in conventional charaka stoves. Considering the efficient performance of the charaka stove, awareness building and market development (for demand generation) were crucial inputs to disseminating these stoves without dependence on subsidies. However, the implementation of activities for awareness building and market development required financial resources. In December 2000, TIDE submitted a proposal to SERI 2000 for financial support to implement a project leading to creation of sustainable networks for promoting the TIDE improved charaka stoves. In February 2001, SERI 2000 granted TIDE a project 'Promotion of Energy Efficient Charaka Stoves' to undertake test marketing of the improved charaka stove so as to develop a strategy for large-scale dissemination and to develop a final design of the improved stove that can be disseminated. Based on the outputs achieved during the 1st phase of the project, SERI 2000 granted TIDE a project 'Promotion of improved charaka stove'. This project commenced in September 2001 and the duration of the project was 31 months. The objective of the project was to contribute to poverty alleviation among reelers of charaka silk reeling units by reducing expenditure on biofuels, effected through adoption of energy efficient charaka stoves promoted by sustainable market driven networks.

By the end of the two projects, entrepreneurial networks in the states of Karnataka and Andhra Pradesh had installed more than 2300 charaka and 41 cottage stoves in realer locations. The stoves installed under the project have saved reduced expenses on biomass fuels by about Rs.87 Lakhs by December 2004. In 2004, the Department of Sericulture, Government of Karnataka adopted the improved stoves promoted by the project and disseminated the stoves through the entrepreneurial network developed under the project. Considering the successful progress of the project, SERI partners forum granted a project to TIDE to document the processes adopted to promote the improved stoves.

Under this documentation project, a report consisting of chapters - Project Environment, Technology Development, Process Description, Learning's and conclusion was prepared and submitted. A presentation on the documentation was also made to the partners' forum.

ASSESSMENT OF TECHNOLOGICAL SOLUTIONS FOR IMPROVEMENT OF WORKING ENVIRONMENT IN SILK REELING UNITS

(Supported by SERI Forum of Swiss agency for Development & Cooperation)

In the present project, TIDE aims to develop a technology option that could prevent exposure of sericin containing fumes, detrimental to health of workers in silk reeling units. The project focuses on preventive intervention to reduce exposure of workers in silk reeling units to occupational hazard due to sericin.

Prolonged exposure to steam containing sericin from reeling basins causes respiratory problems among workers. Use of hoods would draw the steam away from the reeling workers thereby preventing health deterioration due to exposure. The project initiated activities relating to hood development by assessing steam production rates in all the three types of silk reeling units. The findings are given below:

Type of reeling basin	(Steam production in reeling basins) kgs/hr per cooking stove
Charaka units	0.8
Ramanagaram type (4-pan)	5.0
Italian type reeling units	2.0
Ramanagaram type (6-pan)	6.0

Currently, the steam escapes into the working environment. Also, most of the units (indoor) are poorly ventilated. The project attempts to develop hoods (chimneys) that could be retrofitted to the existing oven so as to eject steam away from the reeler. Hoods for both charaka and cottage units would be developed. The guidelines for technology development were defined as given below:

i. Cost of the product to be about Rs.2000 per charaka stove, Rs.3000 per Italian stove and Rs.5000 per Ramanagaram stove

ii. The opening of the hood should be at least 40 cms above the reeling vessel

iii. The chimney ducts should be placed in such a position that it does not obstruct reeling operations

iv. The power consumption should be as low as possible

v. The on-site installation requirements should be minimal

vi. The product should be serviceable by local fabricators / electricians

Considering socio-economic conditions in the silk reeling sectors, TIDE has initiated activities in the cottage sector. 3 hoods for Italian type ovens and 2 hoods for Ramanagaram type ovens (6 pan) have been developed and installed in reeling units. 1 hood for charaka type oven has also been installed. The design-related issues that were addressed include airflow rates and quantity of steam, type and power of fan, shape and dimensions of hood opening and configuration of ducts

Hood for Ramanagaram oven

User response to hoods was assessed. It was found that Hood positioning was suitable as it did not obstruct movement / reeling operations. There was an ambiguous response to adoption due to cost concerns. Capital cost was the primary concern while variable costs (cost of electricity) was the secondary concern. Workers were categorical in their opinion that the hood improves their working comfort. Government officials felt that the hoods were useful but were circumspect about reelers buying the devices. Reeling unit owners were forthcoming and cooperative for installation of the hoods in their units.

So far, 3 hood designs for Italian-type ovens, 2 hood designs for Ramanagaram-type ovens and 1 hood design for Charaka type ovens have been installed. The power requirement for Italian, charaka units is 1 kWh for 12-hrs operation while the power requirement for Ramanagaram-type hood is 1 kWH for 8-hrs operation. The hoods can be installed in any reeling unit with having single-phase power connection. The hoods do not interfere with reeling operations. The hoods require basic maintenance to avoid rusting, friction to fan rotation etc. The estimated costs to adopter presently are:

i. Italian: Rs. 3500 + taxes

ii. Charaka: Rs. 3500 + taxes

iii. Ramanagaram-type: Rs. 7000 + taxes

Hood for Charaka oven

Optimal configuration of hood for the Italian units has been developed for all the three types of reeling units. Ramanagaram-type units are more interested to adopt the hood as compared to Italian-type units. The device has been well received by cottage unit owners but whether they would adopt by paying the full cost of the device has to be assessed.

Workers have indicated improvement in working comfort due to the hood. By March 2005, the three types of hoods would be tested in 9 user locations.

PROCESS DOCUMENTATION (CASE STUDY) OF THE ENTREPRENEURIAL DISSEMINATION OF ARECANUT COOKING STOVES

(Supported by Asia Regional Cook stove Programme, Indonesia)

The case study focuses on arecanut cooking stoves, one of the widely disseminated stoves being promoted by the entrepreneurs. The case describes the socio-economic setting in which the project was implemented and historical factors that influenced project performance. The strategy formulation process and implementation mechanisms have been highlighted. The various stages of the project have been explained and assessed for their relevance. The project impact on various dimensions has been objectively described and economic analysis undertaken in relation to project costs. The case focuses upon sharing the major learnings from the project and the critical points that should be considered in replication programs and other similar programs.

Single-pan areca cooking stove

The case has been written primarily on a process evaluation mode. Brief surveys and focus group discussions have been undertaken with major stakeholders to assess perceptions. The project setting has been assessed and described based on secondary data while historical factors are described based on information collected from interviews with stakeholders (that were involved in past programs) and secondary data. The sections of the case study are: Introduction, Areca cultivation and processing - a recent history, Development of areca processing stoves, Experiences in demonstration and dissemination of areca stoves, Results and analysis and Learnings for future unsubsidized industrial stoves in informal industries.

The final version of the case study would be available by March 2006.

LOW COST CHARCOAL MAKING FROM WASTE BIOMASS AND ITS EFFECTIVE UTILIZATION

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

This 3-year project (Sept 2004-Aug 2007) has the following objectives:

- To review and assess environmental friendly and energy efficient techniques of small scale charcoal making from waste bio-mass/wood
- To develop, adopt to local conditions, test and demonstrate the technology of making solid charcoal pellets by effective use of volatile evolved during char making.
- To install two demonstrate units for charcoal making unit in user location.
- To develop a prototype of a gasifier using charcoal as fuel

The proposed output for the first year (Sept 2004-August 2005) is the identification and analysis of biomass, development of laboratory models of charcoal kiln and its fabrication. Towards achieving this output, TIDE undertook a literature survey on different methods of charcoal production and types of fuel used in making charcoal. The survey revealed that the capacities of the existing kilns are very large, and the volatiles are not used. Subsequently, considering dimensions of volatiles and transportability, the project team developed six versions of a charcoal kiln and tested them for yield, time of charring, quality of char etc. The project identified different types biomass viz., sugarcane trash, baggase, hongemia, lantana, ipomia, tamarind, juliflora, etc., and tested these fuels with different designs. Testing revealed that the first two models used for making charcoal do not burn volatile and produce a lot of smoke during the operation. In these models volatiles were not utilized during the burning process. The fuels used were lantana, sugarcane trash and ipomea.

The next lab model was developed with different design other than the previous model. The capacity of the kiln was about 40 kg and yield was about 20%. A modified version of this third model produced good quality charcoal and utilized maximum volatiles for water boiling. 15 tests were conducted and the yield was found to be consistent. This model is working with a yield of 28-30 % charcoal and uses most of the volatiles.

CORE SUPPORT TO VOLUNTARY ORGANIZATIONS

(Awarded by Department of Science and Technology, Govt. of India)

TIDE was awarded the core grant of the DST 5 years ago. In January this year, a review team of DST reviewed the progress made by TIDE under the core grant and recommended extension for 5 more years. In the core grant extension proposal submitted by TIDE after the review it had proposed the following in the extended phase of the grant:

- Develop linkages with more grass root level NGOs / SHGs / Govt. agencies working in rural areas and with technology generating institutions
- Work in two specific areas of importance to rural societies, rural process industries and technologies for water use optimization

In the current year, TIDE has reached out to several NGOs in south India working largely in the area of environment improvement and natural resource management. TIDE would like to strengthen this linkage and use the same for its technology dissemination activities. A map showing the locations of the NGOs with whom TIDE has forged linkages is shown in the figure. TIDE would try to evolve the current linkages into a network that can develop as a conduit for low investment technologies.

TIDE is also continuing its testing of the low efficiency brick kiln. Brick burning trials showed that the kiln needed to be fortified and this has been done. TIDE is in the process of demonstrating the kiln to brick makers in TamilNadu and obtaining feedback from them. The core grant team is also in touch with NGOs in TamilNadu and exploring a new dissemination strategy where the NGOs would own the kiln and hire it out to brick makers for a fee.

TIDE has also been working in cooperation with Vikasana an NGO in Birur taluk in Chikmagalur district where the technology of bore well recharge has been transferred to the rural NGO who is in turn training local plumbers in the skill. An equipment that measure the depth of the water has also been placed in the premises of the NGO so that farmers who have recharged their bore wells can collect data on the water level in their wells

In the coming months TIDE would collect data on the performance of improved jaggery pans, assess potential for entrepreneurship through this technology and seek project funding to disseminate the same in other regions. It would also identify other technologies developed by technology generating institutions and develop plans for their field adaptation

Rainwater harvesting for polyhouses: The installation of Rainwater harvesting system (RWH system) with polyhouse can provide adequate water for the growth of higher value plants in a safe, controlled environment. The basic concept involves the collection of rainwater falling on the rooftop of polyhouses, storing the collected water, and supplying the water to plants through drip system.

TIDE, Agricultural Engineering department of, Gandhi Krishi Vignana Kendra (GKVK) and Mr. Vishwanath (of Rainwater Club) were involved in installing RWH system for a polyhouse in the University of Agricultural Sciences, GKVK, Bangalore. The team has undertaken water quality studies to analyze rainwater and found that the collected rainwater is suitable for irrigating plants in the polyhouse. The work has resulted in the entire water requirement for growing *capsicum annum* in the polyhouse being met through polyhouse rooftop RWH. Subsequently, the construction parameters for polyhouse RWH systems have been standardized.

RWH System for polyhouse

GI gutters have been provided to the roof of the existing polyhouse to collect rainwater. Three rain barrels of 1000 liters, 2000 liters and 2000 liters capacities have been fitted below the gutters to harvest rainwater. It is assessed that in this particular polyhouse, about 30 mm of rainfall would fill these rain barrels. Provision has been made to collect overflow of water from these barrels. Water measuring system have been installed to measure the quantity of water collected in the rain barrels and quantity of water that overflows to the underground tank. Water from the barrels as well as the underground tank is fed to the drip irrigation system through filters.

The total roof area of the polyhouse is 176 Sq. Meter. During the period, 5th May 2005 to 4t^{h} November 2005, 2,02,000 litres of water has been harvested with an efficiency of rainwater collection at 90 %. The total cost of the rainwater system for the polyhouse is about Rs 30,000/-. Assuming similar quantum of rainfall, system lifetime of 15 years, and annual maintenance cost of Rs.3000, the cost of water has been estimated at Rs.0.04/ litre. The returns from cultivation of high-value horticultural crops ensure a short payback period for polyhouses of any dimension.

In the present setup, the harvested rainwater was used for watering the capsicum annum crop. The crop has been cultivated by using harvested rainwater and groundwater by adopting drip irrigation system in the polyhouse. The total crop water required for six months duration is 42,000 litres of water was used to grow the Capsicum annum, and surplus harvested water was used to grow flower plants and other crops in the area. The rainwater harvesting system retrofitted to the polyhouse can reduce pressure and dependence on groundwater resources. The quality of rainwater is seen to be good when compared to groundwater. The low TDS and constituents of rainwater allow for supply of water through existing drip irrigation systems. The system can be used to grow other agricultural/ horticultural crops (French beans, Pole beans, Cabbage, and flowers (Carnation, Gerbera and Chrysanthemum) in the Polyhouse. The surplus water could be used for growing other crops or for artificial recharging of groundwater.

DIFFUSION OF EFFICIENT BIOMASS UTILISATION TECHNOLOGIES IN NON-FORMAL INDUSTRIES IN KARNATAKA AND KERALA

(Supported by India Canada Environment Facility, New Delhi)

The main objective of the project was to promote improved biomass fuel combustion devices on a commercial basis by developing entrepreneurs. The project area specified under the project was the states of Karnataka and Kerala and later during the project extension period (February 2003 to March 2004), the project area was widened to other states such as Tamilnadu, Andhra Pradesh, Chattisgarh, Madhya Pradesh and Uttaranchal. The trained entrepreneurs have installed 8363 devices from the past 5 years, since setting up as independent enterprises.

Training in borewell recharge

developing linkages with societies, institutions, NGOs organizations. During the linkages with the Karnataka Government under Project' to supply and install cooking stoves in the select Karnataka. About 1000 stoves were installed by TIDE has supported the entrepreneurs by various cooperative and Government year, TIDE developed entrepreneurs and the 'Jal Nirmal improved household districts of North household cooking entrepreneurs under this program. Linkages were developed with Sericulture Department, Government of Karnataka and with the entrepreneurs involved in promoting improved energy efficient silk reeling devices for installing silk reeling devices in Karnataka. The entrepreneurs have installed about 230 silk reeling devices during the year.

All the entrepreneurs were trained on 'Recharging of bore well through rain water harvesting during the year. The training was provided basically to increase their product line and to help the entrepreneurs sustain during the lean season.

Due to this project, 8363 energy efficient devices have been installed in user locations and cumulatively have conserved about 1.5 lakh MTs of biomass fuels and about 2.5 lakh tons of GHG emissions. The average annual turnover of all the entrepreneurs is about 1 crore during the period 2001 to 2005.

CAPACITY BUILDING FOR EXISTING NETWORKS OF NGOS / CBOS AND SHGS FOR ENVIRONMENT LINKED INCOME GENERATION ACTIVITIES

(Supported by India Canada Environment Facility, New Delhi)

The project is initiated with the objective of creating enterprises by providing training related to environment friendly technologies to the individuals / members of the existing networks of NGOs / CBOs and SHGs. The activities of the project were initially started in the three states of Karnataka, Kerala and Madhya Pradesh and later it was decided to extend the project in Tamilnadu. In Madhya Pradesh the project could not find new environment friendly technologies to implement, so the project was discontinued in this state.

Madhya Pradesh: The following environment friendly income generation activities were undertaken under the project a. Installation of Sarala household cooking stoves and water heating stoves and b. Installation of improved energy efficient brick kiln

Sarala stove constructed by the trainer

Installation of Sarala household cooking stoves and water heating stoves: During the

year the individuals trained in constructing household cooking stoves have constructed about 55 Sarala stoves and 9 water heating stoves. Various market development activities such as Mobile exhibition, door to door campaigns, advertisements in local news papers and meetings at villages were conducted to create awareness about the stove and to obtain orders for constructing the stove. The trainees were encouraged to undertake promotional activities such as door-to-door campaigns on their own and to install stoves whenever the order exists.

Construction of energy efficient brick kiln

Installation of improved energy efficient brick kiln: An improved brick kiln was installed at Gaygohan, Chhindwara and training was provided to Sri Sai Seva Samuh to operate and maintain the kiln. TIDE has supported the SHG by providing the fabrication materials, labour and bricks required for installing the improved brick kiln.

Karnataka: The following environment friendly income generation activities were undertaken under the project a. Installation of Sarala household cooking stoves b. Producing charcoal from loose biomass c. Production of vermicompost d. Fig drying through biomass based dryers and e. Bore well recharge through rainwater

Wall painting as a part of promotional activities

Installation of Sarala household cooking stoves: During the year, the project promoted Sarala stoves by conducting various market development activities such as wall painting, mobile exhibition, display of the stove documentary in local channels, appointment of agents, organizing meetings at the adopters place, etc. Competitions were conducted among the trainees to encourage construction of stoves throughout the year. Apart from these market development activities the traditional market development activities such as distribution of pamphlets, door to door campaigns, providing information in the SHG meetings were conducted. Capacity building and motivational programs were conducted at regular intervals for the trainees, basically to understand their problems (both technical and non-technical), to provide information about latest developments in up gradation of the technologies related to mould and others. About 12 trainees out of 104 trained are active and have constructed about 925 Sarala household cooking stoves and have been able to earn about Rs. 41,000/- in a span of 18 months. The total contribution from the adopters for installing household cooking stoves is about Rs. 1 lakh.

A training program was organized to improve skills of stove constructors. The objective of the program was to achieve greater dissemination of the product in new areas and to transfer the skill of installing stoves to other individuals in their surrounding areas. A comprehensive manual was provided to the participants and eminent professionals made lectures and practical demonstrations. Linkages were developed with the Department of Rural Development and Panchayat Raj, Government of Karnataka for promoting and providing training to the identified individuals under the projects developed by them. Constant efforts were being made by the project staff to upgrade the technology to ease the trainees from the problems faced by them. In this regard, plastic moulds were

developed, because the trainees were supposed to carry heavy moulds while installing the stove and lately experiments are being carried out for making prefabricated stoves.

Trainees processing Prosopis Juliflora for producing Charcoal

Producing charcoal from loose biomass: Charring is the technique, where biomass is carbonized under controlled conditions, by heating/burning the biomass in the absence of air or negligible amount of air. The purpose of this step is to drive out the volatiles and high moisture contents to enrich the residue in carbon content. A group of women at Jodkuli, near Chikkodi in Belgaum district was identified and trained in making charcoal from the twigs of *Prosopis Juliflora*. These women work under the supervision of an entrepreneur, who is responsible for providing biomass to the women for converting the same into charcoal and marketing the same. TIDE has supported the entrepreneur by providing Rs. 2000/- as loan towards the working capital requirement. The women have processed about 10 tonnes of wood into charcoal and have earned about Rs. 3,000/- as wages. The entrepreneur has made a profit of about Rs. 600/- and has earned about Rs. 900/- as wages for undertaking this activity.

Production of vermicompost using plastic bags

Production of vermicompost: The demands for vermicompost is gaining importance now, since more number of people are practicing organic farming. The training was provided in consultation with CPCRI to women's group near Huliyar in producing vermicompost through coconut waste. We have introduced a latest variety of earthworm related to a local strain of African Night Crawler, which is quite efficient in converting coconut waste into vermicompost. This new variety was identified, based on the research work undertaken by CPCRI. Recently, the first batch of vermicompost was produced and the women's group themselves have used the compost for their own farms. TIDE is experimenting to produce the vermicompost by using plastic bags, instead of producing through normal method i.e., by using pit. The vermicompost produced using plastic bags is considered as easy to operate and less expensive, as the initial investment required is very minimal.

Fig processing undertaken by womens' group

Fig drying through biomass based dryers: A group of women belonging to the Swayam Siddha Shivashakti Sva Sahaya Sangha, Babbur, Hiriyur Taluk was trained in drying figs. TIDE is supporting this women's group in developing market and standardizing the drying method. It was felt that the quality of the dried fig has to be improved, because the shelf life of the dried fig was short. TIDE has consulted Indian Institute of Horticultural Research for understanding the drying protocols for improving the quality of the dried fig and shelf life of the product. It is estimated that about Rs. 700/- profit can be earned if the dryer is used to full capacity, apart from the labour that they earn for drying the figs.

Borewell recharge through rainwater: Training of borewell recharging was provided to the entrepreneurs developed under the earlier projects of TIDE and to the VIKASANA, a local NGO. The objective of borewell recharge training to entrepreneurs developed by TIDE is to increase the product range of the entrepreneurs, so that this activity can be undertaken during the lean season. VIKASANA is implementing a program on borewell recharging and the training on borewell recharge is provided to individuals identified by the NGO. The individuals initially undertake the borewell recharging under the project and later they provide the service (borewell recharge) at a cost.

Artificial recharging of borewells: Artificial recharging was demonstrated in a borewell located in an agricultural plot in Antaragatte village, Kadur taluk of Chikmagalur district. The depth of borewell is 150 feet, casing 20 feet and reported yield is about 16200 liter per hour with groundwater sources at 40 feet. It is also reported that borewell yield has decreased during the last 3 years due to scanty rainfall and addition of new borewells in the region. For artificial recharge, a circular pit of 9 feet diameter and 9 feet deep was excavated around the borewell having a metal casing pipe. 6-mm holes were made in the metal casing pipe at 2 inch distance, resulting in about 130 perforations. The bottom of the pit was filled with boulders, jelly and sand at the top. The perforation part of casing was wrapped with netlon mesh. The silt collection pit was suggested close to the borewell to collect silt from the incoming surface run-off water.

The monthly water level in the recharge borewells is being monitored from March 2005 onwards. Water level data shows that there is increase in the ground level and improvement in the water quality Groundwater level is measured in the artificially recharged and unrecharged borewells to assess impact.

Demonstration of Pupa drying

Energy efficient Other technologies such as Pupa drying, Brick Kiln and Rainwater harvesting system for Polyhouse are being experimented. These activities will be taken up during the next year. Under this project about 20 enterprises has been created and during the next year the objective under this project would be to replicate these technologies for more number of groups to develop enterprises among the above mentioned activities.

Kerala: The following environment friendly income generation activities were undertaken under the project a. Household cashew processing b. Production of Coconut chips & Dried fish and c. Production of Vermicompost

Removing of kernel from cashew

Household cashew processing: Cashew processing involves harvesting, drying, steaming, removing of kernel from the peeling, grading and packing. TIDE has trained a SHG in Kollam Village in Kasargod district for

processing cashews. After training, the SHG has purchased about 6,000 kgs of raw cashew and has processed about 4,000 kgs. TIDE has supported them by providing equipment for processing cashew and some advance for procuring raw cashews. Recently the group has got a loan of Rs. 2 lakh from a local bank for meeting its working capital requirement and for constructing a shed. TIDE has supported the SHG by assisting them in sales and has achieved a profit of about Rs. 36,000/- by processing 2,000 kgs of raw cashew. During the year, 3 more SHGs and a village Panchayat from the cashew processing cluster have approached TIDE for training in cashew processing.

Coconut chips produced by womens' groups

Production of Coconut chips & Dried fish: Training to 1 women group was provided for making coconut chips and drying fish in the last year. The group has produced and sold about 600 pockets of 50 gms each and earned about a profit of Rs. 3,000/- . Experiments were made for producing different varieties of coconut chips such as Masala coconut chips and Salted coconut chips and efforts were made to market dried tapioca and bitter gourd. From the fish drying activity the group has earned about Rs. 800/- as profit. This group will undertake the fish drying activity whenever the fish is available at the rates specified by TIDE. TIDE has fixed a price for procuring the fish from the group to ensure that profits can be achieved.

Production of Vermicompost: Last year 3 groups were trained in producing Vermicompost from coconut leaves using the special strain of earthworms developed by CPCRI. These groups have produced about 1,900 kgs of Vermicompost of value about Rs. 10,000. The produced compost was used as manure for their own farms. Another 2 groups have started producing Vermicompost during the year after seeing the success achieved from the first 3 groups.

Tamilnadu: Technologies of 'Kitchen garden in a polyhouse' and 'Improved brick kiln' will be undertaken in Tamilnadu. The objective of 'Kitchen garden in a polyhouse' is to train the identified SHGs / Group in producing vegetables and fruits in the spaces available in their backyards (members houses) by constructing polyhouses. The polyhouses will have rainwater harvesting systems, where the demand for water could be met and dependence on municipal water distribution can be reduced to a larger extent. 4 locations have been identified with the assistance from a local NGO 'Nilavolli Palligal' for implementing this activity in Kanchipuram. ODAM, an NGO in Virudhunagar district has been identified for installing the 'Improved brick kiln'. The NGO is interested in providing this kiln to the local brick manufacturers to use the facilities of improved brick kiln for some charges. Heavy rains during the year have delayed us in implementing the above mentioned activities in Tamilnadu.

EXTENSION OF THE TECHNICAL TRAINING IN HOUSEHOLD STOVE CONSTRUCTION AND PILOT TRAINING IN CHARCOAL MAKING FROM WASTE BIOMASS

(Supported by ETC, Netherlands)

This two-year project commenced in May 2004 and has the objectives of a. Creation of job opportunities for rural women through training activities b. Introduction of clean energy technologies in rural / urban areas and c. Improvement of health of women (users of these clean technologies)

Expected outputs are: a. 30 women (15 groups of two women each) trained in technical and market related aspects of stove construction and generating incomes in addition to their conventional livelihood of agricultural labour b. 5 women trained as trainers and c. 4 women entrepreneurs (two groups of two women each) would be trained in technical and market related aspects of charcoal making.

1. **Training in construction of stoves**: In partnership with 5 local NGOs-Vikasana in Tarikere, BIRDS in Huliyar, Asbhivruddhi in Gubbi, Prachodana in Hassan and Jnana Jyothi Trust in Tiptur- awareness about the ill effects of smoke on the health of the family were highlighted. Members of self-help groups were motivated to take up training as potential stove builders. The NGOs on the basis of criteria specified by TIDE identified trainees. 108 (84 women and 24 men) persons were trained in the construction of Sarala stove in Tumkur, Chikmagalur and Hassan districts of Karnataka. Of these about 22 (17women and 5 men) are actively building stoves and earning an income out of it. So far, 927 stoves have been constructed by them.

Training provided to SHG members of SEWA Bank, Ahmedabad

SEWA Bank, Ahmedabad approached TIDE to get trained in an energy efficient device. After observing the various devices in the field, they decided to get two of their members trained in the construction of Sarala stove. Accordingly, two women were trained. They bought a mould and have started building stoves in Ahmedabad.

Demonstrating use of the Sarala stove to user

TIDE provided marketing support for the builders to get them orders for stove construction. The most effective marketing campaign was the mobile campaign. Nine mobile campaigns were done, during which a model of the Sarala stove was taken around 292 villages. In order to convince women about the smokelessness and efficiency of the stove, meetings were held in the house where a stove had been built. Shopkeepers/Restaurants in highly frequented areas of the villages were appointed as agents. The agents would receive a commission from the builder for their service. A film, called 'Sunbeams in Smoke', which was made in the last project of ETC, was dubbed into Kannada and screened in the local cable channels. Two competitions were organised for the stove builders with a view to motivate more women to take up stove building as well as to get more stoves built. Apart from these, the builders use their SHG networks and word of mouth to procure orders for the stoves Materials developed and used for promotion are wall calendars, pamphlets, wall paintings in 10 locations, boards for agents.

A survey of women who had got trained, but have not taken up stove building was done. A meeting of all the stove builders was also organised to interact with them and get to know the problems they face, so that solutions can be found, which can further result in the increase in the number of builders and stoves. The results of the survey and the feedback received in the meeting indicated that some women find the mould too heavy to carry around. Many women had very low confidence levels, which prevented them from venturing to build stoves even after being trained. It is also clear from the feedback and experiences in the field that stove builders meet a lot of challenges and have to cope with a lot of resistance from a. own family/ husband b. own Self Help Group (members do not want to pay for the stove constructed by another member) and c. Community which demands free stoves because of the earlier stove dissemination programmes of the Government, where stoves were heavily subsidised or users got the stove for free.

Group of master trainers with a stove built by them

stove builders as master initially called 'Training of training of Master trainers, emphasis on technical skills. Besides, most of the The women who attended

2. Training of Trainers: A six-day programme was conducted to train 12 women trainers. The programme was Trainers'. This was changed to because there was more subjects, and not on didactic participants were not trainers. the programme were building stoves and would continue to build stoves, apart from training others to build them. At the end of the training programme, they are designated as Master Trainers. The programme was held between 1st August and 6th August 2005. All the sessions were conducted in Kannada, the local language spoken by all the women. The faculty, consisting of staff of TIDE as well as external consultants, explained the design of the mould and the stove and the purposes each part served. The effects on the performance of the stove if the design was changed were also explained. Practical exercises were conducted during which conventional stoves as well as the Sarala stove were constructed by the women. At the end of the training, a manual written in Kannada, explaining all the aspects that were dealt with in the various sessions was distributed to the participants.

3. Training women in production of charcoal from loose biomass: The process of charring is done by burning loose biomass inside a closed MS drum in the absence of air. The technology is simple and is environment friendly, since waste biomass is used to produce charcoal.

Four groups were trained in producing charcoal from loose biomass.

The team at TIDE therefore identified a region in Belgaum district where lantana was available in large quantities. It decided to carry out the training in this location and six women were identified and trained.

Another group was identified at Ugar in Belgaum district and this group of women was trained to produce charcoal from the woody biomass of *Prosopis juliflora*. The charcoal produced is of good quality. There is a good market for the charcoal in the surrounding areas.

A group of four women was identified in Jodkurli village in Chikodi district of Belgaum taluk and trained. Since harvesting Prosopis twigs is not easy because of the thorns, a wood supplier was identified to harvest and cut the twigs to the required size. An entrepreneur was identified whose role would be to procure the wood and give it to the trained women, who would then produce charcoal. The entrepreneur would market the charcoal. The enterprise was demonstrated to the entrepreneur by TIDE, before handing it over. The enterprise is picking up slowly. In the meantime, efforts are on to identify one more group in Belgaum district to train in this activity. Efforts are also on to identify one more group in Belgaum to produce char from bagasse, as it is perceived that there is a large market for charcoal in the area.

Women producing charcoal

Experiments are being done to investigate the quality and marketability of charcoal produced from areca husk, which is a major waste product of the areca processing industry in Shimoga district. A manual on the process has been prepared.

ANALYTICAL STUDY AND ACTION PLAN FOR SOLID WASTE MANAGEMENT OF 3 TOWNS IN KARNATAKA AND 3 HILLY TOWNS

(Supported by SASES unit, The World Bank, New Delhi)

The study involved preparation of action plans for solid waste management and scenario based financial modeling for the three towns of Bellary, Shimoga and Tiptur in Karnataka and three hilly towns of Nainital in Uttaranchal, Shimla in Himachal Pradesh and Shilong in Meghalaya. The study was undertaken in association with M/s TIDE Technocrats Bangalore and M/s Sycom Projects New Delhi. An action plan for solid waste management for each of the town was prepared which included information about the present situation and the proposed system. The equipment requirement, staff deployment and the funds required were estimated. Based on the ground reality at each location, alternative scenarios of expenditure have been prepared over a 20-year time frame and modeled for assessing the long term fund requirement and costs of operations. The data for each of the town was presented as a separate report. A comparative report for the hill towns bringing out the special features was also prepared.

Present system of solid waste management | Proposed system

Name	Primary collection & staff	Transport	Processing	Disposal	Primary collection	Transport	Processing	Disposal
Tiptur	53 bins + 25 open+63 staff	6 tractor trailers	Nil	Dumping	D2D, 3 auto, 24 TC	14 containers, 3 Tractor lifters	Nil, local units	Engineered landfill
Shimoga	533 bins +462 staff	11 lorries, 5 tractor, 1 tiller	Nil	Dumping	D2D, 32 Auto, 30 HC	72 containers, 6 DP	80 tpd Compost plant	Sanitary landfill
Bellary	564 bins + 479 staff	11 tractor trailers	Nil	Dumping	D2D 38 auto, 30 HC, 20 TC	78 containers, 7 DP	120 tpd compost plant	Sanitary landfill
Nainital	40 container + 22 bin+ 229 staff	2 DP	Nil	Dumping	D2D, 55 hand collectors, 9 vans	16 containers 2 single bin DP	Nil, local units	Engineered land fill
Shimla	142 container + 209 bins +528 staff	10 DP , 4 tippers	100 tpd compost plant	Dumping	D2D, 120 hand collectors , 14 vans	40 containers, 4 DP	100 tpd in-vessel compost	Sanitary landfill
Shillong	D2D 15 k HH, 115 bins + 407 staff	10 truck, 2 tractors+ 11 trucks	100 tpd compost plant	Dumping	D2D, 53 vans	60 containers, 6 DP	100 tpd compost	Sanitary Landfill

D2D - door to door collection

Waste being moved to disposal site

In Hilly towns, houses are constructed on hill slopes and consequently the access to individual houses is not good. Significant littering is observed and hill slopes laced with plastic appear unsightly. Depending on the structure of the town few roads, which are arterials, cannot be used during peak traffic timing. Further the road widths are also lower. The nature of economic

activity is different and equipment maintenance facilities do not get developed. The hill towns typically are also tourist attractions; the waste generation varies significantly over the year. Overtime excess staffing is built up in the urban local bodies, as the work standards are lower than in the plains. This makes the whole solid waste operations expensive. Many of the construction and other materials have to come from the plains; the facility investments tend to be higher. Being at higher altitude the temperature is lower in winters causing problems for treatment of wastes. The rainfall is higher and numbers of rainy days are higher. Flat lands are very valuable and expensive; processing and disposal sites are available in valley areas.

The study has shown that there is scope for improving the efficiency of operations in all towns. There is a need for segregating collection of dry and wet waste in initial period to ensure segregated waste handling. There is a need for flexibility in processing and disposal standards for smaller towns to match financial ability.

Number of devices constructed								
Device	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**Total**
Karnataka								
Areca Cooking	126	253	314	517	499	567	369	2645
Jaggery making	4	4	0	0	0	0	1	9
Silk reeling systems	0	8	501	683	637	0	230	2059
Tobacco curing	15	0	0	0	0	0	0	15
Drying systems	36	34	27	124	98	57	35	411
Cooking/heating systems	10	36	23	47	86	90	1033	1325
Lime/pottery kilns	0	2	13	16	0	0	0	31
Brick kilns	0	0	1	1	0	0	1	3
Other stoves/driers	0	0	0	4	62	0	0	66
Total Karnataka	191	337	879	1392	1382	714	1669	6564
Kerala								
Rubber band stoves	30	9	5	2	2			48
Cardamom drier	3	1	3	3	2	4	3	19
Stoves for hotels	3	35	19	13	7			77
Ayurvedic units Stoves	70	133	90	205	89	81	69	737
Areca cooking	9	0	0	2	0			11
Coconut driers	0	23	24	11	12	13	16	99
Rubber smoking units	0	1	2	0	0			3
Brick kilns	0	0	0	0	0			0
Other stoves and driers	4	4	2	5	3	5	3	26
Total Kerala	119	206	145	241	115	103	91	1020
Tamilnadu								
Textile/silk dyeing stoves					122	103	41	266
Andhra Pradesh								
Pochampalli stoves					14			14
Silk reeling stoves					367	0	230	597

Chattisgarh								
Silk dyeing stoves					5	0	0	5
Total TN, AP, C'garh					508	103	271	882
Total Project	**310**	**543**	**1024**	**1633**	**2005**	**920**	**2031**	**8466**