Clay-Pottery Kiln Project
in Sri Lanka, Kurunegala District

Colombo, January 2008
### Overview

| Organization | Swisscontact, Swiss Foundation for Technical Cooperation  
Döötschiweg 39, 8055 Zurich |
|--------------|---------------------------------------------------------------------|
| Country / Region | Sri Lanka, District of Kurunegala  
(North Western Province) |
| Project Description | Clay-Pottery Kiln Project  
Development and building of 100 potter-kiln’s within three pottery producing rural villages of marginalised communities |
| Beneficiaries | 1’000 members of 200 pottery producing families, as well as indirect beneficiaries: 3’700 people living in the vicinity (smoke hazard from kilns), and 400 members of 40 clay supplying families and 40 traders (each family: 5 members)  
total: 5’100 persons |
| Local partner | Pottery Makers Associations  
Provincial Department of Small Industries  
Private consultants: Synergy Consultants |
| Implementation and Monitoring | Programme Director Swisscontact Zurich, Ruedi Nützi  
Project Manager Swisscontact Sri Lanka, Jayandra Seneviratne and local partners |
| Duration | 2008 bis 2010 (34 months) |
| Objectives | Improve the economic and social well being of the Clay-pottery producers of selected villages (Kelinawala, Yahalegedara, Beddegama and Galwewa) in the Kurunegala District by introducing new pottery-kilns |
| Contents | Developing technical knowledge and constructing 100 new pottery-kilns using local expertise, creating a self-development process within the pottery industry |
| Budget | Project Cost: CHF 250’000  
10% Project management: CHF 25’000  
Total Cost: CHF 275’000 |
| Required Funds | CHF 275,000 provided by Infrasure |
1. CONTEXT

Sri Lanka’s economic growth has largely been confined to the capital Colombo and its surrounding area. It is, above all, the rural districts that continue to struggle against widespread poverty and under-employment. The obstacles range from the inadequate skill levels of the local entrepreneurs to the public infrastructure that is holding back development.

Clay pottery making is one of the traditional small industries in Sri Lanka. The producers are mostly based in rural villages where clay is available. In the Kurunegala district there are five such villages of which Swisscontact works in three.

The production process of clay products is fully based on traditional practices where technology improvements and process innovations are hardly found. The traditional pottery makers are known and identified as low caste people in the rural culture in Sri Lanka. They are naturally marginalized, underprivileged and ruled out by the other communities in general. 52% of the pottery families are below the national poverty line and the rest just above which is not substantially different from having an income marginally below. 1/3 of the cottage industry is headed by females, the rest by husband and wife.

2. BENEFICIARIES

Direct beneficiaries: 1’000 members of 200 pottery producing families
(2 families using 1 kiln)
indirect beneficiaries: 3’700 people living in the vicinity (smoke hazard from kilns),
400 people positively affected (directly and indirectly)
In total there are 5’100 people living in the vicinity (smoke hazard from kilns),
400 members of 40 clay supplying families and 40 traders
people positively affected (directly and indirectly) by the project
(each family counts in this region 5 members)

Spill-over Island-wide:
It is expected that the project will have a large spill-over benefit to the Pottery sector in Kurunegala District and Sri Lanka as a whole. Producers from other villages (not from the three in focus) have visited the kiln and shown interest already.

The pottery makers are naturally underprivileged and secluded by the other communities in general. Today 46% of the producer families still live in low profile and unsafe houses made of wattle and daub with a roof of dried coconut leaves. In most cases the pottery production, living, cooking and sleeping are done in the same small hut. Due to the multiple situational facts, there has been no initiative to develop the lives of these people and this sector, either by the Government or private sector.
3. SWISSCONTACT STRATEGIC PLAN IN SRI LANKA

Swisscontact has been active in Sri Lanka since 1981. The main focus has been in Small and Medium Enterprise Promotion (SMEP) and Vocational Education and Training (VET) and since 2000 also contributing to peaceful co-existence in the Eastern districts torn by war and terror. The Local Economic Development (LED) project began in 2005 focusing on the District of Kurunegala in the North Western Province. Through an in-depth study and a participatory approach the project identifies competitive sectors. The competitive sectors identified and supported in the LED project are mainly clay-pottery, dairy, betel and cut-foliage.

The purpose of LED is to raise the wealth of local communities by creating business and employment opportunities. Just like other economic development approaches, it aims at remedying market failure. It involves an effort to actively integrate those groups that are marginalized or excluded by markets, be it as producers, as employees or as consumers.

The project works on a systemic approach by linking markets and financial services, improving knowledge and skill and creating awareness to the poor who are marginalized, at the bottom of the pyramid.

The construction of new pottery kilns goes beyond the LED’s project focus. Thus this project is a timely intervention that complements the LED project activities in the pottery sector. The project has worked with the sector in organising producer groups, creating awareness on product diversity and market demand, exposure to trade fairs and in the process taking initial steps in helping the groups in changing their perception and inferiority caused by being labelled as low a caste community.

The project’s holistic approach in facilitating better services and productivity in the public sector has created an enabling environment within the division. The project focuses on supporting and developing existing systems that can be sustained using local resources. The LED project in Sri Lanka addresses fundamental obstacles that stand in the way of inclusion of poor making a significant difference, in addressing causes of exclusion.
4. WHY POTTERY-KILNS?

The clay pottery sector still has a good market. The people in towns and cities demand for clay pots for cooking. Due to the lack of technology and finance to upgrade the products for emerging market demand, producer families are having a hard time to survive in the industry. One of the main problems of pottery production process is the withering and burning, which is one of the most costly steps of the whole process, and confronting the producers with the following problems:

1. High cost of investment to upgrade the small business.
2. Banks are not interested in providing loans as the amount they need is small and these poor families do not have collaterals the banks demand.
3. Due to lack of technology, existing pottery burners are very inefficient. They consume more firewood, create harmful smoke and damage the products.
4. High rate of damages, during weathering and burning on an average of 40% damages.
5. Cost of fuel is high and on the increase day by day.
6. Pollution and emission levels are high due to inefficient burners and people get affected with chest diseases.
7. Supply of orders is delayed in rainy seasons as the producer cannot wither and air dry pottery products before burning due to both rain and drought.

However, to improve the technology only and through that the income level will not be enough. Entrepreneurial aspects and the social and emotional side of the average pottery producer family will need to be addressed as well.

The expected outcomes are categorised under the following:

**Social**
- Increase of family income and living standard
- Increase equal opportunities in the “normal” society

**Economic**
- Cost of fuels and fire wood is reduced
- Overall 40% damages are reduced to 10% within the process
- Faster production will increase sales

**Environment**
- Reduction in air pollution caused by inefficient burners
- Improve working environment for men, women and children
5. THE TECHNOLOGY

5.1 Outline of the technology
A paddy husk powered pottery kiln will be introduced aiming to reduce fuel cost and damages in pot burning while limiting the current use of coconut husks as the fuel for traditional pottery kiln. The latter is a valuable material for a number of industries.

Paddy husk is a major bi-product of the rice milling industry with around 500’000 metric tons of husk annually. It is widely available throughout the year and an unused biomass energy source in this part of Sri Lanka. Currently the paddy husk is obtained free of charge from rice mills. In addition, high production and low demand of paddy husk makes its disposal a serious problem for rice millers. Disposal of paddy husk creates environmental problems such as:
• Water pollution due to dumping husk in water streams
• Pollution due to high CO2 emission in open air burning by millers

The most common technology is direct combustion of rice husk to dry or burn different commodities. It is the first time that such a type of paddy husk fuelled direct combustion kiln is developed in Sri Lanka to produce high quality clay pots.

The kiln consists of twin burners fed by paddy husks feeding buckets above, the pot burning chamber that is loaded from the back side and closed with straw and clay, and a chimney that is creating an up-draught. The kiln is constructed out of locally available bricks and mortar whereas the burner and feeding part is out of steel. The kiln is covered by a shed so that it can be operated during all weather conditions. The pottery burning process needs a low temperature for the initial heating and high temperatures for final burning of the clay pots. For the first twenty hours the kiln works at 400 to 2000 Celsius. During this stage the twin burners are fired up and fed with controlled paddy husk into the combustion chambers.

During the last five to six hours burning period, more paddy husk and air is supplied into the stow to create a rich gas firing effect inside the pot burning chamber, going up to 5000 to 6000 Celsius around the heated pots. This enables the pots to be burnt well with a fine colour.
5.2 Advantages and benefits
The new pottery kiln has the following advantages and benefits compared to the old one:

- Low cost of pot production
- Recovery of capital and financial benefit
- Free availability of rice husk and its fuel characteristics
- Overall efficiency of the cycle (reduced damage rate of the kiln)
- Low cost of construction and availability of materials
- User friendliness
- Rich fire that reaches 5000 to 6000 Celsius
- Heat/fire controllability
- 400 pieces (clay pots and pans) maximum capacity per batch
- Rear or side door for lying-out pots
- Capacity to load paddy husk for one hour of burning and three hours of heating
- The combustion system with high oxygen intake reduces harmful gases
- The high exhaust system reduces direct emissions at the working level

5.3 Further developments
During the first phase of the project further kiln improvements are planned. Testing of emission level and measuring temperature levels and distribution using high-tech instruments will be done as well.

From the final design, the main components such as the paddy husk feeding basket and vertical burning chamber and chimney will be designed and produced as pre-fabricated parts to speed-up kiln installation.

It is important that the pottery kiln is designed to easily adapt to the local pottery sector. Using local material, technology and manpower is an important aspect that will be considered throughout the development, so that the new innovation can be replicated beyond the project.
6. IMPLEMENTATION
The pottery kiln development project follows a participatory approach as in LED. The introduction of the new technology involves pottery producers, associations and buyers in the planning and implementing of respective activities. The foreseen challenge in implementing the project is “influencing to change”, where pottery producers make an investment to shift from the old kiln to the new one. The process will gradually raise awareness, involve associations, select beneficiaries, set up models, and start construction of kilns in each of the four villages. The entire process of constructing 100 burners is broken down in to three stages, with an anticipation of sufficient initial time for the new kiln to be accepted within the producer community by its overall performance and benefits. The local consultancy firm will be involved in the process from the beginning. The initial developments and testing of the new kiln is done in the village of Kelinawala, in the Panduwasnuwara-East Division of Kurunegala.

6.1 Initial Appraisal
A participatory appraisal conducted in each village will study the number of old kilns in use and the problems and/or constraints they have in meeting market demand, especially during seasons of very high demand. Pottery producers, association leader, service providers and buyers will collectively define and analyse the problems and discuss solutions in the process of production. This is a strategy that will raise awareness of the new technology and help the project start working closely with the particular group and village.

6.2 Beneficiary Selection
Selection of beneficiaries for each stage will depend on the number of producers who are well convinced and ready to invest partially for the kiln. Therefore, selection of the first, second and third batches needs to be done during the business training mentioned below, followed by the initial appraisal. Pottery production is scattered in small villages within the division. To have the new technology available in an equitable manner, most suitable locations will be identified within the division, not limiting to selected villages. In general two families will use a single kiln.
6.3 Capacity Building
Because of socio-cultural and entrepreneurial backwardness, the average producer will be reluctant to accept the new technology or shift from old kiln to the new one. The kiln technology introduction is combined with an entrepreneurship, business management education and most importantly the development of social skills, targeting social empowerment. The objective is to create a significant impact over the income and social status of producer families.

Sector specific business/entrepreneurship training will be developed and delivered to selected producers, prior to selection of kiln building locations.

Throughout the project social empowerment activities will focus on developing leadership skills and self confidence of the pottery producing families through coaching and exposure visits to ensure social equality within the overall society.

6.4 Construction
The consultancy service provider Synergy will train a selected group of masons and pre-fabricate selected parts of the kiln prior to construction activities. The first stage selects and trains six to seven producers from each village who will implement the construction of the first 20 kilns. The second stage will use the experience and resources from stage one to construct the second stage of 40 kilns. Finally the third stage will be the construction of 40 kilns.

7. LOCAL PARTNERS

7.1. Synergy Consultants
Synergy Consultants will be responsible for the technical development and implementation of the improved pottery kilns that is headed by two technical experts. They previously successfully developed and implemented a dryer for the tobacco industry, which initially attracted the project to approach the organisation to come-up with a similar innovation for the pottery sector. Mr. Wasantha Hunukumbura is a BSc. Engineer who has a passion for such innovations. Mr. Doratiyawa is an individual with hands-on experience, being the Manager of the Engineering Department of the University of Peradeniya near Kandy. The duo has put in countless number of hours day and night experimenting on the best model kiln. During the years of operation in Sri Lanka, Swisscontact has learnt that using local expertise is a key success factor in Local Economic Development. Their main tasks are: 1) Further technical development of the pottery kiln including detailed drawings, 2) Arranging pre-fabricated paddy husk basket and burner, 3) Capacity building and training of a group of masons for building the kilns, 4) Supervision of the kiln construction and 5) Follow-up and technical evaluation including emission control.
7.2. Pottery Makers Association
The pottery makers association at village level will select potential pottery producers. Four such associations have been established in the four DS of the LED Project. The associations will work closely with Swisscontact Sri Lanka and Synergy Consultants in implementing the kilns in selected locations. Since these associations remain inactive at the moment, special capacity building measures will be carried out to activate and involve the associations in order to assure proper dissemination of kiln technology during and after the project period.

7.3. Department of Small Industries
The Department of Small Industries will take part in providing technology training on clay products.

7.4. Human Resource Development Authority
Human Resource Development Authority will also be involved within the process as the provider of finance and other machinery required for pot production but not for burning.

7.5. Swisscontact Sri Lanka (SCSL)
Swisscontact Project Field Office (PFO) Kurunegala will be the overall coordinating office that implements the entire pottery value chain development. The PFO will carry out: 1) Sector appraisal, 2) Overall planning, 3) Entrepreneurship development, 4) Social empowerment and 5) Monitoring of the new kiln technology. A full-time person from SCSL will be in charge of the project. He/she will be supported by a field staff member and the field office administration in Kurunegala.

8. Monitoring and Evaluation
The Swisscontact Project Field Office will monitor and evaluate the entire process in a participatory manner. Monitoring of implementation process will be done at different levels:

- Technical level
- Social level
- Business level (Sales/marketing)

8.1 Results Based Monitoring
The monitoring of the project will be based on Results Based Monitoring (RBM) that has been introduced in 2007. The process is based on the results chain model and is part of a project’s self-evaluation. Identifying what changes have been generated directly or indirectly by the project. It is not focussing on what has been done but more on the changes and outcomes and impact on the beneficiaries and the environment. The process is based on collecting, analysing and using information in a systematic way. RBM will be the main management instrument to support steering and reporting. The RBM will be in line with the above indicators at each respective level of the results chain, based on a Monitoring and Evaluation plan.
8.2 The Results Chain

9. RESUME OF PHASE BUDGET

Project Phase 01.03. 2008 - 31.12.2010

CHF

Technical expertise and Capacity building 94'140.--
Construction of Kiln and Cover Shed 98'630.--
Cost of operation 57'230.--
Total Project Cost 250'000.--
10% Project management (internat. Audits, controlling etc.) 25'000.--
Required fund by Infrassure 275'000.--