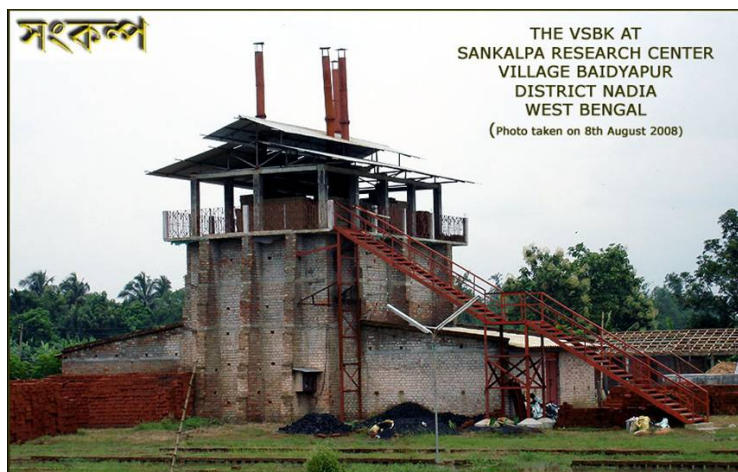


Concept Note:

Training and Technology Transfer Workshops for disseminating Eco Kiln and Sustainable Shelter Technologies in West Bengal and North East India.

Preamble: In this three-year project, we propose to develop a ‘**Shelter Technologies Training Center**’ (STTC) at Village Baidyapur, Nadia, for the delivery of hands-on training programs and workshops on sustainable shelter technologies in general, and the Eco Kiln in particular, for the rural people in West Bengal and the North Eastern region of India. The three-year budget of Rs. 93.8 Lakhs includes a first year provision of seed capital for operating the Eco Kiln and sustainable shelter projects, for demonstrating the operations and management of the Eco Kiln, and village-based, sustainable shelter technologies.



The proposed project is a collaborative effort between the following coalition partners:

a.) **Sankalpa Trust**, (Registered Trust/NGO devoted to rural development)—Lead Partner

Contact Person: Subhrankar Mukherjee, PhD, MBA—Managing Trustee and PI for the project

Address: P6: Cluster 2, Purbachal, Salt Lake, Calcutta 700097, India.

Telefax: 91-33-23359812 **Mobile:** + 91 94330 19821 **eMail:** [subra@enr.colostate.edu]

b.) **Indian Association for Productivity, Quality and Reliability (IAPQR)**, (Education & Quality)

Contact Person: Professor S. P. Mukherjee—President

Address: AD-276, Sector - I, Salt Lake City, Kolkata 700 064.

Telefax: 91-33-23346234 **Mobile:** 9831558126; **eMail:** [prof.mukherjee@gmail.com]

c.) **Millennium Inst. of Energy & Environment Management**, (Knowledge resources & Think Tank)

Contact Person: Professor H. S. Ray—President

Address: 203, Sarat Bose Road, Kolkata 700 029.

Fax: 91-33-24730957 **Mobile:** 9339865451; **eMail:** [hs_ray@yahoo.com]

1 Background:

An Eco Kiln (see image above) has been constructed at Sankalpa Research Center—Nadia (SRC-N), Village Baidyapur, Nadia, West Bengal with funds totaling Rs.14,06,800 obtained from a two-year grant¹ from Department of Science and Technology (DST), Government of India, in collaboration with Development Alternatives.

During this two-year project, we have also implemented a number of sustainable shelter technologies that are shown in the collage on the right, including (a) Micro Concrete Roofing Tiles (MCRT); (b) Ferro-Concrete Doors and Windows (FCDW); (c) Compressed Earth Block (CEB) and (d) Improved *chulha* made with IISc Bangalore technology, *et al.*

The **Building Center** at SRC-N is therefore involved in developing asset-based models that showcase sus-



¹ Grant No: DST No.: SP/RD/060/2003 dated July 3rd 2006

tainable and appropriate shelter technologies, which can be disseminated using the ‘market creation approach’ (MCA) and through the agency of ‘Public Private Partnerships’ (PPPs). For more information, please visit: [<http://www.sankalpamfs.org/src/03she/03she.html>].

2 Role of Baidyapur ECO KILN and shelter technology models

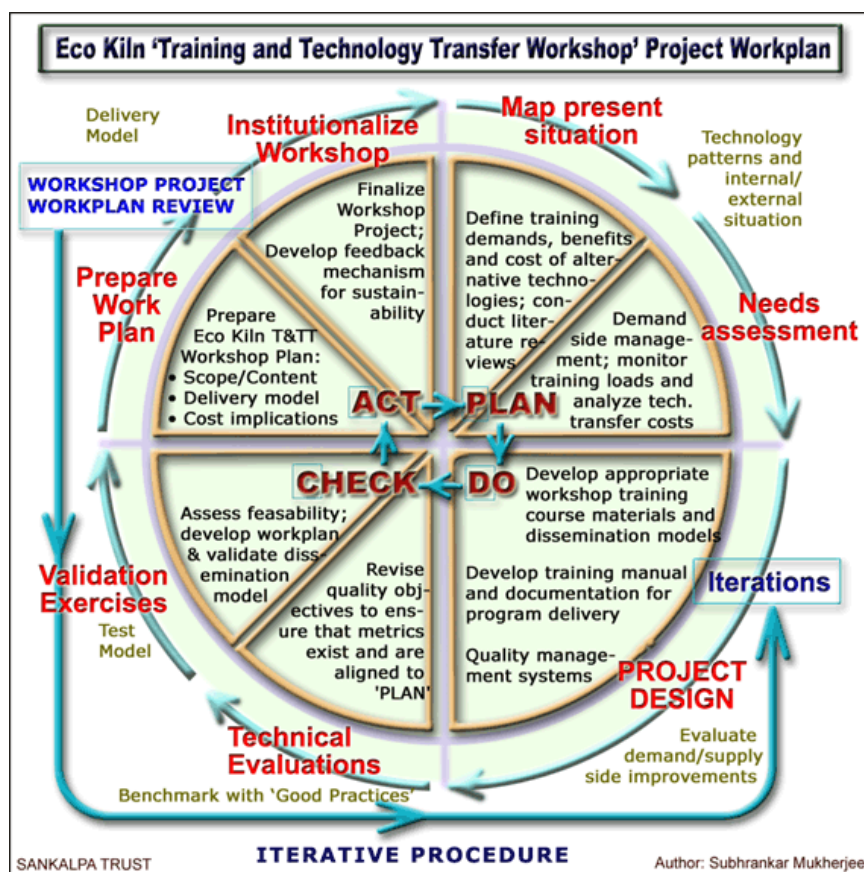
The Eco Kiln² [<http://www.sankalpamfs.org/src/03she/03she.html#8>] that has been commissioned at Village Baidyapur (see footnote #1) provides the focal point for the proposed hands-on “Training and Technology Transfer Workshops”. The **two-day TT&T Workshops** in the locations defined in the maps of West Bengal and the North East Region in Section 3 will provide a **theoretical understanding** of the working principles of the Eco Kiln and other sustainable shelter technologies that are showcased and modeled at SRC-N. This will be followed by a **two-week hands-on training program**—held eight times in a year—at the **Village Baidyapur Eco Kiln**, where the theoretical lessons imparted during the town-based workshops will be reinforced by direct hands-on training in the production of bricks in a functional Eco Kiln environment at Village Baidyapur, Nadia District and operation of appropriate, village-based shelter technologies (see collage in Section 1). This pattern of knowledge dissemination will be repeated for the next two years. The project duration is therefore three years.

It is expected that the project will be self sustainable after the third year. Accordingly, the level of funding support required for establishing the Training Center tapers off steadily over the last two years.

3 Project Workplan

The Eco Kiln (EK)-centric ‘Shelter Technologies Training Center’ and project workplan is graphically depicted on the right—based on the Plan-Do-Check-Act (P-D-C-A) approach:

The hands-on training programs at Village Baidyapur will be conducted by Mr. Protul Sarkar, Nadia Projects Coordinator, Sankalpa Research Center. He will be assisted by two Technical Assistants. Dr. Subhrankar Mukherjee will also be primarily responsible for conducting the field workshops. He will be assisted by a designated “Lecturer”, who will be trained as an understudy of Dr. Mukherjee. S/he will progressively assume



² Sankalpa Trust has built an Eco Kiln or Vertical Shaft Brick Kiln (VSBK) at Nadia, West Bengal with DST funding (~Rs 14 Lakhs)—with (a) energy savings of 30-50% of conventional methods; (b) requires less land, reduces deforestation and has lower dust and ‘Green House Gas’ (GHG) emissions; the emission reduction and energy savings at an annual production level of 5,071,000 Kg-bricks/Year is estimated in a UNFCCC-CDM report to be 508.5 tCO₂/Year and 1.634 GWhth/ Year. It has a vertical shaft of rectangular or square cross-section, which works as a counter-current heat exchanger, with heat transfer taking place between the air moving up (continuous flow) and bricks moving down (intermittent movement). The combustion of coal (added along with bricks at the top) takes place in the middle of the shaft. The ‘round-the-clock-operation’ requires special skills and supervision. The ‘firing’ operator needs to maintain a correct balance between: (a) Energy—controlled by amount of coal used; (b) Air-flow—controlled by stacking density and damper position; (c) Unloading speed—which is operator controlled.

the responsibility of conducting the workshops on a regular basis, and assume the position of ‘Project Manager’.

The content of the Workshop and the hands-on Training Programs will be designed and implemented on the basis of the above workplan, under the direction of Dr. Subhrankar Mukherjee, Managing Trustee, Sankalpa Trust.

4 Workshops to be done in West Bengal and North Eastern states

4.1 Workshops in West Bengal

We propose to conduct T&TWs in the nine towns of West Bengal, as shown on the right, and with frequency as shown below.

#	Location	Frequency/ year
1	Kolkata	1
2	Barasat	1
3	Bardhaman	1
4	Medinipur	1
5	Puruliya	1
6	Bankura	1
7	Murshidabad	1
8	Maldah	1
9	Siliguri/Jalpaiguri	2

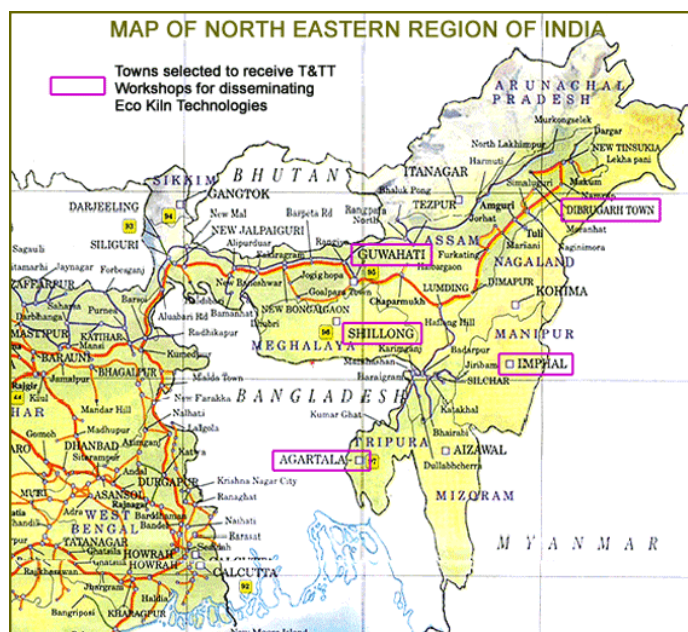


We have partners in each of these locations to coordinate the logistics and management of the programs. Samples of similar ‘Workshop’ and the hands-on ‘Training Programs’ are available for review at [<http://www.sankalpacmfms.org/>].

4.2 Workshops in North East region

We also propose to conduct T&TWs in the five towns in the North Eastern region of India, as shown on the right, and with frequency as shown below.

#	Location	Frequency/ year
1	Guwahati	2
2	Shillong	2
3	Agartala	2
4	Dibrugarh	2
5	Imphal	2
	TOTAL	10



There will therefore be a total of twenty workshops per year—ten in West Bengal and ten in North East India. **Sankalpa Trust has partners in North Bengal, Assam and Arunachal Pradesh, who will be contracted to provide local support for organizing and conducting the workshops.**

In order to economize on the logistic effort and travel costs, the workshops in the North East will be conducted in two sweeps per year, over a three-week period in each instance, where the five towns will be covered in succession. Similarly, the workshops in West Bengal will also be suitably bundled, to save in travel and logistic expenses.

5 Budget for conducting ECO KILN workshops and training programs

The detailed budget for three years projected expenses (in present value terms) is shown in Annexure 1. The Budget summary is as follows:

#	Items	1st Year (in Rs)	2nd Year (in Rs)	3rd Year (in Rs)	TOTAL (in Rs)
1	Human resources	1,312,000	1,312,000	1,312,000	3,936,000
2	Travel	198,000	198,000	198,000	594,000
3	Equipment and supplies	2,937,000	0	0	2,937,000
4	Local office	240,000	240,000	240,000	720,000
5	Other costs, services	100,000	15,000	15,000	130,000
6	Subtotal direct costs (Σ[1 to 5])	4,787,000	1,765,000	1,765,000	8,317,000
7	Provision--contingency reserve (2.5% of #7)	119,675	44,125	44,125	207,925
8	Total direct costs (6 + 7)	4,906,675	1,809,125	1,809,125	8,524,925
9	Admin/Institutional Overhead (10% of #8)	490,668	180,913	180,913	852,493
10	TOTAL BUDGETARY ESTIMATE (8 + 9)	5,397,343	1,990,038	1,990,038	9,377,418

The total budget for the three year project is estimated to be Rs. 93.8 Lakhs. This includes a budget of Rs 25 Lakhs in the first year, and zero thereafter, to reflect the funds needed to start the Eco Kiln as a demonstration project in the first year, for hands on training (See Notes 2 & 3 in Annex 1). From Year 2 onwards, the bricks produced in the first year as a demonstration project will be sold at market prices, to provide sustainability of operations in succeeding years for providing hands on training to participants, for the life of the Eco Kiln ~ 20 years. It should be noted that ARTS is registered under Section 12AA of the Income Tax Act.

6 Outcome of workshops:

a. Proposed no. of trained persons with hands on training:

<i>No. of persons trained in Workshops</i>	<i>No of persons trained in Eco Kiln</i>
No of field workshops = 20 per year Average number of participants=15/workshop Total number trained = 300/year or 900 in 3Years	No of Eco Kiln Training Programs = 8/year Average number of participants =15/workshop Total number trained = 120/year or 360 in 3Years

b. Proposed no. of ECO KILN's to be constructed and operated by entrepreneurs in:

West Bengal	North East India
<ul style="list-style-type: none"> • First Year = 5 Eco Kilns • Second Year = 10 Eco Kilns • Third Year = 15 Eco Kilns • <i>Total (in three years) = 30 Eco Kilns</i> 	<ul style="list-style-type: none"> • First Year = 1 Eco Kiln • Second Year = 4 Eco Kilns • Third Year = 10 Eco Kilns • <i>Total (in three years) = 15 Eco Kilns</i>

7 Conclusions

The emissions reduction and energy savings of an Eco Kiln (VSBK)—at an annual production level of 5,071,000 Kg-bricks/Year—is estimated in a UNFCCC-CDM report to be 508.5 tCO₂/Year and 1.634 GWhth/Year⁽¹⁾. The corresponding figures for forty five (45) Eco Kilns therefore aggregate to a massive 22,883 tCO₂/Year and 74 GWhth/Year, respectively, which is an enormous global environmental benefit.

References:

- [1] Clean development mechanism simplified project design document for small-scale project: [http://cdm.unfccc.int/UserManagement/FileStorage/GOALLSJ8VTL1GTWJOKYB7ESJ7N6N6I]
- [2] Please visit: (a) [http://www.sankalpamfs.org/src/03she/03she.html] for information on the 'Building Center' at Sankalpa Research Center—Nadia, and (b) [www.devalt.org] and [www.vsbkindia.com] for information on DA and VSBK.

Budget for Eco Kiln Training and Technology Transfer Workshop	Year 1				Year 2			Year 3			Total (3 years)	
	Expenses	Unit	# of units	Rate (in Rs)	Amount (in Rs)	# of units	Rate (in Rs)	Amount (in Rs)	# of units	Rate (in Rs)	Amount (in Rs)	Amount (in Rs)
1. Human resources												
1.1 Salaries/Honorarium (gross amounts, local staff)												
1.1.1 Technical - Principal Lecturer	Per Workshop	20	5,000.00	100,000.00	20	5,000.00	100,000.00	20	5,000.00	100,000.00	300,000.00	
1.1.2 Technical - Assistant Lecturer	Per Workshop	20	1,500.00	30,000.00	20	1,500.00	30,000.00	20	1,500.00	30,000.00	90,000.00	
1.1.3 Technical - Research Assistant	Per month	14	15,000.00	210,000.00	14	15,000.00	210,000.00	14	15,000.00	210,000.00	630,000.00	
1.1.3 Technical - Eco Kiln Manager	Per month	14	25,000.00	350,000.00	14	25,000.00	350,000.00	14	25,000.00	350,000.00	1,050,000.00	
1.1.3 Technical - Eco Kiln Supervisor	Per month	14	15,000.00	210,000.00	14	15,000.00	210,000.00	14	15,000.00	210,000.00	630,000.00	
1.1.4 Administrative - Accountant/Commercial Officer	Per month	14	12,000.00	168,000.00	14	12,000.00	168,000.00	14	12,000.00	168,000.00	504,000.00	
1.1.5 Administrative - Support Staff	Per month	14	5,000.00	70,000.00	14	5,000.00	70,000.00	14	5,000.00	70,000.00	210,000.00	
1.2 Salaries (gross amounts, external staff)											0.00	
1.2.1 Technical - Consultant/Advisor	Consolidated	1	50,000.00	50,000.00	1	50,000.00	50,000.00	1	50,000.00	50,000.00	150,000.00	
1.3 Per diems for missions/travel											0.00	
1.3.1 Per diem - in West Bengal	Per day	20	1,000.00	20,000.00	20	1,000.00	20,000.00	20	1,000.00	20,000.00	60,000.00	
1.3.2 Per diem - North East India	Per day	40	2,000.00	80,000.00	40	2,000.00	80,000.00	40	2,000.00	80,000.00	240,000.00	
1.3.2 Local (staff assigned to the Eco Kiln)	Per month	12	2,000.00	24,000.00	12	2,000.00	24,000.00	12	2,000.00	24,000.00	72,000.00	
Subtotal Human Resources				1,312,000.00			1,312,000.00			1,312,000.00	3,936,000.00	
2. Travel												
2.1 Travel for conducting workshops - in West Bengal	Per Workshop	10	5,000.00	50,000.00	10	5,000.00	50,000.00	10	5,000.00	50,000.00	150,000.00	
2.1 Travel for conducting workshops - North East India	Per cycle	2	50,000.00	100,000.00	2	50,000.00	100,000.00	2	50,000.00	100,000.00	300,000.00	
1.3.2 Local (staff assigned to the Eco Kiln)	Per month	12	4,000.00	48,000.00	12	4,000.00	48,000.00	12	4,000.00	48,000.00	144,000.00	
Subtotal Travel				198,000.00			198,000.00			198,000.00	594,000.00	
3. Equipment and supplies												
3.1 Workshop Project Components												
3.1.1 Eco-Kiln consumables (See Notes 2 & 3)	Consolidated	1	2,500,000	2,500,000.00	0	1,000,000	0.00	0	1,000,000	0.00	2,500,000.00	
3.1.2 Workshop hardware (beam box + peripherals)	Consolidated	1	100,000	100,000.00	0	100,000	0.00	0	100,000	0.00	100,000.00	
3.1.3 Miscellaneous equipment	Consolidated	1	15,000	15,000.00	0	15,000	0.00	0	15,000	0.00	15,000.00	
3.2 Furniture and fittings	Consolidated	1	25,000.00	25,000.00	0	25,000.00	0.00	0	25,000.00	0.00	25,000.00	
3.3 Laptop computing equipment and peripherals	Per Unit	2	45,000.00	90,000.00	0	45,000.00	0.00	0	45,000.00	0.00	90,000.00	
3.4 Vehicle costs -					0			0			0.00	
3.4.1 Motor-bikes for Staff	Per Unit	2	60,000.00	120,000.00	0	60,000.00	0.00	0	60,000.00	0.00	120,000.00	
3.4.2 Bicycles for field staff	Per Unit	4	3,000.00	12,000.00	0	3,000.00	0.00	0	3,000.00	0.00	12,000.00	
3.5 Other - Media & communication equipment	Consolidated	1	75,000.00	75,000.00	0	75,000.00	0.00	0	75,000.00	0.00	75,000.00	
Subtotal Equipment and Supplies				2,937,000.00			0.00			0.00	2,937,000.00	
4. Local office												
4.1 Vehicle costs -												
4.1.1 Motor-bike running costs	Per month	24	2,500.00	60,000.00	24	2,500.00	60,000.00	24	2,500.00	60,000.00	180,000.00	
4.1.2 Car rentals	Per month	12	3,000.00	36,000.00	12	3,000.00	36,000.00	12	3,000.00	36,000.00	108,000.00	
4.2 Office rent	Per month	12	8,500.00	102,000.00	12	8,500.00	102,000.00	12	8,500.00	102,000.00	306,000.00	
4.3 Consumables - office supplies	Per month	6	2,000.00	12,000.00	6	2,000.00	12,000.00	6	2,000.00	12,000.00	36,000.00	
4.4 Other services (tel/fax, electricity/heating,	Per month	6	5,000.00	30,000.00	6	5,000.00	30,000.00	6	5,000.00	30,000.00	90,000.00	
Subtotal Local office				240,000.00			240,000.00			240,000.00	720,000.00	
5. Other costs, services												
5.1 Capacity Building												
5.1.1 Training for Trainers	Per month	6	5,000.00	30,000.00	0	5,000.00	0.00	0	5,000.00	0.00	30,000.00	
5.1.2 For Eco Kiln staff	Per month	6	5,000.00	30,000.00	0	5,000.00	0.00	0	5,000.00	0.00	30,000.00	
5.2 Expenses to create training materials	Consolidated	1	25,000.00	25,000.00	0	25,000.00	0.00	0	25,000.00	0.00	25,000.00	
5.3 Monitoring & Evaluation costs	Consolidated	1	15,000.00	15,000.00	1	15,000.00	15,000.00	1	15,000.00	15,000.00	45,000.00	
Subtotal Other costs, services				100,000.00			15,000.00			15,000.00	130,000.00	
6. Subtotal direct costs (Σ[1 to 5])				4,787,000.00			1,765,000.00			1,765,000.00	8,317,000.00	
7. Provision for contingency reserve (2.5% of #7)				119,675.00			44,125.00			44,125.00	207,925.00	
8. Total direct costs of TRD Pilot Project (6 + 7)				4,906,675.00			1,809,125.00			1,809,125.00	8,524,925.00	
9. Administrative/Institutional Overhead (10% of #8)				490,667.50			180,912.50			180,912.50	852,492.50	
10. TOTAL BUDGETARY ESTIMATE (8 + 9)				5,397,342.50			1,990,037.50			1,990,037.50	9,377,417.50	

Note:

1. Details of program expenses, methodology and justification of estimations will be made available on request.

2. The budget for item "3.1.1 Eco-Kiln consumables" is put at Rs 25 Lakhs in the first year, and zero thereafter, to reflect the funds needed to start the Eco Kiln as a demonstration project in the first year, for hands on training. From Year 2 onwards, the bricks produced in the first year as a demonstration project will provide sustainability of operations in succeeding years for providing hands on training to participants, for the life of the Eco Kiln - 20 years.

3. The Rs. 25 lakhs includes (a) Rs 15 Lakhs as working capital and supplies; (b) Rs 5 Lakhs for purchasing the TARA Brick Mech and (c) Rs 5 Lakhs for constructing the conveyor belt and other hardware for automation and educational projects.