


# WORKING WITH THE BRICK FIREMEN COMMUNITY

A techno-social initiative in eastern Uttar Pradesh



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and Entrepreneurship,  
Government of India**  
State Agency for Employment  
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**CoSMILE**



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Swiss Agency for Development and Cooperation, 2009

ISBN 978-81-7993-232-2

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**Published by**

TERI Press  
The Energy and Resources Institute  
Darbari Seth Block  
IHC Complex, Lodhi Road  
New Delhi – 110 003  
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Printed in India at I G Printers, New Delhi

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## FOREWORD

The brick industry lies at the very heart of the rural economy in India, with around 100 000 small-scale brick kilns producing around 140 billion bricks each year. These units provide the sole source of livelihood for around ten million people at any point of time during the brick-making season. Most of them are impoverished migrants, who are driven to work in brick kilns during the hot and dry summer months, when the land yields little or no income. On the other hand, brick-making units are highly energy-intensive and consume an estimated 24 million tonnes of coal and a huge quantity of biomass each year, generating around 42 million tonnes of CO<sub>2</sub> emissions.

With the demand for bricks increasing to meet the growing needs of the infrastructure, commercial and housing sectors, there is a clear need to reduce the pressure on resources such as clay and coal, and to cut down on pollution by the brick industry, through the introduction of improved technologies and alternate resource-efficient products. However, given the crucial role played by the brick industry in providing income and sustenance to millions in rural India, it is vital that these improved brick technologies must not displace existing brick workers; rather, they should build upon the traditional skills of workers and be adapted to meet their needs and to suit local conditions. Like all other small-scale industries, the Indian brick industry is strongly resistant to change. The challenge is to help the industry adapt to change while protecting the interests of its workers, entrepreneurs, and other stakeholders.

In 1993, TERI, with the support of SDC (Swiss Agency for Development and Cooperation), became involved in a project to promote a clean, energy-efficient brick-making technology – the VSBK (vertical shaft brick kiln) – in the Indian brick sector. In addition, TERI continued to work with the larger brick kiln owners with the aim of improving energy efficiency and reducing pollution from BTKs (Bulls' trench kilns) – the technology which is most predominant in the Indian brick sector. While working closely with the brick firemen at various kilns in North India, TERI came to know that almost all the firemen belong to three districts in eastern Uttar Pradesh. From 2000 onwards, the focus of TERI's work under the TERI-SDC partnership in the brick sector shifted to improving the economic and social conditions in which the firemen and their families live and work. In partnership with two grassroots-level NGOs, TERI's activities have followed three parallel paths.

- 1 To promote best operating practices among firemen through capacity building programmes, thereby strengthening the firemen's technical skills and enhancing their ability to negotiate for better terms from their employers
- 2 To promote the VSBK among the firemen community as an artisan-owned kiln that could increase household income at village-level
- 3 To promote socio-economic development among the firemen community through the formation of a collective, or sanghatan, for concerted action

Over the years, the firemen sangathan has grown considerably in terms of both membership and influence; it now touches the lives of over 20 000 firemen and master firemen, and their families. The sangathan is proving to be a catalyst of socio-economic change in the villages, and can be an effective medium for knowledge exchange and social and technological capacity-building initiatives.

This booklet summarizes the experiences of TERI and its partners in the course of their work among the brick firemen community. Since almost all the firemen in North India dwell in eastern Uttar Pradesh, this region holds the promise of being a 'hub' for initiating and sustaining positive change in all areas related to the brick industry – technological development, R&D, capacity building initiatives, and overall socio-economic development of the firemen community.

R K Pachauri  
Director-General, TERI



## INTRODUCTION

### Born to fire

*'My name is Lal Bahadur. I come from Tharia, a small village in Pratapgarh district in eastern Uttar Pradesh. This district has around 250 brick kilns, mainly owned by landlords or businessmen. A brick kiln is usually managed by a team of four to six bhatta karigars or firemen, working under a master fireman. Most of the men in my village are firemen. They manage the fires in brick kilns located nearby, as well as in faraway places like Punjab and Bengal. My father himself was a master fireman. From childhood days, I knew I'd also become a fireman when I grew up. This is the tradition in our community.*

*'Life was hard in the village. My father's wages were barely enough to sustain us. Worse, he was away at the kilns for six to eight months each year—from the end of one rainy season up to the end of the next summer. Without him around, it was especially hard for my mother to manage the household from day to day. We had a small plot in which we grew some pulses and some seasonal vegetables. But the money we earned by selling our produce was barely enough to last us a few months. Nor could we save anything from what my father earned at the kilns. In the hot and dry season, our land yielded nothing because there was no water. So we had to find other ways to earn money during this period, or else we would have to borrow from the moneylenders.*

*'While still a boy, I started to work in nearby farms owned by wealthy landlords. During one particularly hot summer, a labour contractor came around with the news that a large number of brick workers were leaving the kilns in the neighbourhood because of the terrible heat. The kiln owners were desperate to hire substitutes. So, despite my mother's anxiety, I joined a kiln as a kind of helper to a fireman—I must have been 14 or 15 years old then. Initially, I was only taught how to rake coal. It was tough work, but at least I earned much more than the seven rupees I was getting daily as a farm labourer! After that, I went to work every year at brick kilns. Slowly, by observing the other firemen at work, I acquired the skills of tending to the fires. Sometimes, a senior fireman would leave the kiln for a few days, and I would be given charge of his shift. And so, over the years, I myself became a fireman....*

*'It's a terribly hard life at the kiln. We firemen literally live on top of the kiln. For shelter we have a little hut, with a wooden bench on which we take turns to sleep in between shifts. And every 15 minutes, for 8 to 12 hours every day, month after month, we must tend to the fires. We breathe in searing hot air, 45°C and higher in summer months. And always, beneath our feet, we feel the intense heat rising from the inside of the kiln. The surface is so hot that it melts plastic or rubber sandals; we have to wear wooden clogs. Dust and hot ash and smoke swirl about constantly, choking us, burning our nostrils and throats....*

*'Perhaps most terrible of all is the loneliness. Other workers, such as moulders and loaders, usually have their families with them. They live and toil under conditions even worse than ours; but they at least have someone in their huts to go back to after work; they at least have others to work with side by side. The fireman goes to the kiln all alone. And he works alone. At the end of a shift, he is so exhausted, all he can do is stumble back to the little hut on top of the kiln, eat a morsel and sleep...till he is woken up to take the shift again.'*

Lal Bahadur's tale is similar to that of thousands of firemen who manage the firing of brick kilns in northern India—with one difference. Today, Lal Bahadur is no longer a fireman. He is a field worker associated with an NGO, working in partnership with TERI (The Energy and Resources Institute) to bring about improvements in the socio-economic conditions of the firemen community in eastern Uttar Pradesh. This book relates the experiences of TERI and its NGO partners in the course of their work, and the results of their efforts.

### Background

The Indian brick industry consumes an enormous amount of energy and generates huge quantities of greenhouse gases and particulate emissions.<sup>1</sup> On the other hand, small-scale brick-making units play a crucial role in providing jobs and income for millions of poor people, particularly in rural areas. Around eight million to ten million people work in brick kilns at any point of time during the brick-making season. Most of them are impoverished migrants; small and marginal farmers and landless agricultural labourers. During the hot and dry summer months they are unable to generate any income from their land, and are driven to seek work in brick units – often, several hundreds of kilometres away – as labourers, moulders, and firemen. The brick industry is hence attuned to the planting and harvesting seasons as well as to the monsoon cycle. In India, the brick-making season begins around November and lasts till the onset of the rainy season the following year (June–July).

There are around 100 000 brick kilns in India producing around 140 billion bricks each year. The majority of these bricks are produced by BTKs (Bull’s trench kilns) in the northern and north-eastern plains, stretching from Punjab to Assam. The soil in the eastern Uttar Pradesh region – covering the districts of Rae Bareilly, Pratapgarh, Allahabad, and Varanasi – is particularly rich in clay. Hence, this region has a very large number of BTKs.

### How bricks are made

Bricks today are made using the same basic principles and procedures that were followed thousands of years ago. Clay is taken from the topsoil of fallow fields and moulded into green bricks, which are then dried and ‘fired’ in a *bhatta*, or kiln (from Latin ‘culina’ = kitchen). Firing essentially means heating the bricks to 800 °C–1100 °C over a period of time, holding them at this temperature for a while, and then cooling them. The products are the familiar ‘fireclay’ or burnt bricks (Figure 1).

In northern India, the most popular kiln is the BTK (Bull’s trench kiln). Essentially, a BTK is a circular or oval-shaped trench in which bricks are stacked and fired every day. The fire moves through the stack, and the fired bricks are unloaded and green bricks are loaded on a continuous basis. A BTK produces 15 000–50 000 bricks per day. It may have a fixed chimney or a moving chimney. Moving-chimney BTKs are far more polluting than fixed-chimney BTKs. In view of this, the Ministry of Environment and Forests, Government of India, has banned moving-chimney BTKs (Figure 2, 3).

TERI’s involvement in the brick industry began in 1993, when SDC (Swiss Agency for Development and Cooperation) initiated a study of energy consumption patterns in the Indian small and micro enterprises sector, including the brick industry. The study findings were presented and discussed at a ‘Screening Workshop’ organized by SDC and TERI in December 1994, and the following observations and recommendations were made with regard to the brick industry.

<sup>1</sup> According to a TERI study in 2002, the Indian brick industry annually burns an estimated 24 million tonnes of coal, in addition to a huge quantity of biomass. The total annual CO<sub>2</sub> (carbon dioxide) emissions by the brick industry are estimated at 42 million tonnes.



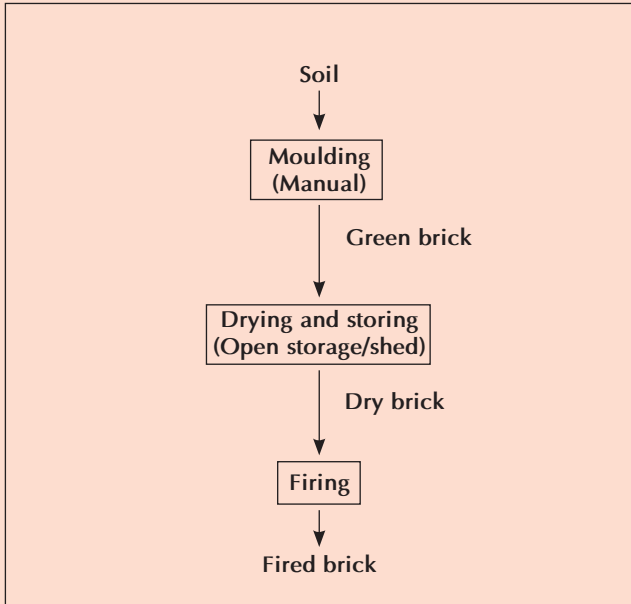


Figure 1 Flow chart for making clay brick



Figure 2 Fixed chimney BTK



Figure 3 Moving chimney BTK

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- The demand for bricks in India far exceeded supply, and the demand–supply gap was rapidly growing. Meeting this gap through existing brick-making technologies would place enormous additional demands on India’s coal and biomass resources. There was hence an urgent need to improve the energy efficiency of the existing kilns.
- The VSBK (vertical shaft brick kiln), which had been developed and proven in China, should be explored as one of the technological options for brick-making in India.

Following the Screening Workshop, SDC initiated a project aimed at transferring the VSBK from China to India, and adapting it to local conditions for dissemination in different regions of the country. Initially, the project had two partners: DA (Development Alternatives) in charge of technology transfer and TERI in charge of energy and environmental monitoring. Subsequently, three more partners joined the project.

- Gram Vikas, Berhampur (Orissa) – an NGO working with technology at community-level
- MITCON (Maharashtra Industrial Technical Consultancy Organization), Pune – an industrial consultancy
- DCSL (Damle Clay Structural Pvt Ltd), Pune – an entrepreneurial brick technology consultancy

Although the initial phase of the project was largely technology-oriented, SDC envisaged the VSBK as becoming a driver of positive social change among the brick-making community in the long term; a clean, energy-efficient technology that also promised to be a commercially viable and socially fair option for small-scale brick producers.

The action research phase of the brick project ran from 1995 to 2000. TERI provided technical support to other partners in energy-related issues, and also studied existing brick kilns – primarily BTKs in north India, including eastern Uttar Pradesh – to gain knowledge about traditional firing practices and to evolve and disseminate better firing methodology. During this period TERI worked closely with the firemen at various BTKs in the region, (Figure 4) and also forged links with INP (Int Nirmata Parishad), Varanasi, the district-level association of BTK entrepreneurs in



Figure 4 Studying BTK operation: TERI team at work

eastern Uttar Pradesh. In the course of its work, TERI gained insights into the traditional knowledge and skills of the firemen, as well as the hardships their community faced—both at the kilns and in the villages. TERI also came to know that almost all the firemen in North India came from villages in eastern Uttar Pradesh.

### Migration and the firemen community

Almost all the firemen who work on brick kilns in north India come from three districts of eastern Uttar Pradesh: Pratapgarh, Allahabad, and Rae Bareilly. Firemen do not migrate to the kilns along with their families for a simple reason: unlike semi-skilled or unskilled jobs such as moulding and loading, which can be done by an entire family, the fireman's job is highly skilled and individualized. During the brick-making season, the migrating firemen leave behind their families—women, children, and the elderly—who face great difficulties in coping with day-to-day hardships in the villages, particularly in the absence of basic social infrastructure such as facilities for health, sanitation, and education. With the firemen away for most of the year, the womenfolk have to shoulder the responsibilities for the welfare of their families. This is an especially challenging role when they have little or no savings and when they lack education and employment opportunities.

Firemen are usually identified and recruited by a 'master' fireman—that is, one with long experience and proven expertise in operating kilns. The master fireman is himself chosen by the kiln owner and paid advance money for the purpose of recruiting a team of firemen.

Firemen work under gruelling conditions (Figure 5). They literally live on the kilns. Despite the skilled nature of their work, firemen are paid only moderate wages. Often, they face delays in obtaining payment for their work at the kilns, and they usually remain unemployed when the brick-making season is over. Among the few who own agricultural land, most have small plots of no more than a few biswa each (one biswa = 1/20 of a bigha = 136 square metres), which cannot support a household for very long in the absence of dependable irrigation facilities. Hence, many families of firemen are forced to borrow money at very high interest rates from the local moneylenders, and fall into endless debt traps. Under such circumstances, it is almost inevitable that boys from firemen families begin to work in the kilns at a tender age, thus perpetuating the cycle of poverty, migration, and struggle.



Figure 5 Fireman at work

## When hearts turn to stone

When we mothers see our boys go with their fathers to the brick kilns, we are anxious, afraid. Any mother would be; the boys are so young, the kilns so far away, the work so arduous. Yet what else can they do? And so we turn our hearts to stone and hide our fears in silence....

*Vimla, a fireman's wife, Tharia village*

By 2000, DA, Gram Vikas, MITCON, and DCSL succeeded in demonstrating VSBKs in various regions of the country. This was also the time when SDC sharpened the focus of its Country Programme for India on alleviating rural poverty through the creation of better livelihood opportunities. SDC, therefore, wanted the partners to increase the focus on social action in their future activities; specifically, to promote the VSBK as a small-scale brick-making technology, which could be adopted by brick workers to increase their income and improve the quality of their lives. This phase of the SDC project (named India Brick Project or IBP) ran from 2000 to 2004.

## VSBK: small, clean, and efficient

The VSBK (vertical shaft brick kiln) evolved in rural China in the early 1960s, and an improved version was developed in 1988 by the Energy Research Institute of the Henan Academy of Sciences, Zhengzhou, China. In essence, the VSBK is a modular, vertical structure with one or more shafts. Green bricks with sized coal are loaded on top of a shaft. The bricks are slowly moved down the shaft through the firing zone in the middle, and the fired bricks are removed batch by batch at the base of the shaft (Figure 6). Air enters at the bottom of the shaft, gets preheated by the fired bricks in the lower part of the shaft, and enters the firing zone. The hot flue gases from the firing zone preheat green bricks in the upper portion of the shaft on their way up to the chimney. The VSBK has a lower energy consumption (0.7–1.0 MJ/kg fired brick) than the fixed-chimney BTK (1.1–1.5 MJ/kg fired brick) because of better heat transfer and reduced heat losses. It is also far less polluting than the BTKs.

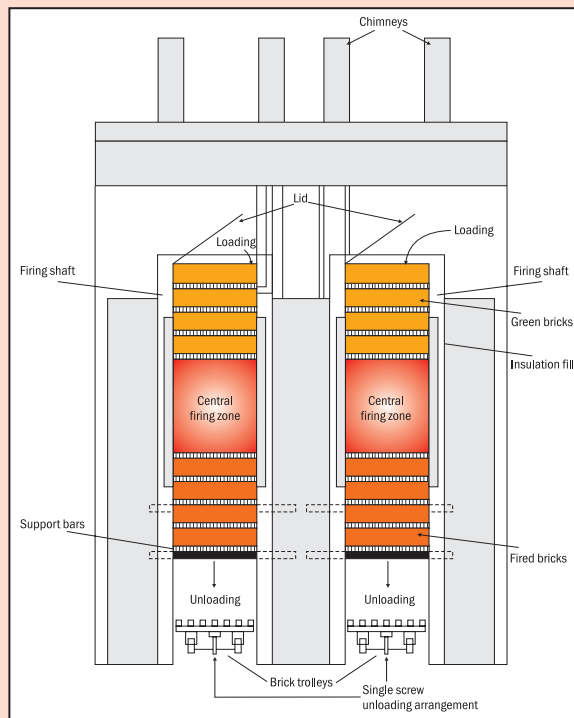


Figure 6 A two-shaft VSBK

## INTERVENTION

The increased focus on social action under IBP posed a challenge to the project partners. Barring Gram Vikas, which worked with technology at grassroots level for community development, all the other project partners – including TERI – were primarily technology-oriented organizations. Therefore, the first step for TERI was to find suitable grassroots-level NGO partners to work with in the field of social action. Having worked closely with firemen during the action research phase, TERI decided to focus its social action initiatives on the firemen community in eastern Uttar Pradesh.

In 2001, TERI identified and entered into partnership with two NGOs in eastern Uttar Pradesh: PEPUS (Paryavaran Evam Prodyogiki Utthan Samiti) based in Allahabad, and Lokmitra, based in Rae Bareilly. PEPUS had a specific focus on empowering women through vocational training and by creating awareness on issues related to their social and economic rights; while Lokmitra had a specific focus on basic education for children. TERI envisaged scope for synergy between the two NGOs as the partners worked among the firemen community. Under IBP, TERI pursued two paths to promote the VSBK.

- 1 The VSBK was positioned as a possible option for the 4000 or so moving-chimney BTKs that were then operating in eastern Uttar Pradesh. These kilns had to meet emission norms by 30 June 2001, or else switch to fixed-chimney operation. Most of the moving-chimney BTKs were small, producing 15000–20 000 bricks daily; an output level that could be achieved by VSBKs operating in parallel. TERI decided to identify a suitable ‘lead entrepreneur’ in eastern Uttar Pradesh for the VSBK; successfully demonstrate a VSBK in the region; and thereby pave the way for its adoption by other moving-chimney BTK entrepreneurs.
- 2 The VSBK was positioned as an ‘artisan-owned’ kiln that firemen could operate at village-level to augment their local income. This effort formed an integral part of the activities that TERI and its NGO partners undertook among the firemen community in their villages in eastern Uttar Pradesh.

### The path of techno-social integration

Even as TERI and other IBP partners engaged in efforts to create an enabling environment for adoption of the VSBK, SDC initiated activities to strengthen their understanding and capabilities in areas related to social action. In 2000, SDC engaged Mr Sunil Sahasrabudhey, a resource person focusing on social issues in eastern Uttar Pradesh, to provide direction to the social action path under IBP. Mr Sahasrabudhey drew up a plan that centred on the innate ‘strengths’ and ‘initiatives’ of the brick workers. The strengths essentially comprised the highly specialized traditional knowledge that each community of brick workers possessed. The initiatives were manifestations of these strengths; they took the form of solidarity among workers of each community based on their shared yet specialized knowledge, their unique vocational skills, and their capacity for sustained work. Mr Sahasrabudhey suggested that rather than follow the typical ‘problem-solving’ approach in harnessing technology for social action (an approach that usually discounted or ignored traditional knowledge), the project partners should follow a path that recognized and acknowledged the existing community strengths and initiatives.

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These ideas were debated extensively by SDC and project partners in a series of workshops, and evolved into an approach that came to be known as ‘techno-social integration’ or TSI. TERI defined the meaning of TSI in terms of two primary thrust areas, which evoked a broad consensus among all the partners.

- 1 Technological interventions in the target sectors that benefit society, with special reference to vulnerable groups.
- 2 Social interventions in the target sectors that promote ‘common good’ (activities that benefit the workforce and their families directly).

The TSI approach suggested that partners work with communities along four parallel tracks to make their interventions effective and meaningful.

- Investigation of workers’ existing knowledge.
- Dialogues and support for ameliorative action.
- Financial and technological downscaling of the VSBK.
- Involvement of women in all activities.

### **TSI: a dynamic, evolutionary process**

Knowledge is the centre around which the strengths of poor people – workers, artisans, be they individuals or communities – are networked. Skills, practices, initiatives, value systems, and solidarity are in essence woven together, with knowledge being the thread. This being the case, any external intervention aimed at alleviating poverty must gel with existing knowledge for it to become the people’s own effort/initiative—essential for it to succeed and be sustainable. This is particularly so for technological interventions, for they often emanate from alien ‘outside’ conditions and remain remote....

So, technology must be pro-poor. This means much more than merely ‘cheap’; it must blend with local traditions and practices, it must in a sense evolve by marrying existing knowledge with new knowledge. This, in a sense, is the approach called TSI or techno-social integration. So, TSI is not a goal. Rather, it is a dynamic process, an evolution....

TSI is particularly meaningful for the poor and marginalized. Often, these sections possess a great variety of skills and knowledge about nature and natural processes. However, over generations of social and economic discrimination they have lost the ability to articulate these strengths... TSI provides a way by which these innate strengths can be unlocked and put together (with new knowledge, if necessary) to create means of socio-economic improvement....

*[Extracts from the Draft Report on TSI in India Brick Project]*

The TSI approach called for a paradigm shift in attitudes while planning future activities – a challenge for TERI as well as other project partners, whose teams were accustomed to following the ‘problem-solving’ approach. SDC, therefore, organized a series of ‘Comprehension and Sensitization’ workshops for project partners during 2001–03, in order to familiarize them with the new concepts and techniques of TSI while drawing up and implementing their plans. Also, a number of meets were held during this period to guide work on downscaling the VSBK.



As their understanding of the TSI approach grew, TERI and its NGO partners explored ways by which they could synergize the ‘non-formal’ knowledge of the firemen community, based on traditional learning and experience, with their own ‘formal’ knowledge based on training and experience in science, technology and social action. Thus, the partners’ activities came to be guided by recognition of the value of existing community knowledge; by openness to mutual learning and sharing of knowledge.

### Comprehension and Sensitization workshops

In all, three C&S (Comprehension and Sensitization) workshops were organized under the India Brick Project for project partners. Each workshop had inputs from a number of resource persons — social activists, management consultants, faculty from academic institutes, and other specialists — and was attended by 35–40 participants drawn from all partner organizations. The workshops were highly interactive, with capacity-building discourses and dialogues among the participants.

The first workshop (1–3 November 2001, TARA Gram) underscored the existence of knowledge in society that is inherited and recreated in traditional ways, and provided insights into the expanse, depth, and nature of this non-formal knowledge. It stressed that participants should be open to learning from and building upon this traditional knowledge, rather than restrict the framework of their vision and experiences to knowledge that they already possessed.

The second workshop (22–23 January 2002, Rae Bareilly) focused on solidarity among workers, and on the influence of local market forces on their lives. In particular, it revealed how both solidarity and favourable market forces are necessary for the innate strengths of the workers to manifest themselves in the form of initiatives. The participants learned that they must not merely seek problems to address by ‘external’ initiatives; rather, they should recognize the latent strengths and initiatives of the worker community, particularly of women, and only facilitate the process of unlocking these strengths and initiatives to address community needs.

The third workshop (26–27 February 2003, TARA Gram) attempted to locate the TSI approach in a framework of human and institutional development. It focused on the interconnectedness of social and technological changes, and the need for participants to integrate technical and social dimensions while designing interventions.

### Ways of learning

There are many paths to learning. An experienced fireman will just touch the surface of a kiln and say: ‘Yes, this *bhatta* is heated just right... we will get very good bricks from this batch!’ And invariably, he turns out to be correct.

We, in the project team, would need a thermocouple to judge the kiln temperature before making any such statement. The point is, the fireman and the technologist are examining the same thing, the same process, and they are arriving at the same conclusion. It’s just that the methods and the tools they use are different... and even the terminology, the languages they use to describe the methods and tools are different. This is why we’ve learned over a period of time to recognize and respect traditional wisdom....

*N Vasudevan, TERI*

## Varanasi experience

Under IBP, TERI began its activities in Varanasi, which lies on the river Ganga in the heart of eastern Uttar Pradesh. This area has the best quality of clay, and hence the highest concentration of BTKs in the country. In the course of action research, TERI had established rapport with Mr Kamla Kant Pandey, a reputed brick entrepreneur from Varanasi, who was Vice-President of AIBTMF (All India Brick and Tile Manufacturers' Federation) and President of INP (Int Nirmata Parishad), Varanasi, the district-level association of brick units in eastern Uttar Pradesh. Mr Pandey owned a moving-chimney BTK, and was very keen on participating in activities that might benefit the brick industry in the region – in terms of technology as well as in bringing about improvements in working conditions. This profile made him an ideal 'lead entrepreneur' for the VSBK.

In February 2000, TERI and INP jointly organized a flagship seminar at Varanasi on 'Pollution reduction and energy conservation in brick industries' (Figure 7). The event enabled moving-chimney BTK owners to voice the challenges they faced in switching over to fixed-chimney design before June 2001, the deadline set by the government. It also enabled TERI to present the VSBK as a clean, energy-efficient option for moving-chimney BTKs.



Figure 7 Brick seminar at Varanasi, February 2000

Following the seminar, TERI undertook the demonstration of a VSBK at Mr Pandey's site in Varanasi. The VSBK was completed in February 2001 (Figure 8). However, the TERI team faced consistent problems in operating the kiln, and the bricks produced were of poor quality compared to the 'Class 1' bricks produced by BTKs in the region. Efforts by TERI in association with DA brought about some improvements in the brick quality – but overall, the VSBK bricks remained inferior to those made by BTKs and could not fetch a competitive price. Faced with increasing losses, Mr Pandey finally had to shut down the kiln in 2004. By then, in the absence of any alternative, almost all the moving-chimney BTKs in the region were converted to fixed-chimney design. From TERI's point of view, an opportunity to promote the VSBK on a large scale had been lost. Nevertheless, a number of positives emerged from the Varanasi experience.

Vitaly, the TERI team members, local masons, firemen, and kiln supervisors learned how to construct, operate, and trouble-shoot a VSBK. They also gained knowledge about soil characteristics and moulding practices, and how these factors played a key role in determining brick quality. With the creation of



Figure 8 Demonstration VSBK at Varanasi

this small pool of local competencies in VSBK technology, the foundations were laid for promoting the VSBK as a fireman-owned kiln, and for working with firemen to try and solve some of the firing problems being faced with the kiln.

TERI also undertook a few initiatives in Varanasi that have strengthened and sustained its links with brick entrepreneurs in the region. For instance, entrepreneurs had long felt the need for a laboratory in their vicinity where they could test soil samples, strength of bricks, coal quality and the like. TERI interacted with SIDBI (Small Industries Development Bank of India) and helped set up a well-equipped testing laboratory at the INP premises in Varanasi in September 2002, with partial funding support from SIDBI (Figure 9). Arrangements were made for a number of INP personnel to be trained by DCSL in using the laboratory facilities.



Figure 9 Lab commissioned at INP premises, Varanasi

Most important, the Varanasi experience enabled TERI to remain engaged with firemen working in BTKs in the region. While studying BTKs and working with firemen during the action research phase, TERI had demonstrated that simple changes in operating practices could yield 5%–10% savings in fuel, improve brick quality, and also reduce particulate emissions to a great extent, thereby greatly improving the working environment. In 2001, TERI and INP together developed and conducted a training programme in BOP (best operating practices) for a group of firemen at Varanasi. The programme – the first of its kind – included modules on clay selection, moulding, and firing practices. The response of the firemen was very encouraging, and TERI conducted a number of similar programmes in subsequent years. These training programmes were highly interactive, and enriched by feedback and suggestions from the firemen who had a wealth of traditional knowledge and expertise to offer. The interactions not only deepened the TERI team’s own knowledge and understanding of firing practices; they also reinforced the bonds of trust and goodwill the team had built with the firemen during the action research phase. These bonds proved useful during the TSI initiatives that TERI, PEPUS, and Lokmitra undertook from 2002 onwards among the firemen-dominated villages in eastern Uttar Pradesh.

### Community-level work

Even as it remained engaged with the Varanasi VSBK, TERI initiated steps with its NGO partners PEPUS and Lokmitra to work at village-level with the firemen community in Pratapgarh, Rae Bareilly, and Allahabad districts. The aim was to follow the TSI approach in recognizing and reinforcing the innate strengths of the firemen and their womenfolk, empowering them to claim and benefit from their socio-economic rights – in the villages as well as at the kiln sites. TERI also hoped to achieve the following goals by pooling

its own technical resources and knowledge of brick-making with the firemen's traditional knowledge.

- Evolve and promote best operating practices for firing BTKs.
- Find solutions to the firing problems in the Varanasi VSBK, with the help of firemen.
- Promote the VSBK as an artisan-owned kiln that firemen could operate at village level.

### *Sangathan: an idea is born*

To begin with, the project partners debated the approach to be taken in organizing members of the firemen community. Options such as trade unions (activist, often confrontational) and caste-based groups (restrictive, socially exclusive) were discussed. Finally, the project decided to follow an experimental path, and try and build an organization that was neither trade union nor caste-based; an organization that was inclusive, united by traditional knowledge and practices, representative of both men and women, and that carried the potential to embrace the entire firemen community. Hence, the idea was born of a collective, or *sangathan*, for the socio-economic development of the firemen community. The collective came to be called Bhatta Parivar Vikas Sangathan or BPVS.

Under the TSI approach, BPVS became a forum in which to exchange knowledge and experiences – technical and non-technical, formal and informal – and in which to locate, elicit, and supplement community strengths and initiatives. It provided a powerful impetus for members of the firemen community to organize themselves in their common interest.

With the migrating firemen being away from their villages for several months each year, BPVS was seen as an organization in which women would also play a major role. A series of special workshops were organized by the project to strengthen the role of women in the initiative: 'Mahila Shakti Swarup', with a focus on empowering women; 'Mahila Shakti Sammelan', to convey the ideas of women's empowerment to the larger community; and 'Mahila Kanoon Training' to build awareness among women of their rights and to awaken them to the concept of working in partnership and as equals with men (*sahjeevan*) (Figure 10).



Figure 10 Gender workshop, eastern UP

Both PEPUS and Lokmitra set about promoting the formation of BPVS. While PEPUS focused its activities on villages in Allahabad and southern Pratapgarh, Lokmitra worked in villages in Rae Bareilly and the rest of Pratapgarh (Figure 11). The following were the guiding principles.



Figure 11 Focus areas of the brick project

- Problems faced by the firemen community were to be identified and solved by BPVS itself, with the project only playing the role of facilitator.
- A knowledge dialogue on technological issues was to be initiated among the community.
- Families of firemen, in particular the womenfolk, were to be made important members of BPVS (given the migratory status of the firemen).
- Women’s leadership was to be encouraged and facilitated.

### *Opening the doors*

From 2002, PEPUS and Lokmitra began to visit villages to establish rapport with the firemen and their families, appreciate the conditions in which they lived and worked, gather insights into their traditional knowledge, and encourage them to join under the banner of BPVS. This was an extremely challenging process. There was no ‘standard model’ that the teams could follow to contact and establish bonds of trust with the villagers. Each village had its own unique profile – in terms of inhabitants, the factors that defined their innate unity (such as



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kinship, caste affinities), the day-to-day stresses and challenges that they coped with, and their individual and collective knowledge and skills. Indeed, the only attribute all the villages shared was acute economic and social distress (Figure 12).

The interactions with the firemen community – individually and in groups – demanded great patience, tact, and empathy from the project teams. Hariram and Kamla Devi of PEPUS emphasized that at the very outset, it was vital to find a community member who could act as ‘icebreaker’.



Figure 12 Establishing rapport with families of firemen

### Breaking the ice

It was a huge challenge for us to start our work. Although we'd worked for several years earlier among tribal communities in other parts of Uttar Pradesh, we had no knowledge at all about the brick-making industry. So, we began by visiting a few brick kilns and interacting with workers. We met Shiromani, a moulder whose husband was a fireman. They told us they were from a village in Pratapgarh. Later, we visited their village where Shiromani introduced us to the other women, one by one. Once we began our work in her village, it became easier for us to access other nearby villages. Shiromani is the one who helped open doors for us; she is now one of our field workers. As outsiders, when we want to work in a village, it is vital to have the support of a local person like her—someone whom other villagers know and trust. Even then the barriers of tradition and custom are hard to break... but slowly and surely, with every visit and every meeting, progress is made.

*Kamla Devi, PEPUS*

Rajesh Kumar of Lokmitra echoes the importance of an icebreaker. 'As outsiders, it was not easy for us to begin social work among the firemen community, about whom we knew very little. Fortunately, we came to know a fireman named Lal Bahadur, who joined our organization as part of our education programme. He introduced us to other families in his village, and so, step by step, we were able to move into other villages as well.'

Lal Bahadur had worked as a fireman for over 12 years before he joined Lokmitra. 'Those were hard years,' he reflects. 'I often wished that I could find some alternative way to make a living... but there was nothing else I could do. The turning point came halfway through one brick-making season, when I had to leave the kiln and return home for a few days because of a family crisis. I left the kiln in the care of another fireman, with the kiln-owner's permission. However, when I went back to the kiln, the kiln-owner not only denied me my earlier position, he even refused to pay me my accumulated dues – over 15,000 rupees. That day, I vowed I would never again work in the kilns. Fortunately, soon thereafter, Lokmitra



approached my village, and I seized the opportunity to work with them; not only to earn money, but to help my people become stronger, to escape from this terrible cycle of poverty and drudgery in which we are trapped.'

### *BPVS: sowing seeds of power*

The project teams' interactions with firemen were necessarily restricted to off-season months (when the firemen returned home from the kilns), but took place throughout the year with their family members. Initially, the focus was on appreciating the conditions in which the villagers lived, and the day-to-day problems they faced. The project teams did not themselves try and develop solutions to these problems. Instead, they tried to find ways by which they could supplement the existing strengths and initiatives of the community members – comprising traditional knowledge and solidarity – with their own 'external' knowledge to enable the community to address and overcome its various problems on its own.

Through a sustained campaign of meetings and one-on-one interactions, villagers – particularly the women – were made aware of the power that concerted purpose and action would bring them. They were encouraged to form BPVS units at village level; to discuss the challenges that they faced; and to pool their resources to tackle these challenges. The project teams facilitated the formation and activities of BPVS only by way of additional information and knowledge – for instance, on government schemes available for rural employment; laws related to minimum wages, workplace safety and accident compensation; state incentives for education of girls; health and hygiene issues; and the like.

The firemen and their families faced challenges that fell under two broad categories.

- 1 *Village-level issues* These included lack of wells for drinking water, health facilities, sanitation, connecting roads, schools, and so on. In the absence of the firemen for most of the year, the responsibilities for tackling these issues fell upon women.
- 2 *Kiln-related issues* These mainly had to do with the firemen, and included poor working conditions, late-/under-payment of wages, and other forms of exploitation.

### *Village-level issues*

Initially, the women were slow in responding to the BPVS campaign; they lacked education, and were accustomed to playing a passive role in both household and village affairs. However, the project teams persisted in their efforts at mobilizing and motivating the women, and each BPVS that was formed acted as a catalyst to spur the formation of others. As the women learned about and experienced the benefits of cooperative activities such as inter-lending, they gained confidence in decision-making and in working together for the common good. Slowly but surely, they assumed control over the affairs of BPVS – driving their agendas, organizing and monitoring their activities, managing their funds.

The women also became increasingly assertive and effective in interacting with local government officials and agencies to improve living conditions in their villages. BPVS intervened on behalf of widows to secure pension/compensation for them from the erstwhile employers of their husbands; obtained scholarships for village girls in schools and colleges; ensured that government agencies gave villagers the opportunity to work on local

construction projects (building roads, digging tanks, and so on); and vigorously pursued cases where there were delays in providing villages with basic infrastructure such as taps, wells and roads. The results of these efforts were slow in coming; often they appeared to be small, even intangible; yet for the villagers they brought about perceptible improvement in the quality of life. Significantly, the firemen have now begun to acknowledge the key role being played by their womenfolk in managing both family and village affairs.

‘In the old days we women were scared even to step out of our huts, leave alone go and talk to government officials,’ remarks Manorama Devi of Akhirajpur village. ‘But now that we’ve come together as BPVS, now that we’ve experienced the strength of *sangathan*, we are no longer afraid of anybody.’ Sevasaran, the village elder and ex-master fireman, adds with a chuckle: ‘I remember how ten years ago, when government officials approached our village, the women would flee from the fields into their huts even when the officials were far away. Now, it is the officials who are nervous about meeting our women!’

### First contact

On my first day at work with Lokmitra, I was really nervous. I had never visited villages before, and social work was a new thing for me! I had to travel 60 km by bus from Rae Bareilly, where I live, to Lalganj where Lokmitra’s field office is located. There I met Lal Bahadur, and we walked to a firemen’s village a few kilometres away; a village which he had visited a number of times earlier to motivate villagers to come together as a *sangathan*. Almost all the men were away, for it was the brick-making season. We joined a small group of women gathered outside the village temple. The women were saying a little prayer for the welfare of a child who had been bitten by a dog ....

After the prayer was over, Lal Bahadur stood up and spoke awhile about the strength that comes from shared knowledge and purpose, from unity, from *sangathan*. Very soon, many other women joined the gathering. When Lal Bahadur finished, several women said they were keen on forming a *sangathan*. After that I got to chatting with a few women sitting near me. Very quickly, we became comfortable with one another and my confidence grew. They were astonished at my very presence there. ‘How have you, a young woman, come alone? That too so far from home?’ they asked me. ‘You are so brave! So lucky! Our men will not allow us even to step outside the village!’

I was deeply moved by the depth of their needs, their poverty, the total lack of opportunity for them to express their talents, their creative energies, even their individual identities. BPVS is now helping them to unlock their strengths...

*Kalawati, Lokmitra*

### *Kiln-related issues*

BPVS also provided a forum for firemen to discuss the hardships and insecurity they faced at work. There were three major causes of concern.

- 1 The firemen did not have any ID cards that they could carry when they travelled to and from distant kilns, and so they were often harassed by police and railway personnel

- on the way. Also, lack of ID cards made it difficult for the authorities to ascertain the firemen's origins and inform their families in the event of any mishap en route.
- 2 Very often, firemen had to work in more than one kiln during the brick-making season. In the absence of telephones or any other means of rapid communication, their families did not know their whereabouts and could not contact them even in times of dire emergency.
  - 3 The firemen did not have any written contracts with kiln-owners. This left them vulnerable to exploitation by the latter.

### Building rapport: patient work

I joined PEPUS in September 2001. I am an ex-fireman's son; my uncle is a fireman even now; but till I started working with PEPUS I was unaware of the depth and value of the traditional knowledge that firemen have and use in their work. Now, I have come to know that baking bricks is a very special craft, handed down from generation to generation.

Like other communities of brick kiln workers, firemen are usually poor and uneducated. As we began to establish rapport with the firemen community, their other problems began to get verbalized: non-payment of wages, unsafe work conditions and bad living conditions at the kilns, recurrent accidents, no work for almost half the year. When we started to talk to firemen about ways by which they might overcome their problems, some of them asked us why we were so interested and what we stood to gain out of the whole exercise! It has taken a lot of time and patience to gain their trust.

*Raj Kumar, PEPUS*

### Welling power

Our village of Akhirajpur has about 150 dwellings housing close to 900 people. For years we'd been asking the government for a well with a hand pump... to no avail. We repeatedly visited the office of the BDO (block development officer) and spoke to junior officials and then to the BDO himself; we even spoke to the SDM (sub-divisional magistrate); but except for empty assurances of action, nothing happened. Finally, one day about 60 of us women – all BPVS members – clambered on to a tractor-trolley and drove to the district magistrate's office. Seeing us, the police constables at the gate were alarmed.

'What's this? Some kind of an agitation?' they yelled.

'We represent the Bhatta Parivar Vikas Sangathan! We have come to demand water!' we replied. We showed the constables our BPVS membership cards, and then, ignoring their feeble protests, we all walked into the district magistrate's room. He stood up in astonishment and asked us what we wanted. We explained our case, stressing how other officials had ignored our demands for water over the years. He listened to us patiently, and assured us that he would personally see that our problem was resolved. He kept his word too... within a week, Akhirajpur had its own well and hand pump (Figure 13).

*Shobha, BPVS member, Akhirajpur*



**Figure 13** Water pump installed through community action

### Road to change

Our village, Tharia, was cut off from other villages in the panchayat by a patch of marshy land. For many years we villagers had voiced the need for a road across the marsh; but to no avail. In the meanwhile, we came to know that the government had actually sanctioned money for making a road, but that this money was lying unutilized at the BDO's office. So we went and met the BDO, and requested him to build the road. He assured us of early action... but still nothing happened.

After waiting for a week we decided to act. One night, all of us women went to the marsh. With our bare hands we dug up mud and soil and arranged broken stones, till by morning we had made a *kutchra* road across the marsh. The BDO was furious, and sent a small group of men to demolish the road. We built it again the next night, and again it was broken. Thrice we rebuilt that road, and thrice it was broken, till finally the BDO threatened us with dire consequences if we did not stop our attempts.

That evening we discussed the matter at a BPVS meeting attended by members from all villages in our panchayat. The next day we went in three tractor-trolleys to the town of Lalganj, carrying BPVS banners and shouting slogans. We parked ourselves on the road right outside the SDM's office. It created quite a sensation in the town, even attracting the local media. The SDM hurried out of his office, heard us out, and gave us his personal assurance that a proper road would be built across the marsh. It was—in three days!

*Vimla, BPVS member, Tharia village*

### Identity card

The project helped BPVS in designing a simple but adequate ID card, which the firemen now carry with them when they migrate to work. Each ID card is issued under the seal of the local BPVS centre. (Figure 14) Also, each BPVS centre has introduced a register in which details are recorded of every fireman when he migrates to work – his name and address, details regarding his next of kin, the location of the kiln where he is going to work, and the name and address of the kiln owner. These measures are simple but effective; they bring a degree of security to the firemen, as well as to their wives and other family members in the villages.

### Iqrarnama (Agreement)

During BPVS meetings at various venues, a large number of firemen spent considerable



Figure 14 A fireman's ID card



Figure 15 *Iqarnama*

time in discussing ways by which they could ensure a fair and non-exploitative relationship between the fireman and kiln owner. There was general agreement that the lack of trust between firemen, master firemen, and kiln owners did not benefit any party. Their discussions gave rise to the idea of evolving an *iqarnama* – that is, a written contractual agreement that formally sets out the terms and conditions under which a fireman works at a kiln. Initially, a 29-point *iqarnama* was drawn up by the firemen. Over the years, this has been fine-tuned into a simple, standardized 15-point *iqarnama*, in the form of a passbook that has space for recording dates of employment, details regarding working conditions, and so on. The *iqarnama* covers all the major issues of concern to the fireman – quantum of advance and monthly wages, living arrangements at the kiln site, provision of kerosene for cooking, and so on.

The *iqarnama*, printed in pamphlet form (Figure 15) was sent to many BTK owners and the BTK

owners’ association (Int Nirmata Parishad) in Uttar Pradesh. Ideally, this agreement ought to be signed by three parties: fireman, master fireman, and kiln owner. However, efforts by the project team to sensitize BTK owners on the *iqarnama* have been limited. At the same time, it is encouraging that a few *iqarnamas* have been signed during the past few seasons between firemen and master firemen. Although the legal enforceability of the *iqarnama* is uncertain and as yet untested, the *iqarnama* holds out the promise of providing the fireman as well as his family members a certain sense of confidence and security. On the whole, the evolution of the *iqarnama* through widespread discussions and exchange of ideas has helped in strengthening the *sangathan*. It has raised the level of consciousness, among a community of poor and unorganized migrant workers, of their rights as artisans and opened their minds to the possibility of improving their working conditions. Indeed, among all the initiatives taken through BPVS, perhaps the *iqarnama* has won the widest appeal among the firemen community. It is also important to note that the Uttar Pradesh Brick Kiln Owners Association also initiated a dialogue with the Labour Commissioner of Uttar Pradesh to ensure fair labour practices in their kilns.



### Matters of security

Kamla Devi of PEPUS describes the feeling of security brought by the system of keeping a register on firemen in the village-level BPVS centres. 'Earlier, not only did these women had to manage their families and tackle all life's challenges on their own; they simply did not know where their husbands were—in whose kiln, where and how far the kiln was, whether they'd reached the kiln safely, when they would return... they knew nothing! Now, at least they know where they can find their men in case of emergency.'

In one case, the village register quite literally proved to be a life-saver. In late 2007, six firemen from villages in the Lakhram gram panchayat went to work on a BTK in Bihar. The kiln was owned by two partners who turned out to be very harsh in their treatment of workers. For several weeks they did not pay the firemen their wages. Two firemen who protested were severely beaten up and illegally confined by the owners. A few nights later, these two firemen managed to escape. They fled back home, where they informed the villagers that the remaining four firemen were being forced to work at the kiln without wages under dire threat. The villagers immediately pulled out the register at the BPVS office and located the kiln. One of them called the kiln owners from a public telephone in the nearest town, and warned them that if the firemen were not paid in full and released immediately, several hundred BPVS members would descend on the kiln with the police in tow. The kiln owners obeyed at once.

### *Strengthening the foundations: knowledge-based activities*

As word spread among the firemen community about the positive impact of the village-level *sangathan* movement—particularly its facilitating role in evolving ID cards and an *iqarnama* for firemen, in increasing the firemen's technical knowledge and skills through interactions with the TERI team, and its tangible power to influence local government agencies to provide basic infrastructure services and jobs—more villages were drawn into the BPVS movement. With the number of village-level *sangathans* growing rapidly, the project teams conducted a series of workshops to encourage the collectives to come together at cluster-level. In PEPUS' area of activity, this cluster-level collective took the form of a 'forum for the welfare of firemen families'—Bhatta Parivar Vikas Sewa Sangathan. In Lokmitra's field of activity, the village-level collectives joined as an 'association of brick firemen families'—Bhatta Karigar Takniki Samaj Sangh.

In 2004, TERI decided the time had come to consolidate and synergize the achievements of both Lokmitra and PEPUS, to give greater strength to their grassroots mobilization efforts. Accordingly, on 2 October 2004—Mahatma Gandhi's birth anniversary—the two cluster-level collectives came together with the project's support and conducted a joint 'Foundation Day' conference at the village of Ghuisarnath, near Lalganj. The conference, named Ghuisarnath Bhatta Parivar Sangathan, enabled BPVS members from villages across three districts of eastern Uttar Pradesh to interact with one another for the first time at such a large gathering; to share their knowledge and experiences; and to discuss and resolve village-level and kiln-related problems. In a sense, the Ghuisarnath Foundation Day marked the transformation of the *sangathan*, from a mass organization comprising a



number of village-level collectives to a 'knowledge organization' representing the collective knowledge and strengths of the firemen community. A small office was inaugurated at Ghuisarnath, and a panel of 13 leaders, including seven women, was elected to take forward *sangathan* work on four fronts.

- 1 Promoting ownership of small kilns by firemen and their families in their own villages.
- 2 Obtaining basic services such as water, health facilities, and livelihood opportunities from government.
- 3 Sharing knowledge and creating awareness about rights and resources, particularly among women.
- 4 Persisting in efforts to develop and promote the *iqrarnama* as a formal contractual agreement that would protect the rights and interests of firemen at the kilns.

Since then, TERI and its NGO partners have continued their efforts to mobilize the firemen community to join the *sangathan* movement, to promote knowledge-sharing among them by organizing gatherings such as the annual Ghuisarnath Foundation Day meet, and to build capacities among them in both technical and non-technical fields by means of informal dialogues, workshops, and formal training



Figure 16 Dialoguing with brick firemen community

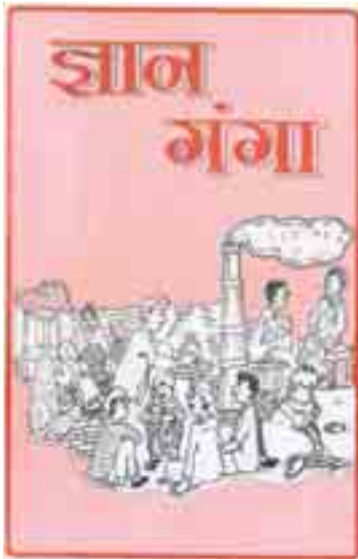


Figure 17 Knowledge publication for firemen community

sessions (Figure 16). The project uses local cultural events—*melas* (festive gatherings), exhibitions, and discussion camps—to interact with the community. Pamphlets and posters describing BPVS activities in various villages are used to strengthen solidarity and spread awareness on the rewards of collective action; local cultural idioms and styles are used to enhance the impact of the messages (Figure 17).

As part of their efforts to facilitate knowledge-sharing among the firemen community, PEPUS and Lokmitra are promoting the concept of *gyan chaupals*, *gyan kendras* and *chintan dhaba kendras* in the firemen villages (Figure 18). These are essentially informal gatherings at venues such as tea stalls, where community members can discuss matters of mutual interest—social issues related to their villages, technical matters pertaining to the firemen's work,



Figure 18 *Gyan chaupal*

*sangathan* issues, livelihood opportunities, and so on. Lokmitra has also started '*gyan protsahan evam soochana kendra*' (literally, a 'knowledge dialogue and information service') to increase people's awareness of and confidence in their own knowledge. Both NGOs are engaged in initiatives to promote reading, writing, and vocational skills among women and children.

In May 2007, a 'knowledge hub' was inaugurated by PEPUS at Lalgopalganj (Allahabad) to provide a physical space where

firemen and other stakeholders can share their learning and experiences. It is envisaged as a place to integrate and make available the traditional knowledge and skills of the firemen community as well as 'outside' scientific and technical knowledge. Mr Sahasrabudhey, resource person for social action, sees the hub as becoming an 'epicentre of knowledge'. He explains that the hub will form an important physical part of a larger, more abstract knowledge-sharing framework:

'The idea of knowledge-sharing is not to centralize knowledge in one place or among a few persons. Rather, the idea is to create a network of knowledgeable persons; a network that is accessible by all for mutual benefit. Indeed, the network can coexist with this physical repository of knowledge.'

The efforts of TERI and its NGO partners are showing results: from coverage of around 20 villages in 2001, the *sangathan* has now expanded to cover 375 villages in Allahabad, Rae Bareilly, and Pratapgarh districts, effectively touching the lives of around 20 000 firemen and master firemen and their families.

### *Capacity building*

Bringing about technological and social changes in a traditional industry such as brick-making requires capacity building at all levels – among policy-makers, regulatory authorities, technology providers, NGOs, brick kiln owners, and the community of workers. In 2005, TERI with the support of SDC launched an initiative in the small and micro enterprises sector titled CoSMiLE (Competence network for Small and Micro Learning Enterprises). Under the CoSMiLE project, TERI conducts capacity building programmes aimed at promoting knowledge sharing and learning among the firemen community and other stakeholders in the brick industry, in both technological and social spheres.

In order to engage with firemen on technological issues and to develop BOP (best operating practices) for BTKs, TERI has conducted a series of workshops with firemen over the years and at various venues. Often, BOP requires changes in systems and methods that BTK owners



Figure 19 Certificate issued after BOP training programme

might be reluctant to make based on firemen’s suggestions alone; especially when the changes have cost implications. Therefore, TERI has conducted BOP training programmes for BTK owners as well. Firemen who attend BOP training programmes are awarded certificates by the project at the end of the sessions (Figure 19). These certificates help the firemen acquire a certain prestige and credibility in the eyes of BTK owners, and thereby facilitate the process of adopting BOP in the kilns.

Summarized below are a few examples of technical and social training programmes conducted by TERI.

### *Gender awareness and training workshops*

Among the firemen community, the womenfolk are traditionally allowed little or no role in decision-making or in managing household finances. They also lack opportunities to obtain education, pursue their creative skills, or find

employment. On the other hand, the womenfolk shoulder the responsibility of managing not only their families but also the entire village for several months each year, when the firemen migrate to the kilns. Clearly, a change in mind-set is needed among both men and women in the community; an awareness that women have equal rights, that they possess unique strengths and skills, and that the community will progress only if women and men strive together in the spirit of *sahjeevan*, that is, as partners. These ideas are summed up by the slogan:

*Hum badhenge tabhi, vikas ki or*  
*Nar-Nari bandhenge jab, sahjeevan ki dor*  
 [On the path of development, we can only move ahead  
 If men and women work as partners, bound by *sahjeevan*’s thread]

The principle of *sahjeevan* formed the basis of a series of workshops conducted by the NGO partners to create awareness of women’s strengths (*Mahila Shakti*), women’s rights under law (*Mahila Kanoon*), to promote gender equality, and to help synergize the strengths of men and women in the community. Examples are:

- Gender workshop, Allahabad: June 2002
- Mahila Shakti Swarup workshops: Lalgopalganj, November 2002, February 2004

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- Mahila Shakti Sammelan (gatherings to spread awareness): Kamalapur, November 2002; Lalgopalganj, April 2004
- Mahila Kanoon workshops: Lalgopalganj, May 2003, March 2005

### *Techno-social training programmes for firemen*

In August–September 2006, TERI organized two programmes aimed at developing both the technical and social competencies of the firemen community. These events were attended by around 50 firemen from Allahabad, Pratapgarh, Rae Bareilly, and Fatehpur districts.

The technical training programme was held at Allahabad in August 2006. It explained various technical aspects of brick-making, and the firemen were introduced to new brick-firing technologies such as the tunnel kiln. During the interactive sessions, the firemen shared their experiences and discussed technical problems that they encountered during kiln operation. The participants were given certificates at the end of the programme.

The social training programme was held at Pure Kalandhar in September 2006. It focused primarily on strengthening the BPVS, linking BPVS with other collective forums, identifying potential leaders to disseminate acquired knowledge in their respective areas, and finding ways to improve negotiations between firemen, master firemen, and kiln owners.

### **Colours of Mindara**

In the village of Mindara stands a small shed made from sturdy bamboo poles with a thatched-roof. At one end stands a battered sewing machine; next to it is a table laden with bundles of wool and cloth. Around 20 girls are seated on a mat, their hands busy with needles and thread and wool and pieces of cloth. This is one of several non-formal education centres (Kishori Shikshan Pratikshan Kendra ) being run by PEPUS to train teenaged girls in the areas of basic reading/writing skills; health and hygiene matters; and vocational skills such as stitching, weaving , and doll-making. ‘We have around 40–50 girls at this centre; they come from Mindara as well as nearby villages,’ says teacher Jyoti. She indicates the *dhol* (traditional drum) next to her with a smile. ‘Whenever possible I teach them lessons by singing songs and telling stories; the girls then remember the lessons much better, and they also learn to speak properly!’ She adds that some girls already know the basics of Hindi and English, because they attended private schools for a few years. But they had to drop out of these schools, because the fees are quite heavy at 40–50 rupees a month, and the rigid timings make it hard for the girls to manage household chores, field work, as well as classes.

Today, the girls are doing embroidery work on little bits of colourful cloth: kerchiefs, napkins, sashes, and children’s dresses. They will keep some of these items for themselves and sell the rest at the weekly *haats* (bazaars). The girls are very conscious about not wasting materials. ‘When we begin, Jyoti didi (sister) makes us practice cutting patterns out of old newspapers—so we don’t ruin precious cloth if we made mistakes,’ explains one girl. Jyoti explains that the girls themselves pay for and bring all the raw materials they use; PEPUS provides only the sewing machine and its accessories. ‘Because they invest their own materials, the girls learn to value what they do; it makes all the difference to their attitudes and sharpens their skills!’





Figure 20 Technical training programmes for firemen

### *BOP training programmes*

TERI conducted two training programmes in BOP for firemen in September 2007; one with PEPUS at Lalgopalganj (5–6 September), and the other with Lokmitra at Suchi (7–8 September) (Figure 20). A total of 90 firemen participated in these programmes, which focused on improving firing practices in BTKs, where the firemen usually work. A Hindi video film on BTKs titled ‘Int bhatte mein behtar karyavidhi-bachat ki or’ (‘Better operating practices in brick kilns—for increased savings’), prepared by TERI, was also shown to the participants. Thereafter, the participants engaged in a group exercise to identify, debate, and solve specific problems related to BTK operation. This session helped in eliciting the traditional knowledge possessed by the firemen.

Participants were also given ideas about new technologies and products to increase their understanding about future trends in the brick industry. The trainers used photographs as aids to explain the concept and features of the tunnel kiln, and to describe new products such as extruded bricks, tiles, and other decorative items that can be produced in the kiln. At the end of the session, a manual on better feeding, firing, and operating practices for BTKs (prepared by PSCST) was distributed among the participants.

### **Knowledge sharing becomes spontaneous**

Inspired by the technical training programme at Suchi on 7–8 September 2007, the firemen themselves organized a one-day discussion on technological aspects at Suchi on 15 September 2007. In this programme, the more experienced firemen/master firemen responded to the queries raised by young firemen on different technological issues—for instance, the reasons why white-coloured fired bricks were sometimes produced, the causes for slow movement of fire, better fuels for brick-making, and so on. This event is indeed noteworthy because it was conceived and conducted by the firemen themselves.

### *Promotion of artisan-owned VSBKs*

In March 2003, TERI organized an ‘exposure visit’ for firemen to the Varanasi VSBK. The visit helped in:

- giving the firemen an opportunity to see the VSBK in operation, assess its technological



Figure 21 Visit of firemen to Varanasi VSBK

VSBK in operation (Figure 21). They were also shown two kilns with green brick setting in zigzag pattern. Following their field visits, the groups made presentations that summarized their opinions, conclusions and suggestions on the VSBK and the zigzag kilns. The firemen found the VSBK more attractive than the zigzag kilns because it offered a cleaner working environment than the latter.

A number of firemen expressed interest in adopting VSBKs, but were apprehensive about the venture cost. TERI took the view that if an aspiring VSBK entrepreneur invested his own land for the kiln, as well as put up a sizeable portion of its capital cost, the project would meet the remaining cost by way of loan and project assistance to the entrepreneur. Based on these criteria, TERI profiled the interested firemen and selected a small number who appeared to have both the enthusiasm and the resources to set up and run VSBKs. These firemen were taken to see the VSBK set up by DA at Gwalior, and DA's VSBK service centre in Datia. Among them was Harisharan Singh, a master fireman of considerable repute from Akhirajpur village in Allahabad district. Subsequently, Harisharan and his wife Manorama Devi came forward to adopt a VSBK.

### *Manorama-Harisharan's VSBK*

Under TERI supervision, a single-shaft VSBK was constructed on a patch of land owned by Harisharan in Akhirajpur. TERI provided the entrepreneur with project assistance amounting to about 90% of the kiln cost. As Harisharan was away at work on BTKs, Manorama assumed responsibility for every aspect of construction, operation, and management of the kiln – ordering materials and ensuring timely delivery, organizing teams of moulders and other workers and supervising their work – while taking care of her family too. The kiln was constructed under TERI supervision, and fired for the first time in May 2004 (Figure 22). The baked bricks had a good colour. However, as with the Varanasi VSBK bricks, they lacked the all-important 'ring' that defines a good-quality brick in North India. Attempts were made over the subsequent years to improve the quality of bricks, but with limited success.

strengths and weaknesses, and advise on how to solve the problems being faced with firing and brick quality

- determining whether any of the firemen would be interested in operating a VSBK in their own villages.

PEPUS and Lokmitra mobilized a total of 36 firemen and master firemen from Allahabad, Pratapgarh, and Rae Bareilly districts to attend the three-day event. The participants were taken in groups to study the Varanasi





Figure 22 Akhirajpur VSBK

‘The main reason for this problem, this lack of ring, is that the VSBK produces bricks which come out from the kiln at very high temperature,’ explains Harisharan. ‘The hot bricks develop cracks when they emerge from the shaft and undergo rapid cooling. These cracks prevent them from acquiring the ring of Class 1 BTK bricks. Here, in Akhirajpur, we are surrounded by BTKs and the market is full of Class 1 bricks! Despite this, we managed to sell all our bricks, although at a lower

price. During the 2006/07 season we could get around 1100 rupees per thousand bricks. In comparison, BTK bricks fetch 1500 rupees or more per thousand.’

### *Inderjit's VSBK*

Akhirajpur falls within PEPUS' area of activity. TERI, therefore, decided to try and promote an artisan-owned VSBK in Lokmitra's area of activity as well. In late 2004, five promising entrepreneurs were chosen from this area and taken to Akhirajpur to see the working of Manorama and Harisharan's VSBK. Thereafter, TERI identified the best prospective VSBK entrepreneur among the five– Inderjit Verma, of Pure Kalandhar village in Pratapgarh district.

### **Bricks never go waste**

All the bricks produced by a kiln will find buyers in the market; only their prices will vary. For instance, there is a thriving market for *addha*, or half-broken, bricks, and even for *khanjar*, or over-burnt bricks which are very hard and therefore useful for applications such as laying roads.

Indeed, 'quality' itself is a matter of perception and varies from region to region. The traditional parameters that define brick quality, such as colour and ring, are difficult to measure or quantify. Mr Kamla Kant Pandey explains: 'My VSBK bricks did not fetch a good price in the Varanasi market because they could not match the colour and ring of good-quality BTK bricks. Yet, a visiting brick entrepreneur from Bangalore was deeply impressed by their quality!' TERI team member Sachin Kumar adds: 'In the North, particularly in Punjab and the Ganga valley regions of Uttar Pradesh and Bihar, where the soil is rich in clay, there are as many as six different qualities of bricks; but in the South, where the soil is not as rich, there is only one quality of brick. A brick considered medium-quality in the North is in fact comparable to the best brick one gets in the South!'

## WORKING WITH THE BRICK FIREMEN COMMUNITY

Inderjit was not a fireman, but he had worked for several years on BTKs and acquired considerable knowledge of kiln operations. He evinced great enthusiasm in setting up a VSBK, and possessed land on which to set up the kiln. Being the son of the *pradhan* (elected village leader), he also exercised a fair amount of influence in the village and nearby areas. These factors played a decisive part in choosing him to be the second VSBK entrepreneur in eastern Uttar Pradesh.

Inderjit's land was at a slight elevation and already had a small building on it (Figure 23). TERI used the layout of Inderjit's land, as well as the building on it, to maximum advantage while designing and constructing the VSBK, and thereby reduced its cost.

In February 2005 Inderjit's VSBK was commissioned at Pure Kalandhar (Figure 24). At first, the bricks produced did not have satisfactory colour and tended to break easily. The problem was rooted in the nature of the clay-bearing soil in the area; the green bricks made from this soil did not fuse properly as the bricks passed through the fast-firing, fast-cooling VSBK cycle. In order to address the problem, the daily throughput of the VSBK was reduced from 11 batches to 7 batches. In effect, this slowed down the firing rate and increased the 'residence time' of the green bricks. The quality of bricks improved substantially, but they still could not match the Class 1 BTK bricks. Also, the productivity of the kiln dropped sharply (from over 3000 bricks to around 2000 bricks daily). Due to these factors, Inderjit incurred a net loss during the first year of operation. However, with admirable perseverance he has continued to operate the kiln.

'The VSBK is a small kiln, but it's very hard to operate!' says Inderjit. 'So, when people come to me saying they're interested in setting up a VSBK, I tell them: "Don't act in haste! Work with us awhile on this kiln; understand how it works and all the challenges you have to face, before you set up your own VSBK. It's a tough kiln to run... but it will reward your efforts.'"

### *Study of rural brick market*

In 2004, TERI commissioned a study of the brick market with respect to rural consumers in the low-end economic category in three blocks of eastern Uttar Pradesh: Lalganj (Pratapgarh district), Badshahpur (Jaunpur district), and Kaurihar (Allahabad district). The study was carried out by Triratna Consultants Limited, Lucknow and had four primary objectives.



Figure 23 Site for Pure Kalandhar VSBK



Figure 24 Pure Kalandhar VSBK

- 1 Identifying the criteria that influence rural consumer decisions while purchasing bricks.
- 2 Estimating the market size for different categories of bricks.
- 3 Estimating the quantities of various quality bricks purchased, along with their sources and end-purposes.
- 4 Listing of master firemen in the surveyed villages.

The study clearly revealed the following.

- For rural consumers, brick purchase is regarded as a one-time investment for construction purposes; hence, even the economically weaker consumers prefer to buy good quality bricks.
- The most important criteria by which consumers identify a good quality brick are (i) colour and (ii) ring sound.
- Awareness levels regarding brick quality is high among the consumers; particularly because members of the firemen community dwell in these areas of eastern Uttar Pradesh.

The findings of the study emphasized the need for further experimentation and R&D efforts on the VSBK, to enable the kiln to produce bricks that meet the quality criteria (colour and ring) that are demanded by the rural consumers in eastern Uttar Pradesh.

### Equal partners

The bricks produced by Manorama's and Harisharan's VSBK carry the impression 'M H'; an appropriate symbol for an enterprise in which a woman and a man have worked as equal partners. 'Earlier, all the villagers used to refer to me as 'Harisharan's wife,' says Manorama Devi. 'Now, the villagers refer to me as 'Manorama's husband,' responds Harisharan with a wry grin.

### Gritty entrepreneur

From the very start, Inderjit has shown great *lagan* – drive and determination – in making his VSBK a success. He worked with great enthusiasm alongside us at every stage of construction and operation, and displayed a very innovative spirit. Over a period of time, his entire family has become involved in the enterprise (Figure 25).

There is a small building on Inderjit's land, which his family sometimes uses as a dwelling. On Inderjit's suggestions, we built the VSBK against one of the building walls to reduce construction costs. Also, an adjacent room in the building was modified so that one portion can be used as a 'cooling chamber'; that is, an enclosure where the baked bricks can be stacked and allowed to cool down slowly to improve their quality. To enable easy loading of green bricks, a small platform has been made to connect the roof of the building to the top of the VSBK shaft. Innovative measures such as these have helped in making kiln operations easier and in bringing down its overall cost. But above all, it is Inderjit's *lagan* that has kept the Pure Kalandhar VSBK going despite great odds.



Figure 25 Inderjit's family engaged in brick-making

Rakesh Johri, TERI

## CHALLENGES AHEAD

TERI and its NGO partners have conducted their activities in eastern Uttar Pradesh under the TSI approach. This is a slow process, demanding both patience and sustained efforts from the project partners. Yet it has begun to show results – evidenced by the spread of the *sangathan* movement, the growing confidence of community members in their own abilities to foster change, and their openness to learning new skills and to sharing their knowledge for the betterment of the community.

From a mass organization, the *sangathan* is now taking the form of a dynamic knowledge organization that represents the collective wisdom and power of the firemen community. It is proving to be a catalyst of socio-economic change in the villages, and an effective medium for knowledge exchange and social and technological capacity-building initiatives. The challenge is to strengthen the *sangathan* as a knowledge organization so that objectives like empowerment of workers, multiplication of livelihood options, and capacity building can be served better. While doing so, it may be necessary to forge links with other knowledge-based organizations. In particular, capacity building initiatives must be focused on master firemen, who have proven to be effective drivers of change by virtue of their experience and the respect they command in the community. Also, more imaginative programmes are needed to encourage and support women’s leadership. In addition, the project team members require further capacity building in the principles and practices of TSI.

There is a clear need to work with firemen during the off-season period, to improve the livelihoods and living conditions of firemen and their families. In doing so, it must be taken into account that firemen will continue to work in BTKs, which will remain the dominant brick production technology for the foreseeable future.

Aided by TERI’s capacity-building efforts, a number of firemen are employing best operating practices in BTKs. In the process, they are improving the energy efficiency of the kilns by reducing fuel consumption, as well as cutting down emission levels. These capacity-building programmes must be sustained, particularly in the light of evidence that BTK owners have begun to recognize and reward the enhanced skills of firemen who have been trained by TERI. There is need to evolve and establish a suitable certification and accreditation mechanism for firemen trained by TERI; for, this will enhance their credibility and value among BTK owners and improve their prospects for better wages.

The experience with the fireman-owned VSBKs in eastern Uttar Pradesh has shown that the VSBK is a clean and energy-efficient kiln, but its ability to produce good quality bricks is determined by the quality of clay and green bricks and their suitability to undergo the rapid heating and cooling cycle of the VSBK. Therefore, further R&D efforts, involving master firemen as well as scientific laboratories/institutions, are required to improve the ability of the VSBK to make good quality bricks from the clay-rich soils of eastern Uttar Pradesh. This is important, as the market study conducted by the project reveals that even the poorer sections of the rural consumers in eastern Uttar Pradesh prefer buying Class 1 bricks.

Like all other traditional industries, the Indian brick industry is strongly resistant to change. Yet, change must inevitably come in an era of globalization, driven by technological

imperatives, environmental concerns, and market forces. The challenge is to help the brick industry in adapting to change while protecting the interests of its workers, entrepreneurs, and other stakeholders.

The brick industry lies at the very heart of the rural economy in India. With the demand for bricks increasing to meet the growing needs of the infrastructure, commercial and housing sectors, it will remain the most important source of livelihood – indeed, route to survival – for millions of migrant workers and their families in rural areas. Therefore, any intervention aimed at bringing about change in the brick industry must factor in and address the larger socio-economic issues that influence migration – landlessness, dwindling returns from agriculture, poverty and social discrimination, absence of basic infrastructure in villages, and the lack of alternative livelihoods in rural areas.

Moreover, in the long term, there are limits to the availability of clay and fuel for brick-making. Brick kilns will also come under increasing pressure to curb pollution. Traditional brick entrepreneurs will be compelled to learn and switch over to new brick-making technologies, and to making new products such as hollow blocks and perforated bricks. Workers who possess traditional skills – like the firemen of eastern Uttar Pradesh – will have to learn to adapt to these new technologies.

These immense challenges can be tackled only by a combination of social, economic and technological capacity-building efforts, at policy level as well as grass-roots level. A knowledge management strategy is required, under which a ‘knowledge map’ will have to be evolved to identify and link knowledge needs and knowledge sources. This will enable the setting up of a framework which provides space for multi-stakeholder networks, and gives direction to future activities in the brick sector in eastern Uttar Pradesh.



This document describes the initiatives taken by TERI (The Energy and Resources Institute) along with its NGO partners PEFLUB (Paryavaran Evam Prodyogiki Uthhan Samiti), Lokmitra and Vidya Ashram to bring about positive socio-economic change among the community of firemen who work on brick kilns in northern India, in a programme supported by SDC (Swiss Agency for Development and Cooperation). The majority of the firemen dwell with their families in just three districts of eastern Uttar Pradesh, Allahabad, Pratapgarh, and Rae Bareilly. During the brick-making season, lasting for 7 to 8 months each year, the firemen migrate to far away brick kilns where they work in very difficult conditions. They leave behind womenfolk, children and the elderly, who face great difficulties in coping with day-to-day hardships arising from lack of financial resources and basic social infrastructure.

Rather than follow the usual 'problem-solving' approach, TERI and its partners have attempted to bring about positive social change through empowerment both at the kilns and in the villages by recognising and integrating the traditional knowledge and skills of the firemen community with scientific and technical knowledge. The project facilitated formation of BPV8 (Bhatts Parivar Vikas Sangathan), a community based organization, to resolve the internal and external issues of the community.

