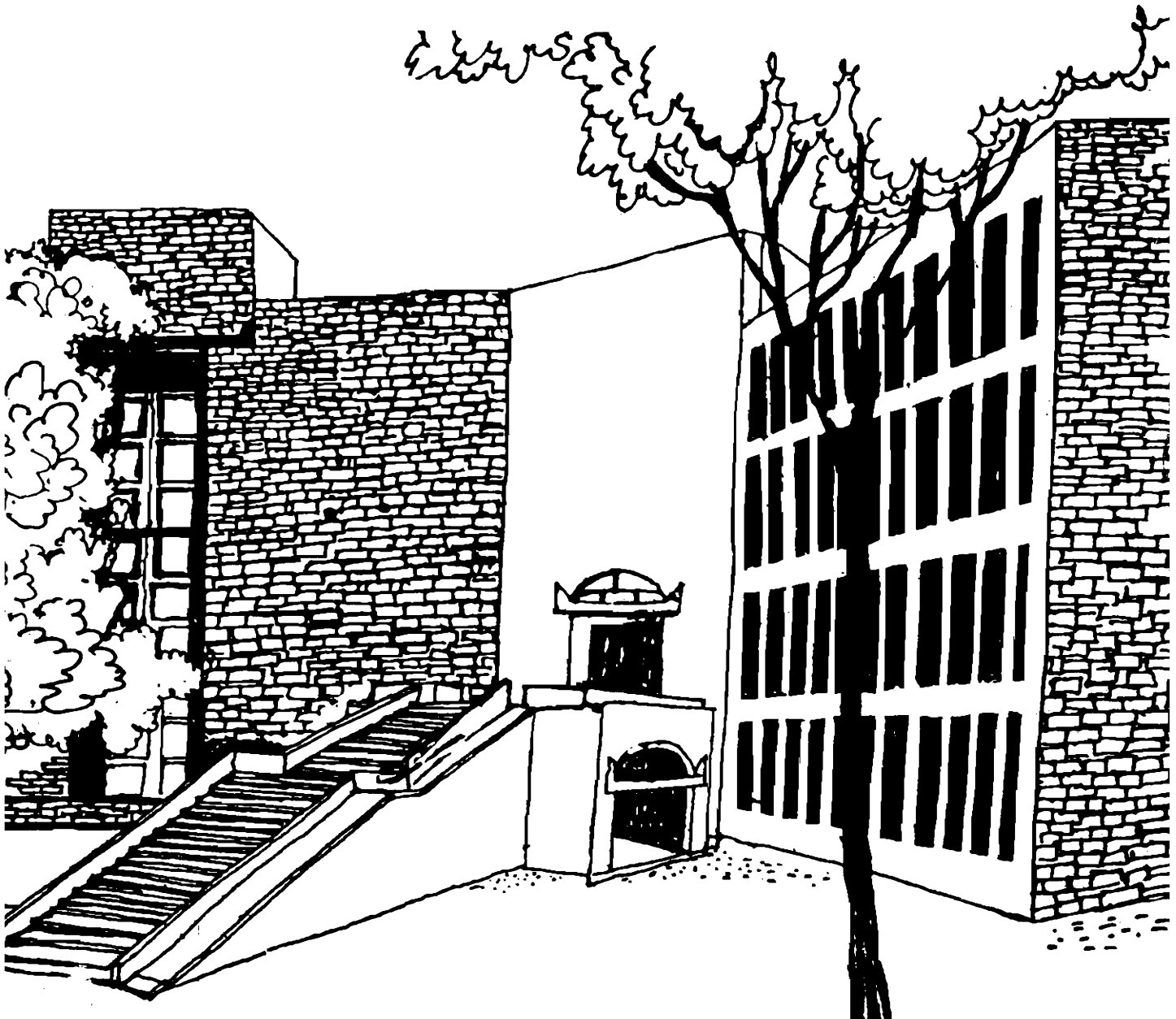




# Working Paper



NIRMITHI KENDRA AT QUILON:  
AN INNOVATIVE ORGANIZATION

By

B. Sreekumar  
Research Assistant

WP1110



WP

1993

(1110)

W P No. 1110  
June 1993

The main objective of the working paper series of the IIMA is to help faculty members to test out their research findings at the pre-publication stage.

INDIAN INSTITUTE OF MANAGEMENT  
AHMEDABAD-380 015  
INDIA

**PURCHASED**

**APPROVAL**

**GRATIS/EXCHANGE**

**PRICE**

**ACC NO.**

**VIKRAM SARABHAI LIBRARY**

**I. I. M., AHMEDABAD**

# NIRMITHI KENDRA AT QUILON: AN INNOVATIVE ORGANIZATION

## ABSTRACT

*Nirmithi Kendra at Quilon is unique in many respects; its concept as well as its management practices are innovative. It was established with the objective of disseminating low cost housing technology. Nirmithi has influenced change peoples' notions about housing and has succeeded in sowing the seeds of low cost technology in Kerala's housing field. It could demonstrate the viability of low cost technology which could reduce building costs by 30 - 40 percent. Viable Technology, Motivated leadership, strong patronage of the government, support from housing agencies and media publicity were crucial for its institutionalization. This paper discusses the activities and management practices of the Kendra, and examines challenges this innovative concept had to meet before it became institutionalized.*

## INTRODUCTION

Construction costs of buildings can be reduced by the application of low cost technological innovations. In India, research institutions such as *Central Building Research Institute, Roorkee (CBRI)* and *Structural Engineering Research Center (SERC), Madras* have developed many techniques of low cost construction. Moreover, architects like

Laurie Baker have demonstrated ways of building construction using low cost and locally available materials.

Nirmithi Kendra at Quilon is born out of an innovative concept of disseminating low cost housing technology among the masses, which is the prime objective of the Kendra. Through demonstration projects, training programmes and consultancies

it would popularize among the masses, the low cost construction techniques developed by the research institutions.

### Importance of Low Cost Housing Technology Dissemination

Most people are not aware of or are not convinced about the feasibility of low cost construction techniques. Secondly, construction workers who traditionally employ conventional construction skills have to be trained on low cost construction skills, in order to make available their services in low cost construction works.

People's attitude used to be that greater the investment in construction, better will be a house. Whereas, promoters of low cost housing technology have demonstrated that it is possible to reduce construction costs without compromising strength or aesthetics. Considerable savings in resources could be achieved in low cost housing, which could be channelized to other productive investments or for providing low cost houses to more people.

Moreover, many of these innovative

low cost building materials are energy efficient, reduce timber consumption and are environmentally friendly as compared to conventional building materials.

### Genesis

Nirmithi Kendra at Quilon is the brain-child of the then district collector of Quilon, Shri. Ananda Bose. He envisaged a *lab to land* programme to bring to the people, the fruits of laboratory research in housing technology. In 1986, at his initiative, the center was established, and was registered under *The Travancore-Cochin Literacy, Scientific and Charitable Societies Registration Act, 1955*. The primary activity of the Kendra would be to impart training to engineers and construction workers in low cost construction techniques.

Nirmithi model of housing technology dissemination was found to be effective. Its importance was soon recognized by the Government of Kerala as well as housing agencies like Housing and Urban Development Corporation (HUDCO).

Since then Nirmithi has come a long way. It has generated many man-days of employment during its operation from 1987 to 1991 and has trained a number of workers and engineers in low cost construction.

Recently, Nairobi based United Nations Human Settlements Commission has offered support for this. Kendra. Nirmithi received *National Habitat Award* for 1990 for its contribution in the field of housing. Recently, at the initiative of the state government, Quilon model Nirmithi Kendras are being established at all other districts of Kerala; a State Nirmithi Kendra as an apex co-ordinating agency to monitor the activities of and advise the District Kendras has been established at Trivandrum; sub-centers at Block level are also proposed. The Quilon Nirmithi Kendra is being elevated to the status of a *Habitat University* with the World Bank aid. SAARC nations have adopted Nirmithi model.

The evidence of popularity of low cost houses created by the Kendra was seen from the mushrooming low cost houses all over Kerala. Many small private construction companies have realized

the upcoming market of low cost housing and have started offering consultancy services on low cost housing.

### Applications of Low Cost Housing Technology

Housing cost includes not only the cost of construction of built form but also includes land price, cost of borrowing, capital cost for providing infrastructure such as water supply and drainage, duties paid, furnishing etc. When all these costs are taken into consideration, cost of built structure would be only a fraction of the total cost of a building. Moreover, about 70% of the cost of a building is material cost and rest is labor cost. Low cost construction techniques mostly concentrate on reducing the material cost.

In case of housing for low income groups in places where land prices are high and skilled labor is not easily available or is expensive, the cost reduction achieved through the reduction in building material cost may not be significant in percentage terms. But in rural housing, or in mass housing for low income where land is

cheap, the application of low cost technology could give significant cost advantages.

Low cost housing require highly skilled and trained labor; building centers could fill this gap by supplying trained workers.

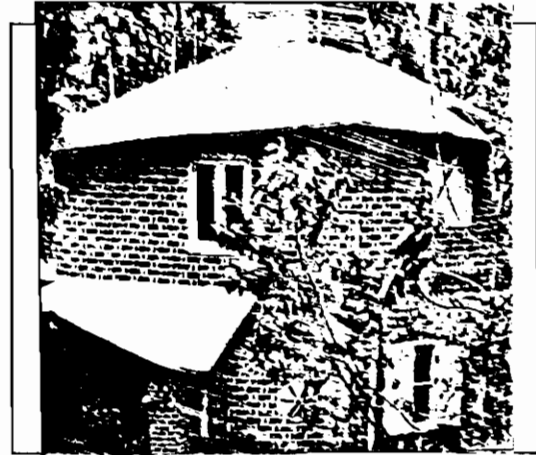
### Low Cost Building Construction

The term *low cost housing* actually implies *cost effective housing* and *not* low quality housing; a low cost house is a house in which resources are optimally utilized.

Nirmithi Kendra applies certain basic principles of cost reduction to buildings as described below.

- \* Proper structural design, so that buildings are not over designed.
- \* Use of low cost building materials, prefab building components and locally available construction materials.
- \* Application of architectural features to give functionality to maximum interior space.

- \* **Good Construction Management.** A mass housing programme in which good construction management could apply scheduling and inventory control and reduce costs.



### Features of Nirmithi Construction

Nirmithi Kendra construction is influenced by the architecture styles of Laurie Baker, who is well known for his architecture for the masses; he uses locally available construction materials instead of energy intensive and capital intensive high cost materials like cement, steel and burnt bricks. He is a propounder of mud architecture. His buildings are mostly un-plastered and reveal the beauty of the bricks. His buildings have become a fashion, with

their myriad shapes and deviations from conventional rectangular plans, curved elements, arch lintels, unplastered brick masonry and unique jalis, all these enhancing aesthetics while reducing costs of buildings.

Hollow concrete blocks, stabilized mud blocks and funicular shell roofing suit the budgets of economically weaker sections and are suitable for mass housing projects for low income groups.



For a middle class, building cost of Nirmithi construction comes to be around Rs.1200 per square metre as against the conventional building cost of Rs.2000 per square metre.

For low income construction where prefab components are intensively used, it could be as low as Rs.800 per square metre or still lower at Rs.400

per square metre by application of mud technology.

## MANAGEMENT OF THE KENDRA

The Kendra is involved in low cost construction, prefab building production, consultancy and training in low cost houses.

### Innovative Administrative Structure

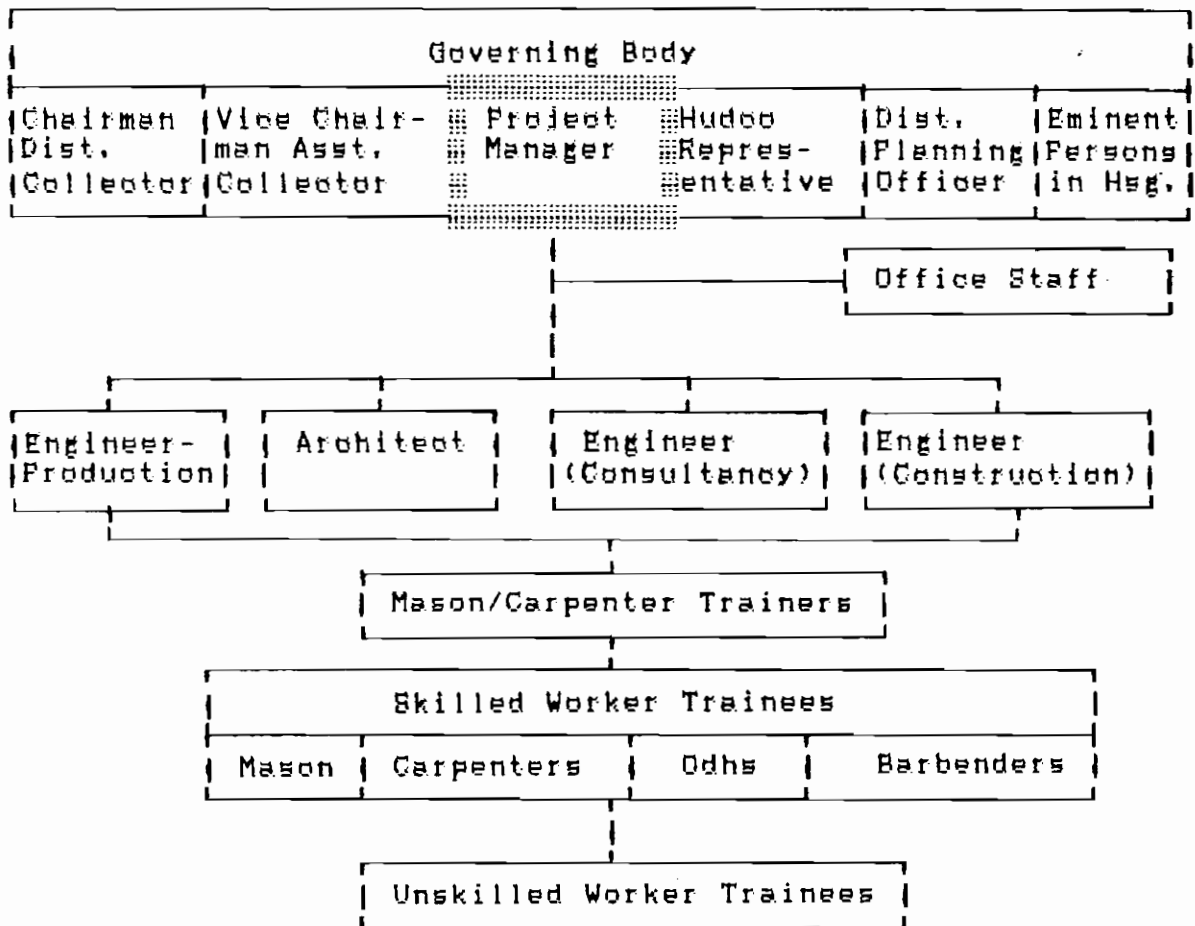
The administrative structure of Nirmithi Kendra is unconventional. It tries to combine positive elements of a conventional public housing agency, a non-governmental organization and a private consultancy.

The Kendra is governed by a governing body consisting of government officials like district planning officer, Hudco representative and eminent people in housing. The chairman of the Kendra is District Collector (ex-officio). The government, though not directly involved in the administrative matters of the Kendra, does have control over its administration through the governing body. At the same time the Kendra enjoys certain autonomy. Because it is



an autonomous body it does not face red-tapism and other bureaucratic hurdles associated with public housing agencies. It acts as a contractor for the government in housing related projects and it offers services which other contractors are not eager to undertake due to low profit margins.

### ORGANIZATION CHART



It is a non-profit organization committed to dissemination of low cost technology of housing for low income groups. Being registered under Charitable Trust Act, it enjoys many advantages which Non-Governmental Organizations enjoy. All engineers and workers are trainees; they are paid stipends only. The Kendra enjoys tax benefits also, since the profits are ploughed back for its own development. Its projects are not affected by labor problems.

Besides, like any other private company, it does consultancy work for private parties of all income groups; it also sells prefab construction components through sales outlets such as Khadi and Village Industries Commission (KVIC). This innovative structure helps the Kendra in overcoming many problems.

Decisions regarding its administrative matters are taken by the governing body of the Kendra. The governing body meets once in a month. It monitors the activities of the Kendra, verifies the accounts and takes important decisions on its future plans of action.

## Profile of Engineering Staff

Project Manager is in charge of overall administration and he plays a crucial role in the management of the Kendra. He is a civil engineering graduate. He attends governing body meetings, reports the progress of the works and implements the decisions taken by the governing body and is the link between the governing body, office staff and the trainees.

All engineers working here are known as *Engineer Trainees*. They are young graduates, freshly recruited, mostly from engineering college at Quilon. An engineer trainee receives Rs.900 per month as stipend. The duration of the training programme is 6 months. After completion of first training programme the trainees are eligible to apply for advanced training programmes.

The engineer trainee who is in charge of prefab components production, ensures quality of the items produced. Another engineer trainee supervises the low cost construction works at site. There is a design engineer trainee or an architect trainee in charge of making plans and estimations for buildings.

Occasionally engineer trainees conduct theory classes for worker trainees regarding low cost construction and prefab production.

### **Profile of Worker Trainees**

There are two categories of trainees - Skilled Worker trainees, and Unskilled Worker trainees. Block Development Officers identify SC/ST construction workers and encourage them to apply for training programmes at Nirmithi Kendra. Applications along with recommendations from Block Development Officers are received at the Kendra. Kendra processes the applications and sends interview calls to suitable candidates.

Most laborers have studied at least up to 8th class, though formal qualifications are not a prerequisite for participating in the programmes. Most of the trainees belong to SC/ST categories. Financial support is available for socially backward classes from various developmental funds. Most trainees had been working under master masons and master carpenters before joining the Kendra.

A trainee mason gets a stipend of Rs.15 per day, in case he is availing the tool kits supplied by the Kendra; otherwise he receives Rs.25 per day. A trainee whose period is extended beyond 6 months is called an Advanced Trainee; he gets Rs.35 per day as his wage.

Labor inputs from the trainees are utilized in all projects of the Kendra (this has some impact in lowering construction costs of Nirmithi projects).

### **Skills Imparted**

By the end of the training programme, the trainees would have acquired construction skills for fabrication/construction of the following building components-

- \* T beams
- \* Window and Door Frames
- \* Rubble Filler Blocks
- \* Hollow Concrete Blocks
- \* Ferrocement Water Tanks
- \* Ferrocement Rafters
- \* Tile Filler Concrete Roofing
- \* Soil Stabilized Mud Blocks
- \* Smokeless Chulahs
- \* Low Cost Sanitation

- \* Construction of Brick Arches
- \* Hollow Brick Masonry (Rat Trap Bond)

The Scientist in charge of the CBRI cell at Trivandrum occasionally visits the Kendra and conducts training sessions of workers and engineers. He is paid honorarium for his services.

### Placement of Trainees

Under SCA scheme, assistance is available to a trained person even for starting his own enterprise after training; One third of the capital for starting a new enterprise is borne by the government as grant while the remaining two third may be obtained as loan. But most of the trained masons have not availed these facilities due to difficulties in obtaining bank loans and also may be due to lack of entrepreneurship.

It was found during the research that most trained masons have not got opportunity for working in low cost construction field after training.

Only few got employment as trainers at the Kendra itself to training fresh

trainees. Some more would find job at proposed block level sub centers.

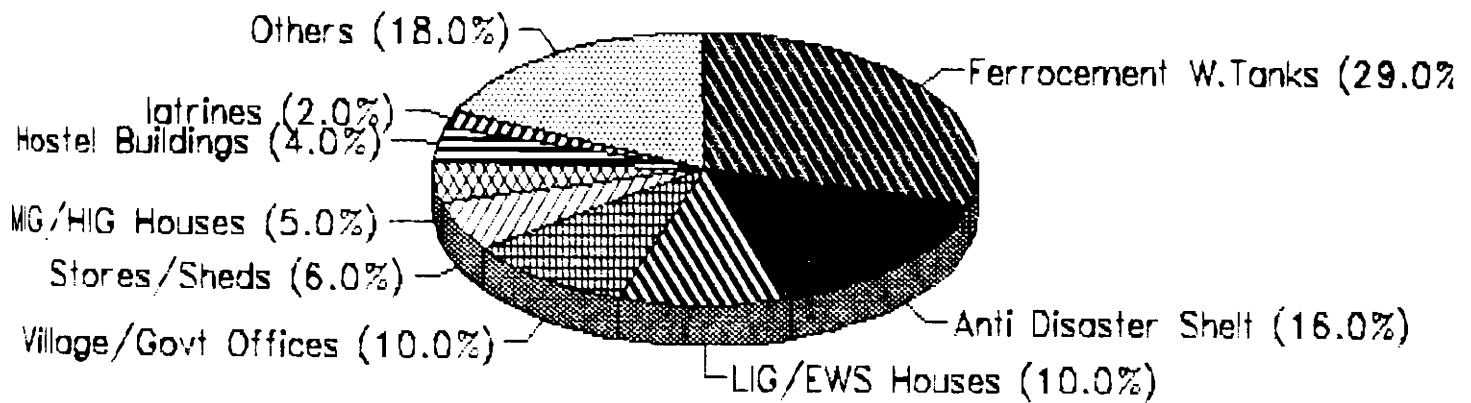
### Finance

Nirmithi was started with an initial seed capital of Rs.50,000 state government grant and Rs.1.5 Lakh as Hudco's assistance. Main sources of training funds are central government employment generation funds and other welfare funds for SC/ST classes like *Special Central Assistance (SCA)* and *Special Component Plan (SCP)* and Hudco's training funds. Other sources are *Council for Advancement for People's Action and Rural Technology (CAPART)*, *Jawahar Rozgar Yojana (JRY)*, *Rural Landless Labourers Employment Guarantee Programme/National Rural Employment Programme (RLEGP/NREP)*, and *Training for Rural Youth for Self Employment (TRYSEM)* funds meant for training.

VIKRAM SARABHAI LIBRARY  
INDIAN INSTITUTE OF MANAGEMENT  
VAHAPUR, CHENNAI-600050

Figure 1

**Type of Construction Work and its Percentage of Total Value of Works Undertaken**



Kendra has also generated profits from its operations in construction and consultancy fields and prefab material sales.

Though the stipends of the trainees are lower than the market wages of construction workers, trainees expressed happiness over the regular employment which they get during the training period, which, otherwise they would not have got.

**Prefab Building Component Production and Construction of Low Cost Houses**

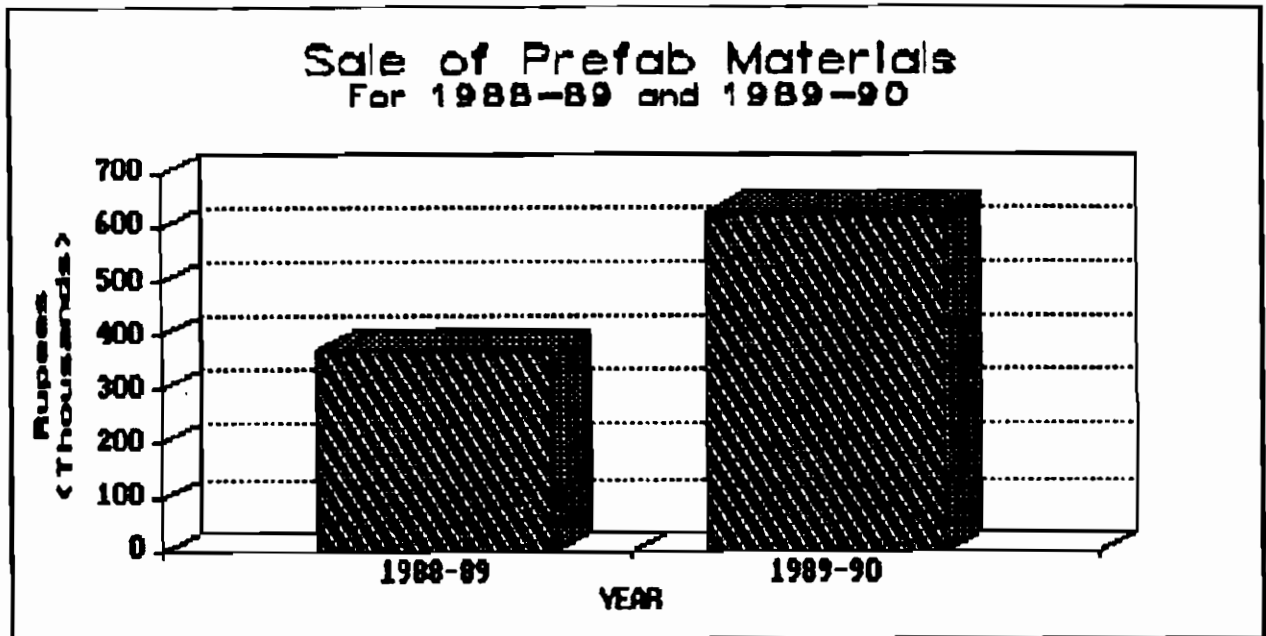
Prefab building components produced at Nirmithi include-

- \* Hollow Concrete Blocks
- \* Concrete Door/Window Frames
- \* Funicular Shells for Roofing

\* Ferrocement Water Tanks, etc.

The sales figures are encouraging for Concrete Door and Window Frames, Funicular Shells, Hollow Concrete Blocks and Rubble Filler Blocks.

## Prefab Building Component Production and Construction of Low Cost Houses



### Management of Innovation

An organization with sole objective of low cost technology dissemination was an innovative concept.

Any innovation, from the time of its conception of new idea to the stage when it is institutionalized, might undergo opposition from various corners. People have tendency to reject an innovation. During the study the researcher met some people who expressed apprehensions about the strength of Nirmithi Houses and its suitability to tropical environment with heavy rainfalls and so on.

All those who are involved in implementation of an innovation have to be fully convinced about its potential, and feasibility. Nirmithi also faced many challenges. But a number of factors favoured Nirmithi Kendra.

#### *Motivated Leadership and Government Patronage:*

Nirmithi benefitted from the motivated leadership of its founder, Ananda Bose.

Nirmithi Kendra received government patronage also to a great extent. It could bag many government projects

which were so crucial for its survival. The prefab items like Ferrocement Water Tanks were bought by municipalities. Nirmithi constructed government offices, bus stands, post offices etc. on contract. Even now, public agencies are the prime customers of the Kendra. The government projects undertaken by the Kendra has helped demonstrate the viability of low cost housing to the public.

Hudco is promoting Nirmithi model of building centers all over India through various innovative financial schemes for building centers and material production units. It has brought out pamphlets which illustrate technical aspects of reducing housing cost and distribute them widely and free of cost to the public. Hudco's interest in low cost housing stems mainly from its desire to make its low income housing schemes financially viable.

*Technological Feasibility:* Kerala's settlement pattern has helped make low cost construction technology feasible under local conditions. Kerala's settlement pattern is such that its towns and villages are difficult to

be distinguished since the population is more or less uniformly distributed across the state. Detached houses surrounded by compound walls are more common. House designs are greatly influenced by preferences of the occupants. Low cost technology suited the environmental conditions and the prevalent building construction processes.

*Socio-economic Factors:* Kerala is predominantly a middle class society. Here people usually prefer to live in large houses, with number of rooms and spend large portion of their savings on housing. Nirmithi houses which were innovative, aesthetically pleasing and lower in costs, were readily welcome.

*Publicity:* The role of the press and TV in giving publicity to Kendra's activities is significant. Local Malayalam newspapers frequently publish colorful photo features and articles on the Kendra and its activities, lauding its efforts in low cost housing field and describing the construction techniques used by the Kendra. Because of this, awareness about low cost housing, popularly known as *Baker*

*Housing* was found to be good even among economically and socially weaker classes.

#### *Availability of Qualified Manpower*

The engineers and architects who are working for Nirmithi Kendra are paid a stipend. When interviewed it was revealed that Nirmithi was only a temporary stop-over for these fresh engineers in their careers; Some of the engineers have left for lucrative options. The availability of such fresh engineers for low cost construction is definitely a boon for the Kendra. In places where such professionals are not available in this field, it would be very difficult to implement Nirmithi model of an institution.

National Building Organization (NBO) cells and CBRI cells have been trying to popularize low cost construction techniques but they have not met with such positive results as that of Nirmithi Kendra, because their management styles were not suitable for implementing innovations.

Replication of Quilon model Nirmithi Kendras at other district capitals is

being tried out. Results have not yet come.

For their success, these new centers would also require similar motivated leadership as that of Quilon Kendra.

**Feedback from Customers:** All owners who were interviewed during the study were satisfied about the low cost houses which they had built. Moreover, they reported that they had been receiving many visits and enquiries from many curious individuals about the cost and functionality of their low cost houses.

Middle and upper middle class households reported significant savings in construction costs.

It was found that middle and upper middle income house owners opted for these houses mainly because of their innovativeness and secondly because of their lower costs and aesthetics.

Another interesting question is that after the objective of dissemination of low cost housing technology has been fulfilled, what would be the role of the



Kendra. Would it become another public housing agency like housing board; should it continue its construction activities like a private construction company; or should it be dismantled?

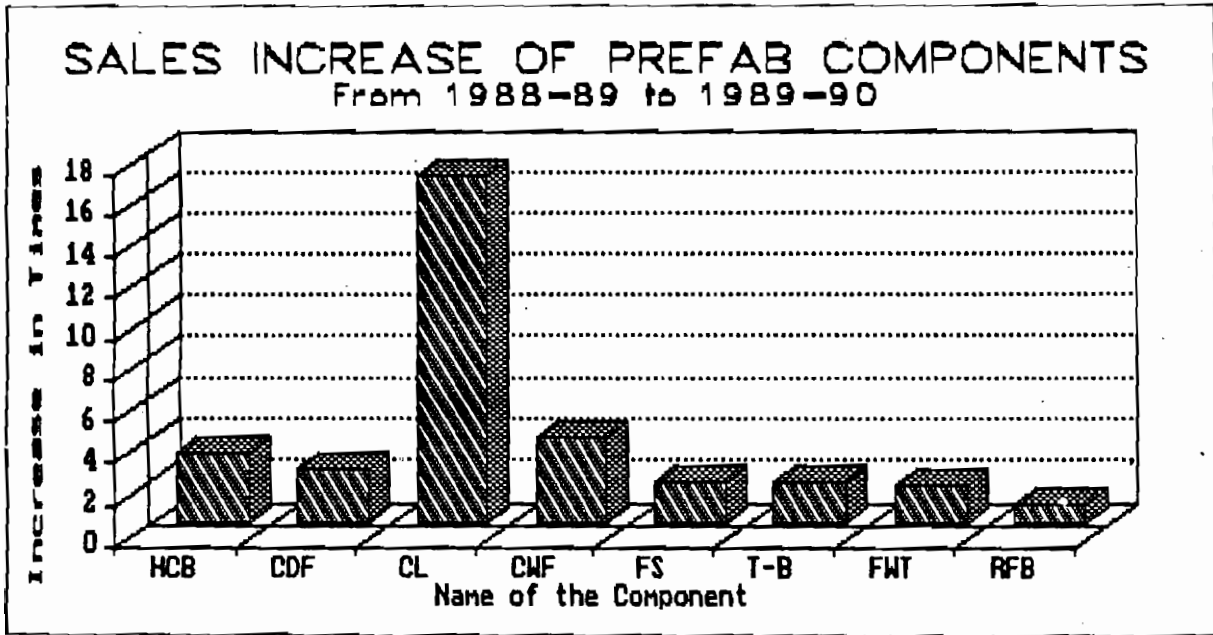
**Appendix 1**  
**Nirmithi Training Programme**  
**Period 1987-1990**

Total Workers Trained	303
SC/ST	285
Others	18
Males	278
Females	25
Total Engineers Trained	25

**Appendix 2**  
**Prefab Building Components Sales of Nirmithi Kendra**

Building Component	1988-89	1989-90	Abbrev
Hollow Concrete Blocks	6716	22109	HCB
Concrete Door Frames	52	128	CDF
Concrete Lintels	26	434	CL
Concrete Window Frames	49	198	CWF
Funicular Shells	1230	2389	FS
T-Beams	284	528	T-B
Ferrocement Water Tanks	48	84	FWT
Rubble Filler Blocks	2602	2375	RFB

Figure 2



**PURCHASED**

**APPROVAL**

**GRATIS/EXCHANGE**

**PRICE**

**ACC NO.**

**VIKRAM SARABHAI LIBRARY**

**I. I. M., AHMEDABAD**