Use Of Alternative Building Materials In Rural Housing –NBRRI Demonstration Project In Yankatsari Village, Kano

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INTRODUCTION:

Building materials used in Nigeria can be broadly divided into two groups namely modern and traditional building materials. The modern or conventional building materials which include such materials as concrete, steel, glass, zinc and asbestos roofing sheets are often imported or require high use of imported raw materials and technology for their production. Due to their high quality performance, aesthetics and status symbol which they convey, they are in high demand not only in the urban areas and among the elites but also in the rural areas, despite their exorbitant costs and scarcity. Traditional building materials on the other hand, are readily available materials usually produced from rudimentary and crude technology. However, they are despised even amongst the rural dwellers due to their low quality performance and the mad craze for imported building materials.

As a result of the dwindling economic fortunes of Nigeria in recent times coupled with the clarion call to look inwards, there has been a loud clamour for the widespread use of locally available building materials. To ensure that cheap, durable and sociologically acceptable building materials are produced from local sources, NBRRI embarked on a series of research and development activities to improve on available traditional technology and develop new and appropriate ones. Significant results of some of these research efforts have led to the production of stabilized bricks (for walling) and coconut fibre cement roofing sheets. These materials were effectively and successfully used in a demonstration programme in the Yankatsari model village, Kano.

YANKATSARI MODEL VILLAGE DEMONSTRATION SCHEME

OBJECTIVES:

Yankatsari village is located in Dawakin Kudu Local Government Area of Kano State. It was chosen by the Kano State Government as a regrouping centre for the surrounding scattered rural settlements. Based on the previous research works carried out at the Nigerian Building and Road Research Institute, Lagos, the institute was approached by the Kano State Housing Corporation for the design and construction of prototype rural dwellings with the following objectives:

(i) To design appropriate houses to reflect the living pattern of the affected rural dwellers.

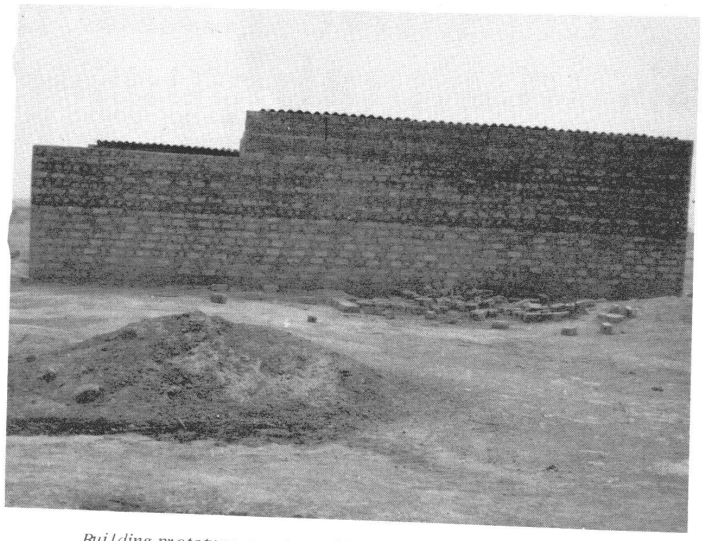
(ii) To provide a more permanent landscape by the use of improved local building materials.

(iii) To introduce a building management system designed to harness the self help spirit of the people.

A living pattern survey of the rural people was jointly carried out by the Kano State Housing Corporation, Kano and the Nigerian Building and Road Research Institute, Lagos to determine among other things the peoples' preferences, the average household size and composition, household activities and their mode and place of performance. The analysis of the survey results revealed the following living pattern characteristics;

* Large family size
* Restriction of entrance into compound
* Outdoor and indoor activities
* Interaction with neighbours
* Privacy, especially for the females
* Disorderly planning and waste
* Unorganised growth.

The influence of the above characteristics on the quality of spaces and house design, and other means of ensuring affordability and durability were investigated and analysed. Based on this analysis, three design prototypes were evolved

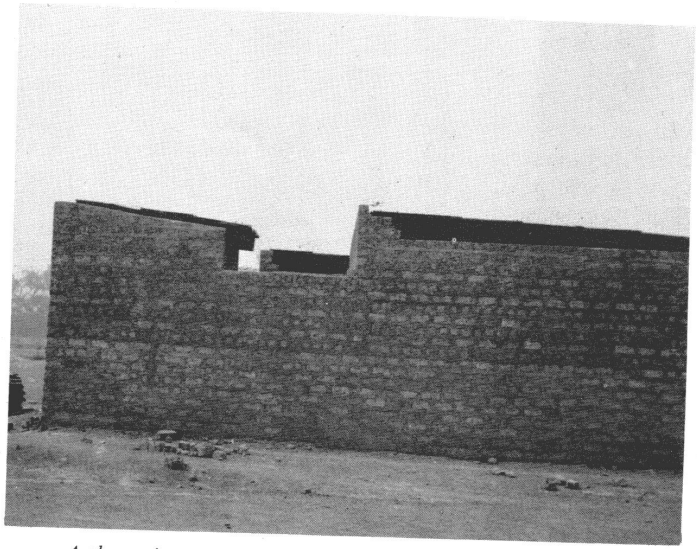


Building prototype constructed by NBRRI at Yankatsari Model Village near Kano using local resources, technology and communial labour.

with the following basic features:

Incorporation of living pattern needs
Regulated entrance to inner core of houses
Orderliness in planning and growth
Optimum space utilization
Open planning
Possibility of stage construction.

One of the prototype house designs was chosen for construction. The use of fired bricks produced from local clay type was investigated. The low compressive strength of fired bricks arising from the nature of the locally available clay type as well as the lack of firewood made the use of an alternative walling material imperative. Stabilized mud bricks produced with NBRRI brickmaking machines were eventually used. The bricks, produced in 290mm x 140mm x 100mm. moulds, have a compressive strength of 1.68N/mm^2 and high aesthetic and durability qualities, far above those of the traditional "adobe." Similarly, NBRRI innovative coconut fibre cement roofing sheets, produced from materials in the ratio of 6kg sand: 6kg cement: 300g fibre were used in place of the traditional 'azara' flat roof to minimise maintenance cost. The sheets which have tested breaking load of 107kg/m^2 are produced



A closer view of the building prototype constructed by NBRRI at Yankatsari Model Village near Kano.

in $1m^2$ sheets using manually operated mahcines designed at NBRRI. They satisfy not only the essential requirement for durability and low cost but also that of aesthetics which convey status symbol with it.

CONSTRUCTION STRATEGY:

Supervision of the construction was done by NBRRI members of staff. The bulk of the labour force ranging from carpenters to masons however came from the rural dwellers. This ensured a quick and effective transfer of the required skill in production and handling of the innovative materials and technology developed at NBRRI and used in the demonstration project.

FEEDBACK FROM THE COMPLETED DEMONSTRATION PROJECT:

The building has been completed. Feedback studies conducted reveal that the rural dwellers are impressed by the performance of the materials used and are infact willing to use them in building their own houses. Also based on the feedback studies, the designs have been reviewed with the following amendments and additions effected:

* Segregation of human and animal traffic.
* Simplification of design to facilitate quick construction, phasing and cost reduction.
* Reduction of built up area to further reduce cost.
* Introduction of Ventilated Improved Pit (VIP) Laterines.

CONCLUSION:

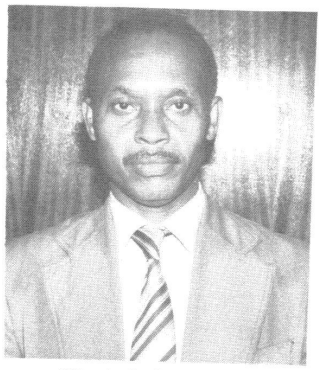
The performance of the demonstration house built at the Yankatsari model village shows that the materials and technology developed at NBRRI and utilized in the project are indeed appropriate for rural housing in Nigeria. The prototype house constructed is a model to be adopted by the rural communities in Yankatsari village in their housing programmes. Similar technology can be extended to other rural communities in Nigeria, but this has to be preceeded by the production of appropriate building plans based on the living patterns of the communities.

The brickmaking machine, obtainable at NBRRI is simple and can be easily operated by a three-man team. Similarly, the roofing sheet technology is simple and can be readily effected even in rural areas.

NBRRI PIONEER STAFF

NBRRI Pioneer Staff: Sitting from left to right, Mr. M.N. Ugorma (Accounts), Mr. G.N. Omange (Research), Mr. L. K. Komolafe (Research), Dr. A. O. Madedor (Director), Mr. N. A. Jagunmolu (Administration) and Mr. A. I. Oke (Audit).

NBRRI Heads Of Departments.



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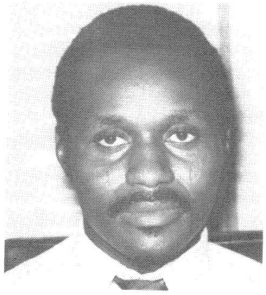

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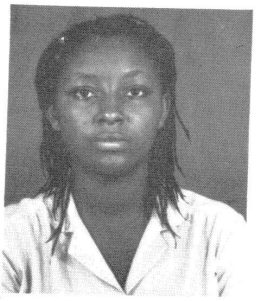

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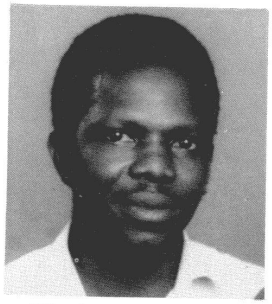

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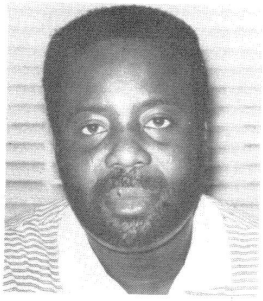

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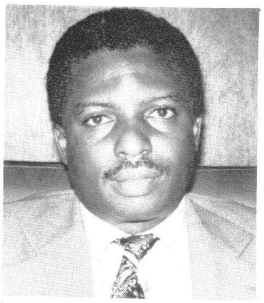

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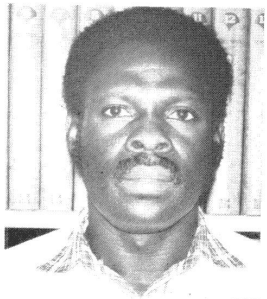

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