

Innovative Materials and Design Principles for Low-Cost Housing in Rural Areas

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Abstract : *The paper discusses the design principle of low-cost housing in rural areas, the issue, which arises out of the process of planning, design and construction of the houses. It deals with the study of the orientations of the officials responsible for implementation and aspects like, user participation and the involvement of the villagers, accommodation requirements, the selection of site, technical parameters of the construction program, choice of materials, the cost factor and maintenance requirements and the choice of an appropriate building agency for managing the construction. The paper discusses the aspect that, the effort at coordination can be extremely beneficial to rural construction, which can form a part of development programs all over the country. The design principle of low-cost housing in rural areas should be prepared on a set of Illustrated Design. Recommendations which take into account the different climatic conditions and the construction options based on locally available materials and planning properties. The three design principles, which take into account the different types of disaster conditions, which can be regarded as typical for certain regions are,*

- 1) conditions arising from heavy rains, cyclone and winds
- 2) conditions arising from cyclone winds and tidal waves
- 3) conditions arising from heavy rains, floods and high winds

During the process of site selection the involvement of the community/ villagers is a most essential factor. The importance of community participation right from the initial stages of site selection through the construction & maintenance of the centers is critical to the success of program that the community be involved at every stage.

Keywords: Low Cost, Materials, Housing, Rural areas

Feasibility:-

The issue, which arises out of the process of planning, design and construction of the houses, are clustered under the following subheads:-

- 1) Orientation of the officials responsible for implementation.
- 2) User participation, i.e. involving the villages in the stage of planning, working out accommodation requirements for the house and selection of appropriate site with them.
- 3) Technical parameters of the construction programmed to be set out with regard to varying climatic conditions and locally available materials and technology.

Orientation of the officials responsible for implementation:-

The construction programmed, is only part of a large rural development program and the participants – engineers as well as administrators need to view the constructions in this light. Very few are in tune with this large point of view. This may be why most buildings constructed by official agencies in rural areas try to imitate urban models, which appear out of place in rural environment. Such buildings are expensive to built and difficult to maintain and repair. They are aesthetically and functionally inappropriate in a rural setting. They set up artificial values, which, in the long run cause frustration due to unfulfilled expectations. Traditional building craft get neglected and begin to die out, thus destroying an important resource.

There is a definite need for orientation of development officials and engineers to make them aware of the positive features of the Indian rural environment and its variety in different parts. Thus an optimum use of indigenous modes, rather than imported urban-based techniques, can be built upon. The Longer-term development goals of the program could then be related more specifically and appropriately to local situations and traditions.

The importance of establishing appropriate and if necessary, new procedures for construction cannot be over emphasized.

User participation and the involvement of the villagers: -

Involving the users in the decision making of design and construction is the one powerful way of encouraging full use of the house once it is built. It will also increase the Villager's sense of ownership and in maintaining the house. To ensure proper participation a building committee should be formed in each village where a no. of houses is to be built. The committee should consist of local opinion leaders. Care must be taken to include representations of all the sections of the community, especially, women, the youth and poorer sections of the village.

Accommodation requirements:-

The building committee should discuss and finalize the list of activities required for their houses. The technical experts can translate these into a schedule of areas, keeping in mind the overall cost ceiling.

Thus a design tailored to suit local requirements in one-way of ensuring better use of the house as well as local interests in maintenance.

The selection of site:-

For disaster areas this selection has to be in the accordance with local needs, keeping in view the existing facilities like Panchayat ghars, mahila mandals, balwadis, etc.

During the process of site selection the involvement of the community/ villagers is a most essential factor. The importance of community participation right from the initial stages of site selection through the construction & maintenance of the centers is critical to the success of program that the community be involved at every stage.

Technical parameters of the construction program to be set out with regard to varying climatic conditions and locally available materials and technology :-

In deciding the technical parameters of a construction program it is essential that the wide variations in existing conditions at different places where the houses are to be built are taken into account. Further the necessities of keeping construction costs low make it important that local materials and technologies are employed as far as possible. This will also serve the aesthetic criterion, as indigenous designs will blend the environment and users will be more comfortable in a building they are familiar with. Unfortunately this variation is not often reflected in the building constructed by government agencies. The reasons for indigenous modes are not always clear.

Choice of materials, the cost factor & maintenance requirements:-

The proposed houses in rural development projects should attempt at solutions which are low cost and relevant to local community/villagers needs, especially those of the rural poor. Locally available materials, attuned to the immediate environment, should be used as far as possible. Such experimentation and innovation will correct the imbalance caused by introducing urban, industrialized architectural forms in rural areas. They will also demonstrate the technical and economic soundness of indigenous construction techniques appropriate to local cultural and social traditions.

Indigenous construction techniques are labor-intensive whereas newer techniques use a high component of expensive, industrially produced materials. In the rural environment labor intensive techniques are more appropriate and cheaper especially if a spirit of self help is introduced among the users in the construction program. While indigenous rural construction may cost less, the newer techniques of cement intensive construction cost more.

Cement based construction make even less sense when we consider environmental comfort in building. Indigenous materials like mud and thatch has vastly superior insulating qualities and offer much greater environment comfort compared to cement concrete and 9inch thick brickwork in cement mortar. Indigenous materials can also be easily recycled and do not upset the ecological balance in the environment.

Maintenance requirements:-

Maintenance requirements are also important limiting factors in the choice of materials for construction. One of the reasons

given for rejecting indigenous materials is that these are more 'difficult to maintain'.

If we analyze this issue we find there are two aspects to it :-

- a) frequency of maintenance required, &
- b) Cost of each maintenance operation.

The frequency is related to ability of the material to withstand weathering. In this respect, indigenous materials have a shorter life and require more frequent renewal.

But the cost of each maintenance operation is directly related to the original cost of the material. Indigenous materials, being for less expensive, require much less capital expenditure to maintain. Thus the opinion that the indigenous materials are 'more difficult to maintain' is not a reflection on the cost of maintenance but only on the difficulty in achieving the administrative efficiency required for frequent maintenance. If the users of the building can be motivated to manage the maintenance operations themselves, then indigenous materials will become not only cheap but also easy to maintain.

Methods of making mud walls waterproof and pest proof and increase in the life of thatch can be obtained through fire-retardant treatment.

The reason why thatched roofs decay rapidly is because they are often supported on a framework of inferior timber or bamboo and such supports have a short life. If the supporting framework is strengthened, the life of the thatch covering will also increase. Further by introducing asbestos sheeting below the thatch covering, the risk of fire is minimized and the life of the covering is increased.

The choice of an appropriate building agency:-

The choice of an appropriate building agency should be made by the department or organization managing the construction. The objectives of the program emphasize the importance of using local craftsmen for the construction. Furthermore contractor-built buildings are invariably more expensive and often of poorer quality than owner/ user-built and managed constructions.

Voluntary organizations: -

Voluntary organizations working in the field of rural development can also act as catalysts in mobilizing the community /villagers.

The importance of establishing appropriate and, if necessary, new procedures for construction management cannot be over emphasized. To fulfill the objectives of the program expressed in the guidelines keeps within the cost limits specified without sacrificing the environmental comfort or functional utility, will require a very special and coordinated effort on the part of both administrators and engineers.

The orientation program can also form the beginning of a more detailed and in depth study of indigenous building techniques in the country. It is important to note that there are already a few organizations, government as well as voluntary, doing serious research on the use of local materials and indigenous techniques for evolving construction methods which are low-cost and appropriate to rural areas.

Conclusion

There is an increasing need of information on appropriate, indigenous building techniques suitable for rural construction programs. An effort at coordination can be extremely beneficial to rural construction, which forms a part of development programs all over the country. The information on indigenous building techniques & contemporary improvements to these, if properly fed into rural construction programs, can result in enormous cost savings, increased rural employment and the emergence of an aesthetically and ecologically more appropriate built environment in rural areas.

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