16th WEDC Conference
Infrastructure for low-income communities
Hyderabad, India 1990

Rural housing in Zimbabwe

Dr Martin Mansell

INTRODUCTION

In Zimbabwe nearly 7 million people of the population of over 9 million live in the rural areas. As in many developing countries the rural people are at a considerable disadvantage in terms of the standard of their housing and their access to means of improving it. A recent government report considered that about 70% of existing housing in rural areas was substandard and indecent.

Even if the present standards were satisfactory it is estimated that a total of about 2 million new houses will need to be constructed to satisfy the UN Global strategy of shelter for all by the year 2000 of which a large proportion will be in the rural areas (ref 1).

There are clearly going to be many problems if such a policy is pursued. The main constraints facing such a massive investment programme in housing in the rural areas can be summarised as :

1. labour skills
2. materials supply
3. finance
4. energy costs

It is tempting to underestimate the level of resources already available in rural areas particularly in the first of these categories and equally to undervalue the contribution that alternative materials can make to producing rural housing of an acceptable standard.

This report considers the problem of rural housing in Zimbabwe from the point of view of:-

1. the existing methods of construction
2. the existing types of skill available in rural areas
3. financial and other constraints
4. the contribution of alternative materials to solving the housing problem.

It is partly based on a survey carried by the Department of Civil Engineering of the University of Zimbabwe in 1986 into Rural Housing Needs and Resources (ref 2).

RESULTS OF SURVEY

General

The survey took the form of a questionnaire completed by engineering students on the basis of interviews with 200 households in various rural areas. Over half the surveys were carried out in 'communal lands' the remainder being mainly in commercial farming areas. There was no criteria of selection apart from the requirement that they should be in a rural area.

In the survey an attempt was made to identify the priorities of the householders in terms of various spending options. They were asked to rate the top 5 out of 9 possible choices of spending a large (but unspecified) sum of money.

Figure 1

IMPORTANCE RATING OF SPENDING OPTIONS

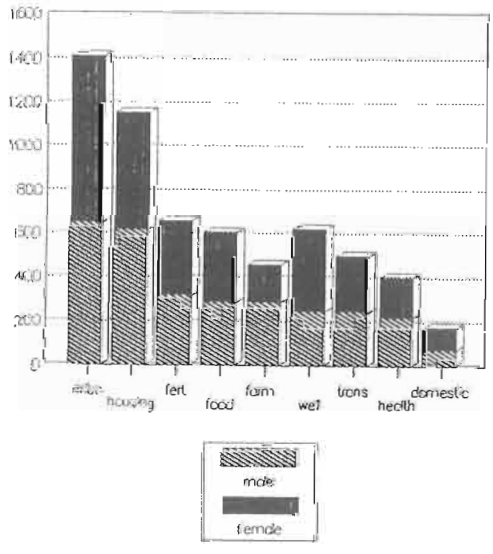


Figure 1 shows that education and housing were clear favourites and that there was, perhaps surprisingly, little difference between males (80% of the householders) and females. The popularity of education may be partly due to the high profile it receives with government spending and that for housing may be partly out of respect for the aims of the survey.

Existing Housing Construction

The 200 households interviewed comprised a total of 924 houses of which about 42% were used for sleeping and 23% for cooking. The remainder were used for storage, latrines or for multiple purposes.

Of these buildings 379 (2 buildings per household) were selected for more detailed study (unless the household only had one house).

Figure 2

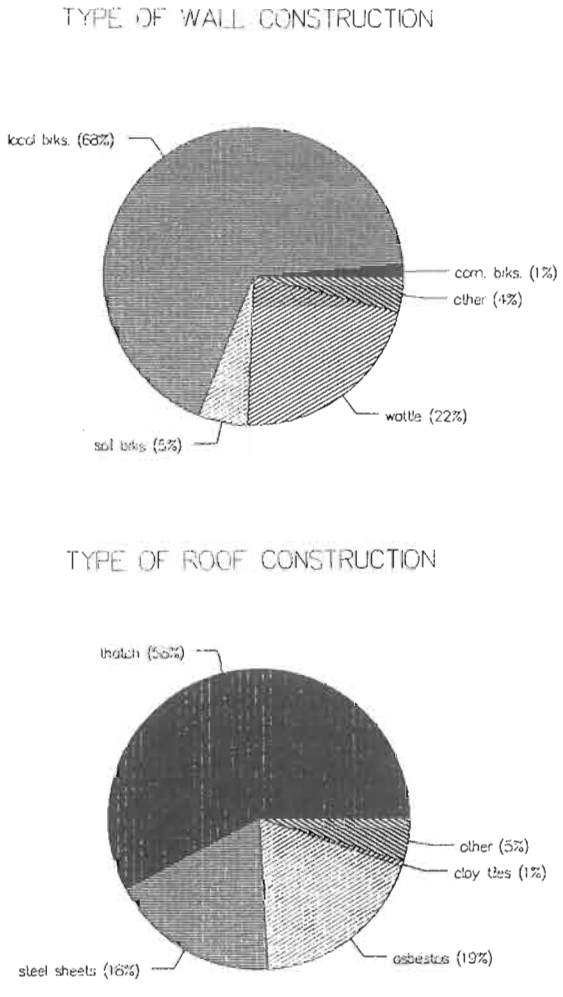
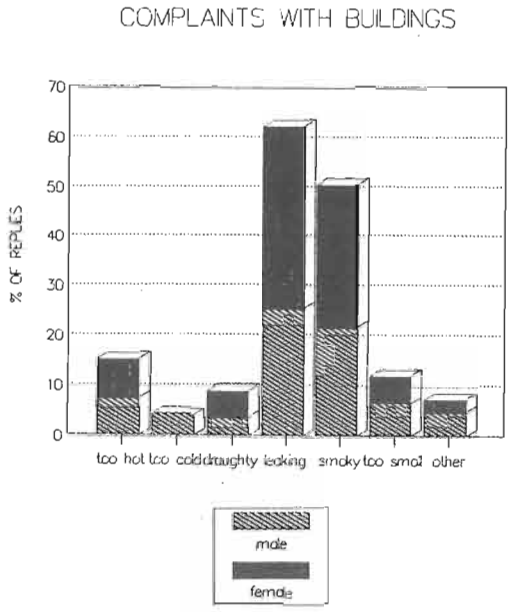


Figure 2 shows the main materials used for the construction of the walls and roofs. Most walls were constructed of local burnt bricks and the majority of roofs were thatch.

The householders were asked to indicate their most serious complaint about their building. The results shown in Figure 3 indicate that the most common problems concerned smoke and leaks. The differences between male and female respondants were relatively minor except that more males than females had no complaints at all.

Figure 3



23% of the buildings had had the roof replaced at some time. A further 15% had had repairs to the roof carried out and 12% had had other repairs carried out. Only 1.8% of the buildings had a lightning conductor.

Availability of Building Materials

Life in rural areas is characterised by problems of transport and availability of commerical products. Commercial building materials are particularly difficult to obtain because of the relatively high cost of transport.

A list of 4 common commercial materials was selected, together with 1 building tool (a carpenter's hammer). For each of these the students were asked to find out whether they were available at the local business centre and if not how far away the nearest source was. The results are summarised in Table 1.

Table 1 Availability of Commercial Materials

Item	% available at local bus. centre	Dist. to alternative source (km)	Transp. Element %
Cement	74	44	44
Roofing Sheets	32	48	9
Sawn Timber	34	37	16
Bricks	21	41	33
Hammer	46	44	0.2

It can be seen that less than half the business centres stocked common building materials such as steel roofing sheets, sawn timber or bricks and since the survey was carried out cement has become much more scarce than indicated by the survey.

The average distance to the nearest business centre was 5.6km. In many cases the nearest alternative source was over 40km away and transport costs account for nearly half the cost of cement and a third of the cost of the bricks. However these figures were based on small quantities.

To assess the availabililty of local 'alternative' building materials a similar list of 5 typical materials was selected. In this case the question concerned whether the material had been used and the distance to the nearest source. The results are presented in Table 2.

Table 2 Availability of Local Materials

Material	% Available and Used	Average Dist. to Source (km)
Clay	88	3.7
Building Sand	75	6.0
Thatching Grass	92	7.4
Wood Poles	96	4.8
Sisal	29	8.7

It can be seen that local materials are used widely in rural housing (with the exception of sisal) and sources are generally available within a reasonable distance.

Labour and Skills

The average overall time of construction of the houses was 3.7 months although it is likely that the work did not proceed continuously. The actual times varied from less than 1 month to 40 months. The most popular time for starting construction was during the winter with 75occuring between April and October. This corresponds to the dry season when the labour requirement for agriculture is less. The average age of the building was 11.7 years.

The average numbers of people involved in different aspects of construction are given in Table 3.

Table 3 Number of people in House Construction

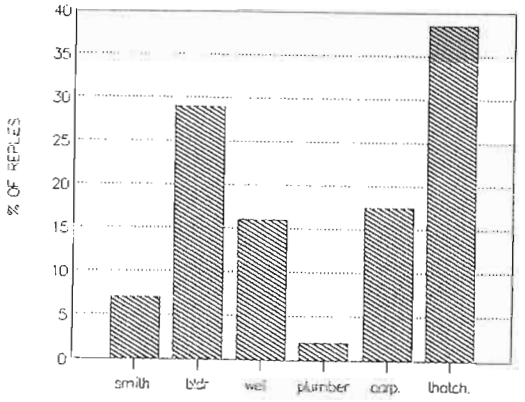
Operation	H ousehold Members		Non Household
	Male	Female	Members
Floor	1.8	1.0	1.4
Wall - collect mats.	2.2	1.0	1.3
- prepare mats.	1.9	0.9	1.6
- construction	2.0	0.7	1.5
Roof - collect mats.	1.9	0.9	1.0
- construction	2.1	0.5	1.6

The divisions of labour into household members shows almost equal proportions of males and females.It can also be seen that the majority of the work was carried out by household members. There is normally no shortage of unskilled labour depending on the agricultural and other demands.

Figure 4 shows the incidence of building related skills within the households. It shows that a third of the housholds had at least one thatcher and/or a builder although the level of skill was not specified. Even if the skills are not found within the household they are normally readily

Figure 4

DISTRIBUTION OF SKILLS



available within the community.

However management and financial skills were not investigated and there is likely to be a severe lack of skill in these areas.

Finance

Finance is one of the main constraints on large scale housing development. It was not possible from the survey to derive accurate figures for the costs of rural housing because people were naturally reluctant to provide such information . However even using family labour and local materials it is likely to be a substantial proportion of income.

58% of the householders considered that they would be elligible for a loan from a bank or building society. However such institutions are normally reluctant to lend money for rural housing partly because of the uncertanity of income and more importantly because the applicant is unlikely to be able to show any legal title to the land or any other security.

A further 27% thought they could obtain finance from a friend or relative and the remaining 15% did not think they would have access to any finance. For the samples in the communal areas only the figures were very similar being 56% 28% and 16% repsectively.

Environmental Constraints

The use of both local and communal building materials by definition involves some environmental degradation.

For example burnt clay bricks which are widely used in the rural areas need about 1000 kg of wood to make 1000 bricks. However wood is already widely used as a primary energy source for cooking and heating. About 6 million cubic metres of wood are consumed each year in Zimbabwe and there is widspread concern about the effects of deforestation. Even thatching requires large inputs in terms of land area; it is estimated that at least 15 000 hectares of grass are cut each year for thatching.

OPTIONS FOR IMPROVING RURAL HOUSING

In this section a few examples of current research by the Department into improving house construction are given.

Burnt Clay Bricks

As has been seen, burnt bricks are very widely used for house construction, and work in the Department has concentrated on improving the consistancy of the brick properties and in economising in fuel use.

Cement Stabilised Bricks

The advantages of cement stabilised bricks are the substantial use of local material and labour and the reduced energy requirement compared with burnt clay bricks. Using a 10% cement clay mixture the theoretical energy requirement (for the cement) is about 0.7 MJ/kg compared with 1 - 3 MJ/kg for concrete blocks and 3 - 6 MJ/kg for burnt bricks. The strength of such bricks (0.5- 4.0MPa) is of the same order as burnt clay bricks.

The Department has also investigated the use of such bricks in dome type roof structures which could largely eliminate the need for timber in housing.

Compressed Soil Blocks

A Zimbabwean company has recently imported a special press which can produce large blocks (300 x 190 x 100 mm) from local soil at a rate of up to 10 000 blocks per hour. It is claimed that there is no need to add cement and that the blocks can be laid dry since their size (being laid flat) and their adhesion provide the required stability.

The Department tested blocks made from two types of soil and found their strength more than adequate although comparison with conventional bricks is difficult because of the size factor. Shrinkage (measured after 7 days) was quite significant especially in the more clayey material while the moisture absorbtion was more noticeable in the silty material.

Fibre Reinforced Cement Roofing

Sisal reinforced cement is used in Zimbabwe mainly for roofing sheets and tiles.

A number of tests were carried out in the Department on the flexural and impact strength of sisal reinforced mortar sheets. Although the fibre strength is relatively high the low elastic modulus means that this strength is not moblised before the concrete cracks and thus the flexural strength does not improve significantly with increased fibre content although the fibre length is significant. There are also doubts about properties of the fibre in the long term since the sisal tends to react with the alkliis in the cement and become brittle with age.

GENERAL CONCLUSIONS

It is clear from the above that the major constraints affecting the development of rural housing are in the areas of finance and the availability of materials.

Examples have been given to show that local materials can be used to provide a building of more than adequate standard.

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