

THE INFLUENCE OF HOUSING STANDARDS IN THE DEVELOPMENT OF LOW COST SUSTAINABLE HOUSING IN ZIMBABWE

Mohammad Sharif Zami, Angela Lee

Research Institute for the Built and Human Environment, University of Salford,
Salford, M5 4WT, UK

E-mail: m.s.zami@pgr.salford.ac.uk

a.lee@salford.ac.uk

ABSTRACT: This paper highlights that, building standards sometime impacts negatively on the development of sustainable low cost housing in Zimbabwe. Building standards are administered by the Ministry of Local Government, Public Works and National Housing through local authorities in Zimbabwe, formulated to help acquire, maintain and regulate a certain set of laid down principles and/ or procedures. The building industry has urban planning and building standards in use in order to achieve the above. These standards have been assessed in this paper with the aim of demonstrating the negative impacts and influences they have on the sustainable development of low cost housing.

Keywords - Housing standards, Low cost housing, High density suburbs, Sustainable development.

1. INTRODUCTION

Housing standards were first introduced in the western world in the 19th century to protect the weaker members of society against overcrowding and ill health. The main thrust of these standards was to acquire minimum requirements of hygiene, safety and privacy in the housing units, which were provided to the working class. These standards evolved over the years to suit the changing needs of the societies in which they were to be found. In developing countries, and Zimbabwe in particular, housing standards were said to have been instituted by the colonial government to protect the European settlers and officials; the standards usually led to the replication of the type of dwelling enjoyed in the home country. Standards should be for the safety and convenience of the home owners. To authenticate this point, positive impacts of the standard are highlighted at to help acquire a broader view of all the effects of standards in the building industry. Several of the urban planning and building standards are assessed in detail, in addition to their relevance and application. A working definition of standards is adopted in this paper and based on this definition; assessments of standards are carried out. In order to appreciate the function of standards, positive impacts are also highlighted. A standard being established for the safety and convenience of the home owners and for the maintenance of a minimum quality, this paper aims to reveal the efficacy of standards and the truly need to update.

2. HISTORICAL BACKGROUND AND DEFINITION OF HOUSING STANDARDS

The concept of conventional approach to housing provision can be traced back to the 19th century when rapid industrialisation brought about environmental deterioration which was said to cause disease epidemics. Guidelines on zoning, stand sizes, building materials and infrastructural facilities were gradually developed and these later became specific development standards. During this historical period, the idea that city planning, urban design, and architecture were a science which used natural science methodology was at its

peak. Cities for instance, were planned to contain a specific number of inhabitants above which a new city had to be designed. Such population figures were scientifically derived. Standards on stand sizes, infrastructure facilities, building materials and structures were thus “scientifically” formulated. Like scientific laws, standards were seen as universally applicable. Extended to housing this implied that it should be provided by and as per the standards set by the professionals.

According to Mafico (1991, p107), housing standards can be defined as, “relative measures of suitability, acceptability and liveability for a given socio-cultural, economic and cultural settings”. In the same text, the UN defines standards as, “measures of the acceptability of housing at a given time and place in a cultural, technological and economic setting.” Mafico also (1991, p108) states that, housing standards were first introduced in the western world during the 19th century to protect the weaker members of society against overcrowding and ill health. The main thrust of these standards was to acquire minimum standards of hygiene, safety and privacy in the housing units, which were provided to the working class. These standards evolved over the years to suit the needs of the societies in which they were to be found. In developing countries, and Zimbabwe in particular, housing standards were said to have instituted by the colonial government to protect the European settlers and officials, the standards usually led to the replication of the type of dwelling enjoyed in the home country. This situation also focuses on one major point, standards were for the benefit of the community and to promote and maintain a minimum quality. These same standards in developing countries stipulated that working class indigenous people be housed in bachelor accommodations and they were not allowed to bring their families as family life would disrupt daily activities. Mbare, Harare is such a case, a high density suburb where families were not allowed by the local authority.

It is within this background that the central components of the conventional low cost housing paradigm were developed. Housing has been perceived as structures built within the guidelines of planning standards. Housing is an end state of construction activities. Infrastructural facilities provided along with shelter have also to conform to standards. This literally means that squatter settlements do not fall into the conceptualisation housing. In such settlements, there is illegal occupation of land and illegal development which does not conform to standards. Turner, writing in 1976, questions this emphasis on structure and standards. In particular, he notes that this is a misunderstanding of housing. What is important about housing, he notes, is “not what it is.... But what it does”. The observation is particularly relevant in the cities of the third world where resources (especially finance) are very limited and the persons involved are in dire poverty.

3. INFLUENCE OF HOUSING STANDARDS ON FINANCIAL COST

Burns & Ferguson (1985) states building codes, occupancy standards, zoning restrictions, environmental controls, and other regulations that aim to raise the quality of construction in particular or the quality of life for occupants and larger communities in general, also impose higher costs in the process (Mabogunje, et al. 1978). The legislation and enforcement of high standards may be well-intentioned, for they are meant to guarantee high quality shelter for rich and poor alike but, if enforced, frequently lead to the ironic conclusion that the latter are priced out of the market and get no housing at all. Often codes and standards are blindly extrapolated cross-nationally from the developed to the developing nations with little regard for differences in climate, culture, or ability to pay. At times they exceed industrialized nations’ standards; for example, a low-income housing competition for Delhi specified separate bathrooms and Water closets, “something that is not required of official housing in

Great Britain” (Payne, 1977, p202), and building regulations in the Sudan specify minimum ceiling heights of three meters (Hardoy and Satterthwaite, 1981, p256).

Burns & Ferguson (1985) also state that the compromise of standards, particularly those set at unrealistic levels, can produce substantial cost economies. The case is well illustrated by a settlement-serving infrastructure. Disposal of human waste, for instance, through conventional water-carried systems is estimated to cost US \$500-600 per installation (Dwyer, 1975). Even using intermediate technologies such as the vacuum method that depends on collection by trucks or an elaborate pipe network may be prohibitively expensive. Although its image may not be appealing to planners trained in designing more complex systems, the only cost-effective method realisable to low-income countries, according to Dwyer, is the communal facility where excreta falls into a simple concrete box that is manually emptied and carried away in animal drawn carts.

According to Burns & Ferguson (1985), adherence to and enforcement of unrealistic standards produces at least two effects. First, they will maintain the relatively high costs of units produced by the organised construction sector, thus restricting consumption to middle and high income groups. Second, they will encourage shifts in production to the informal sector where such standards are more readily ignored. Rather than imposing standards as a condition of occupancy, a more realistic approach for public policy would be to facilitate the upgrading of occupied substandard units. Given institutional support and skilled advice, occupants can then raise their shelter standards on their own. Standards are met at certain financial costs and such costs are often high, higher than what the governments and the poor people in cities of the developing world can afford. Indeed it is debatable whether the standards of housing were set with economic conditions of the developing world in mind. The high cost imposed by standards have invariably meant that housing supply in general is limited and the poor are logically unable to access formal housing. This has not only been observed in Latin American cities by Turner, but also in African and Asian cities (UNCHS, Habitat 1987). The relationship between planning standards, housing cost, housing supply, and the housing problem involving the urban poor thus seem quite clear and logical.

According to Mayo, et al. (1986) the potential problems created by choosing inappropriate design standards are illustrated in figures 1 & 2 respectively. They show estimates of the minimum subsidy needed to induce moderate income households (defined as those in the thirty fifth income percentile) to participate in sites and services projects with specific design standards and of the income percentile of households that would be most likely to participate in a project in the absence of subsidies. Each figure has a family of curves showing how subsidies or participants incomes are related to the average incomes in a city (the horizontal axis) and the assumption of design affordability. The latter is represented by A, which is the assumed proportion of income that target households will allocate to housing.

Fig 01 demonstrates the effect that project standards have on the incentive of target groups to participate, and the need to provide subsidies to induce participation when standards are set too high. For example, suppose it were assumed that households in an African country with 1981 household income of roughly \$100 per month would be willing to pay for a house designed to cost 20 percent of their income. According to figure 1, a subsidy of roughly 60 percent of market value of the house would have to be paid to induce households in the thirty fifth percentile of the income distribution to participate, even if such households were willing to increase housing expenditure to 20 percentage of income from a lower “typical” level (Mayo, Malpezzi & Gross, 1986, 196).

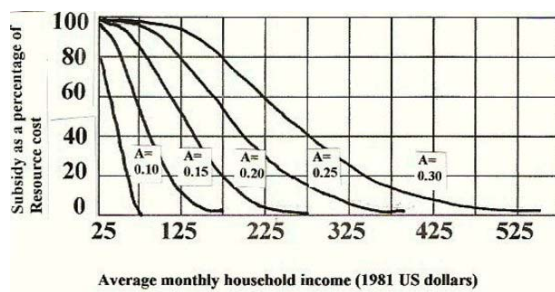


Fig 1.
Effect of project standards on the incentive target of group's participation.
Source: Mayo, Malpezzi & Gross, 1986, 196.

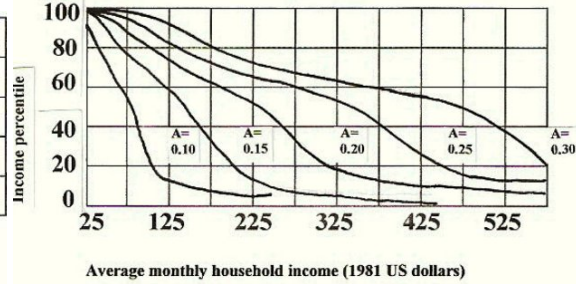


Fig 2.
Effect of alternative design standards of unsubsidized Projects on the income of probable participants.
Source: Mayo, Malpezzi & Gross, 1986, 197.

Figure 02 illustrates the effect of alternative design standards of unsubsidised projects on the income of probable participants. Not only does a higher design affordability ratio raise the income level of likely participants, but it does so with dramatic effect at various thresholds. For example, for households in low income countries (i.e. countries in which average household income is less than \$100 per month), setting the design standards on the assumption that households are willing to spend 20 percent of their income on housing implies that households in approximately the eighteenth percentile of the income distribution could afford to participate without subsidies. Dropping the standard to one based on 15 percent of income has only a modest effect, including participation down to the sixty-fifth percentile in the absence of subsidies. By dropping the standard to just 10 percent of income, however, groups all the way down to the fifteenth percentile would be reached. Similar thresholds exist at each income level, which suggests that dramatic improvements can be made in the ability to reach the poor through sites and services projects by finding the “correct” design standard – the one that reflects the true willingness-to-pay of poor people.

4. INFRASTRUCTURE STANDARDS AND LOW COST HOUSING

Infrastructure standards are applied on the services that enable the efficient and hygienic use of any building. These inevitably affect the quality of the low cost structures. Without these standards the houses will be inhabitable. Roads provide a means of accessing plots (on which the structure is located) and suburbs as well. The width of the access roads affects the method of accessing any particular plot and width of the access roads of old suburbs in Zimbabwe are 10 meters. Older (before independence in Zimbabwe) high density suburbs had narrower roads due to the fact that, residents of these suburbs were not expected to own vehicles and roads were only designed for service trucks. Roads of these old high density suburbs were tarred, and are still tarred but full of potholes which is very inconvenient to motorists. On the other hand, newer (after independence) high density suburbs in Zimbabwe are blessed by wider (15 meters) access roads because of the revised infrastructure standards but surfaced with only gravel instead of being tarred.

The increased road width is a positive development for the new high density suburbs as roads in older suburbs are always congested. It is important to note that the introduction of gravel road leaves the new high density suburbs looking like a growth point whereas these high density suburbs are located in the country's largest cities. Mafico (1991) states that, “this has reduced costs of providing services (which it has), it has on the contrary, actually lowered the minimum quality requirements of newly established suburbs.” There are several problems that have resulted from the current standard of road (gravel). These include:-

01. Dust cloud is an everyday occurrence especially during the dry season which promotes air borne diseases. Fig 03 shows such dust access road of Hlalanikuhle low cost housing in Bulawayo.

02. Roads are impassable during the rainy season as they will be muddy and vehicles get stuck and pedestrians travel with difficulty.

03. Potholes are major problem especially after the rainy season and the local authorities in Zimbabwe in the current economic situation take a long time to repair these. Fig 04 shows such a road full of potholes in Makokoba high density suburb, Bulawayo.



Fig 3.
Dust access road of Hlalanikuhle housing, Bulawayo.
Source: Author, 2006.



Fig 4.
One of the roads in Makokoba high density suburb in Bulawayo. Source: Author, 2006.

Reticulation Standards relate to the infrastructure that ensures supply of water to dwellings for the purpose of keeping the home environment safe and for promoting good health for the user. They also guarantee the disposal of all waste that needs to be removed from the home environment. Older high density suburbs used to have communal water taps and toilets, which resulted in poor maintenance of hygiene conditions around these facilities. These standards have been upgraded and the provision of communal water taps and toilets have been abolished. The individual houses now have their own taps and toilet facilities. This has actually improved the standards in line with the need to have easy access to water and toilet facilities in a hygienic manner. But unfortunately, some of these households can't afford sinks, W.C or shower fittings.

5. TOWN PLANNING STANDARDS AND LOW COST HOUSING

Town Planning Standards cover a wide range of standards in the building industry. For example: - subdivision, height restriction, land use, zoning etc. Subdivision Standards govern minimum dimensions any plot to be used for the purposes of construction. The plot should ideally contain adequate space for constructing a basic structure, future expansion, and gardening and or recreation. This is an area where standards have been evolved to the contrary. What Town Planners have achieved is a reduction in costs of acquiring a plot at a reasonable cost, house owners have actually remained with a plot that does not allow area for expansion, recreation and gardening.

Plots in older high density suburbs measuring 25 X 15 meters, were reduced to 25 X 12 meters, and further reduced to 25 X 10 meters. Further reductions in plot sizes resulted in these plots measuring 25 X 8 meters. These dimensions are the ones currently in use in newer

suburbs such as Cowdary Park and Pumula South. The latest reductions in plot sizes resulted in these plots measuring 8 X 25 meters (Operation Garikayi/ Hlalanikuhle housing areas). The above evolution of the subdivision standard results in the smaller plot size in which users are failing to accommodate their basic furniture and functions. There are several problems created because of the above discussed evolution of subdivision standards. The problems are as follows:-

01. These plots do not have adequate expansion space and rooms that are formed in these houses are unable to accommodate basic furniture.

02. Inadequate circulation space inside the house.

03. These houses are basically of the same design according to the particular high density suburbs, called BB3, BB7, BB1, etc. One of the restrictions of these reduced plot sizes is to limit the variety of architectural design that designers could have exploited and only allows development in one direction. Fig 05 shows such monotonous view of Hlalanikuhle housing in Bulawayo, Zimbabwe.

04. Due to the small side dimensions left between two adjacent houses, privacy of individual rooms is significantly compromised. Fig 06 shows such privacy infringements of the households due to the narrow gap (2 meters) between two housing units in Cowdary Park Housing, Bulawayo, Zimbabwe.



Fig 5.
Monotonous view of Hlalanikuhle Housing.
Source: Author, 2006.

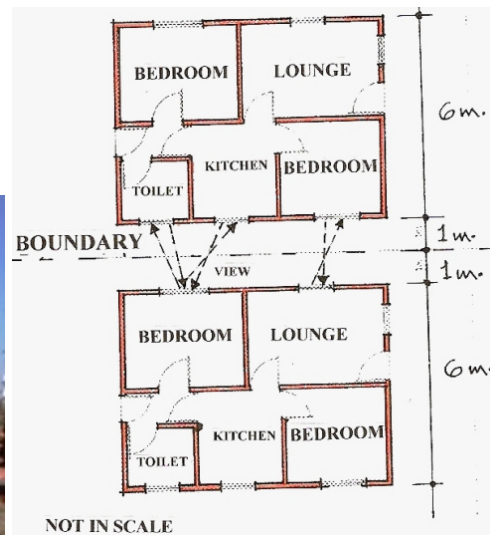


Fig 6.
Housing units of Cowdary Park Housing.
Source: Author, 2006.

All the above mentioned problems are due to the revision of subdivision standard/ plot sizes. The arguments in favour of the reduction of plot size are the “reduction of costs.” The reduction of costs should not stand as a justification for compromising privacy and the economic condition should not be used as a barometer in determining revision or evolution of standards. From interviews with residents, it has emerged that the revision of the standards on plot sizes has in essence ignored the acceptability (by the user) aspect of standards in terms of the cultural and technological setting of the concerned communities.

6. BUILDING STANDARDS AND LOW COST HOUSING

Building Standards affect the building industry and architecture at large and are contained in the Model Building By-Laws propounded as an act of parliament in 1977. They are a major setter of building standards in the building industry. They are finely detailed regulations that specify exact technical requirements concerning the design and construction of buildings and other related services. They cover a wide range of issues such as foundation, masonry and walling, miscellaneous materials and construction. It provides a very high level of structural safety and operational efficiency. In administering these by-laws, plans for the proposed construction are submitted to the local authority for approval before construction can begin. During the course of construction building inspectors inspect the structure under construction in different phases of construction for compliance with these by-laws and other authority by-laws.

For a house to achieve its finished stage it has to undergo several phases of processing which involve a range of raw materials. A house is composed of several materials such as brick, cement, timber for purlins and rafters, window frames and panels, door frames and leafs and several other building materials which contribute to the finished product. The use of bricks as a standard building material began in the early 1900s in Zimbabwe. This was because materials in use then were neither thermally friendly nor sound proof nor above all non fire resistant. However, high density housing in Zimbabwe allows the use of 115 mm brick walls to be used as load bearing walls. This is used as a cost cutting measure because it almost reduces the cost of housing by more than a quarter of its total anticipated costs. These walls do not however have good sound and thermal properties due to the inadequate thickness. It is important to note that, the local authorities in Zimbabwe do not allow such thicknesses for house buildings and not even garage construction in low density suburbs.

One major setback to the provision of a high quality product in the building industry as a whole is the non availability of competition on the materials provision industry. This means that the producers can easily compromise on the quality of materials due to lack of competition. Whatever materials they produce the consumer has no option but to purchase them as this is the only source. A good example is the production of cement, which is only produced by Unicem, and brick, which is manufactured by Macdonald Bricks only in Bulawayo. The above discussed problems should be controlled and addressed by the building by-laws but unfortunately seem to be ignored. The problems created related to the quality of the low cost housing in Zimbabwe are as follows:-

01. The poor performance of 115 mm thick load bearing walls in terms of sound and thermal insulation. Fig 08 shows a low cost house unit which is poor in sound and thermal insulation in Hlalanikuhle Housing, Bulawayo.

02. The roofs are only covered in asbestos cement sheets and do not have any form of insulation nor do they have ceilings fitted to them so that these roofs are very poor in thermal quality. Fig 08 shows a low cost house unit which is poor in thermal insulation in Hlalanikuhle Housing, Bulawayo.

The minimum room size as specified by the legislation is 7 sq. meters with the shortest side measuring 2.1 meters. In terms of architectural standards, a habitable room should comfortably accommodate the occupants with minimum or preferably no difficulty at all. Such room should usually be able to accommodate all the basic furniture that the room is designed for. Most of the bedroom and kitchen designs in high density suburbs cannot accommodate basic minimum furniture and circulation space is very inadequate. The kitchen

cannot accommodate a sink, stove, and refrigerator (Fig 07) and a main bedroom cannot accommodate a double bed, a wardrobe and a chair with minimum circulation space. This situation is an indicator towards the need to revise the space requirements of low cost housing in Zimbabwe.

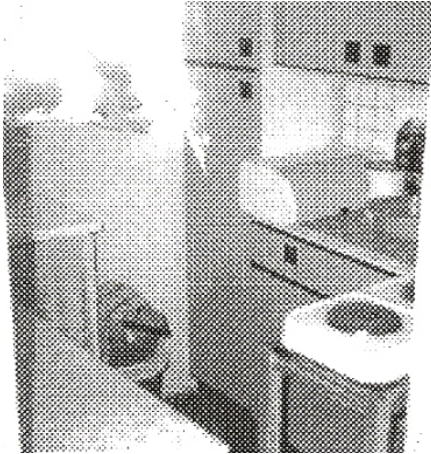


Fig 7.
Kitchen of a low cost house in Cowdary Park Housing in Bulawayo.
Source: P. Munikwa, 2003.



Fig 8.
A house unit which is poor in sound and thermal insulation in Hlalanikuhle Housing, Bulawayo.
Source: Author, 2006.

Natural ventilation and lighting are big problems in these high density suburbs. Fig 09 shows a typical layout of plot subdivision plan with house units on it in Cowdary Park Housing and natural airflow pattern. It is very difficult for natural air to circulate around the house units because of poor composition of the house units. Fig 10 shows the actual view of those particular house units and how boundary walls protect natural airflow in a dense environment. Fig 11 shows a typical section through two adjacent house units and boundary wall in between of Hlalanikuhle Housing and how sunlight is obstructed by the boundary wall and roof structure.

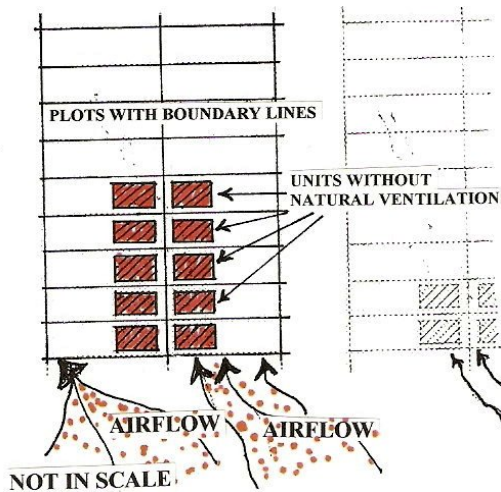


Fig 9.
Layout of plot subdivision plan of Cowdary Park Housing. Source: Author, 2006.



Fig 10.
Dense environment of Cowdary Park Housing. Source: P. Munikwa, 2003.

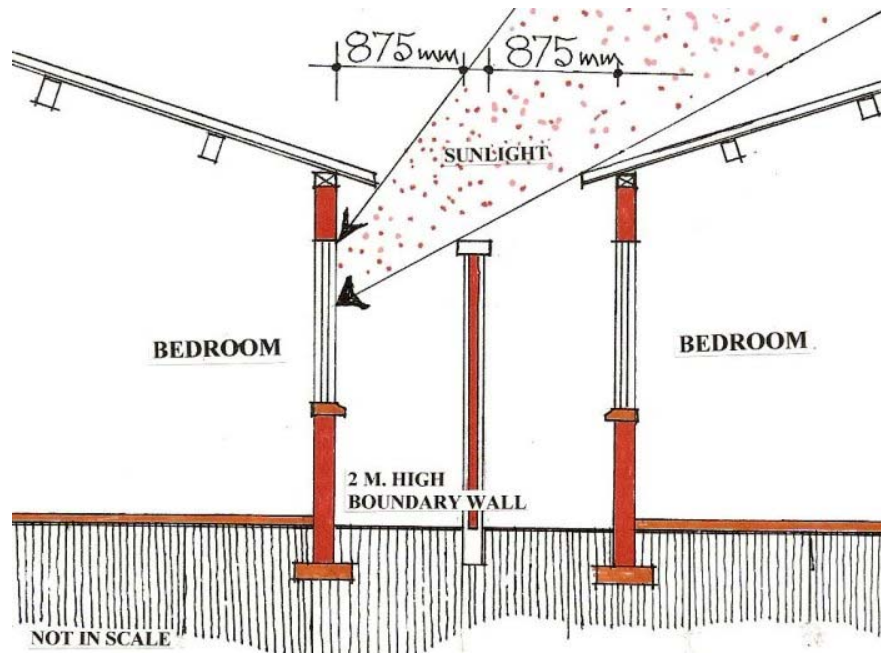


Fig 11. Section through two adjacent house units in Hlalanikuhle Housing, Bulawayo, Zimbabwe. Source: Author, 2006.

7. CONCLUSIONS

Firstly, some of the standards discussed in this paper used in Zimbabwean building practices are not acceptable by the home owners considering the cultural, technological, economical, and time setting of the present situation. The working definitions of housing standards as mentioned earlier in this paper also do not go along with the previously discussed housing standards. Standards currently in use in Zimbabwe have both positive and negative implications. One of the major positive implications is that the costs are reduced with more plots sharing the cost of infrastructure development. The negative implication of this is the quality of life and sustainable environment is compromised. Besides, housing standards currently practiced in Zimbabwe were adopted in 1977 and for the past 30 years there have been a lot of economic, technological and cultural changes. Therefore there is a pertinent need to revise these old housing standards to accommodate the technological, cultural, and economic advancements. It is hoped that those professionals for the implementation of these standards will be able to visualise these and appreciate the need to have these standards revised for the convenience of the user and the sustainable built environment while maintaining a minimum quality. It is also hoped that home owners and cost bearers appreciate the need for standards in order to maintain a minimum quality of life and environment as well.

8. REFERENCES

Burns, L. S. & Ferguson, B. (1985). "*Criteria for future shelter and settlement policies in developing countries*" – chapter for Shelter, Settlement and Development, prepared for the IYSH Advisory Group. Los Angeles, California.

- Chipungu, L. (2005). *Institutional constraints to land delivery for low-income housing: a case study of Harare*. Zimbabwe. RICS Foundation: London.
- Chinyoka, S. (2002). *Effects on physical planning on low cost housing in Zimbabwe: A case of Pumula South*. BAS thesis. Supervised by L. J. Hernandez. NUST, Bulawayo, Zimbabwe.
- Dwyer, D. J. (1975). *People and Housing in Third World Cities: Perspectives on the Problems of Spontaneous Settlements*. London: Longman Group Limited.
- Government of Zimbabwe (1977). *Model Building By-Laws*. Government press, Harare, Zimbabwe.
- Hardoy, J. E. & Satterthwaite, D. (1981). *Shelter Need and Response: Housing, Land and Settlement policies in Seventeenth Third World Nations*. Chichester: John Wiley & Sons. London
- Mabogunje, A. L. Hardoy, J. E. & Misra, R. P. (1978). *Shelter Provision in Developing Countries*. Chichester: John Wiley & Sons.
- Mafico, C. J. C. (1991). *Urban low income housing in Zimbabwe*. Avenbury, Aldershot.
- Mafico, C. J. C. (1989). *An evaluation of urban planning standards for low income housing in Zimbabwe*. RUP occasional paper. UZ, Harare, Zimbabwe.
- Mayo, S. Malpezzi, S. & Gross, D. (1986). *Shelter Strategies for the Urban Poor in Developing Countries*. The world Bank Research Observer, Volume 1, Number 2.
- Mead, M. (1964). *Continuities in cultural evolution*. Yale University Press, New Haven, C.T.
- Munikwa, P. (2003). *The negative impacts of standards in the building industry: A study of Cowdary Park high density housing in Bulawayo*. BAS thesis. Supervised by M. S. Zami. NUST, Bulawayo, Zimbabwe.
- National Task Force on Housing (1999). *National Housing Policy for Zimbabwe*. Ministry of Local Government and National Housing, Zimbabwe. Government Press.
- Ngowai, A.B. (2000). *The conflict between survival and sustainability*. Proceedings: international conference sustainable building, 2000. 22-25 October, 2000. Maastricht: Netherlands.
- Payne, G. K. (1977). *Urban Housing in the Third World*. London: International Text Book Company Limited.
- Turner, J. F. C. (1976). *Housing by people – towards autonomy in building environment*. London: Marion Boyars Publishers Ltd.
- Van Der Post, L. & Taylor, J. (1984). *Testament to Bushmen*, Viking, Harmondsworth.