

Zambia has an approximated total population of about 11 million people most of whom are Bantu natives of Africa and a few non-natives comprising Asians and Europeans distributed across a total land area of 753,000km².

The principle urban areas in Zambia are: Lusaka, the nations capital city; Kitwe, with the second largest concentration of people in the country, Ndola, the Copperbelt provincial capital; and Livingstone, the tourist capital.

The national per capita income is estimated at US\$400, while debt per capita is estimated at US\$624. The literacy rate in Zambia is about 79%, and life expectancy about 46 years. Zambia is also among the most urbanized countries in Africa, with an urbanization rate of 38%.

Zambia is ranked 50th on the list of the worlds least developed countries (LDCs) with an approximate Gross Domestic Product (GDP) of US\$800 (<http://www.un.org/special-rep/ohrlls/ldc/list.htm>). An estimated 65 to 81% of it population is classified as poor and live on less that US\$1 per day (CSO 2003).

1.2 Shelter Related Facts and Figures

The first post independence housing policy was formulated in 1996. Zambian Government adopted Enabling Shelter Strategies in the 1996 National Housing Policy (NHP) whose main goal was to provide '*adequate affordable housing for all income groups in Zambia*' (GRZ, 1996:15). Prior to this, housing strategies were spelt out in 5 year National Development Plans as part of the overall nationa development strategy. During this period, housing was regarded as a social right, and the management and construction of housing was largely the responsibility of local governments and parastatal organisations. The government not only sought to adopt better designs of houses for people but increase the housing stock and offer higher standards like electricity, water and all weather roads. Integration of previously segregated housing between European and African locations was also a priority. Table 1.3 outlines the various NDPs and their main objectives.

Table 1.3: Post-independence National Development Plans (source: GRZ 1965, GRZ 1967, GRZ 1971, GRZ 1979, Tipple 1981, GRZ 1989, UNCHS 1996, Makasa 1997, Mabo 2002, Mususa & Wood *undated*)

NDP	Period	Main Approach	Main objective(s)
Transitional NDP	1965 to 1966	Modernization and urban growth	Physical planning and production of shelter by public agencies through central planning
First NDP	1966 to 1972	Redistribution with growth	Promoted self-help efforts on a project-by-project basis using state support
Second NDP	1972 to 1976	Basic needs	Recognition of the informal sector, promotion of squatter upgrading, site-and-service schemes and state subsidies to land and housing
Third and Fourth NDPs	1979 to 1983 and 1989 to 1993	Shift from socialist to capitalist approaches	Attaining minimum shelter standards

The 1996 housing policy revealed that of Zambia's 1, 768, 287 housing units, only thirty-one percent of the total housing stock was formal and fully approved in accordance with prevailing statutory regulations and building standards. The remaining sixty-nine percent was informal because they were built using unconventional standards and methods thus illegal according to Zambian Building Codes (GRZ 1996). It was estimated that to clear the housing backlog, which stood at over one million units in 1996, a building rate of approximately 110, 000 dwelling units per annum would be required over a ten-year period (*ibid.*). This backlog took into consideration the formation of new households, natural population growth rate and the need to upgraded existing informal settlements among other factors. These statistics have not significantly changed since. There has been no significant improvement in the number of dwelling units, while the housing backlog has increased due to shortages in housing relative to population growth and migration (CSO, 2003).

Apart from the now defunct Presidential Housing Initiative (PHI), no efforts have been made practically to implement the recommendations made in the NHP because there is no coherent implementation strategy. The informal sector however, continues to grow at an

alarming rate. For instance, between 2000 and 2006, eight new settlements have sprung up in the City of Kitwe alone. This is partly because the rate at which the public and private sector produces new housing stock in the city falls far short of demand. This scenario is reflective of the overall national picture.

1.2.1 Planning standards for housing settlements

Like most developing countries, the problem of informal settlements in Zambia stems from an inability of public institutions to cope with housing the growing urban population. The rate at which the poor are building their houses informally and creating new homes for themselves in Zambian cities today is unprecedented. The result is that existing institutional structures, and conventional approaches are rapidly being proven to be inadequate in dealing with the situation. This demands a new and fresh approach to the current housing crisis (Silavwe 1998).

Institutional housing policies, which tied urban housing to employment, had dire consequences for urban housing in Zambia. It was a continuation of the ill-conceived colonial policy, which failed to recognise that cities typically develop through the cumulative efforts of their residents, who progressively improve their welfare, including housing (Silavwe 1998). This process of city development and improvement usually only needs proper regulation to enable existing resources and the full potential of all stakeholders to be fully utilised (Turner 1976).

Zambia can no longer afford to ignore the plight of its informally housed citizens, who now number about 2.6 million representing 26% of the national population, living in about 260 informal communities of various sizes around the major urban centres. The average growth rate of urban areas has been approximately 8% over the last few decades while informal settlements have been growing at about 14% annually (CSO 2000).

Both the central and local governments in Zambia acknowledge the need to recognize and regularize such settlements. In addition, there appears to be sufficient policy and legislative framework regarding the legalization of informal settlements (Mulenga 2003). Informal settlements are recognized by local authorities and declared as 'Improvement Areas' by the Department of Physical Planning and Housing in the Ministry of Local Government and Housing (MLGH) through the Housing (Statutory and Improvement Areas) Act Cap 441 of 1974. Settlers can then obtain renewable 30-year occupational licenses. However, in order to be

declared an Improvement Area, informal settlements must meet the following criterion (Mulenga 2003):

- a. 60 percent or more of the land on which they are located must be publicly owned,
- b. The settlement must have been in existence since 1974,
- c. Development for which the land is zoned on the local development plan must not be imminent, and
- d. 50 percent or more of the dwelling structures in the settlement should be constructed of conventional materials.

However, despite the existing policy and legislative framework, there does not appear to be a supportive regulatory frameworks which offers the urban poors attainable and affordable housing and human settlement standards. Current building codes demand strict adherence to prescribed building materials and high housing standards established by the National Housing Authority (NHA) through the NHA Act of 1974 (Mulenga 2003, Hughes & Masimba 2004).

In view of this scenario, the National Housing Policy (NHP) unveiled by the MLGH in 1996, sets forth an ambitious set of objectives, including: “*streamlining building standards, regulations and other controls to meet the needs and capabilities of various segments of the population;encouraging the production and use of local and affordable building materials* (GRZ 1996)

1.2.2 Access to housing and cost of Basic Services/Infrastructure

Housing produced to the National Housing Authority’s (NHAs) low cost housing standards is unaffordable and inaccessible by the majority of the urban poor in Zambia and an increasing number of the Zambian middle class. For instance, a basic two bedroom 46.6m² house built by the NHA was selling at K51.6million in 2004 (*approx. US\$12 000*) (NHA 2004) (see figure 2). According to Table 1.2, this is about ten years wages of an entry level teacher. (JCTR 2004).



Fig 2: Floor plan and pictorial view of a 2004 NHA low cost house (source: NHA 2004)

Table 1.2: Average net monthly salaries for selected categories of employees in Zambia as at August 31, 2004 (source: JCTR 2004)

	Teacher	Secretary	Nurse	Police officer	Security guard
SALARY/MONTH	K407, 000 to K913, 000	K390, 000 to K791, 000	K461, 000 to K1, 489, 000	K120, 000 to K300, 000	K40, 000 to K180, 000

This forces the poor into informal areas where basic infrastructure and services such as water, sanitation, health and education are almost non-existent. However, despite their illegality, local authorities, donor agencies and local and international non-governmental organisations (NGOs) have in the past tried to provide basic services such as water kiosk, community schools, gravel roads and clinics in these areas.

In order to overcome the rising building costs, majority of informal settlement dwellers now utilise local sun-dried or kiln fired clay blocks as the principle building block for their housing (Mwango 2006). Studies have also shown that majority of the urban poor in informal settlements have generated standards based on the available local materials, techniques, climate, economy, and socio-cultural influences. They often combine their knowledge of traditional building techniques with



Fig 3: Similar design and construction methods using different building materials; clay and concrete blocks on the left and right respectively (source: author 2005)

their new urban experiences to create housing and human settlements that are a hybrid blend of traditional and conventional housing standards(*ibid*) (see figure 3).

However, their lack of formal recognition results in lack of basic service provision which makes them vulnerable to a lot of environmental diseases and problems. However, since the 1960's, experts in the international housing sector, led by Abrams (1955) and Turner (1976), have tried to highlight the positives attributes of informal housing delivery, which in the case of Zambia, Silavwe (1998) says, is more adapted and suitable to the African lifestyle.

1.3 Housing Policy

Zambia, as aforementioned, is still grappling with the problem of housing its citizens. This is partly because apart from the strategies outlined in the National Development Plans which also looked at other sectors such as education and health, there was no comprehensive and coherent national housing policy formulated to specifically address housing challenges in the country until 1996. Consequently, there was no framework for a consistent approach to housing delivery. Investment in housing subsequently dropped from about 30 percent of the GDP in 1969 to less than 0.5 percent by 1992 (Mushota 2000), well below the internationally recognised and recommended minimum of 5 percent.

The 1996 National Housing Policy was intended to change the pattern of housing development in Zambia and restore growth of the housing sector. By providing the framework for sustainable housing development, the policy also aimed at providing a mechanism for ensuring that limited resources are put to their optimum use and thus also addressing poverty alleviation. The policy also defined the technical, financial and administrative framework needed to carry out housing programmes. It also identified the agents in the public and private sectors and outlined their roles in housing delivery (Mbatı-Mwengwe 1998). The main strategies outlined in the policy are summarized in table 1.4 below.

Table 1.4: Strategies of the 1996 National Housing Policy (source: GRZ 1996)

ELEMENT	STRATEGIES
Housing Finance	<ul style="list-style-type: none"> • Mobilising funds for housing development by working together with private companies who would channel their social security funds to building societies who would then administer them using their specialised skills in housing finance. • Providing incentives to private individuals and institutions to invest directly into housing by removing unnecessary rigid regulations that hinder participation in housing development.
Land Delivery	<ul style="list-style-type: none"> • Providing adequately serviced land with secure tenure to all income groups • Providing subdivisions for the development of housing estates for sale or rent by private developers. • Preparing more functional and economical township layout plans.
Building Standards and By-laws	<ul style="list-style-type: none"> • Revising building standards so that they become functional and performance based rather than prescriptive. Their flexibility should reflect the affordable principle by all income groups. • Reinforcing building inspectorates in all local authorities through training.
Development of Local Building Materials	<ul style="list-style-type: none"> • Actively promoting the development of local building materials through research by improving the quality of local materials presently in use so as to extend the projected lifespan of the housing structures. • Funding demonstration programmes aimed at the use of these local building materials.
Development of Infrastructure	<ul style="list-style-type: none"> • Providing infrastructure such as water, roads, street lighting and sanitation so as to stimulate housing production by the public and private sectors. • Ensuring that all land within townships is provided with basic services prior to allocation.
Impact on Building Industry	<ul style="list-style-type: none"> • Ensuring a steady stream of work to the private and popular sector including small contractors by awarding public sector construction contracts.
Home Ownership	<ul style="list-style-type: none"> • Encouraging home ownership as a means of providing security, stability and economic power to the family unit and as a basis for the development of economically strong and motivated communities. • This is to be done through the removal of rent control, withdrawal of employment-tied housing, site and service and squatter and settlement upgrading.

Despite the pronouncements contained in the NHP document, there are still no programmes in place that are addressing the shortage of adequate and affordable housing today.

1.4 Actors in Shelter Delivery and their Roles

The National Housing Authority Act, Cap 426, gives the National Housing Authority sole responsibility for managing Zambia's housing portfolio. A myriad of other agencies are responsible for providing, operating, and maintaining infrastructure and services in Zambia's urban areas. These agencies are also responsible for formulating standards for infrastructure and services that affect all housing in Zambia. Housing regulations are set by central government agencies to be implemented and enforced by all 72 local governments across. For instance, the Ministry Local Government and Housing (MLGH), through its Department of Physical Planning and Housing, is responsible for identifying *Statutory and Improvement Areas* in accordance with the 1974 Housing (Statutory and Improvement Areas) Act. The Department

of Infrastructure Support Services in the MLGH, on the other hand, is responsible for setting standards and managing all donor projects regarding the development, improvement and rehabilitation of infrastructure in all housing areas (Hughes & Masimba 2004).

Local authorities are responsible for local planning, development control, provision of local roads, drainage and solid waste management plus other environmental health functions using standards set by central government agencies. Water and sewerage reticulation services have since been privatized to private commercial utilities (Hughes & Masimba 2004). Informal housing and settlements are now controlled by Squatter Control Departments (SCD) under the respective Community and Social Services Department.

The National Council for Construction primarily regulates the performance of construction firms while the Zambia Bureau of Standards is responsible for quality control and specification of materials. Other key actors in the shelter delivery in Zambia include professional regulatory bodies such as the Zambia Institute of Architects, Planners Association of Zambia and the Engineers Institute of Zambia which govern the training and professional conduct of professionals in the built environment.

2 Organisation

The Copperbelt University's School of the Built Environment (SBE) is well placed to play a very prominent role in addressing the human shelter needs in Zambia. The School is divided into five departments offering degree courses in Architecture, Town and Country Planning, Building Science, Real Estate Studies and Civil Engineering. It annually graduates 15 to 20 most of whom get into employment in both the private and public sectors in Zambia and the Southern African region.

Apart from churning out well trained professionals who can play prominent roles in the housing sector, the SBE could utilise its materials testing lab and faculty to carry research into various untested and undocumented local building materials such as sun-dried burnt mud block commonly used in traditional and informal settlements. This would help in the process of standardising and formalising these materials which further help achieve one of the seven objectives of the 1996 NHP. The SBE could further carry out pilot projects to demonstrate the use of these materials and help popularise their usage.

3 Shelter Problem

As indicated in table 1.4 above, the fourth element of the Zambian National Housing Policy is to develop local building materials. One of the strategy suggested to achieve this by the Government is to actively promote the development of local building materials through research by improving the quality of local materials presently in use so as to extend the projected lifespan of the housing structures.

However, very little has been done to realize this because an implementation strategy is yet to be formulated. Houses delivered through formal programmes have historically excluded the use of local building materials and current formal building codes and regulations do not authorise their use either. There have been no strategies or programmes put in place to standardise and improve local building materials widely used by the informal sector as a way of fostering the production of affordable low income housing solutions for the poor. Consequently, housing and human settlement solutions being used today are beyond the effective demand of the poor in part due to the high cost conventional building materials that have been in use since the British colonial days (Turner 1976, Mitchell & Bevan 1992, Payne 2001).

The informal sector has been able to provide cost effective alternatives to peoples' planning and housing problems, and delivers up to five times more housing units at very little cost to the end user than conventional solutions (Martin 1976a, Turner 1976, Silavwe 1998). Silavwe (1998) argues that by being outside the formal structures that are riddled with bureauracy and administrative bottlenecks, the informal sector has shown the potential of some of the local building solutions including local building materials. He suggests that by incorporating both traditional and urban-African lifestyles and practices, the informal sector has been evolving a new way of urban living which is more related to Africa (*ibid.*). Today, over sixty nine percent of the urban poor use locally made sun-dried or kiln fired clay blocks as their primary building material. These blocks are, however illegal according to prevailing building codes and standards.

4 Proposal for Change and Improvement

As pointed out, underutilization of local building materials, techniques and services is one of the key problems besetting the housing sector in Zambia. As aforementioned, this stems from the fact that there has been very little or no effort put into research, development and improvement of local building materials. The CBU is one of several research institutions that have carried a lot of research into various building materials, including sun-dried or burnt clay blocks, and tested their performance against standards set by the Zambia Bureau of Standards. This paper proposes that these studies, such the one done by Siuluta in 2002 (see table 1.4 below), be done in collaboration with the National Housing Authority and the Zambia Bureau of Standards. Further, as the National Housing Policy recommended such studies need to be funded so that demonstration projects can be set up in order for local building materials to gain acceptance, especially within the private sector, political and professional circles whose vested interests currently hinder the adoption of such material. Mwango (2006) below during a study carried out in informal settlements in the City of Kitwe used indicators listed in Box 1.2 to show the economic, social, cultural and environmental potential of informal building standards which largely employ clay blocks as the primary building material.

Box 1.2: Indicators for enabling building standards (source: Martin 1976, Mabogunje *et al.* 1978)

- a. ***fitness for purpose*** - measures the practicality of standards to fit the purpose they are intended to serve.
- b. ***flexibility*** - measures the ability of standards to permit people to make quick and efficient adaptations and alterations to their houses as the need arises.
- c. ***identity*** - measures the extent to which standards allow people to exercise their human desires to create identity or uniqueness in housing.
- d. ***cultural compatibility*** - measures the extent to which standards are compatible to local cultural practices.
- e. ***social responsiveness*** - measures the extent to which standards improve the quality of life of the under privileged.
- f. ***economic feasibility*** - measure the ability of standards to allow people to make innovative choices that allow the poor to save more rather than spend more on housing.
- g. ***technological suitability*** - measures the extent to which standards are based on available scientific knowledge in a particular society.
- h. ***physical and biological harmony*** - measures the ability of standards to enhance rather than distort the balance between man, the built environment and the natural environment.
- i. ***temporal relevance*** - is the measurement of the quality in standards that allows for changes to be made with passage of time to suit needs of a particular time.

Table 2.1: Assessment of building blocks (Source: Siuluta 2002)

	Foreign		Zambian		
	Concrete block	Burnt bricks	Compressed earth block (CEB)	Compressed earth block (CEB)	Compressed earth block (CEB)
Size of brick (mm) = Volume (m ³)	390 x 190 x 150 = 0.00612	*200 x 100 x 100 = 0.002	290 x 155 x 140 = 0.006295	290 x 155 x 140 = 0.006295	290 x 155 x 140 = 0.006295
Weight of brick	-	22 kg = 1,700 kg/m ³	11.7 kg = 1,850 kg/m ³	11.7 kg = 1,850 kg/m ³	11.7 kg = 1,850 kg/m ³
Stabilisation	Cement	Fire	5% Cement	10% Cement	10% Lime
Cost/ unit on site	K1, 630	K9, 000	K610	K915	K1, 053
Wastage	5%	15%	5%	5%	5%
Units per m ³ (raw material)	159	500	158	158	158
Mortar used	1 Cement 4 Sand	1 Cement 4 Sand	1 Cement 6 Sand 6 Soil	1 Cement 6 Sand 6 Soil	1 Lime 6 Sand 6 Soil
Units per m ² of wall	13	50	22	22	22
Daily output per team	200 Blocks = 16m ²	350 Bricks = 3.25m ²	220 Blocks = 10m ²	220 Blocks = 10m ²	220 Blocks = 10m ²
Cost of 1 m ³ of raw material (including waste)	K253, 353/m ³	-	K96, 000/m ³	K144, 500/m ³	K166, 418/m ³
Cost of mortar per m ²	K4, 784/m ²	K7, 357/m ²	K1, 728/m ²	K2, 601/m ²	K2, 996/m ²
Cost of wall per m ²	K26, 522/m ² (150 mm thick)	K99, 425/m ² (200mm thick)	K17, 225/m ² (150 mm thick)	K25, 525/m ² (150 mm thick)	K27, 572/m ² (150 mm thick)
Pollution emission (CO ₂)**	88kg/m ²	126kg/m ²	16kg/m ²	16kg/m ²	16kg/m ²
Energy consumption (wall)*	1, 157MJ/m ²	1, 657MJ/m ²	110MJ/m ²	110MJ/m ²	110MJ/m ²
Dry crushing strength	*(+)3.5N/m ²	*(+)3.5N/m ²	(±)3.24N/mm ²	(±)3.43N/mm ²	(±)2.53N/mm ²
Wet crushing strength	*(+)2.5N/m ²	*(+)2.5N/m ²	(±)1.42N/mm ²	(±)1.83N/mm ²	(±)1.4N/mm ²
Water absorption	-	10 – 14%	9 – 11%		8 – 10%

Below are additional sources of information used in the table as marked, respectively:

- *National Institute of Scientific and Industrial Research (NISIR), Zambia Bureau of Standards (ZS 007: 1973).
- **Internet <http://www.adobebuilder.com>
- Exchange rate used - 1 USD(\$) = ±K4 500, for October 2002.
- Material cost includes delivery on site. All costs are cost price. The burnt brick is the retail price excluding delivery to site.

Strength

Wet CEB are 27% weaker than burnt bricks and concrete blocks.

Pollution Emission

- CEBs are 5.5 times less polluting than concrete blocks
- CEBs are 7.8 times less polluting than burnt/kilned bricks.

Energy Consumption (during production)

- Consume 10 times less energy than concrete blocks
- Consume 15 times less energy than burnt bricks.

Box 2.1: Comparative summary of compressed earth blocks and other building materials (source: Siuluta 2002)

To this effect, the CBU and other research institutions need to partner with other key institutions such as the National Housing Authority, which has the legal mandate to regulate housing development in the country and the Zambia Bureau of Standards which sets the performance standards required for various building components. The NHAs Research and Development Division would use its legal authority to authenticate research results carried out in the Materials Laboratory and field by faculty and staff from the School of the Built Environment using NHA approved methodology. The Zambia Bureau of Standards which currently does not have a materials research laboratory, would then codify the materials and the methods used to produce the various local materials for widespread reproduction by the public and private sector.

5 Action Plan

	Activity	Duration	Date
1	Make informal contacts with NHA & ZBS colleagues in Lusaka	2 days	
2	Report back to the Head of Department	1 day	
3	Report back to the Dean	1 day	
4	Finalise proposal and submit to Research Committee	3 days	
5	Make formal contacts with NHA & ZBS colleagues in Lusaka for collaboration	2 days	
6	Report to SIDA office in Lusaka on programme success and submit proposal	3 days	
7	New time line for research upon project approval	1 day	

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