Production of Affordable but Quality Housing for the Low Income Urban Dweller

"Promoting the Use of Local Building Materials"

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INTRODUCTION

Shelter is a basic need and a right of very individual. Therefore its provision should not only be looked at in terms of quantity as is often the norm but to take into consideration its quality in terms of adequate protection, sustainability, comfort, ventilation and lighting amongst others.Ghana's housing backlog quantitative is now estimated at over a million and even more in terms of quality by experts. Various attempts to cut down on this has not yielded much due to the high cost of imported (conventional)building materials especially and contractors over dependence on these products

Brick which has been proven over thousands of years to be of superior quality and affordable in terms of total life cycle cost of a building has not been used as much as alternative building material (0.6% out of total houses are built in bricks as against 75% for cement /sandcrete blocks) due to various problems such as cost of production and construction, lack of skilled labour and availability of design data as well as government support.

This paper therefore seeks to: analyse the shelter situation of the country, especially in the urban areas ,identify and analyse the major problems to affordable housing ,discuss findings and results on field studies/surveys ,make proposals for change and an action plan to promote the use of single leaf brick construction in single storey housing.

1 Shelter Situation Analysis

1.1 Basic General Data

Geography and Administration:

Ghana lies on the west coast of sub-sahara Africa sharing boundaries on the West ,North and East with Cote D'ivoire, Burkina Faso and Togo respectively.It occupies and land area of 238,539 sq km(gss), and is been divided into 10 Adminstrative regions and 138 Metropolitan, Munincipal and District Assemblies (MMDA's) respectively.

Accra , located in the Greater Accra region along the coast , is the capital with an estimated population of 4 million(Ghana in figures, 2008).Ghana practices a multi party democracy,with the nation divided into 232 constituencies.

Picture.1: A Map of Ghana showing its Administrative Regions and Its Boundaries

Demography and Health:

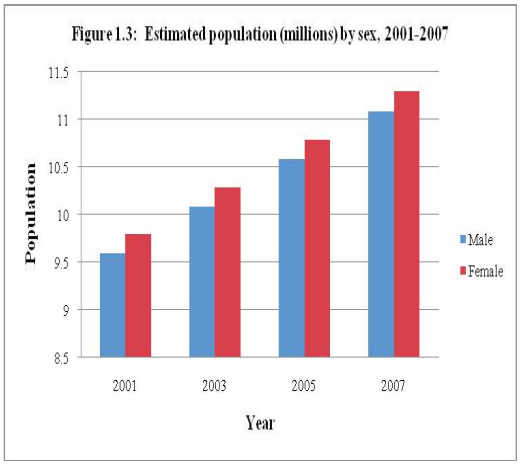
The demographic structure of the country has not differed much since 1957 when Ghana gained independence.(1960,1970,1984 and 2000 population census volumes) The breakdown of regional population and projected population as of 2007 as shown in Table one and graph 1.

Table 1: Regional Population Distribution and Estimated Population Density

Region	Area (sq km)	Projected population	Estimated population density (persons/ km)
Western	23,921	2,358,849	99
Central	9,826	1,777,337	181
Greater Accra	3,245	3,903,564	1,203
Volta	20,570	1,798,247	87
Eastern	19,323	2,251,180	117
Ashanti	24,389	4,459,435	183
Brong Ahaf	39,557	2,120,881	54
Northern	70,384	2,121,567	30
Upper East	8,842	978,121	111
Upper Wes	18,476	618,730	33
Total country	**238,533**	**22,387,911**	**94**

Source: Ghana in figures 2008,

Graph.1. : Estimated Population Distribution by sex



Source: www.statsghana.com, 2009

The population has grown from about 5 million in 1960 to about 10 million in 2001,and it is projected to be 22,390,000 in 2007. According to the government statistician, Dr. Grace Bediako, the current population is estimated at 23 million (Daily Graphic,23/07/09 pg 1). Females constitute 51.5%.The average household size is 4,with upper west having the highest of 6.5 and greater accra the lowest of 3.4. The population density stand at 79.3% and the urban population accounts for 43.8% of total population (www.statsghana.gov.gh).

The world Bank Group Country report of 2001-2007 indicates that 29% of the population fall below the poverty line,while the average life expectancy at birth is 60.Infant mortality per 1000 live births is 76. The introduction of the National Health Insurance Scheme(NHIS) has had a remarkably increased in the number of people who have access to medical services.According to the Ghana living standards survey report of 2008, 17% of the population is covered by the scheme.

Economy

Ghana's economy is classified as low income with per capita income in the range of $1,300/anum.The fiscal deficit as of the end of 2008 stood at 14.5% of GDP according to the Central Bank of Ghana. Economically active population 15+yrs as of 2000 stood at 8.3 million with 74.7% employed and 25.3% unemployed. GDP growth rate has seen a gradual increase from 4.2% in 2003 to 7.3% in 2008(National Accounts Section,GSS) . The daily minimum wage for 2009 stands at GH¢[1] 2.30p with an exchange rate of GH ¢1.45p to 1 US dollar.

Table 2 :Annual average prime building cost index numbers, 2001-2007

ITEM	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Combined	**260.9**	**324.4**	**493.0**	**523.0**	**685.6**	**738.0**	**919.2**
Labour	**185.9**	**285.6**	**523.6**	**631.8**	**864.1**	**930.3**	**1,189.6**
Skilled labour	162.5	259.1	485.6	599.2	781.5	818.7	1,105.9
Unskilled labour	220.2	324.4	579.4	679.2	985.0	1,094.1	1,311.7
Materials	**320.1**	**355.1**	**468.9**	**437.1**	**544.8**	**586.1**	**710.1**
Cement	253.5	293.8	333.7	352.1	491.3	522.0	678.6
Roofing materials	220.8	270.9	526.5	601.6	745.8	876.6	845.1
Sand	319.4	338.8	350.3	355.7	357.9	401.4	468.5
Steel materials	215.0	248.6	276.5	351.1	555.2	401.4	602.6
Stone	199.8	209.5	300.9	419.2	514.3	582.1	838.5
Timber	235.6	290.4	383.6	423.4	507.8	547.3	705.7
Miscellaneous	**485.6**	**522.7**	**682.2**	**475.3**	**555.6**	**563.7**	**691.2**

Source: Ghana in Figures 2008,GSS

1. GH ¢ means Ghanaian national currency. $ 1 = 1.43GH¢(Feb, 2010)

Agriculture,Services and Industry are the three key contributing sectors of the economy.The construction industry is the highest contributor(38%) in the industrial sector to GDP from 2001-2007.Construction growth rate has also shown much increase from 6.1 in 2003 to 15.0 in 2007 whiles the prime building cost index is going up from 493 in 2003 to 919 in 2007 as shown in table 2 .

1.2 **Shelter Related Fact and Figures**

Access to Shelter

Ghana's housing stock as of 2000 stood at about 2.2 million with an annual deficit of 50,000 units and an overall deficit of 750,000 units.This is against the total annual output of between 25,000-30,000 units.Thus if this deficit is to be stemmed there is the need to produce 250,000 units annually for the next ten years (N.A.Akuffo Addo,2008).

Table 3: Housing stock, persons per house, households and average household size from 1970-2000 Census'.

Characteristics	*1970*	*1984*	*2000*
Stock of houses	880,869	1,216,667	2,181,975
Number of persons per house	9.0	10.2	8.7
Number of households	1,793,580	2,480,368	3,701,241
Percentage urban	33.0	36.0	34.1
Percentage rural	67.0	64.0	65.9
Average household size	4.7	4.9	5.1

Source: Ghana in Figures 2008, GSS

Housing stock per person per house and other housing parameter is as indicated above.In urban areas more households live in rooms in compound houses (55%) than in rural areas (35%) as shown in Table 4 .

Table 4: Households' type of dwelling and locality (percent)

Type of dwelling	*Accra (GAMA)*	*Other urban*	*all*	*coastal*	*forest*	*savanah*	*all*	*Ghana*
Separate house(bungalow)	8.5	4.8	6.0	1.2	2.5	3.1	2.4	4.0
Semi detached house	6.8	3.4	4.5	2.1	2.5	3.4	2.7	3.5
Flat/apartment	8.9	4.5	5.9	0.3	1.0	0.8	0.9	3.0
Room(s)[compound house]	53.9	55.5	55.0	30.8	37.1	35.0	35.1	43.7
Room(s)[other type]	15.6	28.8	24.4	54.4	51.5	24.6	44.0	35.5
Several huts/buildings [same compound]	2.6	2.8	2.7	10.2	4.6	28.5	13.1	8.6
Several huts/buildings [different compound]	0.0	0.1	0.0	0.9	0.6	3.4	1.5	0.9
Tents/improvised home	2.3	0.1	0.8	0.1	0.1	0.7	0.2	0.5
Other	1.4	0.1	0.5	0.0	0.1	0.4	0.2	0.3
All	100.0	100.0	100	100.0	100.0	100.0	100.0	100.0

Source: Ghana living standards survey 5, 2008.

Living in bungalows, semi-detached houses and flats or apartments is not common among Ghanaian households. Only about 10 percent of households in the country live in these types of dwelling. About 16 percent of urban households live in bungalows, semi-detached houses and flats or apartments, while only 6 percent of rural households live in such dwellings(Glss5, 2008).

Table 5: Households in different localities by number of rooms occupied(percent)

Number of rooms	*Locality*							
	Urban areas			**Rural areas**				
	Accra	Other urbai	all	coastal	forest	savannah	all	Ghana
1	53.6	60.8	58.3	58.7	63.0	29.2	51.9	54.6
2	30.8	22.8	25.5	25.0	23.3	31.8	26.2	25.9
3	8.3	8.7	8.6	10.0	9.0	19.8	12.5	10.8
4	3.0	4.3	3.8	2.9	2.4	9.7	4.7	4.3
5	4.3	3.6	3.8	3.4	2.3	9.5	4.7	4.3
All	100.0	100.0	100	100.0	100.0	100.0	100.0	100.0

Source: Ghana living standards survey 5, 2008.

The distribution of households by size and number of rooms are shown in Table 5.

Again the survey indicated that nearly 64 % of households in the country share dwellings with other households. The average area occupied by households in urban areas (33.3 square metres) is higher than average area for household in rural areas (27.6 square metres). There is a marked difference between the proportion of households sharing their dwelling in urban areas (75.8%)and in rural areas (54.1%).

Land (formal/informal)

Land ownership in Ghana can be categorised into three types:

1.State lands are those specifically acquired by the government under appropriate enactment using state powers of eminent domain for a fair compensation,and governed by the State Lands Act of 1962, Act (122).

2.Vested lands are lands owned by a stool or skin but managed by the state on behalf of the stool or skin. Under such ownership the legal rights to sell, lease, manage, collect and rent are vested in the state by the stool or skin by the application of law.

3. Customary forms of ownership occur when the right to use or dispose of user-rights over land is governed solely by customary laws of the community residing on and using the land. Customary laws in Ghana vary from one community to another.

Housing construction & Building materials

Housing construction in Ghana is in a rather turbulent period due to the ever rising cost of building materials,high cost of land purchase, hgh interest rate and a limited acces to mortgage facilities. Table 6 shows the main building material components in the localities within the country.

Below is the distribution of main roofing materials,walls and floor components in the various areas of the country.

Table 6: Main material of Walls, and Floor by households in localities(precent)

Type	*Material*	*Urban %*	*Ghana %*
WALL	Cement/sandcrete	75.7	45.1
	Bricks	0.6	0.6
	All others	23.7	54.3
FLOOR	Cement/sandcrete	93.1	85.1
	Bricks	0.1	0.1
	All others	6.8	14.8

Source: **extracted from the Ghana living standards survey 5, 2008.**

Access to and cost of Basic Services/Infrastructure

Majority of Ghanaians have access to lighting(73%),with kerosene and electricity having both 49%.However 72% of the urban households have access to electricity. 40% of households have access to portable water,41% from well and 16% from other natural sources of water.With respect to fuel for cooking the survey indicated that majority of households use wood(53%) and charcoal 31%.20% of urban households use gas.

It is revealing to note that 1 in 10 households use flush toilet and 32% of households use pit latrine,whiles 20% have no access to toilet facilities at all.(glss5)

1.3 Housing Policy

The country since independence has seen a variety of shelter policies and strategies but little has been done with them due to various factors such as political interference and change of government, lack of political will, policy direction of succeeding governments, lack of funds and private patnerships etc.The “roof loan scheme” which was introduced in 1957 to address shelter problems during the independence era was successful in 25,000 villages until its abrupt end in the 1980’s.

In 1985 when the government realised that there was housing deficit of about 250,000 , initiated a study leading to the preparation of a national housing policy and action plan for the period 1987-1990.The outcome was the draft document of the national housing strategy in 1992 which has been reviewed(Acquaah H.R, UNHSP).The following existing documents/drafts have been used and reveiewed by various governments since the 1990's:

- The National Shelter Strategy Volumes1&2(1993), prepared by the Ministry of Water Resorces ,Works and Housing(MWRWH) under UNHABITAT
- The " Instanbul Declaration and the Habitat Agenda", June 1996
- National Shelter Strategy Part One (revised in December 1999), MWRWH.
- National Shelter Strategy Part One (revised in June 2000), MWRWH.
- Report on Housing Programs and Action Plan to implement the National Shelter Strategy, prepared for the MWRWH by T.D. Consults.

To address the problems of the housing sector in Ghana, President J.A Kuffour's government announced in the State of the Nation Address in 2005 the

commencement of a programme to build 100,000 housing units over a ten year

period, through Public-Private-Partnerships aimed at providing decent, affordable accommodation for the middle and low-income groups.

Government is in the process of reviewing the National Shelter Policy, with the ultimate goal of providing adequate and affordable housing with requisite infrastructure and basic services to satisfy the needs of the people (GOG 2008, Ministry of Water Resources,Works and Housing). A National Housing Conference is scheduled to take place in October 2009 in respect of this.

1.4 **Actors in Shelter Delivery and their Roles**:

The actors in the delivery of shelter and their various functions have been listed below:

- **Government** - the government deals mainly with acquision of land and vested lands and provision of basic infrastructure and uitility services through the ministries,MMDA's and other commissions and agencies such as the Lands Commission and the National Development Commission.

- **Traditional Authorities** - They are the owners of the land or hold the land in trust of the people.Again they initite and execute physica land landuse planning in their areas of jusidiction
- **Financial Institutions** - These bodies provide financial support and mortgage facilities to the prospective owners
- **Private Developers** - Construction and delivery of mass housing units for sale or renting
- **Professionals**- they are responsible for the advice, planning,design and supervision of housing related works
- **Industry** - These are those who make, procure or supply building materials to the housing construction sector.

1.5 **Shelter Design**

Shelter design in the country is mostly done by professional(architects,engineers) and to a lesser extent draftsmen who are qualified to design within a limited scope.These designs are informed by numerous factors such as landuse,building regulations,concepts,climatic,environmental and social settings as well as the tastes of clients.

Again the individualisation of plots(concentration of planning in the horizontal dimension rather than vertical) have given rise to low densities and low floor space index ratios making waste to the land. Poor safety and poor quality standards exists both in the urban and rural areas.This is a result of the low income levels of most households which dictates the kind of housing with respect to design,materials and technology application.

Most houses found in the urban centres are made of cement/sancrete blocks(Glss 5, 2008) and roofed with corrugated metal sheets . With respect to functionality most houses in the urban centres perform multiple tasks with their frontage serving as shops and offices normally complimenting houlsehod incomes. In the rural areas houses are mostly for residential and are succeptible to disasters such as fire outbreaks and flooding.

House ownership has always been with the male as he is always considered as the bread winner of the family.this is fading in the urban centres as women are now owning houses .Sustainnaible development with respect to housing is a big issue in

the urban centres as most methods employed leaves in its trail the over reliance of mechanical ventilation and lighting,and creation of slums leading to land degradation,environmental pollution,health harzards,disasters and poor maintenance.

2 Organisation Profile

The Building and Road Research Institute (BRRI)is one of the 13 research Institutes of the Council for Scientific and Industrial Reserch (CSIR) , Ghana. The BRRI was established in 1952.It is located within the science city campus of Fumesua in Kumasi the second largest and populous city in Ghana.

Our Vision and mission is to be a commercial-oriented research and development organisation in the building and road sectors for the socio-economic development of Ghana.

Some of our core mandate are:

- To undertake Research and Development of local building materials for shelter construction.
- To tailor research and development activities to national needs.
- To undertake research into all aspects of building and road design and construction with the view to ensuring efficiency, safety and economy.

The Institute's core staff are research scientists with varied experience and skills,and are over the years have chalked remarkable success , some of which are in the areas of fast track construction methods,appropriate technology,cost saving building technologies,development of alternative local building materials and management improvement training programs(www.brri.org. June 2009).

3 .0 Shelter Problem:

The provision of affordable and a sustainable housing for the low income earner in the urban centre has always been a problem for the government as various interventions has failed.This is due to the fact that the preferred majority of our building components are expensive and overreliannce of contractors on the use of imported building materials. Ghana spends between 100 and 150 million dollars yearly on importation of clinker and gypsum.

Again the high rate of inflation, lack of adequate and competitive access to credit facilities, lack of interest in local building materials, lack of government subsidy on materials and lack of a strategic policy aimed at affordability in terms of alternative building materials.

According to the UNHABITAT 1996 report the provision of adequate housing for every one requires action not only by government but by all sectors of society which includes the private sector, non-governmental organizations, communities and local authorities as well as partner organizations and entities of the international community. Housing is one of the basic needs of life and it is a fact that delivery has seen profound challenges given the increases in population growth and urbanization

Urbanization is expected to reach 65 percent by 2030. The danger lies, not in the scale, but in the nature of that urbanization, for there is no doubt that one of the major problems facing most developing countries is the massive, unplanned, unbalanced, uncontrolled growth of their cities and conurbations(UN-Habitat).Again slums in developing countries are growing by 120,000 every day as reported by the Cities Alliance Report of 2008.

The country is struggling to achieve the shared vision of the Millennium Development Goals (MDGs) of improving the lives of at least 100 million slum dwellers and reach middle income country status by 2020.One of the key areas whereby a country can stimulate economic while at the same time improving their living conditions is through the provision of affordable shelter(The Growth and Poverty Reduction Strategy II, 2005)

There is therefore the need to look at how government can strategically plan to incorporate the basic needs(housing) of the urban poor in emerging cities and urban centres of the country. One way is to promote the use of local materials such as clay bricks.This was contained in the 2008 budget to parliament where government proposed to conduct futher research into the use of local building materials in order to reduce importation bills.

Clay bricks which has enough raw material deposits nationwide accounts for just 0.6% of the total housing stock whilst cement/sandcrete accounts for 75% in urban areas.this over depence on cement based product has greatly increased the cost of housing because the base material is imported at greater cost to the government.the

continuous us of this product is therefore unsustainable hence the need to look at other better alternative local building mterial- clay bricks.

With housing affordability ratio as low as 6.4%,and the annual average household expenditure outweighing the household income by 50% it is increasingly becoming impossible for the low income to rent let alone save to build. Again most houses are left uncompleted due to ever rising cost of conventional materials .

This problem which not only affects the poor but government expenditures, private developers,professionals and credit lenders has been in existence over the years due to the following reasons:

- Various housing policies, laws and regulations are not wholistically planned and implemented
- Over dependence on expensive but less quality conventional materials
- Inadequate technical knowledge of the professionals,contractors ,artisans and private developers on alternative building materials
- Negative public perception on the use of such local materials

Non local or imported resources are frequently not afforadable and in many cases do not on their own provide the same climatic protection as would be achieved through the use local materials(Building Issues vol 9, pg 5).the use of clay bricks will not only address the issue of accessibility and affordability but will also attain a climatically comfortable built environment.

Advantages to be derived include:

- Brick replacing mud or wood in rural areas means buildings appreciate in value
- Variety of shapes, sizes and colours
- Reduces cost on insurance
- Fire resistance
- Has a better resale value of about 10% more than others.
- Its environmental friendly and recyclable
- Provide better indoor quality and
- Job creation for the people

Environmental Factors/Concerns:

Many concerns have been raised on the sustainability of the use of bricks on a large scale due to its energy demand on the environment.Some of this concerns are: deforestation, land degradation, pollution etc.

Although this is true to some extent modern methods in the production of burnt bricks has actually reduced the energy demands as well as proper land management methods which preserves the land after the land mining. For example the use of woodlots for firing is being replaced with more environmentally friendly one like cow dung(organic manure), palm kernel shells, saw dust ,liquefied petroleum etc. Again land wining(land mining) which brought about land degradation is being managed by either carefully removing the top soil and later replacing or making it a landfill site for reclaimation.Modern methods in the process has also drastically reduced the energy loss and in the process reducing the energy demands. Thus the arguement that burnt bricks causes more harm to the environment than concrete based products is not a truism.clinkerwhich is used in the production of cement requires a lot of fossil fuels input and causes 5-7% of AGW gases worldwide.cement production consumes 4.8 Gj/ton whilst that of burnt brick is 176mj/brick,**Jayant Sathaye te al**, 2005.The table below shows the energy comparison of fossil fuel as against renewable energy:

Fuel type	Brick density(kj/m^3)	Energy content(MJ/m^3
Brick burnt with fossil fuel	700	2,524.20
Brick burnt with renewable energy	700	910

Source:**Fritz Moedinger**,- Sustainable Clay Brick Production.

It must be stated that brick fired with renewable fuels features the least energy content of all building products available on the market today.

3.10 Cost Analysis

A major consideration in the choice of materials for building construction has been the consideration of cost at various stages,and what stands out in developning countries is the initial construction cost. Thus a tendency to be misled that a cheaper initial construction cost will necessary make your building

cheaper.Without considering the life cycle cost of a building one cannot arrive at the conclusion that one house is cheaper than the other.operation costs,mentainance costs, repelcement costs are amongst numerous cost components to consider . In Ghana one contributing factor for the preference of sandcrete blocks to bricks is the initial cost of the material and the cost of construction as shown in table 7

Table7: Current initial construction cost of cement/sandcrete block and burnt bricks(GH ¢):

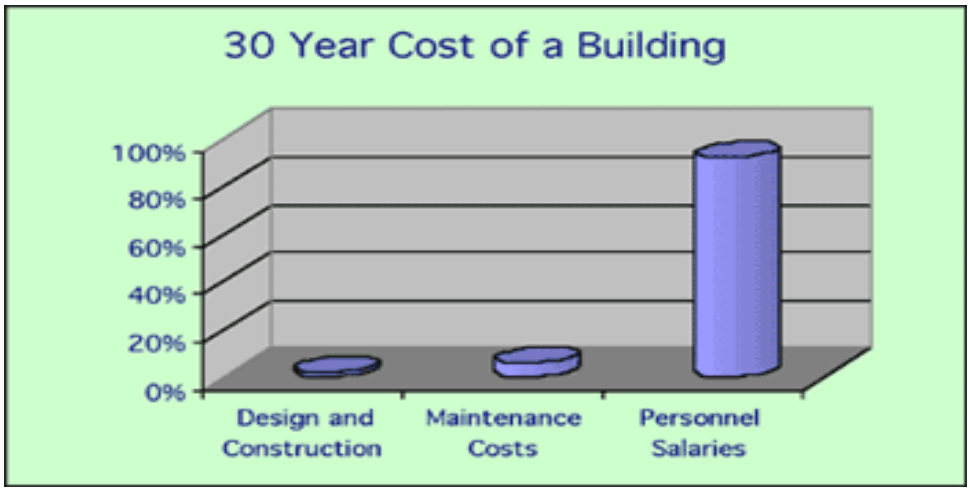
Material type	*Material cost/m^2*	*Labour cost/m^2*	*Rendering/ m^2*	*Painting/m^2*	*Total/m^2*
Sandcrete blocks	13.4	3.43	1.9(*2)	2.6	23.43
Burnt bricks	18.5	6.7	-	-	25.30

Source: Building and Road Research Institute

Note:

The initial construction cost of bricks is slightly higher than the sandcrete blocks due to the cost of production and higher cost of labour, but if it is to be assessed by the life cycle cost then bricks will become cheaper and of a better quality than the former.According to the National Institute of Building Sciences,2009, the design and construction cost of a building constitute only 2% whilst maintenance costs accounts for 6% of total building cost.

Graph 2: Life cycle cost analysis of a 30 year duration of a building



Source: National Institute of Building Sciences

Thus a simple two bedroom house(with 80m^2 built area) that costs about $30,000 to design and construct in sandcrete blockwork (excluding, fenestration, glazing,

ceiling finish,floor finish,plumbing and electrical) will cost $34,500 using brickwork.

TABLE 8:**Comparative Cost Analysis Of Clay Bricks And Sandcrete Blocks Over A 30yr Period**

Item	**Initial Cost (A)**	**Maintenaince Cost - Painting (B)**	**Operational Cost-Electrical (C)**	**Total Cost In 30 Yrs =(A+B+C)**	**Remarks**
2-Bed Sandcretee	$30,000	$16,800	$36,000	$83,800	Painting and Electrical were used for the running cost as major factors in Tropical Regions.
2-Bed burnt Bricks	$34,500	$2,500	$20,700	$57,700	
4-Bed Sandcrete	$52,000	$29,120	$62,400	$143,520	
4-Bed Burnt Bricks	$59,800	$4,500	$35,800	$100,100	

Source: CSIR-BRRI, 2009

Note: The operational and mentainance cost for the thirty year period did not factor in inflation,market trends and depreciation of currency.

A study of 2-bedroom and 4-bedroom house using both materials showed that initial construction cost of burnt bricks was about 11% more than the sandcrete ,at the end of the thirty year period the total cost of the sandcrete had almost trippled whilst that burnt bricks had doubled as shown in table 8.

3.20 BRIEF HISTORY OF THE BRICK INDUSTRY IN GHANA

The Scottish Missionaries first introduced bricks into the country in the late 50's. Brick and tile factories were strategically set up in some regional centers in the late 1970s which was envisaged to be the beginning of a bick and tile revolution in the country. Some of the factories set up were at Asokwa near Fomena in the Ashanti region, GIHOC brick and tile at Weija, others were set up in Accra, at Prampram, at Kibi, and at Danyi, in the Volta region.

A committee was set up in 1976 by the then government with the aim of solving the housing problem facing the country through the development and use of local building materials[*Report of the committee appointed by the Ministry of Works*

and Housing on "The development and use of Local Building Materials – August 1978]. The committees terms of reference were:

1. To examine critically and submit realistic and practical recommendations on how best and how effectively, local building materials could be developed and used extensively in national building programmes.

2. To ensure that the result of the recommendations could be used in the then financial year.

Among the recommendations were; as a short term measure, the improvement of the existing building materials industries especially brick and tile factories, such that they could increase their production capacities. For the medium term the development and use of some essential building materials was also most critical. These were burnt clay bricks, lime, pozzolana, natural stones stabilized earth blocks and wood products. Training of personnel both in the manufacture and their methods of use was also an essential prerequisite to the local building materials revolution. The long term phase was the general use of capital intensive methods of production.

In the view of the committee these three factors were critical:

1. National assault on reducing the cost of building materials.

2. Ensuring a success in the national programme for development and use of local building materials

3. Making national building and construction industry self reliant.

Contribution Of Csir-Brri, and The Sector Ministry On Housing;

Training Of Trainers/End Users

In 1984 – Min of Works and Housing decided to help the BRRI to promote the production and utilization of burnt clay bricks in the country through the use of Hand Moulding Technique and Clamp firing methods which the Institute had developed.

Through the ministry's collaboration about 300 artisans had been trained all over Ghana in the production and laying of bricks.

Research scientists were encouraged to focus attention on various aspects of the production and firing methods to support the brick revolution. This has resulted in the development of other clay products like paving bricks. **[J. K. BOADI, 2003],** salt glazed floor and roofing tiles, to complement the brick usage.

An evalution of the impact of the training programs showed that most of the factories set up had collapsed by 1988, and the contstruction front showed little progress.this was attributed to the lack of capital and market for their products [JAST 1996 Page16]. Unlike the making of sandcrete blocks which takes about two days,the production process of burnt bricks takes a whole month and this apparently holds up capital. Again the failure of BRRI to make follow ups to these factories and organise management training for them also played a factor.

Moreover government initial commitment of championing the use of burnt bricks faded away whilst some of them also had issues with land acquisition.

3.30 FIELD SURVEY

In order to better appreciate and understand the problems why people prefer sandcrete building to that of burnt bricks ,a survey was conducted amongst construction professionals (architects, engineers, real estate developers, control factors, artisans) and non construction professionals such as individual house owners and prospective ones. Since over 95% of brick construction in Ghana is done in single leaf (half brick thick) the survey was restricted to that.

In all a total of 285 questionaires were administered and 216 responded.A breakdown of the respondents were:

- Total respondents 216
- Professional respondents 135
- Non-professional respondents 81

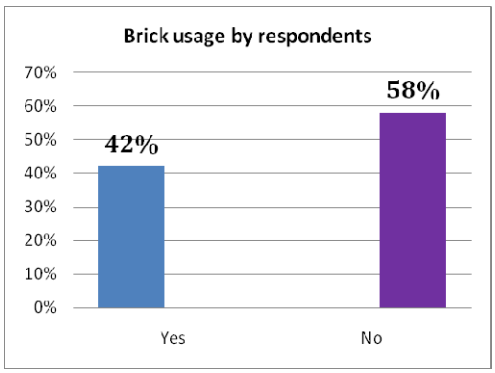
Survey Results And Findings

Issues raised by respondents on the preference of sancrete blocks to the clay bricks in housing construction have been listed below in order of ranking:

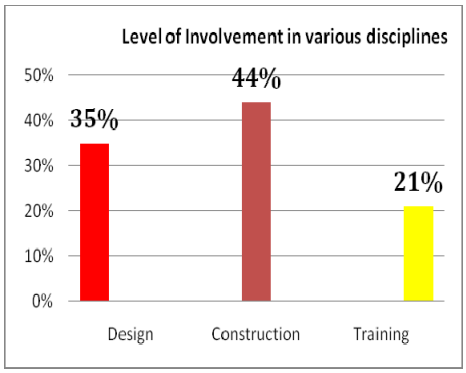
- lack of design data on its use
- non-availability of design and construction experts
- initial cost of construction high
- non availability of the bricks on the market
- irregularity in shape and colour
- smaller and appears weaker than the sandcrete block

- flaky and algae formation

Graph 3: Brick Usage by Stakeholders



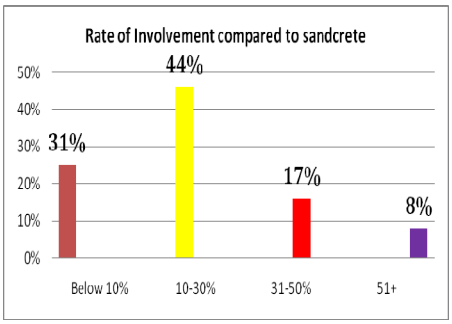
Graph 4: Level of Involvement



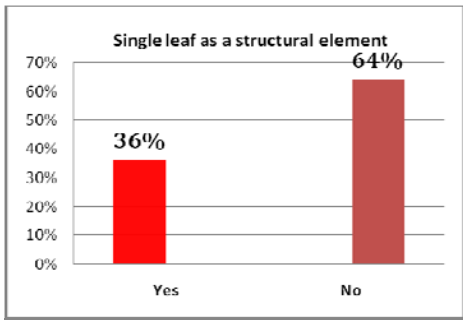
Inference from the survey study show that:

- Majority of the stakeholders have not been involved in the use of bricks in anyway, except the casual hearing of it.
- Out of the minority who are involved ,44% are actually involved in its construction whilst the majority(56%) are into design and training(education).
- 79% would want to use bricks either in full or in part of their building whilst 21% would use it for their fence walls
- 77% are comfortable using brickwall up to a height of 3m
- Majority do not support the idea of single leaf brick as a structural material(beam,column, etc) due to the lack of adequate information on its use

Graph 5: Rate of Involvement

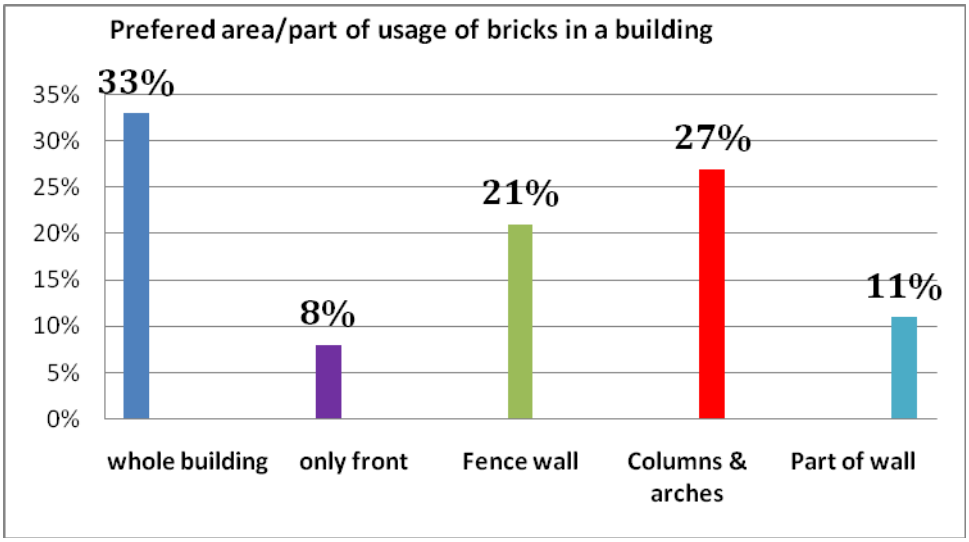


Graph 6: Brick as a Structural Element



- Moreover as shown in graph 5 only 8% of the construction professionals have had more than half of their work done in bricks.a whooping 77% have had less than 30% of their work done in bricks.

Graph 7: Parts of the Building for which Bricks would be Prefferred



- Interestingly all respondents indicated their interest in using bricks either in part or in whole of their building fabric.

4.0 CONCLUSION

Ghana stands to derive a lot of benefits from the production and use of burnt clay bricks if this alternative local building material is critically promoted.Whilst recognising the challenges facing the brick industry such as energy requirements , environmental issues and cost of production,a collaboration with the stakeholders of the housing sector can fashion out practical solutions to these.

To date clay brick usage as a construction material is showing signs of slow, but improved patronage. Despite various fora and workshops being undertaken to promote the use of clay bricks as a major construction material in Ghana, usage is still not up to expectation.

Available data shows that there is enough clay within all the regions of Ghana which can last over 300 years. Massive production and use of clay brick and tiles will reduce import bills on cement and cement products

Although the initial cost of clay bricks construction as of now is slightly higher than that of the sandcrete blocks massive growth and patronage of the brick industry will reduce the cost in the due course. Again it is a fact that it is cheaper to live in a brick house than in a sandcrete house considering the running cost involved in the two.

5.0 RECOMMENDATIONS

It is recommended that as a matter of urgency a national policy on the utilisation of local building materials be put in place and be backed by legislation which will make it enforceable within their localities.Hence the need to revise the national building regulations to incorporate these materials.

It is recommemnded that government through the various metropolitan, municipal and district assemblies construct at least 50% of their projects using burnt bricks.

Furthermore:

- As a medium term measure all dormant and collapsed factories be reactivated by the government
- Document cost-effective and improved technologies for the production of durable bricks.
- Effective training and management workshops should be organised for stakeholders in collaboration with the sector ministry.
- There should be a close relationship between brick producers and users to know the demands and taste of clients.
- Again there should be a national consciousness in the use and application of our local building materials(for which clay bricks cannot be ignored) through curricula development in both secondary and tertiary institutions
- Construction professionals should be sensitised on the design and construction of burnt bricks through their continuos professional education
- Local brick manufacturers should be supported in terms of needed inputs and structures especially needed market for their products
- Serious support for research institutes such as BRRI, IIR of CSIR, Universities, Associations such as MRS-Ghana, with needed equipment and financial support is a must

Above all one cannot ignore that the government's commitment and support is very vital if the brick industry is to be revolutionalised.

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