

**ABSTRACT**

The production of building materials in Nigeria has over the years been dominated by large scale industrial concerns. These establishments thrived in the 1970s and 1980s when government industrialization policy was hinged on import substitution. They relied considerably on the importation of raw materials, machinery, and technology. The downturn in the economy of the nation with the consequential high costs of imported raw materials and spare parts of machinery has brought down their production far below their installed capacities. This, among other related factors, has resulted in gross inadequacy of building materials and very high costs of available ones. The avenue to redress the situation, this paper asserts, is the development of small scale building materials industries employing modified and simplified technology, and sourcing their raw materials locally. The basic objectives underlying the development of these industries are the increase in the supply of conventional and alternative local building materials, the development of indigenous entrepreneurial talents and skills, and the creation of employment opportunities. The paper examines the development of these industries, especially in rural areas, in the bid to revivify the housing industry in Nigeria. This is in view of the fact that building materials constitute a major part in housing delivery and therefore their availability and affordability are imperatives for housing development.

**KEYWORDS:** building; housing; industries; materials; small-scale.

**INTRODUCTION**

Housing is one of the important needs of humanity and it is an essential requirement for existence. Adequacy in housing enhances the welfare and the productivity of the individual and conversely its inadequacy threatens the very basis of his existence. This is quite evident in the circumstances of the urban poor living in slums that are prone to all kinds of communicable diseases, social, and even political unrest.<sup>1,2</sup> The place of housing in the life of humans is therefore eminent necessitating its adequate provision in quantitative and qualitative terms.

In Nigeria there is the incidence of massive rural-urban drift and rapid increase in the points of concentration in the urban centres. A consequence of this is the rapid deterioration of housing in the urban centres. The poor quality of most of urban housing stems mainly from the poor physical state of the buildings. The buildings are often unsafe and insecure and do not provide adequate shelter from the elements of weather. The environment in which the buildings are located is degenerated which leads to slum conditions. A greater proportion of the buildings require major or minor repairs to bring them to normative or structural quality.<sup>3-5</sup> The lack of access to adequate and affordable building materials hampers housing development and is a reason for the poor state of repair of buildings in both rural and urban centres in Nigeria. The state of repair of buildings takes into consideration the soundness of the roofs, walls, floors and foundations.

A major constraint in housing delivery in Nigeria is the scarcity of building materials and the concomitant high costs of available ones. This is due, in part, to the heavy reliance on importation of building materials and the poor state of the building materials industry in Nigeria. The reliance on foreign goods by Nigerians is a reflection of their consumer culture, and a result of their changing tastes, aspirations and needs. The production of local building materials has continually lagged behind this trend, resulting in the massive importation of building materials.<sup>6</sup> Besides, indigenous materials have not developed in appearance, technology of production and

application with time, therefore making them socially and psychologically unattractive to the generality of Nigerians.<sup>7</sup>

The economic depression experienced in the nation, and the consequent low values of the *Naira* (Nigerian currency) against hard currencies have made importation of building materials and raw inputs inexpedient. There is a dire need therefore to develop the local building materials industry in order to bring down the cost of the materials and ensure their availability. In recognition of this need, government has proposed import restriction of building materials to encourage and protect the production of building materials (such as plastic pipes, asbestos roofing sheets, tubes and pipes of cast iron or steel, galvanized roofing sheets) within the country. There is no shortage of raw materials for the production of cement, bricks, lime, asbestos sheets and wood components, thus asserting that Nigeria is in a position to develop its building materials industry thereby offsetting the enormous outlay on imports.

Most of the local building materials industries import their machinery and their spare parts and, in some instances, even have to bring in foreign technical personnel to maintain the equipment. This has become difficult and uneconomical because expenses incurred make the finished products outrageously expensive. Most of the industries, especially cement factories, are operating far below their installed capacities. This is traceable to the difficulty involved in procuring spare parts to repair broken-down kilns and production engines, apart from other problems such as non-availability of cement bags, lack of gypsum and incessant power failure.

A restraining factor in the development of the local building materials industry is the import content of building raw materials. This is in spite of the fact that existing indigenous raw materials are not sufficiently used, with deposits of these materials lying largely unexploited. All building materials whose major raw materials and machines input are locally available and are thus locally produced are recognized as local materials.<sup>7</sup> For instance if the essential raw materials for the production of cement which are limestone, clay and gypsum and the technology used in the production can be locally obtained, then cement is a local material. Improved alternatives to indigenous materials have arisen out of extensive applied research and development, notably by the Nigerian Building and Road Research Institute, NBRRI. These include stabilized earth blocks, clay roofing tiles, coir fibre cement, and reinforced roofing sheets.

This paper takes a look at the development and manufacture of building materials especially at cottage level by small scale industries in order to revivify housing development in Nigeria. This is in view of the fact that building materials constitute a major part in housing delivery and therefore their availability and affordability are imperatives for housing development.

## SITUATION OF HOUSING IN NIGERIA

As it is in most Less Developed Countries (L.D.C.s), the situation of housing in Nigeria is deplorable.<sup>8,9</sup> The vast majority of Nigerians (over 50 percent) live in the rural areas.<sup>8, 10, 11</sup> For these people the deficiency of housing is hardly in quantitative terms. They simply lack safe, sanitary and secure housing. The houses they live in do not have access to public infrastructure and services such as safe drinking water, electricity and sewage. Water from the public mains is a rare sight in the rural areas while virtually all houses there are not connected to any sewage disposal facilities whatsoever. This has severe health implications for the rural inhabitants. The supply of electricity is either non-existent or erratic at best. The buildings in these places often lack normative and structural quality and are, in the main, unsafe for habitation. In urban centres in Nigeria the rate of expansion of public infrastructure and services is low compared to the increase in the population which results in great strain on the facilities and near collapse in many instances.<sup>8, 12-14</sup> Increase in the quantity of dwelling stock too does not match the population explosion which is why there is severe overcrowding in existing stock, the growth of squatter settlements in the cities, and the emergence of slums.<sup>15</sup> Housing in the urban centres is severely degraded owing to poor public services, poor materials of construction (such as sandcrete blocks and concrete with excessive quantities of dust and clayey matter), and the decay of the building structures themselves.<sup>8, 16-18</sup> Urban planning hasn't been properly coordinated in the circumstance which has given rise to illegal structures sprouting up in the cities.

The incidence of housing poverty in urban centres in Nigeria has been informed, not only by the rapid rate of urbanisation in the country but also by the grievous poverty inflicted on the vast majority of the populace on account of the downturn in the economy. Adedeji<sup>19</sup> asserts that 60 million Nigerians (42 percent of total

population) are living below poverty line, 40 million of whom are extreme cases; these are the wretched among the poor. For these Nigerians their housing condition is a menace to health and an affront to human dignity.

### **BUILDING MATERIALS AND HOUSING QUALITY**

There is a correspondence between the attitude of an architect to space and the choice of materials he employs in defining and articulating it.<sup>20</sup> As a synthetic product, housing depends on available materials with particular regard to their properties and technical possibilities. The range and quality of building materials enhance their aesthetic values and structural performances. Owing to the poor state of development of the building materials industry in Nigeria, the nation relies on importation of building materials for its construction activities. The economic depression in the country which has weakened the *Naira* (Nigerian currency) against foreign currencies has made importation a costly and difficult venture, resulting in exorbitant prices of building materials imported into the country. It has further led to an alarming dearth of building materials needed in the country as local production is significantly low.

Aside from the quality of design and construction work, an important factor that determines quality in housing is the building materials and products used.<sup>21</sup> The technical characteristics of these materials, their historical precedents and future potential are determinants of the quality of architectural objects. Housing quality is therefore a function of the quality and efficiency of building materials. Important properties of building materials that come into reckoning in evaluating quality include strength, stiffness, heat resistance, fire resistance and those which the durability and functional performances of buildings depend upon.<sup>20</sup> Colour, face patterns, surface finish and texture all come into play in the determination of the aesthetic value of the building.

The process of design is influenced by decisions which are dependent on such factors as socials, structure, climate, culture, economics, technology, and available resources. This is manifested in traditional architecture which is evolved by the people, built by them and in the context of their community. The acceptance and development of values of the natural domestic (traditional) architecture of a people is vernacular architecture.<sup>22</sup> This is definable in terms of climate, culture and materials, and is congenial to a people and sympathetic to their environment.<sup>23</sup> Vernacular architecture is thus a generalized way of design derived from traditional architecture as built within the community, essential to its life and resolved through available materials. These materials could be indigenous building materials (such as stone, clay and its derivatives, timber, bamboo), improved alternatives (such as cement stabilized block from lateritic soil, bricks and blocks from mineral and industrial wastes, cement bonded wood, wood boards) and novel man-made materials (such as coated fabric and synthesized membranes). The adoption of vernacular architecture and consequently the social structures and cultural values that impinge on house forms would encourage the use of local building materials of indigenous origin by modern architects. These materials have been used for generations in Nigeria and are being improved upon technically through research. They are particularly applicable in housing with the principal objective of bringing it within the economic reach of Nigeria's poor majority who live in straitened circumstances.

### **SMALL SCALE INDUSTRIES AND BUILDING MATERIALS DEVELOPMENT**

A small scale enterprise is a business that employs a small number of workers and does not have a high volume of sales. The legal definition of a small scale enterprise varies by industry and country. The size of a business is thus defined by the number of employees and the amount of revenues. The definition is also dependent on the specific industry. A small scale industry is one with a labour size not more than 250 workers; and the Federal Government of Nigeria defines small scale businesses as those with annual turnover of not more than N500, 000 (\$3, 333) and whose capital investment is not more than N 2 million (\$13, 333)<sup>24, 25</sup> The level of technology employed, type of ownership of the industrial concern, and volume of sales are other determinants considered in the definition of small scale industries.

Studies have shown that small scale industries in many parts of the world play significant roles in the generation of growth and economic development and in the process stimulate economic activities of far reaching magnitudes.<sup>26-28</sup> These industries have substantial potential for growth on account of their significant role in realizing major objectives of creation of greater employment opportunities, increase in the supply of manufactured goods, the promotion of capital formation and the development of indigenous entrepreneurial talents and skills. In this connection Nigerian government has described the industries as the bedrock of the industrial development of a country. However small scale industries in Nigeria have performed at very abysmal level. Small scale industries are inhibited in growth by a number of problems. Some of these are lack of planning, inimical government regulations, poor marketing strategies, lack of technical know-how, and lack of capital.<sup>29-33</sup> Arising from the restraining factor of unavailability

of capital and poor management practices the quality of finished goods is often low. There is also inadequate government patronage of locally produced goods and lack of sufficient public enlightenment of the merits of the goods. All these have culminated in the social unacceptability of locally produced building materials.

Problems plaguing small scale industries in Nigeria could broadly be classified into five, viz: Managerial, Technological, Financial, Infrastructural and Fiscal Policy.

### **Managerial Problems**

There is usually a lack of effective and formal planning before small scale industries are set up. This is coupled with the paucity of necessary information about labour market opportunities, costs, customer preferences, behaviour of competitors, and new production systems.<sup>34</sup> Internal problems such as poor accounting standards, shortage of manpower, financial indiscipline and corruption also plague small scale industries which hamper their efficiency.<sup>30</sup>

### **Technological Problems**

Entrepreneurs often lack adequate information about appropriate machinery and technologies available locally. Importation of high technology (equipment, spare parts, and technical personnel) is out of the question owing to its high financial implication.

### **Financial Problems**

Finance assumes a great importance in the development of small scale industries. In the process of development its unavailability is a severe restraining factor. Small scale entrepreneurs often have difficulties in raising loans because of the lack of collaterals to support the loan application.

### **Infrastructural Problems**

Public services are generally in a poor state resulting in irregular supply of essential services such as power, water communications and transport (including access roads). The cost of alternatives provided in place of the public supply of these services is usually exorbitant and this ultimately leads to the high cost of finished goods.

### **Problems of Fiscal Policy of Government**

The capacity of small scale industries has often been undermined by the inability of government to execute favourable fiscal policies.<sup>30</sup> Inconsistencies in government policies have also been recognized as a major problem affecting small scale industries in Nigeria. Other factors of fiscal policy of government affecting the optimal operations of small scale industries include delay in budget implementation, and absence of harmonized and gazzetted tax regimes.<sup>33</sup>

## **MEASURES FOR IMPROVEMENT**

The production of local building materials needs to be re-ordered and intensified for housing delivery to be better facilitated to reach the teeming poor. The local production of building materials has to involve the development and manufacture of conventional as well as alternative indigenous materials. This is to encourage their development, manufacture and usage which would ultimately make housing in Nigeria more responsive, culturally and socio-economically. It is in this regard, therefore, that local production of building materials has to be revived in order for the nation to achieve self-sufficiency in them and more importantly for the materials to be affordable and be of good quality. The production of alternative indigenous materials alongside conventional ones would certainly give the necessary succour for housing provision in the face of the economic depression in Nigeria.

The local building materials industry should adopt simpler technology which is low in capital cost, flexible and adaptable to local conditions, and can be applied by the generality of the people. This should entail the local fabrication of machines and spare parts and the technical expertise required for their maintenance. Down drought kiln or vertical shaft kiln can be used for the production of clay bricks, and these can be wholly manufactured locally.<sup>35, 36</sup> The Nigerian Building and Road Research Institute (NBRRI) has developed various machines for production of blocks for walling, and paving stones for road construction. These were developed taking into cognizance the level of technology accessible and relevant to the Nigerian building industry at large. The level of technology is intermediate, which is between the traditional, manual/labour intensive system (usually very inefficient), and modern, mechanized, high technology system (usually sophisticated, and capital intensive). Intermediate technology best satisfies the requirements of on-site builders who use their labour to make building

elements in preference to factory-manufactured products that are fast getting out of the economic reach of the poor majority.<sup>36</sup> The machines developed by NBBRI include:

- (i) The interlocking block-making machine,
- (ii) Laterite grinding machine; and
- (iii) Interlocking paring stone machine.

The interlocking block-making machine was fabricated to enhance the efficient production and value of cement-stabilized clay blocks. All the accessories of the machines are sourced locally. The laterite-grinding machine was designed and fabricated by the institute to overcome the difficulty usually encountered in breaking down hard clayey soil to a powder suitable to be tempered with water before moulding. Lumps of clay are grinded to a suitable size with an electronic motor in the machine. The output of the machine depends on the hardness of the laterite. Paving stones, which are used as hard landscaping materials, are manufactured with the use of the interlocking paving stone machine designed and fabricated by NBBRI.

In order to develop the local building materials industry raw materials deposits have to be identified and efforts made to exploit them. This is in view of the fact that local sourcing of raw materials would considerably bring down the cost of finished goods. In further view of the fact that, the nation is sufficiently endowed in raw materials to support local building materials production,<sup>37</sup> industries importing raw materials for their production should be encouraged to look inwards for materials sourcing. Government therefore requires regulating the importation of raw materials in order to consolidate the nation's raw materials base.

In view of the important role finance plays in the process of development, it is expedient for government to make provisions for financial aid for small scale industries in the production of building materials. Credit programmes could be established for small scale entrepreneurs to set up and run their factories. A system of coordination could be evolved by government to ensure the flow of credit to the industry at appropriate terms. Existing arrangements could be strengthened and necessary changes be made to facilitate the availability of credit.

Nigeria could learn from the Indian experience where a wide range of financial assistance is given by commercial banks to the industry<sup>38</sup> viz;

- i) Equity support to start businesses with interest-free loans repayable in 7 years after amoratorium of 5 to 7 years.
- ii) Term loans for the construction of factory buildings and the purchase and installation of machinery and equipment;
- iii) Working capital given against pledge of stocks of raw material, semi-finished and finished goods. Overdraft and bill finance facilities could also be provided, and
- iv) Advances for setting up industrial estates could also be provided.

Small scale industries require counseling on technical and management matters right from appraisal stage. This could be in such areas as financial management, production planning and control, financial analysis and appraisal. This could be geared towards upgrading their managerial skills. Technical competence could be improved by organizing short courses, vocational training courses and part-time evening schools which would engender better work attitudes. It could be undertaken by the relevant arms of government, like the Ministry of Commerce and Industry.

The use of the mass media for the dissemination of information need be intensified on the quality and availability of locally produced building materials. Government at various levels could request architects handling their projects to specify these materials, and ensure that contractors use them as a proof of their good quality to encourage public acceptability.

### **REDEFINING A PROPER ROLE FOR THE PUBLIC SECTOR**

The goal of the New Nigeria National Housing Policy is a laudable one. Its prong is two-fold; first, the concept of affordability of housing is advanced, while accessibility to adequate housing by all, is the second. The socio-political dispensation in the country is generally expected to foster reforms that would revivify the economy of the nation thus leading to an overall socio-economic development. This calls for an integrated development strategy that recognizes the place of housing in the overall development of the nation.

The quantitative housing needs of the populace, though staggering, have to be met for all Nigerians to have access to adequate housing. The proper roles of the public sector need to be defined if this goal would not remain a mirage forever. The public sector would have to take a more definite position rather than remaining a facilitator or promoter of the enabling environment for housing delivery. Its more direct intervention in housing is thus advisable on the premise that:

- i. There is a very high incidence of poverty in the country which makes complete reliance on the private sector as the sole financier of housing unrealistic. The National Housing Fund which is supposed to be the source of housing finance is itself, faced with the difficulty of mobilizing contributions from the informal private sector comprising self-employed workers. These workers, who are mainly low-income earners, have to grapple with vagaries in the depressed economy of the nation, and as a result of mistrust and insufficient awareness on the scheme do not contribute to the Fund. The formal private sector too has not been forthcoming in its contribution to the Fund as the financial institutions (notably the commercial banks and insurance companies) have not been participating in the scheme);
- ii. The housing market has distinct peculiarities (for instance its heterogeneous nature, high cost relative to income, high transaction costs) which make it particularly difficult for the private sector to produce a socially optimal output. The private sector, which is essentially profit-oriented, cannot as well ensure an equitable distribution of housing resources. This is inevitable in a country with high unequal income distribution. The poor majority would, thus, be subjected to unending housing poverty in the absence of decisive intervention with respect to direct house construction of low-cost houses.
- iii. Massive housing intervention stimulates the economy of a nation, generating employment opportunities for the building industry and the various components of the housing market. This can only be initiated by the public sector in a nation with a high incidence of general poverty.

## CONCLUSION

The development of building materials by small scale industries is examined in this paper. This development involves the combination of inputs of technological skills, labour, finance, and managerial efficiency. The paper asserts that small scale industries could contribute substantially to the development of the economy of the nation with regard to employment generation, share of total production, and the utilization of raw materials. The paper highlights the factors militating against the growth of small scale industries in the nation, noting the preponderance of large scale industries in the past the majority of which are already operating far below their installed capacities.

The paper emphasizes the role that the rapid urbanisation of Nigeria has played in the degeneration of its housing, and the incidence of grievous poverty imposed on Nigerians on the account of the depression of the economy. In order to successfully tackle the monumental housing problems of the country there have to be significant reforms to revamp the economy. Housing development can only be meaningfully addressed within a general socio-economic development of the nation.<sup>39</sup> Government has a definite role to play in ensuring adequate housing for all Nigerians. It has a role to play in the development of the small scale industries by providing necessary logistic support. Government has to provide the socio-economic climate that is conducive for public services (telecommunication, power and water supply) to function properly.

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