Towards Sustainable Housing Solutions for the Low/Moderate Income Group in Ghana: Policy Change or Design Innovation?

[1]Agyefi-Mensah, S., [2]Post, J.M., [3]Egmond - de Wilde De Ligny, E.L.C. van, [4]Massi Mohammadi, [5]Badu, E.

[1]Stephen Agyefi-Mensah, PhD Candidate, Technical University of Eindhoven, (TU/e), The Netherlands, s.agyefi.mensah@tue.nl.

[2] Jouke M. Post, Professor of Architecture and Building Technology, Technical University of Eindhoven, (TU/e), The Netherlands, j.m.post@tue.nl.

[3] Emelia L.C. van Egmond-de Wilde de Ligny, Senior Lecturer in Innovation, Technology & Knowledge Transfer for Sustainable Construction, Technical University of Eindhoven, (TU/e), The Netherlands, e.v.egmond@tue.nl.

[4] Massi Mohammadi, Lecturer, Building Technology (Domotics), Technical University of Eindhoven, (TU/e), The Netherlands, m.mohammadi@tue.nl

[5] Edward Badu, Associate Professor of Building Technology, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana.

Abstract

The Government of Ghana since independence has tried various strategies in a bid to provide adequate, quality and affordable housing for citizens. This has involved different policies from direct intervention to current contemplation towards self-help mechanisms. The past results have however, been mixed if not a failure. The housing problem therefore continues to increase overwhelmingly, both in quantity and quality, and particularly for the low/moderate income group. The critical question is to what extent has these policy approaches failed, and in what ways can innovative design solutions contribute to solving the housing problem? What evidence exist, if at all, of the difference innovation in design can make? This paper examines these question using the case of the low/moderate income group in Ghana through a review of existing literature and personal observation. As the way forward, the paper proposes the need to reinforce policy decisions with innvoations in design strategies - solutions which empower residents to meet their own housing needs incrementally over time and in response to their particular requirements. The paper contributes to understanding the factors which may contribute to the success or failure of housing solutions and in particular for the low/moderate income in develping countries. It also contributes to understanding how design innovation can contribute to enhancing the housing quality of the low/moderate income residents.

Key words: Housing, housing policy, low-moderate income, affordable, adaptable, functional, design solution, Ghana

1. Introduction

The global housing problem is one of a tremendous magnitude both in quantity and quality. Already, there are over a billion people who lack adequate and decent accomodation (UNCHS, 1995; 1996). About 100 million people are even completely homeless (UN-Habitat, 2005). Qualititively, most of the existing dwellings are characterized by the lack of sufficent space, durable materials, water and sanitation, etc in the absence of consistent programme of maintenance and repair, most housing stock are fast deteriorating. The problem is acute in urban areas due to and severe among the low income group. UN estimates show that a little over 50% (3.3 million) of the world's population currently live in cities and by 2030 this would increase to about 60% (5 billion) (UNFPA, 2007). To accommodate the increase in the number of household over the next 20 years only, the demand for houses is estimated to be around 877 million (UN-Habitat, 2006). This will require more than 10, 000 housing units per day. The problem is also severe in the developing world – Africa, Asia, Latin America – and particularly among the low income group. Global Urban Observatory data indicates that less than half the population in Africa have infrastructure connections to water, sewerage and electricity in contrast to almost 100% of the population in Highly Industrialized Countries (UNCHS (2001).

Yet, a house is to all a basic human need, providing the environment needed for domesticity, identity formation and realisation of ideas and aspirations (Sparke, 2004). Hassler (2009), underscores the impact on the health, comfort, productivity and wellbeing of residents in view of the fact that an estimated 60-85% of a lifetime is spent in homes with half of this period in bedrooms. This makes design a house also very crucial to quality of life. This is even more so because families grow and shrink changing in composition and size, through the addition, growth, and departure of children, elderly relatives, etc at different stages of the family life cycle. These precipitate the need for change in the form of upgrading, renewal, modifications, adaptation, etc with significant implications for cost. These nothwithstanding, most buildings are rarely design to change as much (Gann and Barlow, 1996).
To be sustainable, housing solutions, however developed – i.e. whether through policy decision or design strategy – must take into account the long-term impact on the quality of life as well as cost of use.

2. The Housing Problem in Ghana

Conservative estimates by the Ministry of Water Resources, Works and Housing (MWRWH) shows that Ghana's housing deficit is in excess of 500, 000 units whilst supply varies between 24, 000 and 40, 000 units as against an annual requirement of 70, 000 units (MWRWH, 2005). According to the Ministry, the current annual supply to demand ratio (for new housing) is estimated at about 35%. This leaves an annual deficit of about 45, 000 units in addition to the backlog. This need is better understood when set within the context of the current urban population of 47.8% growing at an estimated rate of 3.5% (Department of Economic and Social Welfare, DESA, 2006). According to DESA, the urban population is expected to reach 75.5% by 2050, approximately about three times the share of rural population. If the supply-demand ratio is not improved, then in 40 years time, the country's need for housing will reach around 2 million units. This suggests that given the rise in urban population, the pressure on the existing stock will increase greatly, occupancy rate will grow accordingly and the quality of life will be seriously compromised. This could further be compounded by the problem of artificial demand, created as a result of the fact that exisitng houses are unable to support the evolving requirements of users in effective way.

The problem is not only quantitative but also qualitative. In 2001, the slum population in Ghana was estimated at 4, 993,000, at a growth rate of 1.83% per annum scattered in all the major cities in the country and was expected to reach 5.5 million by 2010 (MWRWH, 2005). A good number of the housing units are also characterised by poor materials that cannot protect occupants adequately against the elements (*Ghana Human Development Report 2000,* ISSER/UNDP, 2001). Besides, a large majority of these houses also have little or no basic services infrastructure including proper drainage and waste disposal systems (MWRWH, 2005). Providing adequate, quality and affordable

houses for the low/moderate income families has therefore remained one of the principal policy objectives of government since independence.

3. Past Policy Directions

The literature shows that several approaches have been tested by Government with mixed results (Tipple and Korboe, 1998; Arku, 2009; Obeng-Odoom, 2001; 2009).. In one approach, the Government of Ghana, sought to intervene directly through mass public institutional or formalized housing schemes – financing, subsidizing, producing and administering housing -, while simultaneously controlling rent and regulating the housing market Over time, the weaknesses of this approach, shifted Government's role as a provider to a facilitator, creating the 'enabling' environment for private sector participation through improved instititional frameworks and strategies. Some of these include site-and-service schemes, settlement upgrading, along variants of public-private partnership through liberalization of the economy, tax holidays for developers, tax rebates on building material production, regularisation of land tenure, deregulation of the housing market, establishment of mortgages finance systems, coopertive housing, among others. Overall these efforts have failed to yield the desired results. For example, Tipple and Korboe (1998), reviewed past and present housing policies in Ghana since independence with reference to the National Shelter Strategy, 1993, in the context of housing supply for the low income households. The study revealed that contrary to policy objectives, production figures show a dominance of upper and middle income group housing. Building on this work, Arku (2009), examined the effect of housing policy change in Ghana since the 1990s on the housing sector and the implications of the shift from direct state provision to a facilitator. He concluded that although one of the key goals of the reforms was to make housing accessible to the low/moderate income group, this failed woefully to be within their reach. In summarizing the housing situation for the low-moderate income dwellers in Ghana, the MWRWH (2005) observed that although the low and moderate income families representing approximately 70% of the population are in the most need, only a small fraction of housing delivery has been able to filter to them. Indeed, the trend now is towards gated housing, far out of the reach of even the middle income (Asiedu & Arku, 2009). Housing thus, has failed to be accessible[1] to the low income group in Ghana.

Besides the problem of accessibility, housing for the low income urban dwellers also fail to meet demand in terms of quality[2] (and hence habitability). Konadu-Agyeman (2001), surveyed the housing conditions and characteristics of low income families in urban Accra, comparing the situation in the 1950s to that in the 1990s. The study showed seemingly deteriorated conditions above that of the 1950s. First, over 54% of household heads surveyed expressed disssatisfaction with the conditions of their houses, citing the lack of privacy, adequate facilities, facility sharing, poor sanitation, drainage and waste disposal systems among others. In addition, the study found that on average there were about 49 persons per house, 4.2 persons per room and 1.2 rooms per household. Set against the national occupancy rate of 2.5 persons per room, an overcrowding condition can be inferred. Studies show that characteristically, less attention is given to the physical quality of houses for the low income in terms size, relative to the number of inhabitants, how it is designed and built, such as the quality of materials used, access to basic infrastructural services, such as water and sanitation, etc (Breddnoord & van Lindert, 2010). The UN-Habitat (2006), observes that the lack of adequate living space is most acute in Africa and South- and South-east Asia. Besides, more than 25% of urban population in developing countries, 560 million, are confronted with a lack of adequate sanitation. The problem of housing the low/moderate income in Ghana is therefore not only in terms of access but even more in terms of quality (habitability).

4. The Critical Failure Factors

[1] *Accessibility describes the proportion of people who are able to buy, rent or in other ways obtain adequate, quality housing (UNCHS, 1996)*

[2] *Quality of housing relates to its size relative to the number of inhabitants, quality of construction, and the extent of provision for water supply, electricity, sanitation and drainage (UNCHS, 1996).*

The situation above has been attributed to several factors. Some argue that most of the policies are 'income-blind' resulting in a situation where 'affordable' housing becomes only within the economic reach of the high income group, who purchase and lease or rent the houses to the low income at cut throat prices (Obeng-Odoom, 2010). Studies by Konadu-Agyemang (2001c) on housing affordability, revealed a price/income ratio of 1:67 for a senior public servants and 1:86 for a university professor. This is in the light of the fact that about 39% of the Ghanaian population live below the poverty line, with about 27% in extreme poverty (NDPC, 2004). Gann and Barlow (1996), refers to this as an *'affordability gap'* – the gap between mean incomes and mean house prices. Fiadwo *et al.* (2007), found after examining the relationship between socio-economic and demographic factors and housing quality indicators in Ghana that income appears to be the principal determinant of housing quality. The implication is that the lower the the income, the poorer the quality of the dwelling. In addition to this, Tipple and Korboe (1998), argue that the policies have been divorced from the actual socio-cultural values of the Ghanaian people, suggesting that they are 'context-blind'.They argue that to be supply- efficient, and particularly in response to the demands of the low/moderate income, policies must take into account the perculiar characteristics of the Ghanaian housing and urban society, rather than through the imposition of alien market-oriented value systems. This extends to include constraints on design solutions imposed by outmoded building regulations inherited from British colonial rule (Konadu-Agyemang, 2001; Tipple and Korboe, 1998). For example, Section 18 (1) of the Building Regulations states that no dwelling shall be constructed on a plot of less than 2400 square feet (223 m^2). This tends to increase housing cost. In addition it is difficult to build a traditional compund house and still keep within the building and planning regulations. For example, planning officials regard the courtyard spaces as part ofthe built building area and not part of the open area required in the regulations. The Housing Ministry (MWRWH 2005), on their part blames the problem on the dominance of the conventional (formal/institutional) housing delivery system, which has failed to utilize the capacity of the informal system to contribute to increasing the national output.

Beyond these challenges, Aravena (2006) observes that one of the fundamental problems of social housing is that funds available do not match the cost of building a dwelling. Yap et al. (1993), add that in mass low income housing, rental revenues are unable to cover costs of maintenance and repairs. This means on the part of Government as a 'provider-investor –manager', raising the funds for housing capital investment is often a challenge. On their part, users are unable to pay rents that are commensurate in order to cover maintenance and repair costs. Put together, this makes it difficult to raise sufficient funds to invest as well as to maintain the existing stock. Thus, a *'funding gap'* (Gann and Barlow, 1996) is created. On one hand, the situation increases the inertia for future developments. On the other, where there are insufficient funds to complete initiated projects, capital can be locked for a long time. For example, since the HIPC fund was depleted in about 2007, the nearly 5000 housing units under the Affordable Housing Scheme in Accra and Kumasi during the Kuffour adminstration has remained uncompleted to date.

More critically but less examined is the fact that in many cases the designs used for these mass publci housing fail to meet or support the requirement of residents in an effective and meaningful way. For example, the although the Draft National Shelter Policy (MWRWH, 2005) observes that "house designs do not facilitate the home based economic activities that women engage in". Like many low income houses, they are small and characteristically inflexible (Yap & Walander, 2010). The problem is thought to arise because in mass housing programmes, as a prerequisite for efficient operation and production processes, requirements are often 'normalised' to produce 'standardized' design solutions (Habraken, 1975). The designs are therefore often 'one-size-fit-all' in nature intended to serve some 'common-denominator' group of users, with very rigid plan which do not allow for internal adaptations over time. (Kronenborg, 2007). They are therefore difficult to customize or modify beyond surfaces finishes. The rigid plan unwittingly also introduces some form of built-in obselescence (Kronenborg, 2007). The spatial configuration also lacks both variety and the capacity to accommodate post-occupancy changes (Wong, 2010). Breddnoord & van Lindert (2010), observe that given the diversity of the needs and priorities of households, as a result of differences in stability and sources of income, saving-capacity, and differing phases in the family

cycle, no such standard solution can be thought to be useful. In fact, Habraken (1972) observes that this results in houses the may be described as 'perfect barracks'. The argument is that because the goals, aspirations and perceptions of the user and designer on quality often conflict, it is impracticable to assume that a design that meets the designer's expectation based on expert knowledge and experience will be acceptable by the users (Rebano-Edwards, 2007). Scott (1998), observes that this top-down approach leads to failure of schemes. The designs consequently fail to serve intended purposes – it becomes less functional. This is leads to what may be described as a '*functionality gap*'. In effect users get dissatisfied (Vischer, 1985), even though often with no alternative to move.

It can be concluded that housing in Ghana has failed to be:

i) adequate because they have not been 'fundable'
ii) accessible to the low/moderate income because they have not been affordable
iii) of the habitable (desired quality) because they have not been functional or otherwise adaptable to changing needs

5. The Way Forward: Policy Change or Design Innovation?

The review above shows that in order to meet the demand for adequate, affordable and quality (habitable) housing for the low income urban dwellers, both policy change and design innovation are imperative. From a policy perspective, the Government of Ghana in the Draft National Shelter Policy, now seeks to exploit the potential of self-help housing strategies (MWRWH, 2005). Government recognises that athough the informal sector (non-conventional methods) contribute about 80-90% of the national housing output, little attempt has been made to utilize this capacity (MWRWH, 2005; Konadu-Agyeman, 2001b; Arku, 2009). This may be supported by the fact that self-help has been found by both scholars and practitioners as regularly the most feasible way for the low-income households to meet their need for housing (Turner, 1967; 1983; Breddnoord & van Lindert, 2010). According to the UN-Habitat (2005):

> *"assisted self-help housing is the most affordable and intelligent way of providing sustainable shelter. It is che because it is based on minimum standards and incorporates a substantive amount of sweat equity. It is useful because individuals and coommunities engaged in it acquire precious skills. It is practical because it responds to people's actual needs and levesl of affordability. It is flexible because dwelling units are often designed to be able to expand over time".*

While the design of houses for flexibility still remains marginal to the design profession in general (Habraken, 2008), and barely any attention in housing solutions for the low/moderate income group, studies on product engineering that takes into account life cycle costs, show that between 60-90% of the total product life cycle costs is determined at design (Syan, 2004). The implication is that design decisions may not only affect quality of use but long-term cost-effectiveness and hence affordability.

The growing attention among designers and design researchers attest to this need. For example, the 2008 Royal Institute of British Architects (RIBA) Research Sympoium was devoted to housing (Swenarton, 2009). Organized under the theme 'Space at Home', the symposium focused on what people think about their homes and the features that give a home value. Among the key observations were that although space at home constitutes one of the two essential architectural qualities of a house i) the design of houses hardly figures in what people consider important, being always about what is outside; and ii) that the tight-fit-functionalism of space standards constrain the usefulness of the space at home. Significantly, an approach towards more open design solutions in the form of 'soft space', 'dumb space', 'extendable houses' – houses that can be extened or spaces that can be used in ways thought up by the user rather than by the architect and not directed for a single defined use - in design was put forward.

The proposition of this paper is that, in order to contribute to Government vision of providing quality dwellings for the low income, it is important to examine the contribution of design solution to the success of self-help in other parts of the world. For example, in the Million Houses Programme in Sri Lanka, the design strategy was participatory (Joshi & Khan, 2010). This resulted in houses which were cheaper and better suited to the needs of occupants (Sirivardana, 1986). Habraken (1975), argues that "..no one can live satisfactorily in an environment in which they have no input; "dwelling is building". 'To build is to exercise power…. [it] is only when users themselves exercise power by directly influencing or controlling a part of the physical environment can we expect healthy, vital and steadily improving environments' (Habraken, 1980). In Hong Kong, a design strategy called 'Design for Tenant Fit-Out' has been reported for mass public housing (Sulliven and Chen, 1997). This provides residents with unfinished shell instead of completed flat. The open-ended plan design strategy allows individual families not only to fine tune layouts according to their specific needs, but to build incrementally according to their resource capabilities. Arvana (2006), argues that given the problem of funding, the radical solution to social housing is to build only half of the house, as a shell and core, and leave it to the occupants to finish it. Such an approach enhances functionality while being affordable. In the case of self-help in Bankok, the houses were actually designed to be transformable – being developed incrementally by the occupants (Yap & Wandeler, 2010). This allows the owners to change the interior of the unit to adapt to their specific needs over time.

What is interesting is that residents still find a way to alter their dwellings even if not designed to change as much. In similar studies about government estates houses in Ghana, Zimbabwe, Egypt and Bangladesh, Tipple (1996) and Tipple & Korboe (1994) found that residents transformation activites increased habitable space in terms of floor area and number of rooms, and consequently reduced occupancy rates without the need for new-builds. The conclusion is that design strategies which allow for user input in addition to opportunities for transformation would bettter contribute to meeting user requirement in the present as well as the future.

6. Conclusions

In conclusion, it can be stated that to enhance the housing quality of life of the low income residents, it is important to promote the means by which they can meet their housing needs in ways that best suit them consistent with their socio-cultural values. This means adopting design principles and strategies which meet present needs and also allows individuals to meet their own requirements in the future. In essence, this means the design solutions must be flexible and hence adaptable. This paper suggests that in order to be sustainable Goverrnment's self-help approach should take into particular account design solutions which enhances the capacity of the low income to build their own houses and meet their needs over time. This will help make housng accessible to intended target groups, and to bridge not only the affordability gaps, but also the 'fundability' and functionality gaps. The resulting solutions will then be functional, adaptable and affordable.

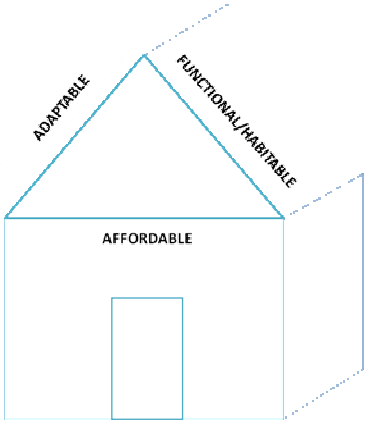

Fig. 1: The contributions innovative design strategies can make

References

Arku, G. (2009). Housing policy changes in Ghana since the 1990s. *Housing Studies,* 24(2), 263-274

Asiedu, A.B. and Arku, G. (2009). The rise of gated housing estates in Ghana: Empirical insights from three communities in metropolitan Accra. *Journal of Housing and the Built Environment,* 24: 227-247

Bredenoord, J. and Lindert, P. Van (2010) Propoor housing policies: Rethinking the potential of assisted self-help housing. *Habitat International, 34: 278-287*

Fiadwo, E.D., Houston, J.E., and Godwin, D.D (2001). Estimating housing quality for poverty reduction and development policy analysis: CWIQ in Ghana. *Social Indicators Research*, 53: 137 - 162

Gann, D.M. & Barlow, J. (1996). Flexibility in building use: the technical feasibility of converting redundant offices into flats. *Construction Management and Economics,* 14 (1) pp. 55 - 66

Government of Ghana, National Development and Planning Commission (NDPC, 2004) *Implementation of the Ghana Poverty Reduction Strategy (GPRS) 2003 Annual Progress Report,* March

Hasselaar, E (2009) 'Health issues and the building stock' *Building Research Information,* 37: 5, 669 -678

Habraken, N.J. (2008). 'Design for flexibility', Building Research and Information, 36 (3), 290-296

Habraken, N.J. (1975). Supports: An Alternative to Mass Housing. Architectural Press, London

Habraken, N.J. (1980). Design for Adaptability: Change and User Participation in Housing Process and Physical Form. Media, Singapore.

Joshi, S. & Khan, M.S. (2010). Aided self-help: The Million Houses Programme – Revisiting the issues. *Habitat International,* 34 : 306-314

Konadu-Agyemang, K. (2001). A survey of housing conditions and characteristics in Accra, an African city, *Habitat International,* 25, 15-34

Kronenburg, R (2007). Flexible: Architecture that responds to change. 1st Edition. London: Laurence King Publishing

Ministry of Water Resources, Works and Housing, (MWRWH) (2005), Draft National Shelter Strategy. Accra, Ghana. pp 4-5, 8, 14, 35.

Obeng-Odoom, F. (2009). Has the Habitat for Humanity Housing Scheme achieved its goals? A Ghanaian case study. *Journal of Housing and the Built Environment. 24: 67-84*

Obeng-Odoom, F. (2010). An urban twist to politics in Ghana. *Habitat International,* 34: 392 - 399

Scott, J. (1998). *Seeing like a state. Why certain schemes to improve the human conditions have failed*. New Haven: Yale University Press

Sparke, P. (2004). Studying the modern home. *The Journal of Architecture,* 9: 4, 413 - 417

Sirivardana, S. (1986). Reflections on the Implementation of the Million Houses Programme. Sri Lanka: NHDA, Ministry of Local Government, Housing and Construction

Swernarton, M. (2009). Research Shortcomings in Housing. *Building Research & Information,* 37 (1), 101-105

Sullivan, B. and Chen, K (1997). Design for Tenant Fit-Out: A Critical Review of Public Housing Flat Designs in Hong Kong. *Habitat International* 21 (3), pp. 291 – 303.

Syan, C.S. (1994). Concurrent Engineering: Concepts, Implementation and Practice, Kluwer Academic Publishers; 1st Edition,

Tipple, G.A. (1996). Housing Extensions as Sustainable Development. *Habitat International,* 20 (3) 367-376

Tipple, G.A. and Owusu, S.E. (1994). Transformations of Government-built low cost housing as generators of shelter and Employment, ODA Research Scheme number R4865. Working Paper No. 2. February.

Turner, J.F.C. (1983). From central provision to local enablement, new directions for housing policies. *Habitat International,* 7 (5/6), 207-201.

Turner, J.F.C. (1967). Barriers and channels for housing development in modernising countries. *Journal of the American Institute of Planner,* 33, 167-180

UNCHS (1995). *Review of National Action to provide housing for all since Habitat*: Nairobi, UNCHS

UNCHS (1996). *An urbanising woarld: Global reports on human settlement* (United Nations Commission on Human Sttlements). New York: Oxford Universiuty Press.

UNDP/ISSER. (2001). 2000 Ghana Human Development Report: Science, Technology and Human Development. Accra, Ghana:. Pp. 4-5, 31-32.

UNFPA. (2007). *State of world population 2007.* New York: United Nations Population Fund.

UN-Habitat (2005). *Financing Urban Shelter: Global report on human settlements*. London: Earthscan

UN-Habitat. (2006). *State of the world's cities 2006/2007, the millennium development goals and urban sustainability, 30 Years of shaping the habitat agenda.* London.

Wong, J.F. (2010). Factors affecting open building implementation in high density mass housing design in Hong Kong. *Habitat International,* 24, pp. 174 - 182

Yap, K.S and Wandeler, K.D (2010). Self-help housing in Bangkok. *Habitat International*, 34, pp. 332 – 341