IV-4 A DYNAMIC ASSESSMENT OF HOUSING INVESTMENT OPTIONS IN A CITY IN A DEVELOPING COUNTRY - THE CASE OF KUMASI CITY, GHANA, AFRICA.

Alex Boakye Asiedu, Seiichi Kagaya, Etsuo Yamamura

Department of Regional Planning,Graduate School of
Environmental Science, Hokkaido University

1. Introduction

The current spate of rapid population growth being experienced in the urban areas in developing countries has resulted in a plethora of problems that continue to attract immense attention in recent years. This trend, stemming from high in-migration and high birth rates, has developed into a situation where the provision of urban environmental facilities in reasonable quantities for the maintenance of clean, safe and liveable urban environments seem to have reached unattainable levels.
Without doubt, the most significant impact of the above phenomenon has been felt in the housing sector of third world cities where as a result of the existance of a permanent gap between conventional housing demand and supply, a large proportion of the population live in makeshift, unorthodox and largely illegal housing set ups with its attendant health and other related problems.

To overcome these problems, most city and national governments have adopted different measures resulting in varying degrees of problem solution. Generally however, the most serious setback seems to be the lack of a coherent and self-sustaining housing policies to accommodate long-term and uninterrupted development activities. Another seeming obstacle, perhaps, is the lack of adequate assistance for helping people in the low income bracket obtain minimum but reasonable housing in line with their affordability levels.
The present study focusses attention on Kumasi city in Ghana (Africa) in an attempt to redress these afore-mentioned problems through a dynamic simulation of housing investment options that can be made available to the different socio-economic groups within the city. Kumasi city with a population of 349000 (1984) is Ghana's second largest city.

2. STUDY OBJECTIVES

Based on the above elucidation, the objectives of the study are framed as follows:

a) To develop a system dynamics model based on housing needs and affordability levels among the socio-economic groups within the city by incorporating system variables such as population and household formation trends, housing investment and affordability levels as well as variations in housing stock.

b) To use the above model to simulate housing availability and investment levels among these groups through the application of different housing investment options.

c) To use the above results as a basis for formulating a housing investment policy that may be useful for redressing housing problems not only within Kumasi city but also in other third world cities confronting similar problems.
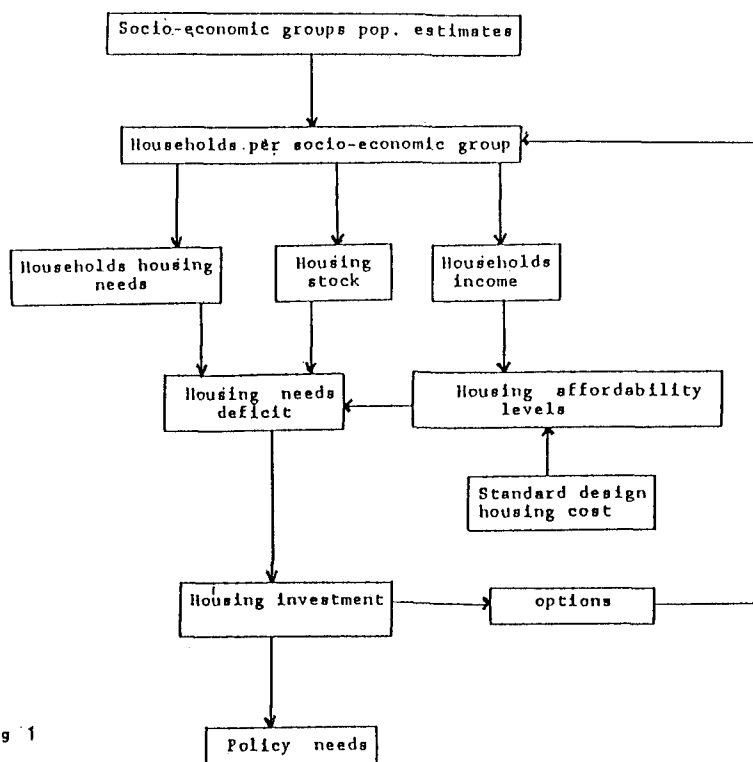
3. STUDY CONCEPT AND METHODOLOGY

Fig 1

The study concept as shown above (fig 1) serves as the basis for the model formulation. Households within the city, like elsewhere in the third world can be classified conviniently into three (3) socio-economic groups to capture the differences and problems imposed by income

differentials. These socio-economic household groups
namely - high income households, middle income households
and low income households display some variations in their
household formation rates, housing affordability levels and
operate within segmented housing markets which are
characterised as high income housing, middle income housing
and low income housing. Variations in earnings and household
formation rates result in a corresponding variation in
housing investments among these groups especially when
viewed from long-term perspectives. Since these processes
are not static and independent but dynamic and inter -
dependent i.e a low income household can an make an upward
movement on the income ladder into the high income
households sector while a part of high income housing stock
can deteriorate into the low income housing sector, the
study adopts and adapts the system dynamics framework
developed by Jay Forrester of MIT as the analytical tool to
suit the conditions prevailing in Kumasi city. The system
dynamics framework is specially designed to cope up with the
dynamic behaviour of the variables employed in the study. It
is also capable of ' taking good care of ' system variables
in which positive and negative feedback processes manifest
themselves in growth and regulatory action.

The above concept was transformed into dynamic flow
processes involving the interation of the various components
constituting the three principal sectors of this study
namely - population and household sector, housing
affordability and investment sector and finally the housing
stock sector and system equations based on the dynamo
framework were formulated.

4. RESULTS

a) Model results under present growth pattern.

Initially, the simulation of the essential model
components - household numbers, housing needs,housing stock
levels as well as housing investment and affordability
levels was conducted over a period of 20 years (1984 -
2004) to determine the changing trends in these model
variables. To allow for effective comparison over time, the
simulation was conducted in durations of five year
intervals. The output presented below (table 1) and
captioned OPTION 1 represents a premise that the present
growth trends in the variables will continue as before.

The results show that while high income housing
needs increase by 42.5% during the period under study, the
resulting increase in the housing stock is 113%. This is
attributable to the expected high construction and
investment activities in line with the current trends. A
continuation of this trend into the future is bound to
bridge the existing gap between the high income housing
needs and housing stock availability.

Table 1 : Results under Option 1

a)   High income sector
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year	1984	1989	1994	1999	2004
Housing needs	14040	16255	17637	18641	20002

(% Increase = 42.5), annual increase = 2.3%

Housing stock	4550	5797	7114	8416	9698

(% Increase = 113), annual increase = 5.65%

Housing investment (million cedis)	1179	1706	2328	3075	4000

b)   Middle income sector
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year	1984	1989	1994	1999	2004
Housing needs	20588	23877	25953	28486	30898

(% Increase = 50.1), annual increase = 2.5%

Housing stock	9504	10838	12321	13882	15539

(% Increase = 63.5), annual increase = 3.18%

Housing investment (million cedis)	1235	1802	2413	3079	4449

c)   Low income sector
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year	1984	1989	1994	1999	2004
Housing needs	22907	26287	28519	30384	34989

(% Increase = 52.7), annual increase = 2.6%

Housing stock	9646	10030	10482	11016	11647

(% Increase = 20.7), annual increase = 1.03%

Housing investment (million cedis)	825	1156	1568	2096	2799

Household housing needs, increase by 50.1% over the planned
period while housing stock increase is slightly higher -
64%, which invariably means that increases in housing
stock may outpace housing needs in the future given this
level of housing investment activity.

On the other hand, the low income sector portray some gloomy results. With housing needs experiencing an increase of 52.7%, the corresponding increase in the level of housing stock is at a proportionate low level of 21% , or an annual increase of only 1.03% in the housing stock as aganist an increase of about 2.64% in low income households housing needs.

From the above discussion, it can be realised that the future low income housing situation in the city, like elsewhere in the urban areas of developing countries looks very bleak and this calls for further examination of the available and reliable investment alternatives or options that can generate far reaching results. The section below examines two other policy options captioned as options 2 and 3.

b)   Model simulation under two other options

The investment policy alternatives postulated under options 2 and 3 draw on a Social security fund which is a publicly operated fund in Ghana. It is constituted partly from workers contributions and partly from government subscriptions and recently there has been an on-going discussion aimed at chanelling preferably half of the future contributions into housing development activities. This section therefore examines how this investment activity can help address housing problems in the city particularly those of the low income households where the problem is very acute.

a) option 2 - Under option 2, it is postulated that 50% of all contributions to the fund (as it is currently being emphasised) made by a specific socio-economic group be re - imbursed in housing development specifically for that group to complement their present housing development efforts.
b) option 3 - This option on the other hand, calls for the creation of a special housing development fund with half the contributions as was envisaged above. This housing development fund is to be allocated to the socio-economic groups as follows - high income households (10%), middle income households (30%), and low income households (60%) to reflect the future magnitudes of the socio-economic groups household numbers in relation to the total number of households within the city.
The results of these simulations, for reasons of brevity and space limitation have been presented below to show the initial and final values for 1984 and 2004. It has also been limited to variations resulting in housing investment turnover and the level of housing stock since they are the two major variables of special interest under the study.

Table 2 : Comparison of the three policy options

a) Effects of policy options on housing investment turnover of socio-economic groups (million cedis)

year	High Income 1984	High Income 2004	Middle Income 1984	Middle Income 2004	Low Income 1984	Low Income 2004
option 1	1179	4000(239)	1235	4449(260)	825	2799(239)
option 2	1179	6001(409)	1235	6674(440)	825	4199(409)
option 3	1179	4563(287)	1235	6137(397)	825	6177(649)

% Increases are shown in the brackets

b) Effect of investment options on changes in housing stock.

year	High Income 1984	High Income 2004	Middle Income 1984	Middle Income 2004	Low Income 1984	Low Income 2004
option 1	4550	9698(113)	9504	15539(64)	9646	11647(21)
option 2	4550	11463(152)	9504	17840(88)	9646	13556(41)
option 3	4550	9864(116)	9504	16121(70)	9646	16253(69)

% increases are shown in brackets

With option 1 as the base, net increases of 39%, 24% and 20% in the housing stock levels of the high income, middle income and low income households respectively are recorded. Investment increases were 170%, 180% and 170% respectively for the high income, middle income and low income households.

Under option 3 however, the respective increases in the housing stock levels were as follows – high income 3%, middle income 6%, and low income 48%. The trends in the housing investment turnover in relation to this policy option also demonstrates similar results as is shown in table 2 above.

5. CONCLUSION

The study has shown that by pure economic considerations, option 2 leads to a better maximization of housing investment benefits as it results in a net increase of about 83% in the level of total housing stock. But when viewed aganist the background of limited financial avenues available to low income households to owe reasonable housing in third world cities, then in line with social equity, option 3 provides the best results.

References

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