

Wilfrid Laurier University

Scholars Commons @ Laurier

Theses and Dissertations (Comprehensive)

1992

Rapid population growth and its impact on residential land use in Ghana: The case of Madina-Adenta in the Accra metropolitan area

Louis Awanyo
Wilfrid Laurier University

Follow this and additional works at: <https://scholars.wlu.ca/etd>



Part of the [Human Geography Commons](#)

Recommended Citation

Awanyo, Louis, "Rapid population growth and its impact on residential land use in Ghana: The case of Madina-Adenta in the Accra metropolitan area" (1992). *Theses and Dissertations (Comprehensive)*. 372. <https://scholars.wlu.ca/etd/372>

This Thesis is brought to you for free and open access by Scholars Commons @ Laurier. It has been accepted for inclusion in Theses and Dissertations (Comprehensive) by an authorized administrator of Scholars Commons @ Laurier. For more information, please contact scholarscommons@wlu.ca.



National Library
of Canada

Acquisitions and
Bibliographic Services Branch

395 Wellington Street
Ottawa, Ontario
K1A 0N4

Bibliothèque nationale
du Canada

Direction des acquisitions et
des services bibliographiques

395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Your file *Votre référence*

Our file *Notre référence*

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

Canada

**RAPID POPULATION GROWTH AND ITS IMPACT ON RESIDENTIAL
LAND USE IN GHANA: THE CASE OF MADINA-ADENTA IN
THE ACCRA METROPOLITAN AREA**

By

Louis Awanyo

B.A., University of Ghana, 1988

THESIS

**Submitted to the Department of Geography
in partial fulfilment of the requirements
for the Master of Arts Degree
Wilfrid Laurier University
1992**

© Louis Awanyo, 1992



National Library
of Canada

Acquisitions and
Bibliographic Services Branch

395 Wellington Street
Ottawa, Ontario
K1A 0N4

Bibliothèque nationale
du Canada

Direction des acquisitions et
des services bibliographiques

395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Voilà. Votre référence

Où là. Notre référence

The author has granted an irrevocable non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of his/her thesis by any means and in any form or format, making this thesis available to interested persons.

L'auteur a accordé une licence irrévocable et non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de sa thèse de quelque manière et sous quelque forme que ce soit pour mettre des exemplaires de cette thèse à la disposition des personnes intéressées.

The author retains ownership of the copyright in his/her thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without his/her permission.

L'auteur conserve la propriété du droit d'auteur qui protège sa thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

ISBN 0-315-78154-8

Canada

ABSTRACT

Rapid population growth rates coupled with low levels of economic development in developing countries have created among others immense obstacles to the provision of adequate housing to the majority of residents. Population growth rates are growing faster than the provision of new housing and housing infrastructure. This has resulted in intensive usage of the existing stock of housing and deterioration of housing environments. Some of the manifestations of housing and residential land use intensification are increasing room occupancy levels, in-situ housing adjustments involving physical changes in housing space and housing space conversions. Intensification of residential land use also has environmental impacts such as increasing problems of waste disposal. Given the predominance of existing housing stock in providing housing space in any given year, it is crucial for housing policy and programme development to identify the factors which facilitate the efficient provision of housing space from the existing stock of housing.

This study undertaken in Ghana examines the phenomenon of housing and residential land use intensification under different socio-economic contexts and primarily seeks an insight into the factors of residential change. Income, housing space availability, room occupancy level, level of change in household size, length of residence and tenure are individually identified as being significant factors of residential change. Household size stress (which directly reflects the impact of population growth) is identified as providing motivation for the undertaking of housing change. Logistic regression modelling further isolates the most significant variables influencing residential change and indicates that security of tenure is an essential prerequisite for effective provision of housing from the existing stock.

ACKNOWLEDGEMENTS

This study would not have been possible without the assistance of many people. I would first of all like to express my sincere gratitude to my thesis advisor, Dr. Barry Boots. His extremely important comments and suggestions guided this work from the draft stage to the very end. I have acquired knowledge from him beyond what could ever be obtained from the classroom. My sincere thanks also go to Dr. Robert Sharpe and Dr. Scott Slocombe, both members of my thesis committee, and Dr. Ben Amoako-Adu for providing extremely useful comments and insights on this study. My gratitude also goes to Pam Schauss for her assistance in drawing all the maps and diagrams.

Special thanks to Mike, Hanson and Mpiamem of the Population Impact Project, University of Ghana, for providing the data which made this work possible. My thanks to the Awanyo family and to my dear wife, Hilda, for all the support and prayers.

I would finally like to express my sincere thanks to the Department of Geography, Faculty of Graduate Studies and the Students Awards Office for providing support at very trying times and for making the completion of my program possible.

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGMENTS	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	viii
LIST OF FIGURES	xi

CHAPTER ONE: INTRODUCTION	Page
1.1 The Problem	1
1.2 Objectives	9
1.3 The Conceptual Framework	11
1.4 Hypotheses	20
1.5 Organization of the study	21
 CHAPTER TWO: A REVIEW OF THE LITERATURE	
2.1 Introduction	23
2.2 The concept of housing	25
2.3 Housing from the existing stock	28
2.3.1 A conceptual framework of household housing adjustment decision making	31
2.3.2 The factors of housing adjustment	36
2.3.2.1 Household income and housing affordability	36
2.3.2.2 Family lifecycle and household size	38
2.3.2.3 Housing tenure	40
2.3.2.4 Preferences	42

2.3.3 The need for an integrated model of housing adjustment	43
2.3.4 A summary of the factors of housing adjustments ..	49

CHAPTER THREE: BACKGROUND INFORMATION ABOUT THE STUDY AREA

3.1 Introduction	53
3.2 The physical growth of AMA	55
3.3 The study area	61
3.3.1 Location	62
3.3.2 The origins of Madina-Adenta	62
3.3.3 Demographic characteristics of the study area	65
3.4 Housing in Ghana	67
3.4.1 Housing delivery agencies	69
3.4.2 Housing types	71
3.4.3 Housing finance	72
3.4.4 Land acquisition	74
3.4.5 Housing construction materials	74
3.4.6 Housing infrastructure	75
3.5 Housing in Madina-Adenta	76

CHAPTER FOUR: METHODOLOGY

4.1 Introduction	79
4.2 The target population	79
4.3 Sampling design	80
4.4 Data collection	85
4.4.1 Primary data collection	85

4.4.1.1 Questionnaire design	85
4.4.2 Secondary data/information sources	88
4.5 Data analytic techniques	89

CHAPTER FIVE: HOUSING AND HOUSING INFRASTRUCTURE

5.1 Introduction	92
5.2 Sample description	92
5.2.1 Typology of housing	93
5.2.2 Factors of sample differentiation.....	95
5.2.2.1 Socio-economic locality by income	96
5.2.2.2 Socio-economic locality by education	96
5.2.2.3 Socio-economic locality by occupation	97
5.2.2.4 Socio-economic locality by tenure of accommodation	97
5.2.2.5 Socio-economic locality by housing space	101
5.3 Quality of housing	103
5.4 Housing infrastructure	104
5.5 Housing facilities and room space required by households	114
5.6 Lack of housing infrastructure environmental problems	119
5.7 A summary of the perceived causes of housing environmental problems	127
5.7.1 Administrative/political authority inefficiency	127
5.7.2 Population growth and its impact on housing environmental problems	128
5.7.3 Activity of residents and its impact on environmental problems	129

5.7.4 Low income and its impact on housing environmental problems	130
5.8 Summary	130

CHAPTER SIX: ANALYSES OF HOUSING AND RESIDENTIAL INTENSIFICATION

6.1 Introduction	132
6.2 Housing intensification in the socio-economic localities	132
6.2.1 Changes in household size	133
6.2.2 Changes in housing space	134
6.2.3 Changes in number of rooms by changes in household size	136
6.2.4 Socio-economic locality and room occupancy levels	137
6.2.5 Socio-economic locality and housing space change..	141
6.2.6 Socio-economic locality and reason for housing space change	144
6.2.7 A summary of housing intensification in the socio-economic localities	147
6.3 Analysis of housing intensification	148
6.3.1 Income and housing space change	149
6.3.2 Housing space availability/housing typology and housing space change	150
6.3.3 Room occupancy level and housing space change	152
6.3.4 Changes in household size and housing space change	153
6.3.5 Length of residence and housing space change	154
6.3.6 Tenure and housing space change	155
6.3.7 Household stress and housing space change	156

6.3.8 A summary of the factors of housing intensification	157
6.4 Logistic regression model of housing change	158

CHAPTER SEVEN: SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Summary	166
7.2 Recommendations	172
7.3 Implications for future research	176

LIST OF TABLES

1. Population growth trends in AMA, 1960, 1970, 1984 ...	58
2. Annual population growth rates in AMA, 1960-1984	60
3. Percentage of population of Ghana in AMA, 1984-2010..	61
4. Population of Madina-Adenta for 1960, 1970, 1984	66
5. Population of Madina by age and sex, 1984	66
6. Place of birth statistics of the population of Madina, 1984	67
7. Sample distribution	93
8. Housing types	94
9. Summary of the relationship between neighborhood and socio-economic variables	95
10. Cross tabulation of socio-economic locality by tenure of accommodation	98
11. Cross tabulation of locality by reasons for building a house	99
12. Cross tabulation of tenure by reason for which house will be built	100
13. Housing space availability by type of housing	102
14. Water sources	105
15. Type of toilet facility	106
16. Refuse disposal methods	108
17. Cross tabulation of education by mode of refuse disposal	110
18. Renovations required	113
19. Housing space/facility scale of preference for Adenta	116

20. Housing space/facility scale of preference for Central Madina	117
21. Housing space/facility scale of preference for Madina-Zongo	118
22. A scale of the magnitude of housing environmental problems for Adenta	121
23. A scale of the magnitude of housing environmental problems for Central Madina	122
24. A scale of the magnitude of housing environmental problems for Zongo	123
25. Cross tabulation of status of environmental problem by locality	125
26. Changes in household size	134
27. Housing space changes	135
28. Changes in number of rooms	136
29. Room occupancy changes in the socio-economic localities	138
30. Cross tabulation of socio-economic locality by room occupancy ratio	139
31. Housing space availability per person by locality...	140
32. Cross tabulation of locality by housing space change	143
33. Cross tabulation of locality by undertaking housing change	142
34. The specific changes in housing space	144
35. Cross tabulation of socio-economic locality by reasons for housing space change	145
36. Cross tabulation of household size stress by housing change	147
37. Housing type by housing space change	150
38. Cross tabulation of housing space availability by housing change	151

39. Cross tabulation of housing construction change by room occupancy level	153
40. Cross tabulation of change in household size by housing space change	154
41. Cross tabulation of length of residence by physical modification of housing space	155
42. Cross tabulation of tenure of accommodation by housing change	156
43. The relationship between housing change and factors of housing adjustment	158
44. Logistic regression for housing change	161
45. Logistic regression for constructional housing change	163
46. Logistic regression of constructional change/ non constructional change	164

LIST OF FIGURES

1. Administrative regions and capitals of Ghana	4
2. AMA Districts	5
3. The POPHOU model	15
4. A model of population and housing	16
5. Processes of change in an urban housing stock	19
6. Areas of housing research	24
7. Housing stress and timing of adjustments	34
8. The household relocation and search process	35
9. Changing boundaries of AMA	59
10. A map of Madina-Adenta	63

CHAPTER ONE
INTRODUCTION

1.1 THE PROBLEM

The research reported below studies the relationships between population, housing conditions and residential land use in Madina-Adenta within the Accra Metropolitan Area (AMA) of Ghana and seeks to add to the literature on the role of demographic change in residential land use changes.

AMA is located in Southern Ghana and comprises Accra, Tema and Ga districts (see Fig. 1 and 2). This area contains localities with some of the highest population growth rates in Ghana, mainly because the region is the political, administrative and socio-economic center of the country. There is a concentration of manufacturing industry, commercial, educational, political and administrative functions within this zone. Its population as at 1990 was estimated at 1.5 million and projected to reach 2.5 million in 2000. Population growth rates in AMA as a whole have been very rapid with all three districts experiencing mean annual growth rates above 3 percent between 1960 and 1984. (Nabila, Songsore and Yankson, 1990 : 2).

The rate of population growth is a function of the rate of natural increase and net migration. For AMA as a whole, it has been observed that whereas rapid population growth between 1948 and 1970 was mainly due to migration, its role declined

considerably between the 1970 and 1984 intercensal period with natural increase dominating as the major factor of population growth (Nabila, 1988 : 2).

Like all other metropolitan areas in the developing world, AMA is saddled with many problems as a result of the interaction of many factors including those related to its population dynamics which tend to accentuate an already unsatisfactory situation. The general housing conditions in the developing world could be described as characterized by high room occupancy levels, low quality, poorly maintained houses, lacking basic infrastructure and other social services and the predominance of slums especially in the urban areas.

The developing world has in general been characterized by low or falling per capita real national product (GNP). The average annual growth rate of per capita GNP between 1965 and 1990 in Ghana for instance shows a decline of 1.4 percent (World Bank, 1992). Coupled with this has been the inability of housing delivery agencies to provide affordable housing for the vast majority. The consequence of this is the proliferation of so called "sub-standard" housing as evidenced in slums and squatter settlements. It has been estimated that 20 to more than 50 per cent of major city dwellers live in slums and informal settlements (squatter settlements) (UNCHS {HABITAT}, 1987: 77; 1982). Specific examples of the housing conditions in the developing world have been described by Hardoy and Satterthwaite (1989: 75-78).

In metropolitan Bangkok, Thailand with an estimated population of 4.7 million in 1977, it was estimated that 1.2 million lived in slums and unauthorized settlements. More than half of Delhi's (India) population lived in very poor conditions. About 60 per cent of Guayaquil's (Ecuador) population live in slums or squatter settlements. Over 2 million of Manila's (Philippines) population are squatter families. In Sri Lanka, 60 percent of the urban population live in slums and shanty settlements of Columbo (Steinberg, 1982).

FIG.1: ADMINISTRATIVE REGIONS AND CAPITALS OF GHANA

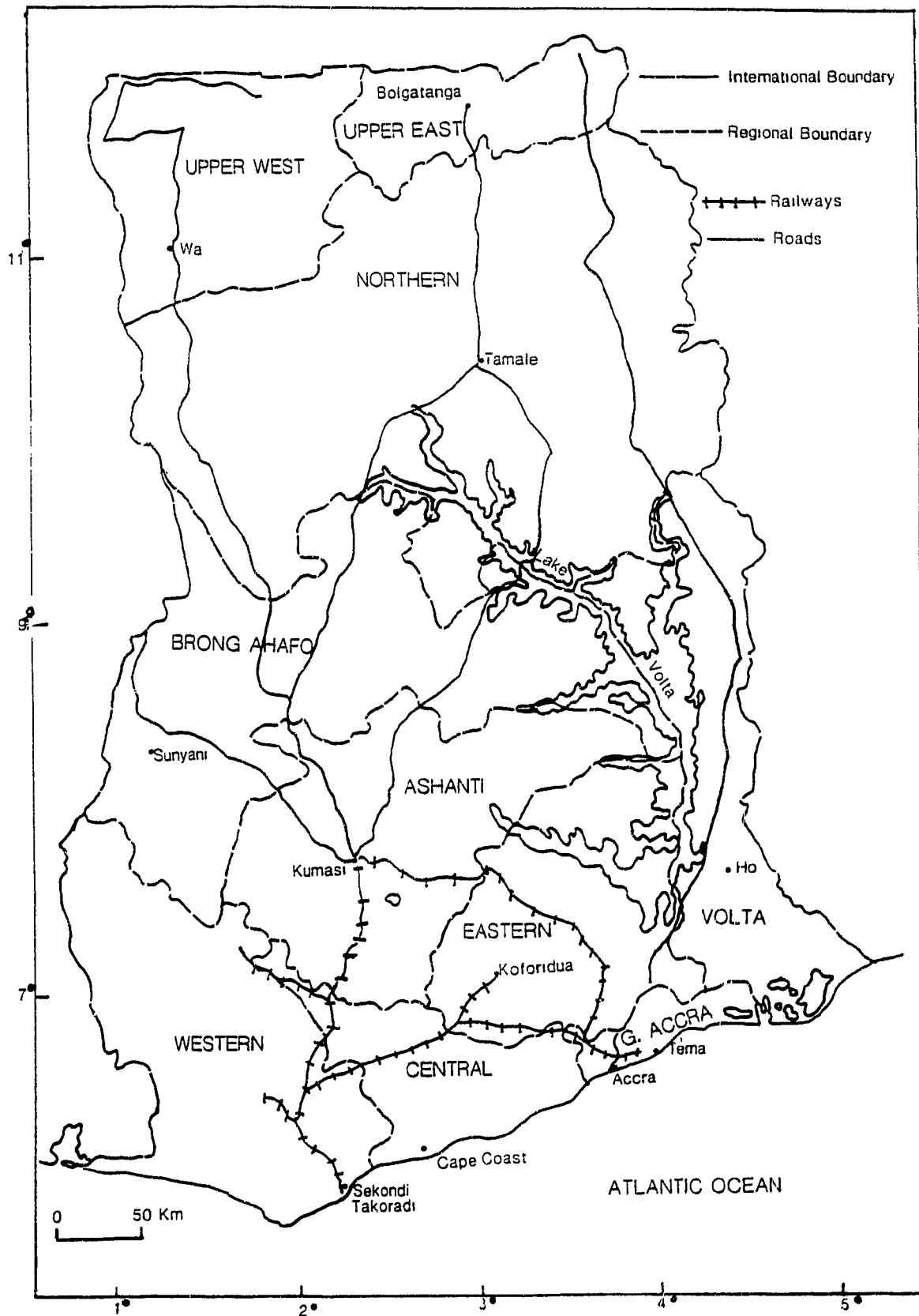
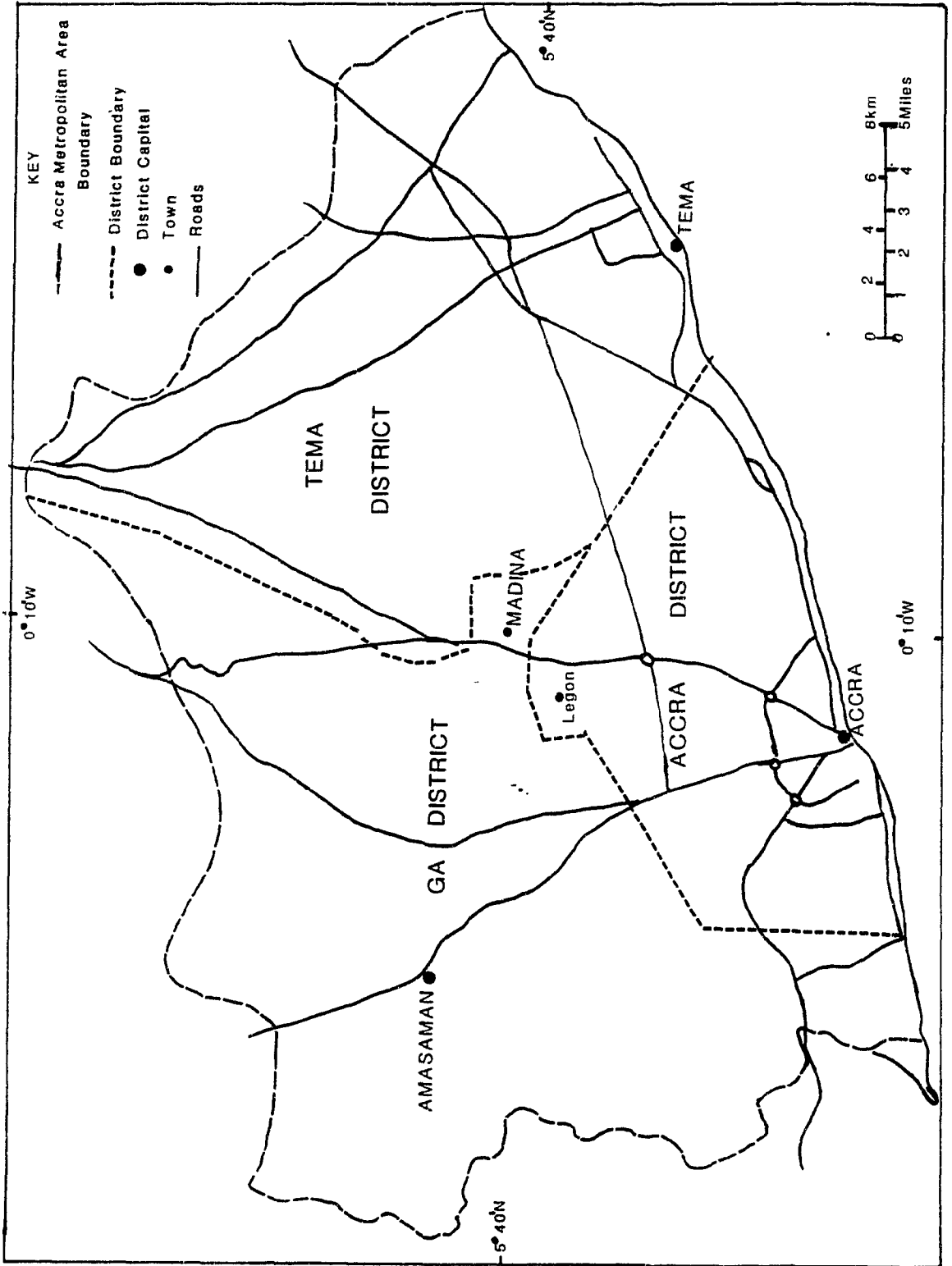


FIGURE 2: ACCRA METROPOLITAN AREA DISTRICTS



The housing deficit in Africa for the decade 1970-1980 is estimated at 30 million units (Okpala, 1986: 205). Examples from various countries in Africa illustrate the magnitude of the housing problem. The Nigerian ministry of housing commissioned a study which revealed that three-quarters, two-thirds, half, and a little less than half of the residents of Lagos metropolis, Kaduna, Port Harcourt and Benin and Ibadan respectively live in single rooms (Osuide, 1988: 132). Ebong (1979: 78), observed the lack of infrastructure and the widespread occurrence of slums in Lagos. The urban housing deficit for Cote D'Ivoire at 1976 was 50000 units. The Ivorian government needs to provide 120000 units per year to meet the 10.5 per cent growth rate in urban population but it is producing only about 6000 units a year (Okpala, 1988: 206). In Nairobi, Kenya, about 40 per cent of the population live in slums and squatter settlements (Hardoy and Satterthwaite, 1989).

Housing infrastructure and environmental conditions in the developing world also indicate the magnitude of the housing problem. The UNCHS (1987), estimates that 57 and 55 percent of urban dwellers had access to water and sanitation services respectively and that low income areas had the lowest coverage. This United Nations agency also estimates that only 25 to 55 percent of the total waste generated in urban areas of developing countries is disposed off by waste management institutions. The situation is appallingly bad in low income

settlements. Hardoy and Satterthwaite (1989: 147-149), again provide some insight into the problem. In Bangkok, Thailand, only a third of the population has access to public water supplies. In Calcutta, India, about three million people live in settlements lacking potable water. The sewage system services about a third of the people. In Dakar, Senegal, nearly a sixth of human wastes is improperly disposed off. In Kinshasa, Zaire there is no sewage system. Half of the urban population are not serviced by the public water system. In all these instances, higher income groups have adequate access to infrastructure and services whereas the lower income lack them. Sule (1981) observed in Calabar, Nigeria, that the predominant modes of disposal of refuse are dumping in open spaces, use of dustbins (for higher income groups) and dumping in gutters and streams. The term "housing poverty" has been used by Merrett (1984), to describe the inadequacy of the physical dwelling and/or lack of housing infrastructure and services.

Rapid population growth has been seen as a factor of deteriorating housing conditions but should not be regarded as the cause of the present housing situation. High population growth rates place extreme pressure on the existing inadequate supply of services and amenities such as water, electricity and sanitary services. Present levels of urbanization in the developing world are comparable to what occurred in nineteenth century Europe and America but the difference is that

urbanization in the latter was associated with industrialization and rapid economic growth (UNCHS, 1987).

The aesthetic and quality characteristics of slums and informal settlements in particular give the impression of poverty. Research substantiates this view. Housing is generally described as affordable if 15 to 25 per cent of the household's income is expended. The UNCHS' survey of slums and squatter settlements (1982: 104-108) reveals incomes below the "absolute poverty" level for most low income residents. From half to two-thirds of the typical household's budget is spent on food alone and in addition residents save part of their meager incomes for the purpose of remitting to relatives in the rural areas. Citing the World Bank, Follain and Jimenez (1985) indicate that as at 1980 urban households in the developing world accounted for 34 per cent of those living in absolute poverty and that this would increase to 57 per cent by 2000. This observation obviously helps in comprehending housing conditions in the developing world.

Shelter and housing constitute one of the basic needs of humans and this study examines in detail the impact of rapid population growth on residential land use in Madina-Adenta. The study area is a sub-urban locality within the AMA and has experienced a phenomenal growth rate of 279.2 percent between 1970 and 1984 (Ghana Population Census, 1984). The Ghana National Housing Policy and Action Plan (1987-1990) stated an accumulated housing delivery deficit of 250,000 housing units.

For the AMA the deficit is estimated at 18,619 housing units. The inadequate supply of housing and the rapid population growth suggests that housing is being intensively utilized. In effect housing space is to a large extent supplied from the existing stock of housing rather than through new construction.

The nature of housing intensification is examined. Specifically, the study seeks an insight into who is doing what form of intensification and why, and where the forms of intensification are taking place. Housing conditions and the impact of rapid population growth on the housing environment are also examined.

1.2 OBJECTIVES

This study stratifies the area of study into socio-economic localities/neighborhoods on the basis of empirical differences. Although the paramount objective is to identify the factors of intensification for the whole study area, stratification is seen as an effective way of comprehending the housing situation in the study area. The criterion used for the stratification is housing type. Housing type affordability is related to one's personal income in Ghana given the near absence of any institutionalized mode of housing finance. It is expected that these socio-economic localities characterized by specific housing types will also be differentiated in terms of housing tenure, available

housing space, and occupational and educational characteristics of their residents. These variables have all been correlated with income in housing literature. Thus it is expected that the higher income areas will be characterized by owner occupancy, larger housing space and lower room occupancy levels, higher levels of education and higher income occupations.

This study specifically had the following objectives:

1. To indicate empirically housing conditions in the study area.
2. To examine the forms of housing adjustments and intensification in the socio-economic localities/neighborhoods.
3. To determine if there is a relationship between socio-economic locality/neighborhood, and level and mode of residential intensification or adjustment. It is expected that differences in the neighborhoods in terms of income, tenure, available housing space per person, educational and occupational characteristics will have an impact on the mode of residential intensification or adjustment.
4. To determine which factors influence the decision to undertake housing adjustments.
5. To determine if there is a relationship between socio-economic locality/neighborhood and responses to some of the consequences of housing poverty. It is expected that the households in the neighborhoods undertake personal activities

to resolve environmental problems associated with the lack of infrastructure, since institutional involvement is very limited.

6. To determine the housing preferences of households in the study area.

1.3 THE CONCEPTUAL FRAMEWORK

Alfeld and Graham (1976), modelled urban processes using systems dynamics models as an aid to understanding and solving urban problems. These authors developed the "POPHOU" model to show the interactions between population and housing. A model is a representation of reality. It is, "... an abstraction from reality which is used to gain conceptual clarity - to reduce the variety and complexity of the real world to a level we can understand and clearly specify" (Lee, C., 1974: 7). Thus a model seeks to capture in a simple and generalized form, what appear to be the most important characteristics of a real world situation. Alfeld and Graham (1976), indicate that the POPHOU model depicts only the interactions among the most "influential" variables. Using the households-to-houses ratio, which reflects adequacy of and demand for housing, the authors suggest that high overall housing availability stimulates in-migration and raises an area's population. Housing availability thus modulates migration into and out of an area because it is a factor one must weigh in order to make a decision as to whether to move to a given area or not.

Bourne (1981: 129, 130) cites Johnson, Salt and Wood (1974) as illustrating the importance of housing availability in influencing interregional migration of labor in the United Kingdom. If housing is completely unavailable no one can move to a place even if there are other attractive features. Low housing availability restricts in-migration and high housing availability stimulates population growth. Migrants occupy the excess housing making it less available. In the short run there is intensive residential land use. The low availability of housing and consequently the high household-to-houses ratio implies a high demand and this stimulates housing construction. There is therefore an extension of residential land use. Later there is a stabilization phase where housing construction and population is stabilized (Alfeld and Graham, 1976 : 143-169).

Figure Three is a flow diagram showing the interrelationships between the variables in the POPHOU model. The housing subsystem appears in the upper half of the diagram and the population subsystem in the lower half. The coupling variable for the two subsystems is the households-to-houses ratio. This variable is a measure of housing availability that reflects such variables as rental levels, vacancies and crowding, quality of maintenance and services of housing units, deposit and down payment requirements and diversity of choice in size and location. The rectangle represents a "level variable" that describes the condition of a system. The arrow

adjacent to the level represents a flow into or out of the level. The "stylized valve" symbol that is crossed by the flow arrow indicates a "rate variable" which alters the condition of a system. The arrows that point towards the rate symbol represent the information flows that are necessary inputs to the rate equations. Variables that appear in circles are auxiliary variables which clarify the chain of cause-effect relationships represented in the model. This initial model is further disaggregated by the authors to reflect socio-economic differentials in population and housing characteristics in an urban area. The total stock of housing for instance is defined as the sum of upper, middle and low income housing (Alfeld and Graham, 1976).

This model has been developed under conditions in the developed countries and only reflects one aspect of how demand for housing is satisfied, that is through housing construction. It is effective demand which influences housing construction and not latent demand expressed in population numbers. Effective housing demand, at the (aggregate level) represents the total of all household expenditures, government expenditure and institutional investments in housing. Its level depends on a combination of population growth, demographic structure (e.g., age), disposable income, housing preferences and tastes, and taxation and investment policies (Bourne, 1981: 125,126). Income levels in the developing world for instance, are generally low and this has an impact on the

level of housing construction.

There is the need therefore to incorporate other relevant variables in the conceptual model. The POPHOU model is therefore adapted to suit developing world conditions. This research transforms the "FOPHOU" mathematical model into a conceptual model (fig. 4). The focus of the present study is on modifications in form and the changes in usage of existing stock of housing. This study also seeks to examine what factors influence the decision to undertake housing adjustments. The basic interrelationships suggested by the "POPHOU" model are maintained in the adapted POPHOU model for the Third World (See Fig. 4). The households-to-houses ratio is maintained as the coupling variable of population and housing. However the POPHOU model is further disaggregated to include other relevant variables derived from a review of housing literature in order to provide further detail on the dynamics of the process of residential land use change.

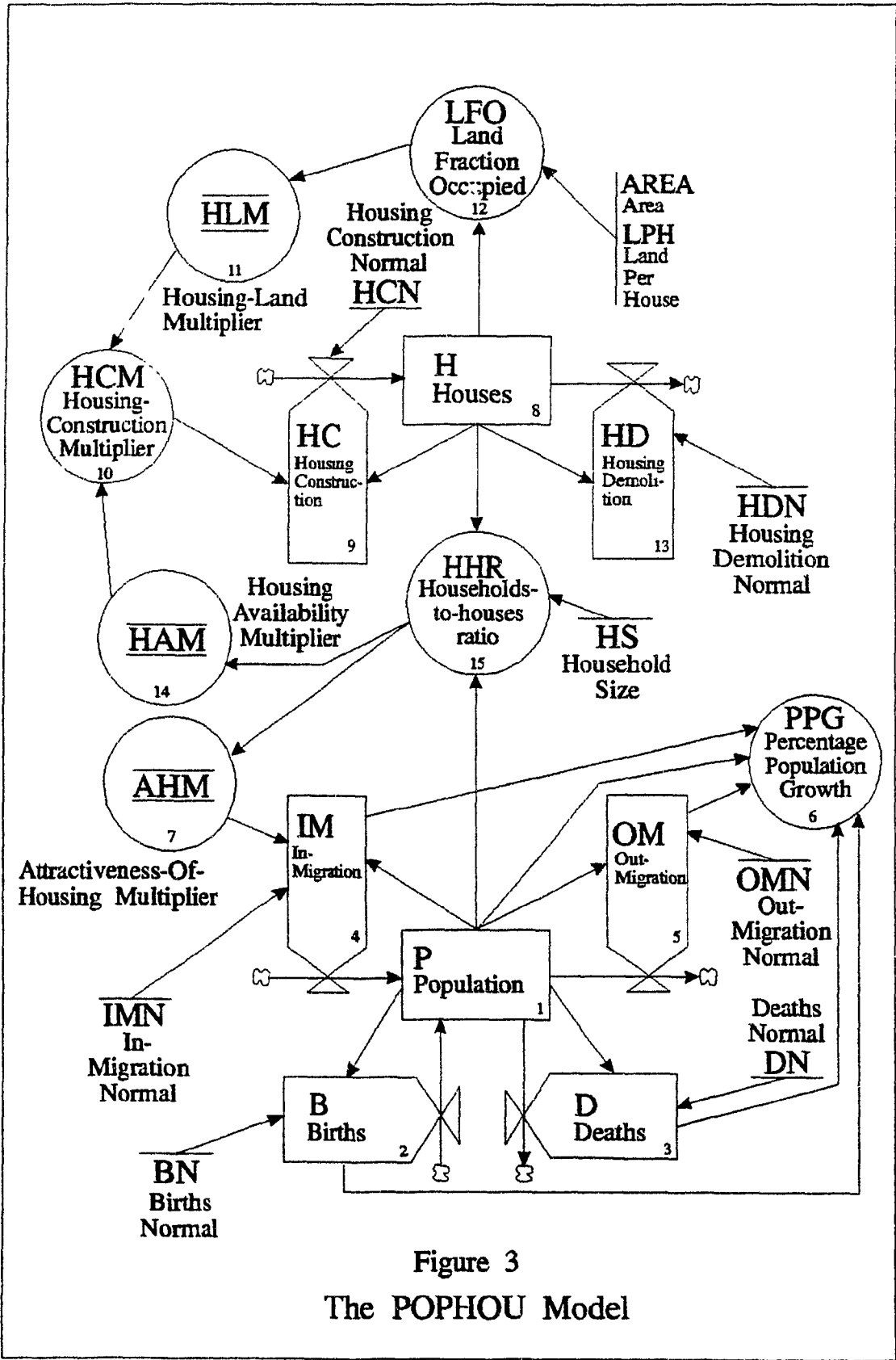
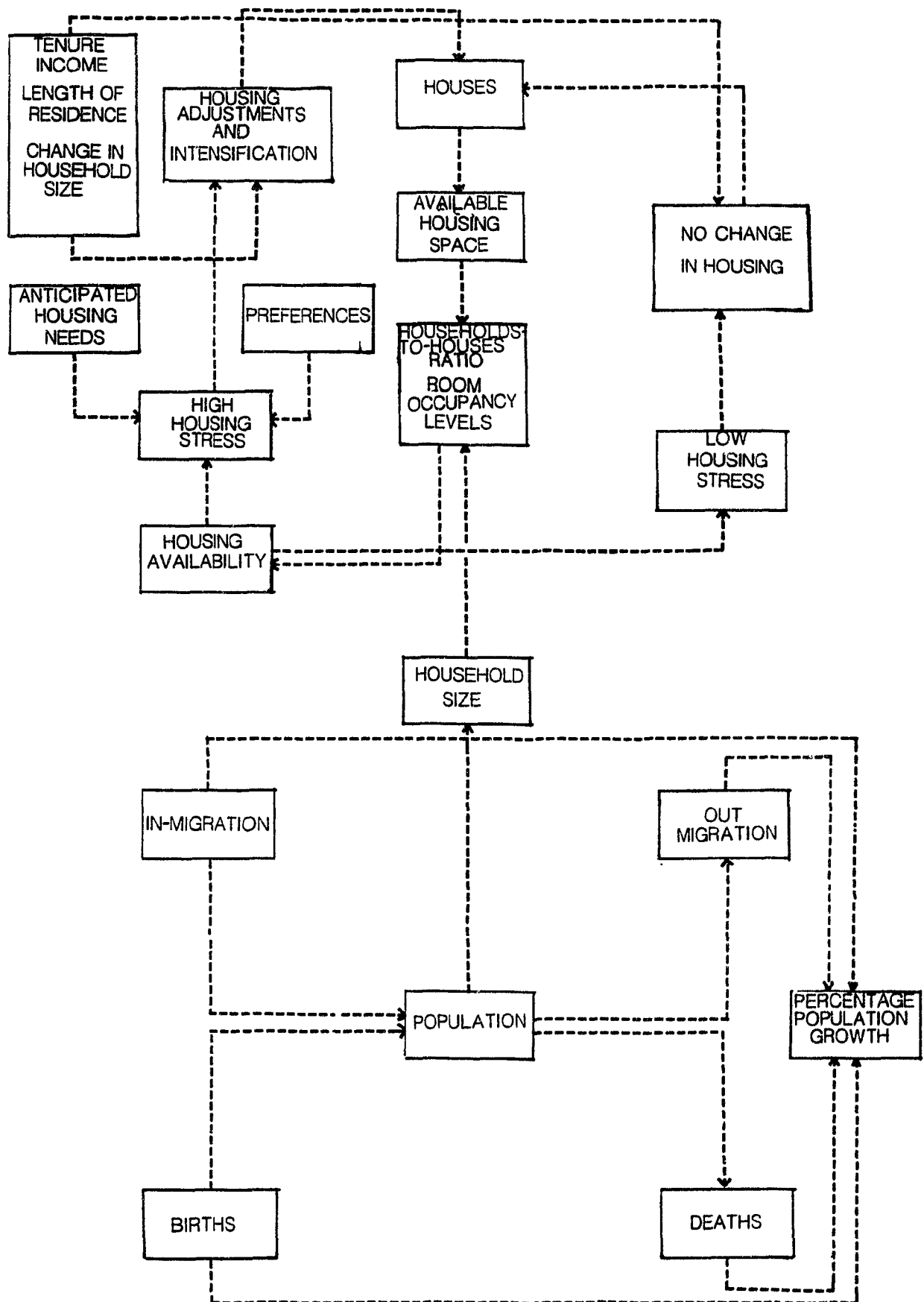


Figure 3
The POPHOU Model

Source: Alfeld and Graham (1976).

FIG.4: A MODEL OF POPULATION AND HOUSING



The "POPHOU" model only examines the extension of residential land use and so this modified framework incorporates the changes which occur in the existing housing stock. The housing stock of a locality is defined as "...the inventory of residential structures or individual dwelling units currently occupied or available for occupancy (Bourne, 1981 : 26).

Bourne (1981), indicates the types of structural changes that take place within a housing stock. The components of total housing stock changes the author identifies, are new construction and net conversions minus removals and demolitions:

Total Housing supply (units) {time t+1} = total supply {time t} + new construction {time t - t+1} + subdivisions of existing units - mergers of existing units (net conversions) {time t - t+1} - demolitions and other removals {time t - t+1}. This is represented symbolically as:

$H_{t+1} = H_t + N_{Ct, t+1} + C_{NETt, t+1} - D_{t, t+1}$ (Bourne, 1981 : 26).

The changes in structural characteristics of the housing stock are further modified and are associated with a number of spatial and temporal socio-economic, tenurial and other changes. Bourne (1981 : 27-29) summarized the full range of modifications associated with housing stock or residential land use changes. The author indicates that housing units can be added to the stock of housing by three structural processes. First of all by building new units on previously

undeveloped land. Secondly through modifications in the form and usage of the existing stock, and thirdly through replacement of existing units with new construction. New construction on previously undeveloped land takes the form of extensions to the built up area and infilling of vacant lands. Changes in existing stock take the form of changes in quality and value (depreciation and appreciation), occupancy change, changes in tenure and changes in structure and use. Replacement of existing units could be in the form of public or private renewal of housing. Each specific change in housing inventory has a spatial dimension, with replacement of existing stock associated with the city center and extension of residential land associated with the suburban fringe. Figure 5 summarizes the types and processes of change in an urban housing stock. This study focuses on the changes in form and usage of the existing housing stock. This process indicates housing adjustment and a change in residential land use. A major objective of this study is to identify the factors influencing the decision to adjust.

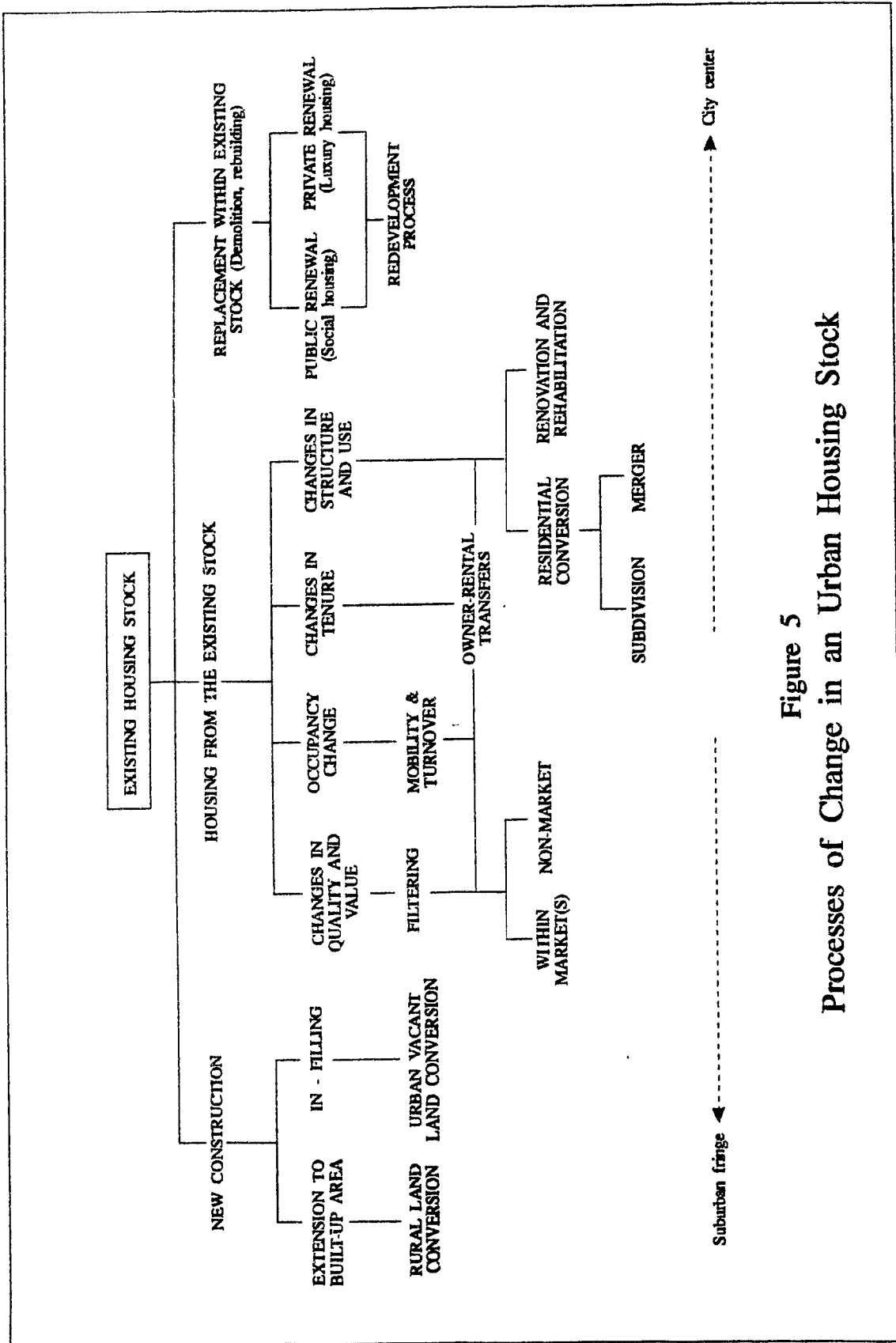


Figure 5
Processes of Change in an Urban Housing Stock

Source: Bourne (1981).

The proposed conceptual framework shows in addition to household size to houses ratio (room occupancy levels), the effects of income, tenure, length of residence, preferences and anticipation of future housing needs on housing intensification. A very important modification to the room occupancy level variable is its transformation or otherwise into housing stress/strain. It is this variable which provides motivation for housing intensification and adjustments.

1.4 HYPOTHESES

Data provided in Chapter Three about the study area shows that there has been a more than proportionate increase in population as compared to new housing construction. This implies an intensification of residential land use. It is expected therefore that the study area will be characterized by structural residential modifications and conversions and increasing room occupancy levels. This research examines the empirical validity of the following assertions:

1. That there are significant differences in levels of housing poverty in the socio-economic localities/ neighborhoods and response to its consequences.
2. That significant differences exist between socio-economic locality/neighborhood, and level and mode of residential intensification. It is expected that these neighborhoods exhibit significant differences in terms of tenure, income, education, occupation, housing space availability and room

occupancy levels. Consequently intensification strategy may be expected to be different in the localities identified.

It is specifically expected that:

- i. A positive relationship exists between household housing affordability/income and housing adjustment/intensification strategy.
- ii. The households with higher room occupancy levels will be associated with some form of housing adjustment while those with low occupancy levels will be less likely to adjust in a given period.
- iii. Homeowners will be more predisposed to housing adjustment than renters.

1.5 ORGANIZATION OF THE STUDY

This study comprises six chapters. Chapter One is the introductory chapter which provides a statement of the problem, objectives of the study, a description of the conceptual framework used, hypotheses tested and a brief outline of the scope of this study. Chapter Two is a literature review which defines the concept of housing adopted for this study and also other relevant housing conceptions. The second section of Chapter Two reviews the relevant literature on the factors influencing the general process of housing adjustments within the existing stock of housing. Chapter Three provides a background to the study area. The origins of the study area are examined. In addition the

demographic and socio-economic characteristics of the study area are outlined. A brief account is also given of some of the population related pressures on housing infrastructure. Chapter Four specifies the methodology utilized to test the stated hypotheses and used to gather data to achieve the objectives. Chapters Five and Six analyze secondary data sources and the responses derived from the questionnaires administered concerning households, housing and the housing environment. Chapter Seven is the concluding chapter and provides a summary, policy implications and recommendations.

CHAPTER TWO

A REVIEW OF THE LITERATURE

2.1 INTRODUCTION

Many areas of research contribute effectively to understanding housing and housing problems. For instance, Bourne (1981 : 10), identified eight distinctive areas of research which have contributed to the Geography of Housing (Fig. 6). The present study examines the role of demographic change and other variables in residential land use changes. This chapter comprises two sections. The first section undertakes a review of literature on the definition of housing. Two fundamentally different definitions are examined. The first conception of housing outlined below has direct policy and housing strategy implication. The second conception provides a working definition of housing for this study. The second section of this chapter examines the factors indicated in the literature as influencing housing intensification processes.

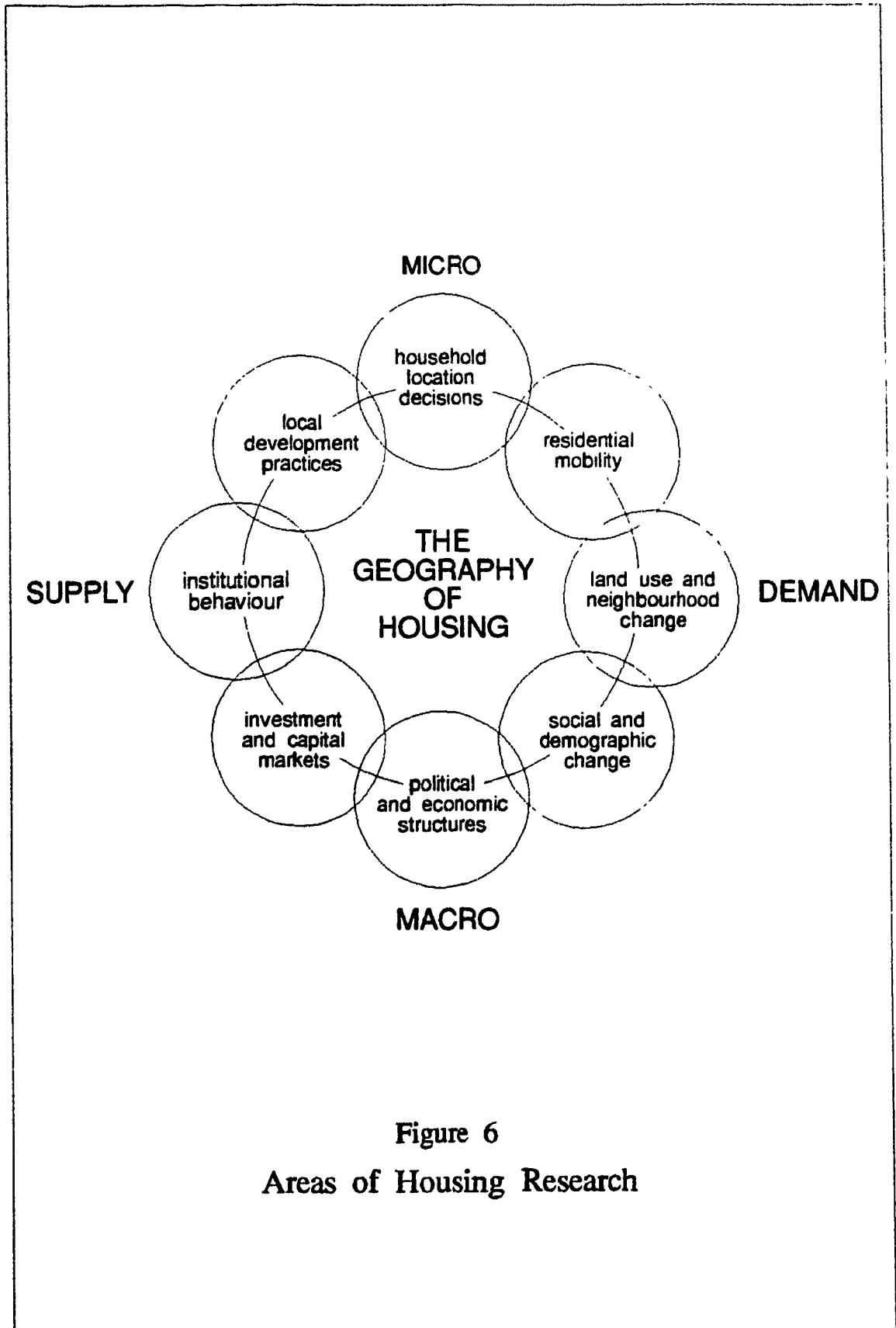


Figure 6
Areas of Housing Research

Source: Bourne (1981).

2.2 THE CONCEPT OF HOUSING

The conception of housing has been seen by some researchers as not being merely for academic purposes but is at the heart of how one analyzes a housing problem and develops policies of mitigation (Ward and Macoloo, 1992). The arguments of Turner, Burgess and others during the 1970s illustrate the importance of housing concepts in the development of policy (Turner, 1972; 1976; 1978; Burgess, 1978).

A major point of contention between the liberal and the marxist conceptions defined by Turner and Burgess respectively, is the issue of "commodification". To Turner, housing is not just shelter or a physical object but is a process, an activity, which is capable of satisfying or frustrating the needs of users. The observed physical attributes of the house per se are not as important as the satisfaction derived from using a particular unit of housing. Turner makes a distinction between use-value and market-value. Use-value is a subjective measure of the unit's utility in terms of what it does for an individual. The use-value of housing represents the "fundamentally social and economic role of shelter as living and even working space, supportive of, yet dependent on people's livelihood and ability to pay" (United Nations Center on Human Settlements {HABITAT}, 1990: 4). According to this view, factors like proximity to and availability of work, and social relationships are important

in determining the use-value of housing. Market-value of a house embodies the sum of all goods and services input of the house. This is expressed in the physical standard/quality of the house and is described as the exchange-value. The liberal conceptions reject the idea that one would be satisfied with housing so far as it is of "standard" quality and stress the importance of user decision-making in the housing delivery process. Direct government involvement in housing construction is therefore seen as inefficient in satisfying needs of users.

The Liberal concept of housing fails to concede that the ability to obtain standard quality housing is probably related to levels of income. A poor household which spends large proportions of its income on food for instance will be unable to acquire "standard" housing, although this may be what would satisfy them.

Burgess (1978) criticized Turner's neglect of exchange value of housing and argued that the exchange value of housing or the commodity form of housing is important in any analysis of the fundamental role of capitalism in causing housing problems. Turner however insisted, (after Burgess' (1978) critique), that the total utility of a house at any moment in time is a combination of the use-value and quality (market-value). Turner expresses the conviction that for low income people especially in warm climates, the general social and economic function of housing is usually far more important than the exchange value expressed in the physical standard of

the house. Turner added that, it is only the relatively rich with more secure social and economic conditions who give the highest priority to physical standards (Turner, 1981). The policy implications of such conceptions of housing have been widely adopted in developing countries through various self-help housing schemes such as site and services schemes.

For purposes of empirical research the concept of housing adopted for this study is operational and provides a working definition of the concept of house. Bourne (1981: 14) provides six definitions of housing based on the review of housing literature. This author considers two of these definitions as being very relevant for the present study and for policy implication purposes. One definition conceives of housing as, "... a physical facility unit or structure, which provides shelter to its occupants but which also consumes land and demands the provision of physical services such as water and sewerage as well as social services to the household". The second definition in a way emphasizes the use-value of housing and describes housing as, "... a package or bundle of services - a view which recognizes that the occupancy of housing involves the consumption of neighborhood services (parks, schools), a location (accessibility to jobs and amenities) and the proximity of certain types of neighbors (a social environment)".

The World Health Organization defines housing as the totality of the residential environment. This includes the

physical structure used as shelter and all the necessary services and facilities needed or desired for the physical, mental and social well being of the family and individual (UNCHS, 1982: 183).

2.3 HOUSING FROM THE EXISTING STOCK

An overwhelming proportion of housing needs in any one year are met from the existing housing stock rather than by new housing construction (Bourne, 1981: 101, 102). Malpezzi (1990: 992) estimates that a total of 90 per cent or more of developing countries' housing needs is provided from the existing stock of housing. Meeting housing needs from the existing stock involves two processes. The first is the process of residential mobility which involves changing residences to meet housing needs. The second is the process of housing intensification, which involves "in-situ" adjustments.

Although literature on residential mobility abounds, there have been very few studies devoted to the study of the phenomenon of housing intensification or in-situ housing adjustments, despite its importance as a response to changing household housing space demands.

Seek (1983), makes a similar observation and reiterates the importance of housing intensification processes as a very important supplier of housing in Australia since the mid 1970s. These housing adjustment processes amounted to 17 per

cent of the value of new dwellings. He expressed dissatisfaction with the very limited amount of comprehensive research on housing intensification processes.

Bourne (1981: 101,102), also observes that, "Empirical data on all forms of physical modifications to the existing stock, however, are notoriously weak and no doubt seriously underestimate the level of activity".

Most studies on housing adjustments have therefore assumed implicitly or have indicated explicitly that residential mobility is the basic element of adjustment in response to changes in household housing consumption demands. Seek (1983) cites as an illustration a quotation by Goodman, 1976: 857):

"The extent to which the family can alter its composition of housing services without moving is quite limited. Home owners can sometimes build an extension onto their house or redecorate the interior, thereby increasing the annual flow of services provided by their housing, but even these modifications are usually not available to the renters.... To change its housing consumption a family usually must move to another residence."

Bourne (1981: 133) also asserts that, "The principal means through which changes in the demand for housing are satisfied, especially in the short term, is by residential mobility". He also adds that, "Most of the literature has, for obvious reasons, looked only at those who decided to move". The "obvious reasons" being that approximately 70 percent of all urban households will have moved within 10 years and perhaps 90 percent in 20 years (Bourne, 1981: 134, 138).

The present study has been justified by the fact that extension of residential land is not keeping pace with rapid levels of population growth and the deduction that can be made is that the existing stock of housing is being intensively used. Opportunities for residential mobility are very limited given the severe housing shortage. Residential mobility studies in developing countries have usually examined the move from rented units by low income households to owner occupancy in squatter settlements. Konadu-Agyeman (1991: 68-71) has enumerated the reasons why squatting is not a common phenomenon in Anglophone West Africa despite the very high population growth rates.

These models of residential mobility imply a freedom of choice in housing. However, the choice is not always whether to move or not, since for some households there is only one choice - to adjust in-situ. Residential mobility to meet households' housing space needs is therefore not a very viable option for most households in West Africa, given the magnitude of the housing shortage, the lack of opportunities for squatting and the limited housing choices open to most households. This is the reality of the developing world situation and even in Australia where the housing shortage is not as intense. Seek (1983) has shown that in Australia, only about 15 per cent of total households move in any given year. Social ties, familiarity and convenience, location and financial costs of moving are given as reasons for not moving

in Australia. In Melbourne for instance, 62 per cent of the total number of households had undertaken some form of housing intensification process in 1980. Seek's work revealed that 70 per cent of households who had improved their dwellings did so for space reasons while 30 per cent had quality improvements (Seek, 1983: 464).

Given the absence of comprehensive literature on housing intensification processes, a review of residential mobility literature in addition to the limited literature on housing intensification is undertaken. Residential mobility is considered by this study only as a housing adjustment process and by this definition is comparable to other processes of adjustments. The focus of this review is on the identification of factors which influence the processes of housing adjustments.

2.3.1 A CONCEPTUAL FRAMEWORK OF HOUSEHOLD HOUSING ADJUSTMENT DECISION MAKING

Bourne (1981) and Seek (1983) have described the processes of household housing adjustment decision making. Seek's (1983) proposed conceptual framework to analyze the process of housing adjustment is similar to Bourne's (1981) adapted model of Brown and Moore's (1970) household adjustment decision making.

Seek argued that the final decision to make housing adjustments is related to a two part decision making process - a decision to adjust one's housing consumption and secondly,

a decision on one of two choices as to whether to move or to improve the present residence. The first decision is made due to the imbalance between the desired and actual level of housing consumption (housing gap) and the second depends on the relative costs and benefits associated with each option of adjustment.

Changes in household characteristics and socio-economic circumstances, changes in taste and preferences, and changes related to housing market conditions may all bring a housing gap. These factors are the internal forces described by Bourne. External forces related to changes in the physical dwelling unit and/or its environment may also bring a housing gap. The level of the housing gap is equivalent to Brown and Moore's "place utility" assessment which measures the household's level of satisfaction or dissatisfaction with a house.

Seek observed that a housing gap does not immediately bring about housing adjustment. "Dissatisfaction" or "stress" mounts and reaches a critical level, after which a decision is made on how best to bridge the housing gap. Brown and Moore also indicate the occurrence of stress, which is later converted into "strain". This psychological process provides motivation for action. Seek's and Brown and Moore's conceptual framework indicates a threshold at which a decision will have to be made concerning housing adjustment. The time lapse between change in housing demand and corrective/adjustment

action differs from household to household.

Figure 7, illustrates differential housing stress among households. XY represents a critical tolerance level for stress which is related to income and wealth. Reaching this threshold does not necessarily mean an adjustment in housing consumption to reduce stress. The occurrence or non-occurrence of an adjustment process is related to the costs involved in adjusting, which could be beyond the means of a household or be more than anticipated benefits. Where no action is taken, the tolerance level has in effect been "pushed upwards". That is the household has adapted to the situation by changing its aspirations on desired housing (Seek, 1983: 457). As shown in Figure 7, the timing of undertaking housing adjustments will differ from one household to another. Events like higher real incomes, birth of children and others produce "shocks" and brings sharp changes in intensity of stress (AC), which would otherwise have been a more gradual process (AB). DE shows the stress curve for another household. Bourne's (1981: 139) adapted version of the model proposed by Brown and Moore is summarized in Figure 8.

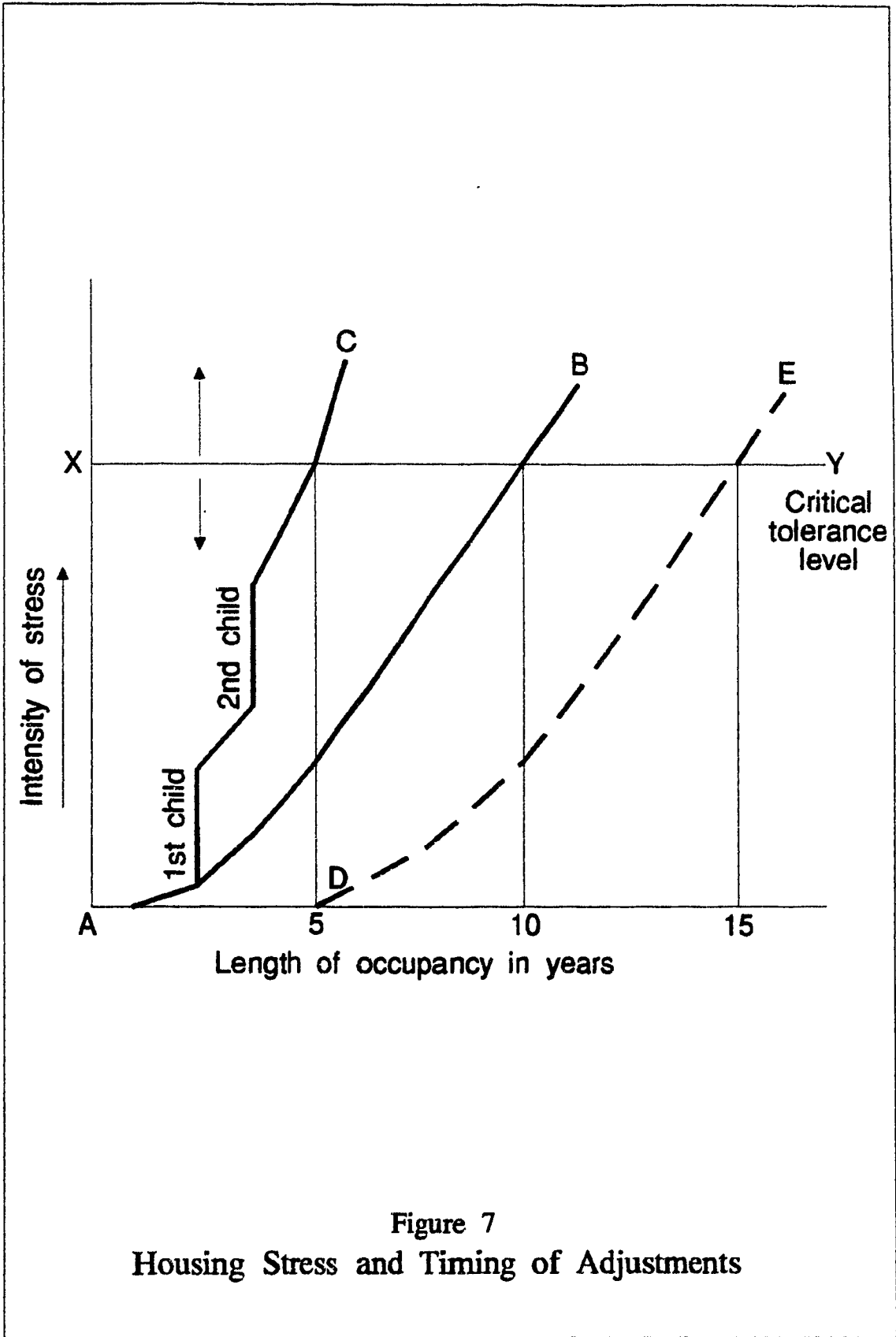


Figure 7
Housing Stress and Timing of Adjustments

Source: Seek (1983).

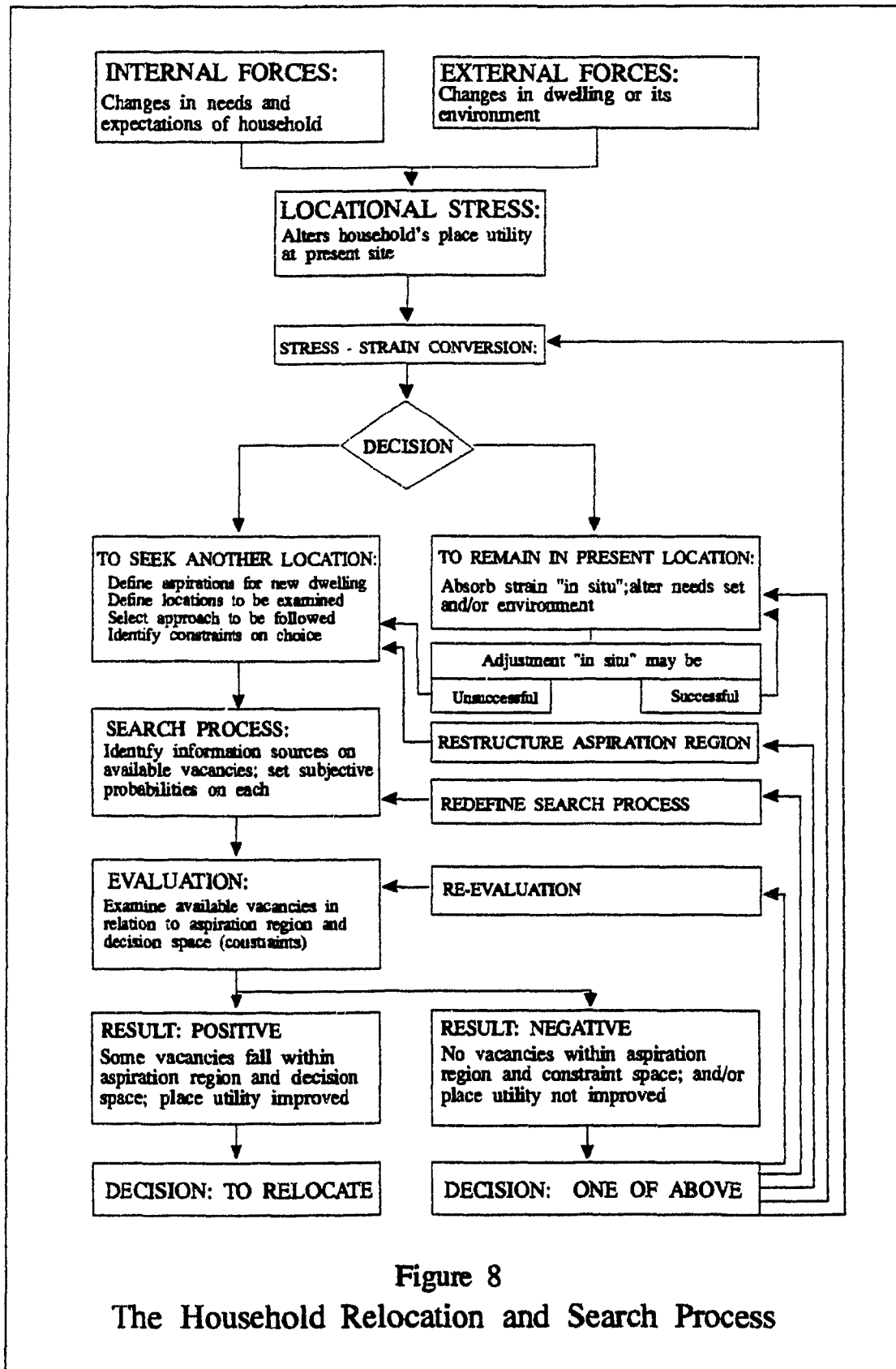


Figure 8
The Household Relocation and Search Process

Source: Bourne (1981).

2.3.2 THE FACTORS OF HOUSING ADJUSTMENT

Literature on residential mobility and housing intensification show similarities in terms of the variables which influence their occurrence. Four main factors have been shown to be relevant in housing adjustment processes. Household income and housing affordability, family life cycle and household size, housing tenure, and preferences have been identified as the relevant factors of both residential mobility adjustment and in-situ adjustments.

2.3.2.1 HOUSEHOLD INCOME AND HOUSING AFFORDABILITY

The household's disposable income and housing market conditions have been seen as very important factors influencing not only the household decision to change accommodation but also housing intensification strategies.

Rudel (1987) has observed in the United States that, households moving from rented to owner occupied housing in response to changing household space needs, declined between 1974 and 1978, with areas having very rapid levels of housing price inflation, such as the Western United States, having the largest declines. This trend has continued, with the Western United States still showing the highest levels of housing inflation. He expresses the conviction that economic considerations are the most important determinants of residential mobility.

The characteristics of the housing market at particular

periods have been recognized as being more important influences over residential mobility and housing adjustments than the characteristics of the household itself, especially among low income households. In his study in Columbia, Edwards (1983) mentions that patterns of mobility among low income households are linked to the availability of cheap housing and land. He argues that housing attracts differential prices over space and time, and that the range of housing alternatives available to individual households is determined by the income they have available for expenditure on housing. He observes that,

" "Choice" in housing is a positive function of income". Doling (1976: 57) also indicates that "a choice in space needs is irrelevant if one hasn't the money to purchase them". Edwards' study comes to the conclusion that a major reason for the lack of transition from rental to ownership of housing by households is related to affordability. Pessimism is expressed about conditions of the low income households because real incomes have remained static or actually declined in the study area in Columbia (Edwards, 1983).

Income constraints have been seen as very important in understanding housing intensification strategy. Physical modification of housing involves considerable capital expenditure. Seek (1983) indicates the constraints of income and wealth on housing intensification. He observes that improvers have on the average higher incomes than other owner

occupiers who undertake no change.

2.3.2.2 FAMILY LIFE CYCLE AND HOUSEHOLD SIZE

Rudel (1987), describes a model to show how the family life cycle and household size influence the move from rented to owner occupied housing. The move from rental to owner occupied is usually associated with a move from smaller to larger housing space. A number of lifecycle stages (involving stages of marriage, pre-child period, child rearing period and finally old age {"empty nest period"}) have been described. The stages are - young single head, young couple, young family, mature family, older family, older couple, older single head, and "other stage" including single or married couples with no children. The family life cycle is paralleled with a housing cycle. New couples initially rent a small apartment, sometimes move to a larger apartment (during pre-child period or first child rearing period), then move into owner occupied housing and then into larger owner occupied with a larger household size. In old age, couples move into smaller housing units. However, Doling (1976: 56), provided data to show that it was not necessarily the case that during old age there is a return to smaller dwellings. The conclusion is that each instance of residential mobility which results in a change in housing type is associated with a change in household composition. Thus increase in household size increases housing space needs and this influences the move

into larger dwellings, and a decrease in household size is associated with a decline in demand for housing space. In effect life cycle change has important implications for housing consumption demand. This relationship between life cycle change and housing cycle change was most apparent in the United States in the 1950s and 1960s (Rossi, 1980; Chevan 1972). The role of life-cycle changes in housing changes is more apparent in the developed world characterized by nuclear families than in developing countries, where extended family relationships dominate. Thus household size in Africa for instance, is not a direct function of life-cycle stage but of the intensity of extended family relationships.

According to Seek (1983), the main explanatory variable for undertaking housing intensification involving physical changes, is the family life-cycle stage. A progressive increase occurs in housing demand to a peak at the mature family stage which is the end of the expanding phase of the life cycle and where income is near or at its highest level. Demand for housing then falls at the old age stage especially where children move house to start their own family. Income also falls at retirement.

Given the fact that homeowners tend to live in the same house for a long time with only a very few actually moving in any given year, Seek (1983), argues that any changes in housing demand related to changes in family life cycles is met by altering existing homes. The types of housing

alterations and adjustments made are related to the expected housing demands associated with the different lifecycle stages. With the household expanding, the housing changes undertaken are additions of space and rooms to accommodate needs for an increasing family size and to accommodate growing children and needs for privacy. While in the contraction stages, there is less demand for extra space and rehabilitation and renovations are important.

2.3.2.3 HOUSING TENURE

Tenure has been identified as a relevant factor of housing adjustment. Rental tenure has been associated with transiency and lack of security compared to owner occupancy. Significant differences in mobility rates between renters and owners have been observed, with one study indicating the former four to five times more likely to move than the latter (Speare, 1970). With regard to residential mobility, Pickvance (1974: 172) states that, "The most consistently observed relationship is that between housing tenure and mobility: owner occupiers are consistently found to be less mobile than renters". Turner (1968) observed the lack of security and independence of rental tenure, and the need for larger housing space influencing a move from rental tenure to ownership in squatter settlements in Latin America.

Seek's (1983) study on housing intensification considered only owners of housing. The author discussed the role of

tenancy and showed that improvements involve substantial capital outlays, which would not enable a tenant to derive adequate returns to his investment. The important role of housing tenure has been mentioned by Leeds (1981); Marris (1981) and Janice (1981). These authors have described the effect of insecure tenure as being clearly illustrated in the case of squatter settlements. Since households in squatter settlements are faced with constant threat of eviction, investment in home improvement and facilities is necessarily high risk and there is no incentive for residents to improve their residential circumstances. A secure tenure results in the release of large amounts of capital and labor investments in home improvements and adjustments. Most tenants therefore prefer to move due to a combination of factors which make housing improvements almost impossible (Seek, 1983: 462, 462; Bourne, 1981: 134).

Edwards (1983: 134), and Tipple and Willis (1991: 36), have disputed conceptions of the transient nature of rental tenure. These authors argue that hardly can rental tenure be described as transient or transitory. Edwards observed a lack of transition from rental to ownership and attributed this to low incomes. He expresses pessimism about the conditions of low income households because their real incomes have remained static or actually declined in the study area in Columbia. Data from a study in Kumasi (Ghana) by Tipple and Willis, provided no substantiation of Turner's residential mobility

model which indicates a move from renting to ownership. The authors indicate that, "It is remarkable how few migrants to Kumasi intend their stay to be short". The renters surveyed had lived in their residences for long periods of time. (Tipple and Willis, 1991: 36). Thus the issue of transiency alone may not be the factor influencing housing adjustment.

These two developing world studies question the universality of Turner's model of residential mobility and other related models. Turner's model indicates that at a life-cycle stage, the household trades accessibility to employment sources for the need for extra space to accommodate a growing family and security and independence offered by ownership of housing in squatter settlements. Squatting is not a choice available to all developing world residents. Some are unable to squat because of the unavailability of land for squatting. This difficulty in squatting results in continued renting of accommodation. Thus renting cannot always be thought of as a transient housing tenure especially in developing countries.

2.3.2.4 PREFERENCES

The role of human preferences as a factor influencing the decision to make an adjustment in housing has been shown by Edwards (1983). Human preferences for the available supply of cheap accommodation is seen as a factor influencing the decision to move in Columbia. A low income household would prefer a slum to a squatter settlement because of the

differences in characteristics of the two settlements.

Duration of residence in a particular dwelling and anticipation of future housing needs have also been cited as influencing housing adjustment. On the basis of demographic studies, Speare (1970: 449) and Bourne (1981: 134) suggest that, the propensity of an individual to move diminishes with duration of residence in a particular place. Seek (1983), indicates that expectations of starting a family for instance is a factor which influences housing adjustment.

2.3.3 THE NEED FOR AN INTEGRATED MODEL OF HOUSING ADJUSTMENT

Housing adjustment literature has increasingly shown the importance of considering all the relevant factors in any explanation of housing adjustment. Many researchers on housing adjustment processes have described the relationships between variables. For instance, Rudel (1987) argued for the need to refine the relationship between life cycle and housing cycle by indicating that growth in family size and increases in income are the best predictors of a shift from rented to owner occupied and in effect the shift from smaller housing space to larger housing space. Turner (1968) makes a similar observation.

Doling (1976: 57), argues that although a changing family structure and preferences influence demand for larger space, increased wealth seems to be very important. He examines the issue of whether the purchase of larger dwelling space with

increasing age and presence of children is a consequence of preference or of changes in income. He concludes that preference for larger space is the motive for acquiring larger housing space. However the ability to acquire larger housing space is a function of the household's income. In Doling's words, "Structural change may well provide the incentive for housing choice therefore, but demand in the sense of willingness to pay is only fulfilled by the means which wealth provides". The importance of income and housing affordability is especially apparent during economic recessions and periods of housing price inflation. The suggestion that "Households endeavour throughout the life cycle to optimize the fit between house and household" (Roistacher, 1974: 12), is especially valid in periods of modest housing price inflation. Rapid housing price inflation makes family size less important in final decision making about residential and housing space change. Strassman (1978) also supports these findings and states that income constraints force low income households into whatever type of accommodation they can afford with preferences and life-cycle characteristics playing little roles.

Other relationships which have been observed are those between life-cycle and income, tenure and income, and tenure and household size. Progression through the life-cycle has been correlated with career advancement and increasing wealth (Seek, 1983). Struyk and Marshall (1974: 299) indicate a

relationship between income and the probability of home ownership. Higher incomes positively correlate with home ownership but the relationship is at a decreasing rate at higher levels of income. Dreier (1984) provides statistics which show that in the United States of America in 1980, "... 67.6 per cent of all renters - compared to 37.1 per cent of all home owners - had household incomes below \$15,000.... Thus very few tenants are tenants by choice....". Bourne (1981), also indicates that the wealthy usually tend to be owners whereas the poor are renters, although this is not the case all through various income groups. In the U.S., Bourne (1981: 57) observes that households with incomes below the median of \$10000-15000 tend to be renters with those above owners.

A similar situation exists in the developing world. Evidence from Latin America indicates that housing owners are wealthier than renters (Gilbert and Varley, 1990: 92). Tipple and Willis (1991) have examined the issue of wealthiness and point to the fact that incomes stated are usually only 42 per cent of stated expenditure and therefore advocated the use of household expenditure as more accurate reflectors of the household's income. The study revealed that owners have higher expenditures than renters. However analysis on the basis of per capita expenditure gives a different picture. Owners have lower per capita expenditures (Tipple and Willis, 1991: 34). It is important to realize that it is very probable that higher income in such societies with traditional values

attracts members of the extended family and results in larger household sizes. Working in Mexico, Gilbert and Varley (1990) observe that rental tenure is hardly by choice all through the life cycle of an individual but is influenced by income, age and other household characteristics, such as household size. The research also emphasizes that a simple income constraint model is inadequate in explaining all the observed patterns of tenure. Locational advantages, for instance may determine the tenure choice. Gilbert and Ward (1985) indicate that renters in Mexico city are 7.5 years younger than owners and that the owner occupied houses have larger household sizes than those in rental accommodation.

A study by Follain and Jimenez (1985a), used an econometric model to analyze household demand for specific housing characteristics in three developing countries - Philippines, Columbia and South Korea. Despite its limitations, the study provides some insights into factors influencing housing intensification. In addition the study adopts an integrated approach in its examination of the factors of housing adjustment. Tenure, income, available housing space and household size, housing characteristics, and preferences are the relevant factors considered. The study made the following observations:

1. Willingness to pay for extra living space decreases quite rapidly as the average size of a dwelling increases. Differences were observed between owners and renters, with

renters willing to pay more for extra living space. Tipple and Willis (1991: 32), for instance have observed that homeowners in Kumasi (Ghana), have larger living space than renters.

2. Household willingness to pay for living space increases with income but at a less than proportionate rate. A caveat is given of small sample size of the study.

3. Differences between owners and renters in willingness to pay for quality improvements. A positive relationship was observed between willingness to pay for quality and urban services by income. Home owners were willing to pay more than renters.

4. Observed in the Korean sample that owners were willing to pay sizeable amounts for additional space despite comparable levels of crowding in the other samples. This was attributed to differences in taste and preferences.

5. The variation of willingness to pay for extra space by household size revealed a decline with increase in household size. The smaller household with one to two members is willing to pay more for extra space than a larger household. This seems to be contrary to lifecycle explanations of housing consumption behavior. However there is the need to consider such issues as anticipation of future household size influencing the size of living space acquired and thus making the need for acquiring extra space less likely in the future. In addition aggregate measures obscure individual behavior.

The relationship between willingness to acquire extra space and household size needs to be observed for a specific household and then to generalize about the relationship rather than to compare willingness to pay for extra space by households of different sizes and to conclude about relationships on the basis of that.

The project implications of the study are also indicated in the study. Follain and Jimenez (1985a) concluded (using the Columbia sample as an example) that, a project that incorporates greater structural quality and increased urban services rather than greater housing space will benefit the poor. The income elasticity of demand for living space is less than unity while that for housing quality is greater than unity. This is consistent with the findings of Follain and Jimenez (1985b). A focus on increased size of dwellings will benefit the rich. Such analyses as the study has done, are useful in determining the kinds of housing projects which would provide the greatest utility. Since "...the costs and benefits depend on the components in a project package, it is crucial to know how the intended beneficiaries rank those components". With this knowledge, the authors expressed the belief that, "projects can be designed that are consistent with the preferences of the tenants".

Observing the relationship between the relevant variables of housing adjustment is important for a comprehensive understanding of this phenomenon, since its occurrence is

influenced by the simultaneous effects of the variables.

2.3.4 A SUMMARY OF THE FACTORS OF HOUSING ADJUSTMENT

The literature on residential mobility and housing intensification as a response to changing housing consumption demands enables one to isolate the major variables for an analysis of housing intensification or in-situ adjustments in Ghana. The findings of all the studies on housing adjustment cited above are summarized below:

1. Housing affordability (measured in terms of income actually available for expenditure on housing and not total income), is a major factor of housing adjustment. In effect a positive relationship exists between housing affordability and housing adjustment.
2. Household size, which corresponds to family life-cycle stage is also a determinant of housing adjustment. As the household grows in size, the greater is the demand for extra living space.
3. If housing is unaffordable, household size becomes less important in influencing the decision to adjust.
4. The move from rental to ownership status, which is usually a response to change in household size, implies moving from smaller housing space to larger ones.
5. Tenure is related to affordability in most instances. That is, it is more of a case of constraint, than choice which results in assuming rental tenureship especially in areas not

characterized by large scale squatting like Ghana.

6. Given the fact that housing adjustment involves substantial capital outlays, a correlation exists between tenure and adjustment. Owners are more predisposed to adjusting than renters.

7. Household characteristics and socio-economic circumstances are important in housing adjustments. However households with similarities in circumstances might adjust differently, with some adjusting and others not. This is related to tastes and preferences.

8. The larger the available housing space vis-a-vis household size, the less likely it will be for the household to adjust in a given period.

9. Since the income elasticity of demand for living space is less than unity (inelastic) and that for housing quality is greater than unity (elastic), households would prefer quality improvements than space additions, especially among low income residents.

These findings were important in structuring the questionnaire for this study. However adaptations to suit the Ghanaian situation had to be made:

1. Although studies examining housing affordability focus on household income, this study collected data only on heads of households income. The reason is the deep conviction of this writer that housing tenure is determined by the income of only the head of household and that other income earners in a

household may contribute towards the subsequent upkeep of the household. Rarely should one expect to find a dual ownership of housing even in a case of the presence of other income earners in the household. Thus the major capital expenditure on housing is by the head of household. Data collected on who undertook any form of housing adjustment seems to confirm this. The head of household is mentioned in all cases as being the one who initiated and implemented the changes in housing space. The income of the head of household is important therefore in understanding the present differences in structure and quality of housing in the study area. Considering the effect of other income earners will distort this pattern.

2. The relationship between family life-cycle and household size is not a direct relationship in societies characterized by extended family relationships like Ghana. The variable considered for the analysis is household size. Family life cycle is not directly considered in the analyses.

The major variables which are deemed important for the analyses of the housing situation in the study area are head of household's income, household size and available housing space, tenureship, and other household characteristics, types of adjustments made and reasons for adjusting, and household housing requirements.

This study also sought to test the validity of some of the findings revealed by the review of the literature. The

literature review enabled the following deductions to be made:

1. Since housing adjustment and housing tenure are related to housing affordability, higher income areas will be characterized by higher levels of owner tenureship and adjustment than low income areas.
2. Owner occupied housing will have comparatively larger living space than rental housing.
3. The largest houses will be owned by the highest income households.
4. The largest houses will be characterized by less adjustments than the relatively smaller ones, because of the availability of adequate housing space in the largest houses.
5. The respondents will be more concerned with quality improvements than space requirements.

The conceptual framework described in Chapter One for examining housing intensification, attempts to integrate all the relevant factors in one model.

Bourne (1981), indicates that expressions of housing adjustments can be observed and measured at different levels of spatial aggregation varying from the individual dwelling unit to neighborhoods or socio-economic regions within an area. This study examines the adjustment process at the sublocality/neighborhood level and undertakes to compare sublocalities/neighborhoods in terms of the characteristics of adjustment. The specific hypotheses this study sought to test have been indicated in the introductory chapter (p.20).

CHAPTER THREE

BACKGROUND INFORMATION ABOUT THE STUDY AREA

3.1 INTRODUCTION

In order to provide the spatial context within which the research objectives (of outlining housing conditions and responses to housing poverty, examining the levels and forms of housing intensification, and examining relationships between localities and intensification) are achieved, this chapter provides the necessary background information not only about the Madina-Adenta study area but also about AMA. To provide context and background, a brief introductory description of urbanization in Ghana is outlined. The growth of AMA is then examined and this is followed by socio-demographic information about the study area. A summary of the housing sector and the present housing situation in Ghana and then for the study area is discussed.

Ghana is located in West Africa, bordered in the north by Burkina-Faso (formerly Upper Volta), by the Atlantic Ocean in the South, by Togo to the East, and Cote d'Ivoire (Ivory Coast) in the West. Ghana covers an area of 238,539 square kilometers. The population of the country as at 1984 was 12.2 million and is now estimated at close to 15 million. The annual rate of population growth is between 2.6 per cent and 3 per cent (1984 Ghana Population Census; World Bank, 1992).

The population of Ghana is becoming urbanized at a rapid

rate. A settlement area is demographically classified as urban in Ghana when it has a population of 5000 or more. In less than 25 years, the urban population of Ghana doubled from 1.5 million in 1960 to 3.7 million in 1984. Thus, as at 1984, about 31 per cent of Ghanaians lived in a town or city as compared to 13 per cent in 1948, 23 per cent in 1960 and 29 percent in 1970. The annual rate of urban population growth was 3.2 percent between 1960 and 1984. With the present total fertility levels of six to seven children per woman, the number of people living in urban areas will increase six-fold by the year 2020.

Given the economic performance of Ghana, this rapid urbanization is a source of concern to the Government in view of the existing almost unsurmountable urban problems of unemployment and underemployment, inadequate services and facilities, inadequate housing and many social problems.

The city of Accra is the national capital and is located in the Greater Accra Administrative Region (see Fig 1). It is the largest urban center in the country. This city contains about 23 per cent of all urban residents in Ghana. Accra together with Tema (which is ranked nationally as the fourth largest urban center), constitute the largest urban agglomeration in Ghana. Among the fastest growing towns with annual growth rates of over 5 percent, are Madina and Ashiaman both in the Greater Accra Region (Dickson and Benneh, 1984; 1960, 1970, 1984 Ghana Population Censuses; Government of

Ghana, Economic Recovery Programme 1984-1986; Nabila, 1988: 1-8).

AMA could be described as a huge functional region with the cities of Accra and Tema as the cores/centers. The peripheral towns and villages such as Madina-Adenta have close functional interrelationships with the center. For instance, a large proportion of the economically active population of Madina-Adenta, commute to work in the City of Accra (Demographic Studies and Projections for AMA, 1990: 34).

3.2 THE PHYSICAL GROWTH OF ACCRA METROPOLITAN AREA

A demographic study of AMA in 1990 indicated the spatial dimensions of rapid population growth on AMA. One important manifestation of the rapid population growth is the rapid physical growth of the Metropolitan region.

The population-related physical growth of this region is expressed vertically and/or horizontally. The vertical physical developments are expressed in multi-storey structures. In the absence of any effective planning, the horizontal growth has resulted in sprawl and the rapid extension of the built-up area into rural areas. This horizontal growth accounts to a large extent for the continued growth of Madina-Adenta. Associated with the rapid population growth is the intensification of housing land use expressed for instance in the form of crowding within existing housing units and in-filling of vacant spaces through housing

extensions.

AMA consists of three administrative districts: Accra, Tema and Ga districts (see Fig. 2). Its population in 1984 was 1,296,470. The rapid population growth and expansion of this region can be traced to a number of factors in the pre-colonial period, colonial period and the modern period. A major impetus for the expansion of this region was the designation of Accra as the seat of government of the colonial administration. Accra consequently became the administrative, transportation, financial and commercial center. This centralization of functions was further entrenched after Ghana's independence. Accra became the industrial center and Tema was developed also as an industrial satellite of the capital. All the major national functions and their associated infrastructure were thus concentrated in the Accra-Tema area. These activities and infrastructure, and the perceived disparity in living conditions between the Accra-Tema area and other regions in Ghana initiated a process of migration and rapid population growth of the Accra-Tema region. The Demographic Study and Projections for AMA (1990), observed that the residential space needs of the increasing population were met by horizontal developments rather than vertical growth. The latter is weak and concentrated in the central business district of the city of Accra. Residential land use is the single most important land use in AMA since it accounts for over 50% of the total urban land use (Demographic Studies

and Projections for AMA, 1990; Nabila et al, 1990).

Concern about the rapid horizontal growth of the AMA is appreciated when one considers the fact that with the exception of Tema township and a very few predominantly high income residential areas, the vast proportion of AMA is unplanned. The city of Accra has sprawled into what was hitherto known as Ga rural but presently the Ga district. This has created a rapidly growing peri-urban zone. The pressures of inadequate housing in the inner city zones and the relatively cheap land values in the developing suburban zones have been seen as very important factors influencing the rapid growth of the peri-urban regions of AMA. The functional relationships these suburban areas have with the nodal centers is further manifested by the fact that these suburban zones are located along the major transportation arteries leading out from the core/center. Madina-Adenta for instance lies along the Accra-Aburi road (Demographic Studies and Projections, 1990).

TABLE 1
POPULATION GROWTH TRENDS IN AMA, 1960, 1970, 1984

Local Councils	TOTAL 1960 pop.	TOTAL 1970 pop.	TOTAL 1984 pop.	% Increase for Inter- censal period 1960-1970	% Increase for Inter censal period 1970-1984
Ga District	33907	66336	136358	95.6	105.6
Accra District	388396	636667	969195	63.8	52.4
Tema District	27127	102431	190917	277.6	86.4
TOTAL AMA	449430	804834	1296470	79.1	61.1

Source: Quoted from Department of Geography and Resource Development, University of Ghana (1990). Demographic Studies and Projections for Accra Metropolitan Area. Pg.22.

Table 1 indicates that the predominantly peri-urban Ga district presently constitutes the most rapidly growing region of the AMA, registering an intercensal population growth of 105.6% between 1970 and 1984. Rapid population growth coupled with extensive and rapid changes in land use is a major characteristic of peri-urban zones. As indicated earlier, residential land use has been very extensive in this region because of the rapid population growth and also because of the availability of relatively cheap land.

FIGURE 9: THE CHANGING BOUNDARIES OF THE ACCRA METROPOLITAN AREA (1924-1987)

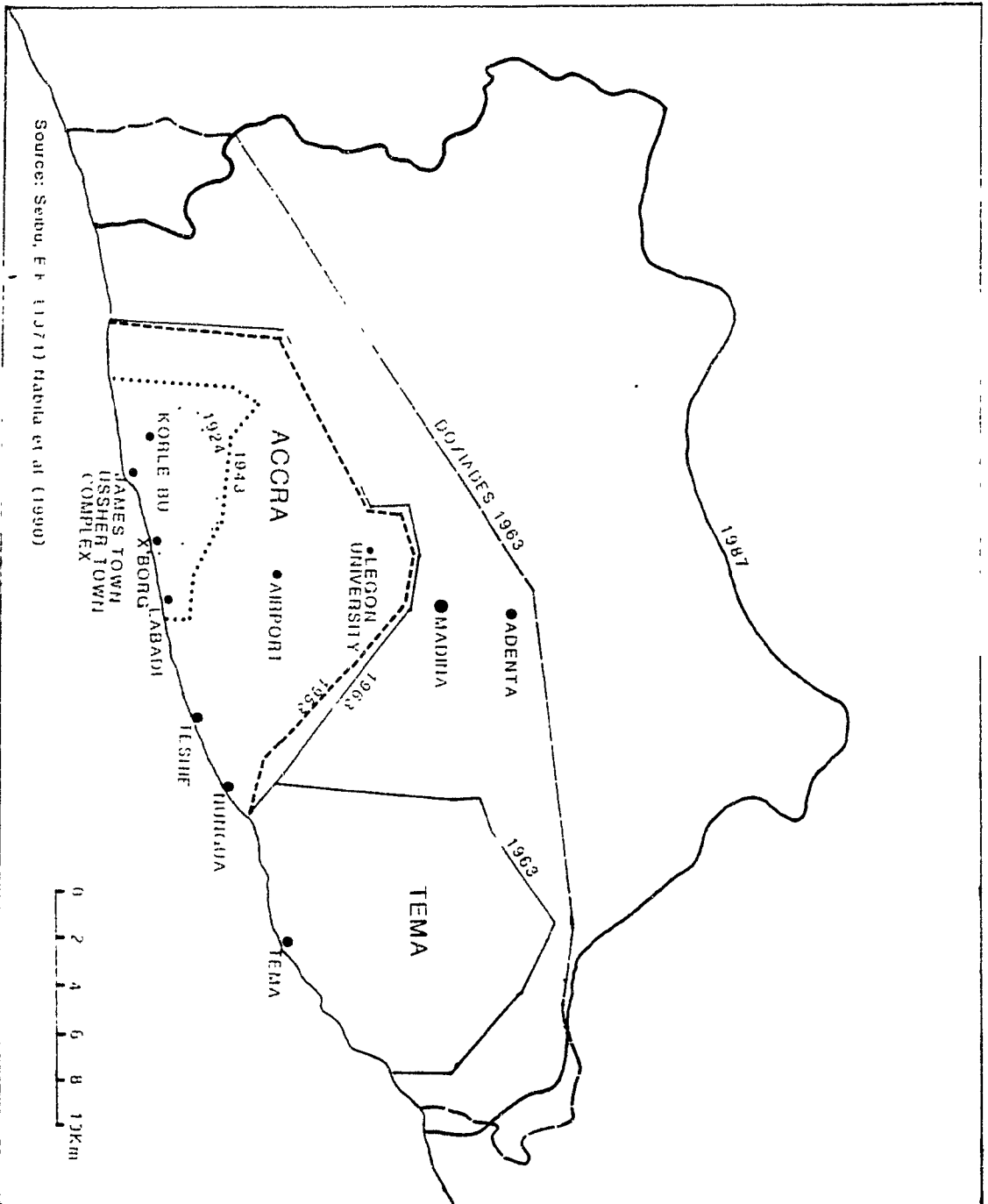


Figure 9 shows the changing boundaries of AMA from 1924-1987 and illustrates how the boundaries of this region have changed in response to horizontal growth. Table 2 gives an indication of the annual growth rates of population between intercensal periods and also the areas of the three districts and population densities. The Ga District presently has the highest population growth rates but a relatively low population density because of the vastness of this urbanizing area.

TABLE 2
ANNUAL POPULATION GROWTH RATES IN AMA, 1960-1984

District	Pop. growth rate		Area (Ha)	Density Person's per hectare		
	1960-70 (%)	1970-84 (%)		1960	1970	1984
Accra	5.1	3.1	23570	16.48	26.99	41.12
Tema	14.2	4.5	16840	1.61	6.08	11.34
Ga	6.9	5.3	88840	0.38	0.75	1.54
Total (AMA)	6.0	3.5	129250	3.48	6.23	10.03

Source: Department of Geography and Resource Development, University of Ghana (1990). Demographic Studies and Projections for AMA.

Population projections indicate continued population growth in AMA as indicated in Table 3:

TABLE 3
PERCENTAGE OF POPULATION OF GHANA IN AMA, 1984-2010

District	1984	1985	1990	1995	2000	2005	2010
Accra	7.88	7.93	8.09	8.22	8.32	8.38	8.42
Tema	1.55	1.59	1.74	1.86	1.97	2.05	2.10
Ga	1.11	1.13	1.21	1.28	1.33	1.37	1.40
AMA	10.54	10.65	11.04	11.36	11.62	11.80	11.92

Source: Department of Geography and Resource Development, University of Ghana (1990), Demographic Studies and Projections of AMA.

11 per cent of the total population of Ghana is presently located in AMA. This is very significant considering the fact that there are 110 districts in Ghana. Table 3 further indicates that this proportion will continue to grow, reaching 12 per cent in 2010. Although the proportional changes seem small in the Ga district, it should be realized that the changes are accounted for by only a few localities.

3.3 THE STUDY AREA

Madina-Adenta is located within a peri-urban zone, which separates the closely built up inner city area of AMA from rural settlements. The study area has been described as

"...one large residential suburb...". Madina is the nucleus of a fast developing residential belt which includes Adenta, Kwabenya and Ashaley Botwe (Demographic Studies and Projections, 1990: 23).

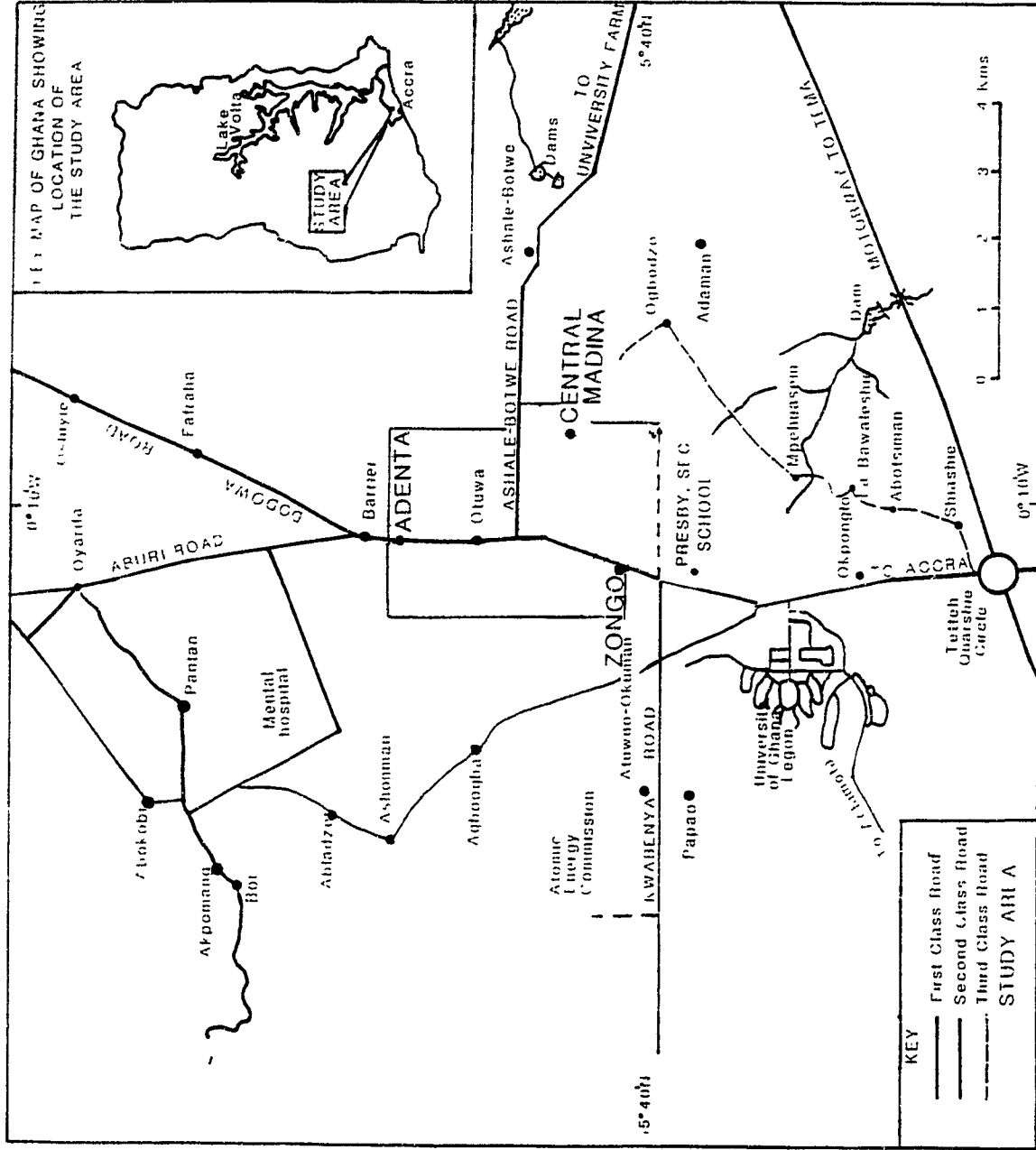
3.3.1 LOCATION

Madina-Adenta is located in South-eastern Ghana in the interior of the Accra Plains. The Plains are found between the Akwapim scarp, the Lower Volta River and the Coast line. The City of Accra lies about 16 kilometers South-West of Madina-Adenta (see Fig.10).

3.3.2 THE ORIGINS OF MADINA-ADENTA

Madina did not exist as a census unit during the 1960 census and Adenta was designated a locality only in 1984. Unauthorized developments on government lands reserved for the University of Ghana by immigrant Northern Ghanaians and Non-Ghanaians, who had legitimately acquired the disputed land from the Labadi Chief, (who is the custodian of land) necessitated a resolution of the conflict. The Government at the time negotiated with the Chief of Labadi in Accra for land to resettle the affected people. These people were resettled at the present Madina. Madina was all farmland before it developed as a settlement area in 1959 (Quarcoo et al, 1967: 3-7).

FIG. 10: A MAP OF MADINA-ADENTA



Efforts at rapid infrastructural developments after Ghana's independence in 1957 also resulted in displacements of the inhabitants of project areas. The construction of the Kanda estates, the Nima Highway, the Nima Redevelopment Project and plans to construct an International Trade Fair Site in Accra necessitated the resettlement of the people to be affected by these projects. Further negotiation with the Chief of Labadi resulted in the settlement of these people in Madina (Asiama, 1984: 174).

The Government proposed that the settlement be planned with well defined lots of land for housing, open spaces and services and light industry. The plan developed by The Trevallion Committee, was to cover a settlement area of 159 acres (64 hectares) with 3300 people initially, but envisaged a total settlement population of 30000 and consequently made provisions for extension of land use (Quarcoo et al, 1967: 5-15; Asiama, 1984: 174). The Plan of May, 1959 recommended that, "No person shall subdivide or develop any land within the scheme which contravenes the subdivision or use zones indicated in the scheme" (Quarcoo et al, 1967: 12). In effect, development of the new settlement was to be controlled. The government and the leadership of the new settlement failed to implement the plan which would have controlled the development of the town. The failure to declare the area as a Statutory Planning area in accordance with the Town and Country Planning Ordinance of 1945 meant there was no legislative instrument

backing the recommendations of the plan (Asiama, 1984: 174).

The impetus for the continued growth of Madina has come from the pressures of inadequate housing in the densely populated inner city area, the cumbersome controls in the inner city zones and the accessibility to relatively cheap land. In addition, it is close to the City of Accra and there is easy access to all the range of functions and services provided by this first order central place (Demographic Studies and projections for AMA, 1990: 20).

Adenta was designated a census unit during the 1984 population census. The factors accounting for the physical growth and expansion of Adenta (and as indicated for Madina) is related to the continued expansion of the City of Accra. A large proportion of the economically active population of Madina and Adenta commute to Legon, Accra and Tema (Demographic Studies and Projections for AMA, 1990: 20,34).

3.3.3 DEMOGRAPHIC CHARACTERISTICS OF THE STUDY AREA

This section gives a brief description of the demographic characteristics of the population of Madina-Adenta. Table 4 below summarizes the total population of the study area for the Population Census years of 1960, 1970 and 1984.

TABLE 4
POPULATION OF MADINA-ADENTA FOR 1960, 1970, 1984

Locality	POPULATION			Intercensal pop. change 1970-84	Intercensal pop.change 1970-84 (%)
	1960	1970	1984		
Madina	-	7480	28364	20884	279.2
Adenta	-	-	1322	-	-

Source: 1960, 1970 and 1984 Population Census of Ghana Reports.

The annual rate of growth for Madina between 1970 and 1984 was 10%, which far exceeds the national average of 3%.

TABLE 5
POPULATION OF MADINA BY AGE AND SEX, 1984

Sex	All Ages	Below1	1-4	5-9	10-14	15-24	25-44	45-64	65+
Female(F)									
Male(M)									
M	13914	396	1820	2034	1723	2476	3841	1408	216
F	14450	397	1727	2152	1920	3094	3946	1006	208
TOTAL	28364	793	3547	4186	3643	5570	7787	2414	424

Source: 1984 Ghana Population Census

56% of the population in 1984 are in the potentially economically active group, that is the 15-64 years age group. The dependency ratio in 1984 for Madina is 80 dependents per 100 potential economically active persons. 49 per cent of the population are male and 51 percent are female. The Sex Ratio

is 96 males per 100 females.

TABLE 6

PLACE OF BIRTH STATISTICS OF THE POPULATION OF MADINA, 1984.

Sex	This	Another	Place of birth	West African
Male (M)	Locality	Locality	Another Region	Country
Female (F)		(Same	in Ghana	
		Region)		
M	4148	2254	7060	424
F	4022	2593	7438	364
TOTAL	8170	4847	14498	788

Source: 1984 Population Census of Ghana.

The statistics above indicate that only 29 per cent of the population was born in Madina. Although without data on former place of residence it would be erroneous to make any migration analysis, the low figure of 29 per cent of residents is an indicator of the predominantly migrant character of the population of Madina.

3.4 HOUSING IN GHANA

The housing situation in Ghana has been described as a national crisis by the Government of Ghana. The annual housing needs for the urban areas in the whole country in 1990, given a household occupancy of 7 persons is estimated at 92000 housing units for all the income groups. The distribution of the housing units among the income groups is 91%, 7% and 2%

for the lower, middle and higher income groups, respectively. There is an accumulated housing deficit of 260000 housing units, which is needed to reduce household occupancy rates from 12.81 to 7 persons per house in the urban areas for all income groups. To meet the objective of reducing household occupancy rates from 12.81 to 7 person's per house for the whole country (both urban and rural), housing delivery agents will need to produce a total of 133000 units annually for the next 20 years. The current annual average delivery rate is estimated at 28000, which indicates a housing performance rate of 21% compared to what is required (National Housing Policy and Action Plan, 1987-1990, Ministry of Works and Housing).

The Ministry of Works and Housing in Ghana has identified indicators which point to inadequate delivery of housing. These include sub-standard housing structures, over-crowding, poor environmental conditions, lack of maintenance and physical deterioration of existing housing facilities and exorbitant rent advances in the urban areas. In the rural areas of Ghana, the problem of quality of housing is a major concern. Housing delivery deficits are also critical in these areas (National Housing Policy and Action Plan, 1987-1990, Ministry of Works and Housing).

Government regulations and policies, and economic conditions are major factors affecting the supply of housing in Ghana. The present government legislated rent controls in 1982 at a time of high levels of inflation. The current rent

control law of 1986 legislates rents to be charged for low income dwellings. Incomes of landlords were affected, with the rate of return on their investments in housing estimated at only 1.25 percent per annum. The consequences of this were, reduction of the housing stock available for rent, low levels of maintenance of existing stock and the considerable reduction in the production of new houses for rent (Willis, K.G., Malpezzi, S. and Tipple, A.G., 1990: 29). The combined effects of currency devaluation and inflation has among others significantly increased the prices of the mainly imported building material inputs. This has had an impact on the supply of affordable housing.

The Government has identified a number of fundamental problems affecting residential land use in Ghana. These include the problem of housing finance, land acquisition, inadequate resources for planning and provision of housing infrastructure and services, scarcity of building materials and construction and design constraints (National Housing Policy and Action Plan, 1987-1990, Ministry of Works and Housing).

3.4.1 HOUSING DELIVERY AGENCIES

The Government of Ghana has recognized the poor performance of the housing delivery sector and has attributed this to the "prevailing national economic constraints". The highest ever achieved annual delivery rate of 40000 housing

units was recorded in 1974, which was a 67% performance rate. As at 1987, the performance rate of the housing delivery sector was only 17%, indicating further deterioration in the housing sector (National Housing Policy and Action Plan, 1987-1990).

Three main categories of housing delivery agents can be identified in Ghana: The public sector, private sector and the popular sector providing 20%, 75% and 5% of the housing stock respectively. The public agencies include the State Housing Corporation, Tema Development Corporation, Redco, The Prefab Concrete Products Company, Social Security and National Insurance Trust, First Ghana Building Society and others. A major criticism which has continually been made against the public sector is their inefficiency in performance. Many of their projects are either abandoned at some stage or are completed at exorbitant costs. The performance rating of this sector has never exceeded 10%.

The private sector is the major housing delivery sector. Using some form of saved capital, individual builders acquire housing construction materials over the years preceding construction or as construction takes place. The performance rating of this sector is estimated at 25%. The reasons for this low performance are the non-availability of basic housing construction materials and consequently their high costs due to the high import content of building materials.

The popular sector has developed mainly to satisfy the

housing needs of migrants. It has been described as the "do it yourself sector" and is usually characterized by sub-standard structures in a totally unplanned fashion. This sector is relatively small in Ghana compared to Latin America and Asian countries.

3.4.2 HOUSING TYPES

Housing is an effective indicator of income levels and standard of living with the type of house constructed or rented closely related to one's income. In effect, a classification of housing can be made: Upper income houses, middle income houses and lower income Houses, with each having distinctive characteristics (Asiama, 1990: 564,565).

Upper income houses are located on plots with a mean size of 100 feet by 120 feet. These houses are usually high quality storied buildings or huge bungalows set in large compounds. Compounds are usually cemented or have well maintained lawns. Such houses have all the basic amenities like piped water and electricity. Housing infrastructure like kitchens, bathrooms and toilets are all modern forms and are provided within the main house. Drainage facilities are also provided. Such houses are typically owner-occupied, one family dwellings.

Housing for the middle income groups is also of good quality construction. The mean size of the land lot for middle income housing is 80 feet by 80-100 feet. The houses are usually single storied bungalows with smaller compounds than

high income houses. The compounds are usually cemented. Such houses also have all the basic amenities and housing infrastructure within the house. Drainage facilities are provided and such houses are owner-occupied or rented.

Low income housing is very distinctive and a typical characteristic is its slum condition. Quality of housing design and structure is low with the buildings not located on clearly identifiable lots of land but rather located very closely to each other. The level of housing maintenance, sanitation, ventilation and drainage are poor. The houses are mainly the compound type or some substandard structure. Pipe-borne water and electricity are not necessarily found in such houses and may be lacking or with only one of these amenities available. Housing infrastructure like toilets and/or bathrooms and/or kitchens may be lacking or even when available may be some structure outside the main house. Drainage facilities are lacking and such houses are rented by multiple households and in some cases the owner resides in the same house. The "Zongos" of Ghana are examples of low income housing (Asiama, 1990).

3.4.3 HOUSING FINANCE

Housing construction is a capital intensive activity, consequently the lack of adequate funding for both the public and private sectors has been seen as a major constraint on housing delivery in Ghana. Low income levels necessitate

institutionalized sources of finance, however the financial institutions have viewed the housing sector as unprofitable and risky. In effect mortgage lending facilities of financial institutions have benefitted very few people. Reasons for the reluctance to invest in housing include: a preference for short term lending as a result of the unstable economic conditions of an economy characterized by high rates of inflation, inability to recover earlier investments made in housing loans, and the low average incomes of the majority of Ghanaians.

The Bank for Housing and Construction and the First Ghana Building Society have a maximum pay back period of 20 years and 25 years respectively. The former charges an interest of 26% and between 1974 and 1985, this bank granted only 297 mortgages. The State Insurance Corporation grants mortgages to its employees, senior staff of the universities and senior officers of the military and in general high income earners. Its loans carry an interest of 14%. Between 1975 and 1985 the Corporation granted only 639 mortgages. It is apparent first of all that financial institutions regard housing as a non-priority area. Secondly, only highly paid individuals have the chance of obtaining loans. Finance for housing construction is therefore generally private coming from personal savings, gratuities and social security benefits (Asiama, 1990: 570).

3.4.4 LAND ACQUISITION

Land is acquired for the various land uses through traditional arrangements, private negotiations and more formal negotiations with government. Ownership of land in Ghana can be classified into the following: State land - managed by the lands commission, Stool/Skin land - with the chief as its custodian on behalf of a community, Stool/Skin land vested in the State, and Private/Family land held on freehold or long leasehold (Ghana Ministry of Works and Housing, 1986).

Land ownership is critical in understanding urban sprawl in Ghana. The traditional sector is predominant and therefore individuals can build houses without contending with government regulations. A major cause of unplanned development of the urban areas can be traced to the Town and Country Planning Ordinance of 1945. This law regulates urban planning and only applies and controls developments in areas the government has designated as a Planning Area (Asiama, 1990).

3.4.5 HOUSING CONSTRUCTION MATERIALS

A differentiation can be made between materials used for housing construction in the rural areas and the urban areas. Housing in the rural areas is mainly constructed with mud and modern materials such as aluminum and asbestos sheets for the roofing. In the urban areas, walls of houses are predominantly cement with roofing materials of aluminum and asbestos sheets.

Construction materials for housing in the urban areas

are usually controlled by local authorities (especially in the major towns and cities) and regulations specify durable materials for a house (Asiama, 1990: 567,568). In addition urban residents have access to more durable housing materials given the location of industries and manufactured products markets in Ghana. The Government of Ghana (1986) specifically indicated the building material constraints as follows among others:

- a. Over-dependence on imported raw materials for the production of building materials due to the lack of utilization of local raw materials.
- b. Gross under utilization of installed capacities of the building material industries.

Given the country's economic performance and the constraints mentioned above, building materials have been scarce and/or highly priced. The building material constraints have important implications for housing delivery.

3.4.6 HOUSING INFRASTRUCTURE

The Government of Ghana (1986) identified many constraints to the provision of adequate infrastructure for houses in the country. The provision of such infrastructure as access roads, drainage systems, water supply, sewerage systems and sewerage disposal facilities, refuse disposal facilities and electricity have been grossly inadequate for the following reasons:

1. The rapid extension of residential land use beyond what can be reasonably supplied with housing amenities.
2. The unplanned development of most of the residential areas coupled with the country's economic status makes the provision of adequate serviced sites almost impossible, and
3. Lack of coordination among the utility development agencies.

3.5 HOUSING IN MADINA-ADENTA

As at 1984, there was a total of 2383 houses in Madina for the population of 28364. This indicates a crude mean house occupancy rate of about 12 persons per house. There were 943 houses in 1970 providing shelter for a population of 7480. The mean occupancy was 8 persons. Thus in a general sense, although residential land use had extended, existing housing was being more intensively used.

In a study on Madina, Asiama (1984: 179) described housing construction in Madina as "informal". Housing construction was not guided by any Town Plan and about 11 percent of a sample of houses were constructed without building plans. Most of these houses were constructed with landcrete (mixture of laterite and cement) and lacked very basic housing infrastructure like toilets, kitchens, bathrooms and drains.

74 percent of the houses constructed using building plans had plans prepared by draughtsmen rather than professional

architects because of the lower costs involved in having plans prepared by draughtsmen. In addition the construction of about 95% of the sample of buildings was done by masons (small scale builders) rather than building construction firms with professional expertise (Asiama, 1984: 179).

Asiama (1984: 181) indicated the quality of housing in the sample area. 93% of the sampled houses had concrete floors, 4% had terrazzo and only 3% had bare floors. 65% had water, electricity and toilets, 19% had toilets and water but no electricity, 4% had electricity and toilets but no water, 9% had toilets but no electricity or water and another 9% had no amenities at all. The author related provision of amenities to annual incomes and stated that those houses with all the basic amenities such as bathrooms, kitchen, toilets, electricity and water had respondents with higher incomes than those who lacked these amenities. This is a reflection of the capital intensive nature of providing adequate housing and emphasizes the need to undertake housing studies under socio-economic group analysis in order to reflect the varying income groups of society and to capture the real housing needs of each socio-economic grouping.

Source of finance for housing is an important factor influencing the quality of housing. Asiama (1984: 180) observed that finance for house building in the sample area was generated through the house builders' own resources. Only 5% of the house owners took mortgages from financial

institutions. This supports the overall housing finance situation described in the housing policy document. The ability to build a house in Madina and its quality is dependent upon one's income since there are virtually no other sources of finance other than personal sources.

CHAPTER FOUR

METHODOLOGY

4.1 INTRODUCTION

All research requires research or survey designs, which enable a systematic procedure or approach towards the investigation of phenomena. The study's conceptual framework, objectives and hypotheses and practical considerations of costs, time and energy (available manpower resources) determine the structure of the research design. Such issues as the target population to be studied, the sample design, mode of data collection, methods of processing data and the available financial resources, time and manpower are considered (Kalton, 1983; Twumasi, 1986). This chapter describes the research design developed for this study and how data collection and analyses proceeded.

4.2 THE TARGET POPULATION

The first step in every survey design is to define the population to be studied (Kalton, 1983). As indicated in the introductory chapter, the area chosen for undertaking this study is Madina-Adenta, a peri-urban settlement in the Accra Metropolitan area. It was necessary given the author's budget and the stated objectives, to choose a single area in which one could meaningfully undertake a stratification into socio-economic localities/ neighborhoods. The area should also be

one on which the author and the research assistants have considerable local knowledge, if the stratification is to be meaningful and reflective of the total population parameters.

The study is primarily concerned with housing intensification and other issues directly related to the housing unit. Consequently heads of households/house owners and/or landlords were the targeted population since strategies of intensification and housing activities will obviously be undertaken or controlled by them. The respondents were therefore, houseowners/heads of households and/or landlords.

4.3 SAMPLING DESIGN

Having defined the target population and given the available financial resources, the next step is to develop a sampling design, which describes procedures for getting responses from respondents (Kish, 1967; Twumasi, 1986; Kalton, 1983).

Selecting a sample which would be representative of the total population, while considering other practical issues is a very important stage of the sampling design process. For statistical utility purposes and for representativeness, the sample size should be at least thirty (Dixon and Leach, 1977: 7). This is a criterion which this study adhered to.

The total sample size for this study is 225. The focus of the study is the impact of population growth on housing intensification and by definition this implies using in the

analysis only those households who have experienced an increase in household size. In addition, the study focused on those who had lived in their residences for at least three years. This period is deemed sufficient for all the range of intensification strategies to have possibly occurred. In order to have an insight into the extent of population related intensification, the field workers were specifically asked to record households in which no changes or a decline in household size had occurred. To achieve the sample size of 225, field workers covered a total of 248 houses. Eight of the sampled respondents had lived in their residences for less than three years and had experienced no increase in household size. Five had lived in their residences for less than three years but had increased in household size. Another ten had resided in their present homes for more than three years but had had no increase in household size. In effect only about 7 per cent of the total number of respondents contacted in the study area had actually faced no household size increase intensification. Using houses as the sampling unit and consequently interviewing heads of households in every house would have been most useful but areas of multiple household occupancy presented a problem. Thus in such areas a single household was selected at random from the target population.

The issue of housing classes has gained a lot of attention among housing analysts. This concept was introduced in 1968 by Rex. The underlying idea has been that there is a

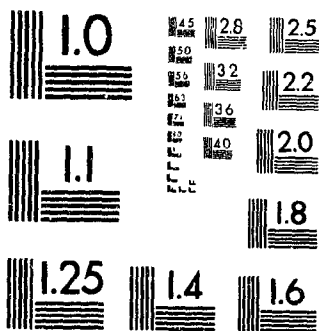
relationship between housing tenure and class (See for instance Harris, 1986, Harloe, 1984; Saunders, 1978; Hegedus and Tosics, 1983). Hegedus and Tosics (1983) have argued that housing class indicates both type of housing and the social groups that correspond to them. Thus a hierarchy of housing classes can be established and the housing characteristics of each described.

Onokerhoraye (1977) has observed that a major feature associated with rapid urbanization is the development of residential districts with socio-economic characteristics which distinguish them from one another. The author described a hierarchical stratification of the Nigerian city of Benin into three major groups in terms of occupation, formal education, religion, living standards and ethnic origin. The upper, middle and low income groups were identified and associated with specific sections and residential districts of the city. Ball and Kirwan (1977: 14) have also argued that households with similar socio-economic characteristics (especially income) tend to cluster.

The introductory chapter has indicated the need to undertake a study based on some form of housing stratification based on the hypothesis that strategies of intensification and housing characteristics would differ from one income group to another. The literature on housing also indicates the validity of undertaking such a stratification if real conditions of housing are to be identified. Given the lack of documented

2

**PM-1 3 1/2"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT**



PRECISIONSM RESOLUTION TARGETS

PIONEERS IN METHYLENE BLUE TESTING SINCE 1874



1500 COUNTY ROAD 3, BURNSVILLE, MN 55337 USA
TEL 612 435 7567 FAX 612 435 7587 TUX 610820486

disaggregated information about the study area, this research used housing type as an indicator of income group. Housing construction in Ghana is largely dependent on personal sources of income. Thus the higher the value of the house, the higher the income of the owner. It was expected, based on housing literature that housing type and income would correlate with level of education, housing tenure and size of housing space, and occupation. The study revealed the correlation of housing type with such variables as tenure, size of total housing space and level of education of head of household.

The selected sample size of 225 respondents was based on available resources, time and manpower constraints. The method of sampling used to obtain the required sample size is a combination of different sampling techniques. Kalton (1983: 8) has observed that although sampling techniques are discussed differently, in practice they are used together in "complex designs". An initial survey was undertaken by the research assistants to test the validity of the stratification of the study area into three areas based on housing type and value and also to pace round the selected areas to have an insight into their relative sizes. The three areas are Madina-Zongo, Central Madina and Adenta corresponding to low, middle and high income neighborhoods, respectively. The purpose of stratification is to classify areas into strata based on some known characteristic. Thus it was necessary that the study area be one on which this researcher and the research

assistants have adequate local knowledge.

The underlying principle of stratification is that the strata should be internally as homogeneous as possible and as heterogeneous as possible (mutually exclusive) when compared to each other. Within sample differences should be relatively insignificant as compared to differences between strata (Kalton, 1983; Blalock, 1979; Dixon and Leach, 1977; Twumasi, 1986). Chi-square analysis served as a basis for testing the validity of the stratification undertaken for this study (see p.96). Separate samples were selected from each strata and to bring about some element of proportionality (see, Blalock, 1979: 558-560; Kalton, 1983: 16-18), the research assistants selected strata sample sizes of 65, 75 and 85 (to reflect housing densities) for Adenta, Central Madina and Madina-Zongo respectively. Thus the basic technique was a proportionate stratified sampling. This research did not have a comprehensive sampling frame, in the sense that the only frame obtained was the census enumeration map which provides the basis for area sampling. A listing of the house numbers was not readily available for a pre-sampling selection of houses. Consequently, the selection of samples was achieved by adopting a method of on-the-spot sampling.

The next stage of the sampling procedure was to systematically obtain the required sample size of each stratum. The approach adopted was that researchers begin the procedure by randomly selecting the first house and thereafter

use the randomly selected number (in this instance number four) for undertaking a systematic sampling. This approach did not achieve the required sample sizes after covering the different areas. Thus the researchers adopted the technique of randomly varying the interval after the initial regular spacing.

4.4 DATA COLLECTION

Having developed a sampling design, the next stage was to adopt strategies for collecting the relevant information from existing documentary sources and respondents.

A combination of primary and secondary research is used in this study.

4.4.1 PRIMARY DATA COLLECTION

A combination of observation and questionnaire interview approach is used in this study. An important preparatory stage for this research was the orientation of the interviewers/field workers about the aims and objectives of the study. Three experienced field workers for each of the three neighborhoods and one supervisor obtained the required information for the data analyses.

4.4.1.1 QUESTIONNAIRE DESIGN

Twumasi (1986: 25) observes that no one method of primary data collection is absolutely the best and that methodological

usefulness is relative and depends on the circumstances and the informed judgement of the researcher. The questionnaire developed was guided by Casley and Lury's (1981) text on data collection in the developing world.

Turner (1981: 227), indicates that the household, its dwelling and its neighborhood make a complex whole and constitute a system (the housing system), and to understand this system one needs to have information about household composition, size, type and socio-economic circumstances. Other essential information includes housing tenure, housing type, its quality and available infrastructure. Thus information collected included that on the household, and the physical housing unit and its infrastructure. These characteristics of the elements of the housing system need to be studied in a neighborhood/locality context (defined as similar areas in urban contexts). This would enable the drawing of stronger conclusions about relationships expressed in recurrent patterns of association among housing elements within an area.

Housing literature and the concept of housing adopted for this study, which acknowledges this system concept of housing, required that information be acquired not only about the household, physical housing characteristics, housing infrastructure and other housing characteristics but also about the housing environment. The undertaking of the study within the neighborhood/locality context provides geographic

focus. Bourne (1981: 9) observes, "... housing cannot be divorced from the legal systems and social structures which influence its production and use, or from the neighborhoods in which it is located. The latter renders a geographic perspective on housing as imperative". For housing policy and strategy reasons, Yeh (1981) suggests empirical knowledge of the "market profile" of settlements is very crucial. The market profile level consists of the community, household and individual profile levels. Community/neighborhood profile should examine such issues as housing quality and types, available infrastructure, persons per house and other characteristics of use of housing structures. Household profile examines such issues as household tenancy, size, composition, income and length of residence. The individual profile includes demographic characteristics, education, occupation and income.

The questionnaire produced (see Appendix 1) incorporates these different insights obtained from a review of the literature. A behavioral component was incorporated to find out individual explanations for undertaking strategies of intensification, to find out perceptions about housing environmental problems and how they have been dealt with and also to identify individual housing needs. The questionnaire is divided into two sections, the household schedule and the housing and housing infrastructure schedule. The household schedule deals with household issues, such as household size,

gender, age, occupation and educational characteristics. The housing and housing infrastructure schedule examines housing type and tenure, available housing space and types of changes to housing space, housing quality, available housing infrastructure, housing needs and existing housing environmental problems.

The questionnaire is designed in such a way as to reveal inconsistencies in responses in order to identify only the reliable data for analyses. A manual explaining each question and defining concepts in the questionnaire was provided to each field worker and the supervisor. The questionnaire combined the pre-coded format with the open-ended format. The open-ended format enables one to have accurate insights into respondents perceptions and reasons for undertaking specific activities. The open-ended responses were all analyzed and coded for computer analysis. The coding procedure was guided by Marija Norusis' (1986) SPSS guide to data analysis.

4.4.2 SECONDARY DATA/INFORMATION SOURCES

As has been indicated above, secondary information derived from a review of housing literature provided invaluable insights into what are the relevant variables and questions which should be incorporated into the questionnaire. The Ghana Population censuses of 1960, 1970, and 1984 provided overall socio-demographic information on the study area. Specific information obtained include data on the total

population, and sex and age distribution. The total number of houses in the area and the changes between 1970 and 1984 were also derived from the Censuses. The Ghana Housing policy document, the Demographic projections for AMA and the Waste management unit document were also very important sources of information.

4.5 DATA ANALYTIC TECHNIQUES

Data analysis was greatly facilitated by the SPSS computer package. Coding the responses of respondents was undertaken in anticipation of using this package. The first stage of the analysis examined frequencies and descriptive statistical measures for all the variables considered in the questionnaire. Cross tabulations and Chi-square analyses were important techniques used in assessing differences in the three socio-economic localities in terms of specific variables and also in showing a general relationship between the three areas and the selected variables.

Chi-square analysis is useful in assessing whether there are significant differences in categories in terms of some other categories. In other words, the technique tests for the relationship or independence between/among categorical variables based on observed and expected frequencies. The results of the chi-square test of independence facilitates the selection of variables which would be useful in predicting the occurrence of another. Thus the relevant variables which

influence housing intensification were identified. The conventional response of researchers faced with a multitude of variables is to undertake a series of cross-tabulations and to compute the chi-square for each subtable, in order to identify whether a relationship exists between the variable and the phenomenon of interest. However this technique does not provide insight into the relationships among these explanatory variables. It is useful to know the effects of the variables on each other (Marija Norusis, 1988: 298).

This study therefore uses logistic regression models to identify the relative effects of the explanatory variables on housing intensification. Thus the model enables the researcher to identify which set of variables are most efficient in predicting the occurrence of an event/activity (Marija Norusis, 1990: 45-69). Using the SPSS program was essential since unlike linear regression models whose parameters are estimated by the least squares method, the logistic regression model is nonlinear and uses the maximum likelihood approach (coefficients which make the observed results most likely) to estimate model parameters. Iterative computation is therefore necessary for parameter estimation. The derived coefficient in simple terms is the change in the probability that an event/activity will occur (relative to the event/activity not occurring) associated with a unit change in an independent variable. Thus those independent variables which stimulate the largest change in probability are most useful in predicting

the occurrence of an event/activity. The most "influential" variables which explain housing intensification were therefore derived through this method.

Although the use of categories facilitates analyses, it has shortcomings. The convenience of categorization is done at the expense of detailed information. The predicted variable is categorized and consequently housing changes involving different capital expenditure are considered similar despite real differences. Different classification schemes could also possibly result in the observation of different relationships among the same set of variables. Despite these problems, however, Chi-square analysis and Logistic regression provide very valuable insights into the relationship between/among variables.

CHAPTER 5

HOUSING AND HOUSING INFRASTRUCTURE

5.1 INTRODUCTION

This chapter describes the factors of differentiation of the neighbourhoods identified for this study and provides a detailed insight into the corresponding housing conditions. Knowledge of the differing housing conditions provides context for understanding the conditions under which housing intensification is taking place and also provides basis for predicting the impact of further population growth on the neighbourhoods' environment. Housing preferences of households are indicated to show the varying housing needs. In addition, perceptions on the nature of environmental problems in the study area and their causes are examined.

5.2 SAMPLE DESCRIPTION

The total sample size used for this study as indicated in the methodology section is two hundred and twenty-five households. The total sample is stratified into socio-economic localities/neighborhoods on the basis of housing type. Adenta, Central Madina and Madina-Zongo are recognized in this study as high, middle and low income neighborhoods respectively. The sample distribution among the three socio-economic localities is summarized in Table 7.

TABLE 7
SAMPLE DISTRIBUTION

Locality	Sample Size
Adenta	65
Central Madina	75
Madina-Zongo	85
TOTAL	225

5.2.1 TYPOLOGY OF HOUSING

Four main types of houses can be found in the study area: compound /multiple household houses, single-storied bungalows, storied houses and single-storied unplanned houses. Table 8 shows the distribution of housing types. Compound houses are single-storied dwellings providing accommodation for multiple households, who share common compound space and housing facilities. Single storied unplanned houses are usually occupied by a single household and were constructed using no housing plans. The value of the housing types indicate their association with specific income groups. Thus the compound houses and the unplanned houses are predominant in the lower income areas of Zongo and the single storied bungalows and storied houses found in the relatively higher income areas of

Central Madina and Adenta. Estimates from real estate developers indicate a price range from C4 million to C8 million for two to three bedroom bungalows with all basic facilities (US\$1 = C450). Storied buildings range from C15 million and above (Ghana Real Estate Development Association, 1991). Since most of the housing types at Zongo do not conform to the standard types it is difficult to have an estimation of their values from Real Estate Developers. It is however very obvious given their quality that their values fall far below the prices for the bungalows and storied buildings.

TABLE 8
HOUSING TYPES

Housing type	Locality			TOTAL
	Adenta	Central Madina	Madina-Zongo	
Compound house	0	0	75	75
Single storied bungalow	33	75	0	108
Storied house	32	0	0	32
Single-storied unplanned house	0	0	10	10
TOTAL	65	75	85	225

5.2.2 FACTORS OF SAMPLE DIFFERENTIATION

In order to further substantiate the classification of the study area into three socio-economic localities based on housing type and value, a number of variables are cross tabulated with the localities to determine the presence of relationships. These variables are, the stated primary incomes, educational and occupational characteristics of heads of households. The others are housing tenure and available housing space for the household. Chi-square analysis is used to determine the existence of relationships between socio-economic neighborhood and the relevant variables. A summary of the results of the analysis is described in the table below.

TABLE 9

SUMMARY OF RELATIONSHIP BETWEEN NEIGHBORHOOD AND SOCIO-ECONOMIC VARIABLES

Variable	Relationship with neighborhood	Chi-square value	D.F	Sig.
Income	Significant	119.7	4	.0000
Education	Significant	117.9	2	.0000
Tenure	Significant	173.0	2	.0000
Housing space	Significant	225.0	2	.0000

D.F = Degrees of Freedom; Sig. = Significance level

Chi-square analysis indicates significant relationships between the selected variables and neighborhood. Housing

literature also indicates the association between income and the other selected variables. Thus the selected variables are described as income-related variables. Chi-square analysis for occupation by locality showed a large number of expected frequencies of less than five. The separate Chi-square analysis of each variable by socio-economic neighborhood are indicated in Appendices 2 to 4 and Table 10.

5.2.2.1 SOCIO-ECONOMIC LOCALITY BY INCOME

The general reluctance of respondents in revealing their incomes and underreporting of incomes have been illustrated by Tipple and Willis (1991). Consequently the primary incomes stated by heads of households are viewed with some skepticism (Appendix 2). However real estate developers estimates of housing values in the study area show significant differences in housing values (see p.95). This provides a general indication of income levels and seems to indicate significant differences in income in the three areas.

5.2.2.2 SOCIO-ECONOMIC LOCALITY BY EDUCATION

Data on education is deemed important in this study as a very general correlate with income, which influences housing type consumption and housing intensification strategy, and as a variable which has an impact on environmental hygiene strategy. Appendix 3 summarizes the educational characteristics of heads of households.

The higher income areas of Adenta and Central Madina are predominantly associated with heads of households with at least secondary education, whereas low income Zongo is predominantly characterized by heads of households with lower levels of education. This relationship seems to generally support Yi's (1985) assertion that education is closely correlated with income.

5.2.2.3 SOCIO-ECONOMIC LOCALITY BY OCCUPATION

Occupation is another major factor influencing levels of income and is therefore important in understanding housing type consumption in the three localities. Appendix 4 describes the occupational characteristics of heads of households in the study area. The high income professional occupations and road, building and timber contractors are all associated with Adenta and Central Madina.

5.2.2.4 SOCIO-ECONOMIC LOCALITY BY TENURE OF ACCOMMODATION

The relationship between tenure and income has been specified by Gilbert and Varley (1990), Tipple and Willis (1991), Drier (1984), Bourne (1981), and Struyk and Marshall (1974). Owner occupied and rented tenures of accommodation are the two forms of accommodation arrangements discovered in the study area. Table 10 describes the distribution.

TABLE 10

CROSS TABULATION OF SOCIO-ECONOMIC LOCALITY BY TENURE OF ACCOMMODATION

Locality	Tenure	
	Owner-occupied	Rented
Adenta	62 (41.3)	3 (23.7)
Central Madina	73 (47.7)	2 (27.3)
Zongo	8 (54.0)	77 (31.0)

*Expected frequencies are shown in brackets
 Chi-Square = 173 Degrees of freedom = 2 Significance=.0000

Adenta and Central Madina are dominated by owner-occupied households and this significantly differs from Zongo where rental tenure dominates. It was the potential of acquiring relatively cheap land for building purposes which attracted the relatively higher income groups into Madina-Adenta in the first place.

Using ownership of housing as an indicator of housing affordability, a valid observation can be made that housing is more affordable for the relatively high income households of Adenta and Central Madina, than for those of Zongo. Thus rental tenure cannot be seen as a preferred choice of some households. To indicate the validity of observations that rental tenure is hardly a preferred choice and reflects housing ownership affordability, this study inquired from respondents first of all as to whether given the financial resources, they would like to build a house within their area

of residence. All respondents indicated their willingness, however there were significant differences in reasons why they would put up a house.

TABLE 11

CROSS TABULATION OF LOCALITY BY REASONS FOR BUILDING A HOUSE

Reason for building house	Locality			TOTAL
	Adenta	Central-Madina	Madina-Zongo	
Source of income	60	60	0	120
Personal use	3	6	84	93
Extended family use	2	9	1	12
TOTAL	65	75	85	225

Table 11 shows that the majority of Adenta and Central Madina residents, (92% and 80% of the respective sample totals) who are mainly owner occupiers, indicated willingness to build a house for generating income (for renting purposes), whereas, almost 99 per cent of the predominantly rental tenure Zongo residents wanted a house for personal use. This open ended question showed that the perceived need for putting up a house for personal use was for better quality needs (18 respondents) and predominantly for housing space needs (55 respondents) and for both quality and housing space (20 respondents). This seems to correspond with Seek's (1983) observations in Australia. Chi-square analysis of tenure by

reason for which house would be built shows a significant relationship.

TABLE 12

CROSS TABULATION OF TENURE BY REASON FOR WHICH HOUSE WILL BE BUILT

Reason for building house	Tenure	
	Owner-occupied	Rental
Source of income	120 (76.3)	0 (43.7)
Personal use	11 (59.1)	82 (33.9)
Extended family use	12 (7.6)	0 (4.4)

*Expected frequencies are indicated in brackets
Chi-square = 183.1 Degrees of freedom = 2 Significance=.0000

Table 12 shows a significant number of owner-occupiers indicated their willingness to build for rental purposes and as an investment. A more than proportionate number of renters wanted a house for personal use. The level of dissatisfaction with existing housing quality and space is expressed in the desire for building a house for personal use. It is significant to note that not all owner-occupiers were satisfied with their present homes. Two conclusions which can be drawn are that, first of all rental tenure is hardly a preferred choice, since all the rental households want personal homes in their present areas of residence. Secondly, the desire for personal homes and the reasons for this desire shows dissatisfaction with presently used housing space, in

terms of quality and predominantly in terms of size. Length of residence data (Appendix 5) also shows that renters have lived in their present homes for an extended period of time and thus cannot be described as "mobile" individuals who prefer rental accommodation. Housing tenure is also important as an indicator of security of tenure and freedom to undertake activities on the housing unit. Housing space has been related to tenure of accommodation. Tipple and Willis (1991) have observed that owner occupiers have larger housing space than renters (see section 5.2.2.5 below)

5.2.2.5 SOCIO-ECONOMIC LOCALITY BY HOUSING SPACE

Housing space availability indicated by number of rooms varies with type of housing. Table 13 illustrates this. Households residing in compound/multiple household houses occupy predominantly two room dwellings usually described as the chamber (bedroom) and hall. This is the total housing space available to such households. Kitchen, bathroom and toilet space is usually located outside the main house and are usually some structure (built with durable materials or otherwise) put up for these specific functions. The single storied unplanned houses are mainly three room dwellings owned and occupied by single households. Most housing facilities are available within the house. The single storied bungalows have much larger housing space and contain predominantly four to six rooms and have all facilities located within the house.

The storied buildings have the largest housing space and usually have an outhouse (boysquarters). The smallest number of rooms mentioned is five and the largest is nine. All household activities take place within the house.

TABLE 13
HOUSING SPACE AVAILABILITY BY TYPE OF HOUSING

Housing type	NUMBER OF ROOMS							
	2	3	4	5	6	7	8	9
Compound house	70	5	0	0	0	0	0	0
Single-storied unplanned	0	8	2	0	0	0	0	0
Single-storied bungalow	0	4	23	44	30	5	2	0
Storied building	0	0	0	4	7	12	6	3

The age, sex, and marital status of heads of households and the length of residence data are described in Appendices 5 to 8. Marital status together with length of residence in a particular residence provides a crude indicator of the stability of a household with a rental tenure of accommodation. Rental tenure dominates in Madina-Zongo, but a consideration of marital status indicates a stability of tenure since most respondents are married. Length of residence data indicate long periods of residency in present houses and consequently stability (see Tipple and Willis, 1991). Marital

status is also important in understanding housing needs and the magnitude of housing intensification given that a couple would prefer privacy and usually occupy one room while all others could be crammed in the other rooms.

5.3 QUALITY OF HOUSING

Data collected on the physical quality of housing was specifically related to housing construction materials. This is deemed necessary by the researcher as a means of comparing quality of housing at present against that indicated by other researchers working in the study area. More importantly, quality of housing data together with data on housing infrastructure and the housing environment is important in understanding the conditions under which housing and residential land use intensification are taking place.

Data collected show that the construction material of walls of all houses in the study area is either cement blocks or burnt bricks, which are very durable materials. There is however the possibility especially in the low income areas of Zongo that cement could be just the plastering material on mud/swish. Construction material for the floors also shows usage of very durable materials, namely cement/concrete, tiles and terrazzo. The expensive tiles and terrazzo are limited to the relatively higher income areas of Central Madina and Adenta. The roofing materials on houses in the study area, also shows the use of durable, modern materials. Asbestos and

Corrugated iron/aluminum sheets are the roofing materials used. Both types are common to all the areas.

5.4 HOUSING INFRASTRUCTURE

The availability of electricity, pipe-borne water, toilet facilities, refuse disposal facilities and drainage facilities are examined. About eighty-two percent of the total sampled population used electricity as a source of lighting. An examination of the distribution of electricity using households reveals significant differences. While all the sampled population at Adenta and Central Madina used electricity, about 48 percent of the Zongo population used less convenient methods such as lanterns for lighting.

Table 14 shows the household sources of water in the study area. All households in Adenta and Central Madina have private taps, whereas only 9.4 percent of the Zongo population use private taps. The majority of the population who live in multiple household compound houses share their taps with other households (94.1%). Another 5.9 percent get their water from taps outside their dwelling places. This information on exclusiveness of use of water resources reflects the pressures on the use of this facility. The lack of private taps for instance, is an indicator of intense usage of water facilities. This situation of lack of private taps at Zongo is a reflection not necessarily of income levels and affordability but a case of practicality. The presence of

other households within the same house makes exclusive use of any facility very difficult.

TABLE 14
WATER SOURCES

Water Source	Adenta		Locality				TOTAL	
	F	%	Central F	Madina %	Madina-Zongo F	%	F	%
Private tap	65	100.0	75	100.0	8	9.4	148	65.8
Shared tap	0	0	0	0	72	84.7	72	32.0
Shared tap outside Hse	0	0	0	0	5	5.9	5	2.2
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

Type of toilet facility used and its exclusivity to household use was also examined. Three main modes of human waste disposal can be found in the study area as indicated in Table 15.

TABLE 15

TYPE OF TOILET FACILITY

Toilet facility	Locality							
	Adenta		Central Madina		Madina Zongo		TOTAL	
	F	%	F	%	F	%	F	%
W.C	65	100.0	75	100.0	3	3.5	143	63.6
Pan	0	0	0	0	73	85.9	73	32.4
None	0	0	0	0	9	10.6	9	4.0
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

Adenta and Central Madina use modern and hygienic methods of disposal of wastes. All the households in these two areas use water closets connected to septic tanks/cess pits for waste disposal. Only 3.5 percent of the Zongo population have access to this mode of disposal. The major mode of disposal in Zongo is by Pan toilet which involves human conveyance. This most unhygienic mode of disposal is beset with very great problems because of the lack of human and vehicular carriers. This method is increasingly being regarded as a most degrading method especially for the human carriers and its use is dying out. Legislation is being introduced to stop the use of Pan toilets in AMA.

Affordability of alternate methods of disposal presents a problem to low income households. The questionnaire administrator for this area expressed the opinion based on his observation of environmental conditions in the Zongo area

that most pan toilets had been abandoned due to lack of disposal and consequently an increasing proportion of this population, in addition to the 11 percent indicated, had no toilet facility. Local authorities in this area impose fines on those who indiscriminately dispose of wastes and the fear of being identified as a source of the problem prevented respondents from indicating the actual situation.

In order to examine the pressures on the toilet facility used, information was gathered on the exclusivity of the facility. All the water closet facilities are for exclusive use of the household, while 12 percent of the pan toilets are for exclusive household use. 84 percent of the toilet facilities in the Zongo area are shared, and given the increasing household sizes the extent of pressures can be appreciated.

Data was also collected about modes of refuse and waste water disposal, which is essential in appreciating the housing environment of the study area. There are no institutionalized modes of collecting garbage in the study area. It is consequently the responsibility of individual households to adopt strategies to dispose of their household wastes. Two methods were discovered each with its consequences: personal incineration of the refuse and indiscriminate disposal (dumping refuse where the household deems fit).

TABLE 16
REFUSE DISPOSAL METHODS

Mode	Locality							
	Adenta		Central Madina		Madina-Zongo		TOTAL	
	F	%	F	%	F	%	F	%
Personal Incin.	65	100.0	75	100.0	13	15.3	153	68.0
Indiscrim.	0	0	0	0	72	84.7	72	32.0
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

All households in Adenta and Central Madina personally incinerate/burn the refuse they produce on a regular basis. No specially produced bin is used and involves either open burning or burning in a hand dug pit. Smoke pollution is an obvious consequence of refuse burning and the efficiency of disposing of wastes through the relatively low temperatures of open burning is another issue worth considering. Another factor affecting the efficiency of burning is the composition of the garbage. Solid wastes produced in Ghanaian urban areas have high moisture contents and putrescibles form 70 to 90% of total refuse generated (AMA, Waste Management Unit, 1991).

Only 15.3 percent of the Zongo population burn their refuse on a regular basis, while the vast majority (84.7%) just dispose garbage any where deemed convenient. This includes disposal in gullies on roads (also serves to reduce road erosion) and in open fields. In many instances, the accumulating refuse is burned by whoever perceives the level

of accumulation as a nuisance. Refuse deposited in areas not immediately adjoining houses is simply left to accumulate. To further examine the refuse disposal situation, questionnaire administrators were specifically asked to indicate the presence of accumulated garbage within compounds and close to houses in the study area. There is a virtual absence of refuse close to houses in Adenta and Central Madina, whereas only six percent of the houses surveyed in Zongo did not have garbage close by. Thus despite issues related to efficiency of burning refuse, inactivity compounds the problem of refuse accumulation.

An examination of all the variables on which information was collected by this study seems to indicate education as the most relevant variable to be related to mode of refuse disposal. Even though the three sub localities identified for analysis of data collected are differentiated on the basis of income, the income variable is not significant in determining mode of refuse disposal since the methods are not influenced directly by the income of the household.

The health hazards posed by irregular disposal of garbage are better appreciated by the level of one's education. On the basis of demographic and health related behavior, heads of households with university or secondary/technical education are classified as one group and those with primary and no formal education are grouped together.

TABLE 17

CROSS TABULATION OF EDUCATION BY MODE OF REFUSE DISPOSAL

Education	Mode of refuse disposal	
	Personal incineration	Indiscriminate
University/Sec/ Tech.	144 (112.9)	22 (53.1)
Primary/No educ.	9 (40.1)	50 (18.9)

* Expected frequencies are indicated in brackets.
 Chi-Square = 102.2 Degree of freedom = 1 Significance=.0000

An examination of the educational levels of heads of households of each socio-economic sub-locality is indicated in Appendix 3.

Eighty-seven percent of households whose heads have education above the primary/middle school level personally incinerate their garbage, (with 13% dumping refuse wherever suitable) whereas only 15 percent with primary education or no education incinerate their garbage, with 85 percent just dumping their garbage. A Chi-square analysis at the 5% level of significance (95% confidence level) indicates significant differences in mode of refuse disposal given the level of education of the head of household.

Again all respondents in Adenta and Central Madina had some form of drains to prevent the accumulation of waste and rain water. These drains constructed with cement deposit the waste water either into a "soak away" or simply allow it to flow into the streets. Only one household (1.2% of the

population) in Zongo had a constructed drainage facility. In most of the other households, accumulated waste water is directed through some form of channel dug for this purpose onto the road. The problem of waste water disposal is very acute during the rainy season when pools of water are a common sight. The abundance of mosquitoes is a reflection of the problem of standing water.

To further examine the problem of waste water disposal and water drainage, the questionnaire administrators were asked to indicate the presence of standing water within the compound of houses in the study area. Findings indicate an absence of standing water in Adenta and Central Madina. Only 5.9 percent of the houses in Zongo were identified as not having any accumulation of water. This further indicates the general lack of any well constructed drainage facility in the Zongo area. However the situation at the time of interviews was influenced by the fact that it was the minor rainy season in Ghana and should not be interpreted as the permanent character of the living environment.

Given the absence of any effective institutionalized measures for resolving the environmental problems related to the lack of housing infrastructure, this study examined voluntary actions aimed at the mitigation of environmental problems. Respondents were asked to indicate whether they made any attempt at solving at least one environmental problem on a regular basis. The environmental problems considered in this

study are those directly related to the lack of housing infrastructure. Once again, respondents in Central Madina and Adenta indicated some attempt at solving at least one problem and as indicated above, all residents in these two areas burn their household refuse. 25 percent of Zongo residents indicated a regular attempt at solving an environmental problem, while 75 percent did not.

Another issue examined which relates to quality of housing was to collect information on aspects of housing which require repairs or some form of renovation. Cracks in the walls of the house appear to be a major area requiring renovation. This problem occurs only in Zongo, with forty percent of that population requiring some renovation. Another serious problem which is restricted to Zongo is the problem of leaking roofs mentioned by almost 12 percent of the population. The only renovation required in Adenta is related to the cracks in cemented walls surrounding compounds. Only about five percent of this population requires such repairs. Plumbing repairs, renovation of walls surrounding compounds, and the cemented compounds themselves and renovations of drainage systems are the repairs/ renovations mentioned as required by households in Central Madina. Renovations of the walls surrounding compounds is the major area mentioned by 33 percent of this area's sample.

TABLE 18
RENOVATIONS REQUIRED

Aspect of housing	Adenta		Locality				TOTAL	
	F	%	Central	Madina	Madina-Zongo		F	%
Compound	0	0	12	16.0	0	0	12	5.3
Drainage system	0	0	6	8.0	1	1.2	7	3.1
Walls of compound	3	4.6	25	33.3	0	0	28	12.4
Walls of house	0	0	0	0	40	47.1	40	17.8
Roofing	0	0	0	0	10	1.8	10	4.4
Floors of house	0	0	0	0	15	17.6	15	6.7
Plumbing repairs	0	0	4	5.3	0	0	4	1.8

Although a comparison is reflected by the table above, it should be noted that some of the facilities mentioned are lacking in Zongo. For instance, most compounds in the area are not cemented. In addition cemented walls surrounding the compound are not a common feature at Zongo, and as has been shown above, constructed drainage systems are virtually lacking. The more serious repairs such as the walls of the house and the roofing are location specific and found only in the Zongo area.

5.5 FACILITIES AND ROOM SPACE REQUIRED BY HOUSEHOLDS

In order to further examine quality of housing, this research sought information on facilities and type of room space households would like to have to improve their living conditions. Respondents were asked to rank in order of need. The top ranked facilities/housing space respondents would like to have (in terms of the most frequently ranked first) for the whole study area are refuse disposal facilities, extra bedrooms, living room space and constructed toilet facilities. 90, 36, 31 and 22 respondents respectively ranked these facilities as what they needed most to make their living conditions more comfortable. The spatial distribution of required facilities and room space for the three socio-economic neighborhoods are examined in Appendices 11 to 13.

Refuse disposal facilities and tarred roads are the top ranked facilities by respondents in Adenta, with 33 and 20 respondents respectively ranking them first. Refuse disposal facilities and extra bedrooms are the top ranked room space/facilities required by households in Central Madina. 53 and 12 respondents, respectively ranked these facilities first. Living room space, extra bedrooms and constructed toilet facilities are the most highly ranked in Zongo, with 31, 24 and 22 respondents respectively ranking them as what they require most in their houses.

In order to develop a scale of preference for all the facilities/housing space requirements mentioned, this study

adopted a composite scoring scheme. The composite score for each facility/housing space required is given below:

Composite Score for facility = Sum (Weight of rank * frequency of rank of the facility)

Thus we associate for each required facility X, a rank of 1, 2N, (as indicated by the respondent), which occur F1, F2FN times respectively and are assigned corresponding weights W1, W2,WN.

The weight assignment for the ranks are as follows:

First: 10 points; Second: 6 points; Third: 4 points; Fourth: 3 points; Fifth: 2 points; Sixth: 1 point.

The basis for adopting such a scheme lies in the general idea that for planning and policy making purposes not only is it necessary to consider the magnitude of a rank but equally important is the frequency of indication of a particular facility notwithstanding the rank assigned. The weighting of the ranks is based on the general idea that the most clearly defined preferences will be that between the one most needed and the one least needed. The weighting system adopted should reflect this big gap in preferences hence a weight of 10 to 1. The preferences in between can be differentiated but the gap between them should not be as big as the first and the last preference indicated. Thus the weighting system should also reflect the easy differentiation between the first and all the other preferences and the subsequent less easy differentiation between preferences in between the first and

the last. This weighting is based on the fact that responses will be on the spur of the moment and not well thought out. Tables 19 to 21 illustrate a composite scale of preference for facilities/ housing space in the three neighborhoods.

TABLE 19
HOUSING SPACE/FACILITY SCALE OF PREFERENCE FOR ADENTA

Facility/Housing space	Composite Score	Composite Rank
Refuse disposal facility	493	1
Tarred roads	316	2
Stabilization of power voltage	217	3
Security System	71	4
Telephone	56	5
Stabilization of Water supply	6	6
Extra bedroom	4	7

Refuse disposal facilities are the most preferred facility required in Adenta, followed by tarred roads and the need to stabilize electricity voltage. The only housing space need mentioned is the need for extra bedrooms mentioned by only one respondent. This is a reflection of the relatively adequate housing space for residents of Adenta.

TABLE 20

HOUSING SPACE/FACILITY SCALE OF PREFERENCE FOR CENTRAL MADINA

Facility	Composite score	Composite rank
Refuse disposal facilities	620	1
Extra bedroom	248	2
Tarred roads	242	3
Stabilization of power voltage	207	4
Stabilization of water supply	74	5
Extra living room	50	6
Extra toilet	12	7
Extra bathroom	7	8

Refuse disposal facilities are the most required facility in Central Madina. Also of significance and the second most required is the need for extra bedrooms and this reflects the impact of housing intensification. The need for tarred roads (which reflects the means of conveyance for households in the relatively higher income areas) and the stabilization of power voltage are the third and fourth most required facilities.

TABLE 21

HOUSING SPACE/FACILITY SCALE OF PREFERENCE FOR MADINA-ZONGO

Facility/Housing space	Composite score	Composite Rank
Living room	466	1
Constructed toilet facility	444	2
Extra bedroom	393	3
Refuse disposal facility	133	4
Electricity	122	5
Private tap	87	6
Constructed bathroom	65	7
Better Ventilation	40	8
Larger room space	16	9
Drainage facility/ Extra living room	12	10
Stabilization of power voltage	10	11
Constructed Kitchen	6	12

The most required housing space is the living room in houses at Madina-Zongo. As shown earlier, most houses lack rooms used exclusively as living rooms. Respondents ranked the need for housing space used exclusively as living rooms as the most important. Constructed toilet facility is ranked as the second most required facility. There are households in this area

which have no toilet facility within the house. The need for extra bedrooms is also an important requirement in Zongo. Most houses in this area have only two rooms. Refuse disposal facilities, which are the top ranked facilities required are indicated as the fourth most important housing requirement in Zongo, although the problem of waste accumulation is most severe within this area in which personal incineration is seldom done on a regular basis. Differences can be seen between the higher income areas of Adenta and Central Madina and the lower income area of Zongo in terms of preferences for a particular facility/housing space.

It is important to note that the scale of preference is an ordinal level of measurement, consequently the only conclusions that can be drawn are based on a comparison of the intensity of preference for housing space/facility expressed in the ranking of respondents. The analysis made above is based on level of the rank and the frequency of indication of need of housing space/ facilities as indicated earlier.

5.6 LACK OF HOUSING INFRASTRUCTURE ENVIRONMENTAL PROBLEMS

The perceptions of heads of households are examined to find out individual opinions on environmental problems related to the lack of housing infrastructure. Given that government resources are limited to effectively mitigate environmental problems of each community, community self help has become an

effective way of addressing environmental problems. It is important to survey perceptions as a first step towards community resolution of these problems and this is based on a simple axiom that problems will only be solved if they are perceived as problems.

Using a scale of relative magnitudes of housing environmental problems, a comparison is made to give some form of indication as to community perception of the major housing environmental problems. A composite score is adapted to reflect the relative magnitude of the problems as seen from the perspective of heads of households.

An overview of the whole study area reveals that the problem of eroded roads is the most frequently top ranked housing environmental problem. Fifty-nine respondents (26.2%) identified this as the major problem. Waste water accumulation, refuse accumulation, the problem of dust and the lack of toilet facilities pollution are ranked first by fifty-eight respondents (25.8%), forty-nine respondents (21.8%), thirty-four respondents (15.1%) and twenty respondents (8.9%) respectively. Other problems mentioned include the problem of malaria, refuse burning pollution and the problem of eroding compounds. Spatial differences are revealed by categorizing the problems by the three neighborhoods. The same procedure for the development of composite scores for housing space/facility requirement is adopted for each problem variable mentioned. The same weights

apply to each rank indicated.

TABLE 22

A SCALE OF THE MAGNITUDE OF HOUSING ENVIRONMENTAL PROBLEMS FOR ADENTA

Env. problem	Composite score	Composite rank
Eroded roads	426	1
Waste water accumulation	353	2
Dust	208	3
Refuse accumulation	106	4
Malaria	30	5
Refuse burning pollution	11	6
Lack of toilet facilities pollution	10	7

Eroded roads was the most frequently first ranked problem, with twenty-nine respondents (44.6%) of the Adenta sample indicating so. The problems of waste water disposal, dust, refuse accumulation, malaria, refuse burning pollution and lack of toilet facilities pollution followed in that order. The composite scores also reveal the same pattern of the perceived magnitude of the environmental problems in Adenta.

TABLE 23

A SCALE OF THE MAGNITUDE OF HOUSING ENVIRONMENTAL PROBLEMS FOR CENTRAL MADINA

Env. problem	Composite Score	Composite rank
Eroded roads	406	1
Dust	334	2
Waste water disposal	304	3
Refuse accumulation	141	4
Refuse burning pollution	66	5
Malaria	52	6
Lack of toilet facility pollution	28	7

Eroded roads are also the major environmental concern of the Central Madina sample. Thirty respondents (40%) ranked this as the foremost environmental problem. Another twenty-three respondents (30.7%) ranked the problem of dust first and fifteen respondents (20%) ranked waste water disposal problems first. Refuse disposal problems, refuse burning pollution, malaria and lack of toilet facility pollution problems are the other problems.

TABLE 24

A SCALE OF THE MAGNITUDE OF HOUSING ENVIRONMENTAL PROBLEMS IN ZONGO

Env. problem	Composite Score	Composite rank
Accumulation of refuse	511	1
Lack of toilet facility pollution	333	2
Waste water accumulation	304	3
Dust	104	4
Malaria	96	5
Eroding compounds	50	6
Refuse burning pollution	30	7
Eroded roads	14	8

Garbage disposal problems are the most frequently first ranked environmental problem. Forty respondents (47.1%) indicated this as the major problem. Twenty respondents (23.5%) mentioned lack of toilet facilities pollution as the most serious environmental problem. Another twenty respondents (23.5%) indicated waste water disposal problems as the most serious. The problems of dust, malaria, eroding compounds, refuse burning and eroded roads are also mentioned. Table 24 gives a composite scale of the relative magnitudes (in terms of ranking) of the perceived environmental problems at Madina-Zongo.

A comparison of the three areas indicate that problems immediately affecting the household are ranked first. The

higher income households of Adenta and Central Madina rank eroded roads as a major problem probably because such households own cars, whilst the lower income Zongo residents do not perceive eroded roads as the foremost problem. The irregularity of garbage incineration at Zongo with only fifteen percent of the sample regularly incinerating their refuse presents this area with a refuse disposal problem and this is reflected in the response of the majority ranking refuse disposal as the foremost problem.

The interviewers were asked to indicate the presence of accumulated garbage or waste water within the vicinity of houses. Ninety-four percent of the Zongo houses had standing water and garbage close by whilst the Adenta and Central Madina sampled areas did not have these problems.

Consequently, it is evident that respondents in Central Madina and Adenta who mentioned garbage and standing water environmental problems were referring to the larger Madina environment and not specifically to their immediate neighborhood. As indicated above, the widespread presence of standing water at the time of the survey in Zongo does not indicate a permanent situation since the survey took place after a very wet rainy season.

In order to have an idea of the changes in status or otherwise of the perceived environmental problems, respondents were asked to indicate if the problems had been mitigated, got worse or remained the same since the household initially

settled in their present dwellings. The results are summarized in Table 25.

TABLE 25

CROSS TABULATION OF STATUS OF ENVIRONMENTAL PROBLEMS BY LOCALITY

Locality	Status of Env. problem	
	Same	Worse
Adenta	63 (28.3)	2 (36.7)
Central Madina	24 (32.7)	51 (42.3)
Zongo	11 (37.0)	74 (48.0)

* Expected frequencies are indicated in brackets
Chi-Square = 111.8 Degrees of freedom= 2 Significance=.0000

It is significant to note that no respondent indicated an amelioration of environmental problems. 43.6 percent indicate no change in the status of environmental problems and 56.4 percent perceived environmental problems as getting worse. The majority of the Adenta sample perceive the problems as remaining the same. Sixty-eight percent of the Central Madina population indicate the problems as getting worse, whilst 87.1 percent of the Zongo population perceive the problems as getting worse. Thus differences exist between the perceptions of the high income Adenta households, who largely see the environmental problems as remaining the same and the Central Madina and Zongo residents who indicate a worsening of environmental conditions. The differing perceptions seem to

be related to different personal empirical experiences of the nature of environmental problems. The calculated Chi-square indicates significant differences between locality and perceptions of environmental problems. The perception of the low income Zongo residents can be said to be related to lack of very basic facilities like drainage facilities and constructed toilet facilities and also the inactivity of the residents in disposing of refuse.

This study also sought perceptions on the causes of the present status of environmental problems. Sixty Adenta respondents (92.3%) mentioned the inefficiency of some political/administrative authority, specifically the government/district authority/local authority as the cause of the poor state of the housing environment. 24.6 percent, 23.1% and 1.5% attributed the problem to increasing population, irresponsibility of residents and lack of personal funds to do any thing about the problems respectively.

The inefficiency of the government/district authority/local authority is the cause of the environmental problems according to 73.3 percent of the Central Madina population. 45.3 percent of respondents also mentioned irresponsibility of residents as a cause and 33 percent perceived population growth as another cause. Two percent mentioned lack of personal funds as important. Administrative authority inefficiency is also the most mentioned cause of the housing environmental problems in Zongo. 80 percent indicate this

factor as important. 31.8 percent, 28.2 percent and 4.7 percent mentioned irresponsibility of residents, population growth and lack of personal funds respectively as important factors.

5.7 A SUMMARY OF THE PERCEIVED CAUSES OF HOUSING ENVIRONMENTAL PROBLEMS

5.7.1 ADMINISTRATIVE/POLITICAL AUTHORITY INEFFICIENCY

Traditional authorities and the district authority have failed to guide the development of the Madina region and consequently human settlement development has grown at an uncontrolled pace beyond the capabilities of these authorities. Sanitation problems as indicated especially in the low income Zongo area are especially severe. Respondents expressed the opinion that these authorities virtually did nothing to resolve environmental problems. The Madina district office officials interviewed attributed the problem to lack of adequate financial resources and claimed that their sources of finance are severely limited. Finances for sanitation programs come from market tolls, property taxes and from other minor sources like road and store tolls. Officials refused to reveal the total revenue and had no idea of required expenditure to mitigate environmental problems although they acknowledged the severity of the environmental problems. The district office mentioned plans to introduce house to house garbage collection based on user fees and it is presently undertaking feasibility studies. Officials hoped government

decentralization proposals for the political, administrative and economic autonomy of districts materialize to enable the District to promulgate laws and actively seek financial resources to mitigate housing environmental problems. (Interview with Madina District Office officials, July 1991).

5.7.2 POPULATION GROWTH AND ITS IMPACT ON HOUSING ENVIRONMENTAL PROBLEMS

As indicated above, the population of the study area has been growing at a rapid rate and this has been substantiated by the increases in household sizes of the sampled areas. The impact of this increase on environmental problems is readily appreciated under situations of grossly inadequate or no institutionalized modes of resolving these problems and where the problems are virtually left to individuals to confront.

It has been estimated that the average daily solid waste production in AMA is 0.5 kilogram per person. Thus increases in population/household size are expressed proportionally in the total amount of waste produced by a household, given that all households indicated no change in mode of refuse disposal since assuming their present tenureship. The AMA Waste Management Unit whose sphere of operation is almost solely in the City of Accra claims to have been able to cope with 67.6 percent of the waste generated. Some of the problems mentioned for their low performance are lack of trained personnel, low revenue collection, inappropriate activities of the public (AMA, Waste Management Department, 1992: 14-40). The

developing peri-urban areas are almost neglected with regard to waste disposal. The Waste Department Unit was established in 1985 at a time when, "Accra's solid and liquid waste system had collapsed" (Waste Management Department, 1992: 1).

The absence of a sewerage system makes the problem of liquid waste disposal especially acute. The daily average liquid waste generated per person is estimated to be 1.5 liters. Lack of a sewerage system and planning associated with most human settlements and lack of drains has brought the problem of liquid waste in close proximity to human settlements. The consequences of lack of storm water drains became very apparent in Madina after severe rain storms during the rainy season of 1991.

5.7.3 ACTIVITY OF RESIDENTS AND ITS IMPACT ON ENVIRONMENTAL PROBLEMS

The waste disposal behavior of some residents has been mentioned as a cause of environmental problems. This situation especially exists in Zongo where the problem of increasing generation of waste is further accentuated with aesthetic and health problems related to indiscriminate disposal of refuse and other human wastes. Since the problem of refuse collection is not spatially specific in Madina, attitudes towards action are related to personal characteristics. This study identified education and its related impact on the perception of the health and aesthetic consequences of the accumulation of refuse close to dwellings, as a key characteristic determining

the activity or inactivity of households towards refuse accumulation problems.

The problem of human waste disposal seems to be related more to income than any other factor due to the level of expenditure required to obtain water closets. Another relevant factor related to low income is the tenure of accommodation. A resident under rental tenure will not be willing to undertake any major changes to a house he does not own, notwithstanding issues of convenience. Although the indiscriminate disposal of human wastes in the Zongo area in particular has been described as irresponsible behavior, it should be seen as a consequence of low income.

5.7.4 LOW INCOME AND ITS IMPACT ON HOUSING ENVIRONMENTAL PROBLEMS

The impact of low income has been illustrated above in the example of toilet facilities. Residents mentioned low income as preventing some households from adopting more efficient modes of resolving some environmental problems. Low income should be seen as having a chain of relationships with other factors and is a significant factor affecting the status of environmental problems in particularly Madina-Zongo.

5.8 SUMMARY

Significant differences in the socio-economic characteristics of the neighbourhoods of Adenta, Central Madina and Madina-Zongo (in terms of housing type, housing

space, income, education, occupation, tenure) have been revealed. These differences are also reflected in the availability of facilities like electricity, private taps, hygienic toilet facilities and drainage facilities, with the higher income Adenta and Central Madina having these facilities while Zongo households lack them.

In looking at response to consequences of housing poverty and lack of housing facilities, the study focused on refuse disposal methods which involve no cost to the household and thus the effect of income is reduced for analysis. Significant differences are observed between Adenta and Central Madina households who dispose of their refuse by regular incineration and the majority of Zongo residents who just dispose of their garbage by dumping it elsewhere. Education has been identified as a key variable affecting mode of refuse disposal. Differences in housing poverty are also reflected in household indication of housing space/facilities required and to an extent, perceptions of the major housing environmental problems.

CHAPTER SIX

ANALYSES OF HOUSING AND RESIDENTIAL INTENSIFICATION

6.1 INTRODUCTION

This chapter describes, summarizes and presents an analysis of housing intensification. The variables used in the housing intensification analyses are based on a review of housing literature and include heads of households' income, household size/room occupancy levels, available housing space, tenure, length of residency and specific responses relating to reasons for housing intensification.

6.2 HOUSING INTENSIFICATION IN THE SOCIO-ECONOMIC NEIGHBORHOODS

In order to gain information on household intensification strategies, this research focused on the relatively stable heads of households who are not easily prone to migration. As has been indicated earlier by Tipple and Willis (1991), working in Kumasi, Ghana, even renters seem to be stable. However this study incorporates a further element of stability. The indicator used is length of stay, using the assumption that one who has lived in a specific house for at least three years is a relatively stable individual and has possibly undertaken some intensification strategies. Thus all heads of households interviewed have lived in their present houses for at least three years.

It was expected that the differences in characteristics

of the neighborhoods (see section 5.2.2) will be manifested in differences in the level and strategy of housing intensification. One form of housing intensification examined is expressed in the form of increasing room occupancy levels. The other forms of housing intensification identified are room conversions involving the change of room functions from one use to another, room conversions involving actual construction and extensions to the housing space. In this section the analysis relates housing intensification to relevant variables influencing housing adjustments.

6.2.1 CHANGES IN HOUSEHOLD SIZE

Data on household size at the initial period of settlement in the present dwelling and the present household size is essential in any analysis on housing intensification especially in instances where there have been no changes in physical housing space size. Appendices 9 and 10 describe the initial and the household size at the time of the survey.

Changes in household sizes for the study area are examined to give an indication of the magnitude of demographic changes taking place within the household. Lengths of stay of heads of households and all other household members in the dwelling is the major variable used to analyze the household size changes. The changes in household size range from an increase of one person to a maximum of six persons.

TABLE 26
CHANGES IN HOUSEHOLD SIZE

Changes in h'hold size	Adenta	Locality Central Madina	Madina-Zongo
Mean	2.09 (43.94%)	2.45 (46.10%)	2.71 (106.96%)
Minimum	1.00	1.00	1.00
Maximum	4.00	5.00	6.00

The mean change in household size for the whole study area is 2 persons. Madina Zongo has had the largest mean increase in household size of 107 percent (2.71 persons) and Adenta the smallest increase of 44 percent (2.09).

6.2.2 CHANGES IN HOUSING SPACE

This analysis utilizes information on living room and bedroom space as an effective way of having a real insight into housing space availability. This is based on the assumption that ultimately it is the sleeping arrangements which present the greatest problems in the face of increasing household sizes. The relatively easy use of the living room as a sleeping room requires its consideration in any such analysis. Changes which have taken place in housing space and the reasons for these changes are very important factors for any analysis of the impact of changes in household size on housing intensification. Table 27 shows the housing adjustment strategies which have taken place in the neighborhoods.

TABLE 27
HOUSING SPACE CHANGES

Housing space changes	Locality							
	Adenta		Central Madina		Madina-Zongo		TOTAL	
	F	%	F	%	F	%	F	%
Room Con.	2	3.1	4	5.3	58	68.2	64	28.4
Room Con. with cons.	2	3.1	15	20.0	2	2.4	19	8.4
Extensions	0	0	24	32.0	4	4.7	28	12.4
No change	61	93.8	32	42.7	21	24.7	114	50.7
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

(Con. = conversion; cons. = construction).

50.7 percent of the total sample have undertaken no changes in their housing space given increasing household sizes. 94 percent of the Adenta sample had undertaken no changes in housing space and only 6 percent had made any form of changes. This is a reflection of the relatively large available housing space in this high income area (see Follain and Jimenez, 1985). The mean number of rooms is six and the mean number of bedrooms is five. Forty-three percent of the Central Madina population indicated no change in their housing space. Another five percent converted their rooms from one use to another. Fifty-two percent undertook some form of construction work. The majority of the Zongo population had converted rooms to dual-function rooms. Sixty-eight percent added sleeping room functions to their living rooms. This is a reflection of the

very limited available housing space in this low income region which has required maximum use of room space. About seven percent had undertaken some form of construction on their room space and another twenty-five percent undertook no change to their housing space. Table 28 shows that Adenta had a decline of 0.85 percent in the mean number of rooms. Both Central Madina and Zongo registered a mean increase of 20.76 percent (0.83 rooms) and 4.9 percent (0.08 rooms) respectively.

TABLE 28
CHANGES IN NUMBER OF ROOMS

Changes in # of rooms	Locality		
	Adenta	Central Madina	Madina-Zongo
Mean	-0.06 (-0.85%)	0.83 (20.76%)	0.08 (4.9%)
Minimum	-2.00	0	0
Maximum	1.00	3	1

6.2.3 CHANGES IN NUMBER OF ROOMS BY CHANGES IN HOUSEHOLD SIZE

A comparative study of the relative changes in number of rooms occupied and household size shows significantly higher increases in household sizes than in number of rooms. For room occupancy levels to remain constant, household size increases should be proportionately matched with increases in number of rooms. Number of rooms occupied have remained virtually constant in Adenta which registered a mean decline of 0.85 per

cent. However this area showed a 43.94 percent mean increase in household sizes. Central Madina data indicates a mean increase of 20.76 percent in number of rooms, whereas the increase in household size is 46.1 percent. The situation in Zongo is even worse, with a 4.9 percent increase in number of rooms and a 106.96 percent increase in household size. It is therefore obvious that in general, housing space is being intensively utilized compared to the initial period of settlement in the present dwelling.

6.2.4 SOCIO-ECONOMIC LOCALITY AND ROOM OCCUPANCY LEVELS

One aspect of housing intensification examined is the differences in levels of housing intensification. Changes in levels of room occupancy have occurred in the three sub-localities.

TABLE 29

ROOM OCCUPANCY CHANGES IN THE SOCIO-ECONOMIC LOCALITIES

Room occupancy levels	Locality		
	Adenta	Central Madina	Madina-Zongo
<u>Initial level</u>			
Mean	0.90	1.39	1.73
Minimum	0.29	0.67	0.33
Maximum	2.00	2.67	3.50
<u>Present level</u>			
Mean	1.25	1.67	2.92
Minimum	0.43	1.00	1.00
Maximum	2.60	3.00	4.50
% Change in mean levels	39%	20%	69%

The mean increase in room occupancy levels for Adenta, Central Madina and Zongo are 39%, 20% and 69% respectively. The mean levels of increase described above are an indication of the levels of housing intensification in the area of study. Chi-Square analysis is utilized for statistical decision making on differences in the impact of intensification on the neighborhoods.

TABLE 30

CROSS TABULATION OF SOCIO-ECONOMIC LOCALITY BY ROOM OCCUPANCY RATIO

Locality	Room occupancy level	
	<2.5	>2.5
Adenta	64 (47.4)	1 (17.6)
Central Madina	71 (54.7)	4 (20.3)
Zongo	29 (62.0)	56 (23.0)

* Expected frequencies are indicated in brackets
Chi-Square = 104.2 Degrees of freedom = 2 Significance=.0000

Significant differences exist between the relatively higher income areas of Adenta and Central Madina and the lower income Zongo area. Relative to the expected frequencies, a disproportionately large portion of the Adenta and Central Madina population have occupancy levels below the Standard, whereas a disproportionately large number of Zongo households exceed the standard.

As a further indicator of occupancy pressures, the room dimensions of houses in the three areas were collected from fifteen houses in each sub-locality. Room sizes at Adenta are almost consistently 20 square meters. Those at Central Madina range from 16 square meters to 20 square meters, while rooms at Zongo range from 9 square meters to 12 square meters. The mean household size for Adenta, Central Madina and Zongo are 7.54, 8.09 and 6.26 persons respectively. The mean number of rooms are 6.22, 4.96 and 2.20 rooms in Adenta, Central Madina

and Zongo respectively. Table 31 illustrates room space availability per person in the localities.

TABLE 31
HOUSING SPACE AVAILABILITY PER PERSON BY LOCALITY

	Locality		
	Adenta	Central Madina	Madina-Zongo
Mean room dimension	20 sq. m.	16-20 sq. m.	9-12 sq. m.
Mean no. of rooms	6.22	4.96	2.20
Mean av. space	124.4 sq. m.	79.36-99.2 sq. m.	19.8-26.4 sq. m.
Mean H.S	7.54	8.09	6.26
Mean space / person	16.5 sq. m.	9.8-12.3 sq. m.	3.2-4.2 sq. m.

The pressure of occupancy could be said to be less severe when one considers the infant and child populations. About 55 percent of the sampled population of Adenta indicate having at least one child of not more than five years. 22 percent mentioned having one or two children under the age of one. In Central Madina, 23 percent of the respondents have at least one infant and 45 percent indicated having a child of not more than five years. 45 percent of the Zongo sampled population indicate having an infant and 60 percent indicate having at least one child of not more than 5 years. Further increases in household size can be expected to result in declines in available space per person given that effective strategies to

resolve household size pressures are not a common occurrence in the study area. The pressures will be especially severe in Zongo given the low available space per person (3.2 - 4.2 square meters).

6.2.5 SOCIO-ECONOMIC LOCALITY AND HOUSING SPACE CHANGE

This study sought to test the hypothesis that there are significant differences in the sub-localities in terms of the mode/strategy of housing intensification. The types of housing intensification strategies identified are classified into two: those involving construction and those without construction or any modifications. To undertake a more meaningful comparison Adenta was not included in the cross tabulations because only four households out of the total of sixty-five had undertaken any intensification strategy. This is probably explained by the adequacy of housing space in this high income area. The chi-square analysis undertaken involving Adenta had 33 per cent of the cells having expected frequency values of less than 5. Chi-square analysis indicates significant differences in Central Madina and Zongo in terms of strategies of housing intensification. Housing changes involving the relatively more expensive constructional works and modifications are more common in Central Madina than Zongo and the "no economic cost" room conversions are more frequent in Zongo than Central Madina. This relationship between income and adjustment supports the observations of Rudel (1987),

Doling (1976), Roistacher (1974), Edwards (1983), Strassman (1978), Pickvance (1974), Bourne (1981) and Seek (1983).

TABLE 32
CROSS TABULATION OF LOCALITY BY HOUSING SPACE CHANGES

Locality	Housing space change	
	Room conv.	Constructional change
Central Madina	4 (24.9)	39 (18.1)
Zongo	58 (37.1)	6 (26.9)

*Expected frequencies are indicated in brackets
Chi-Square = 69.6 Degrees of freedom = 1 Significance=.0000

Another relationship examined is that between locality and the undertaking of a housing intensification strategy or not.

There are significant differences in the three areas in terms of the undertaking of housing changes or not undergoing any change. Thus the higher income Adenta area is associated with predominantly no changes in housing space as against the middle income and low income areas, which are characterized by some intensification strategy (see Follain and Jimenez, 1985a). Significant differences also exist among the three areas in terms of whether physical modification is undertaken or not (Chi-square = 66.2; Degree of freedom = 2; Significance = .0000).

TABLE 33

CROSS TABULATION OF LOCALITY BY UNDERTAKING HOUSING CHANGE

Locality	Housing change	
	Room conv.	No change
Adenta	4 (32.1)	61 (32.9)
Central Madina	43 (37.0)	32 (38.0)
Zongo	64 (41.9)	21 (43.1)

* Expected frequencies are indicated in brackets
 Chi-square = 73.3 Degrees of freedom = 2 Significance=.0000

The creation of bedrooms (85%) was the predominant specified form of housing space change (see Table 34). The other changes include construction of both bedroom and living room space, the creation of only living room space and the expansion of living rooms in the Adenta area.

TABLE 34
THE SPECIFIC CHANGES IN HOUSING SPACE

Type of change	Locality							
	Adenta		Central Madina		Madina-Zongo		TOTAL	
	F	%	F	%	F	%	F	%
No change	61	93.8	32	42.7	21	24.7	114	50.7
Create bed.	1	1.5	31	41.3	62	72.9	94	41.8
Create bed. & Liv. room	0	0	12	16.0	0	0	12	5.3
Create Liv. room	0	0	0	0	2	2.4	2	0.9
Expand Liv. room	3	4.6	0	0	0	0	3	1.3
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

6.2.6 SOCIO-ECONOMIC LOCALITY AND REASON FOR HOUSING SPACE CHANGE

A crucial aspect of this study was to discover the reasons for households undertaking housing space changes. The reasons given can be divided into two classes. The first reason was to create space to meet immediately pressing housing needs related to an increased household size. The second set of reasons did not specifically relate the change to increasing household size but to preferences for larger space. 97.3% of those who undertook housing changes gave increasing household size as the reason for undertaking the housing space changes, while 2.7% indicate other reasons for the change.

Respondents reasons for undertaking housing changes are categorized into reasons related to growth in household size and other reasons not related to increase in household size. Given the low income of Zongo residents and the unavailability of any under-utilized housing space, it could be expected that changes made in this area will be the effect of very pressing housing needs related to household size pressure.

A cross tabulation is made relating reasons for housing space change to socio-economic locality.

TABLE 35

CROSS TABULATION OF SOCIO-ECONOMIC LOCALITY BY REASONS FOR HOUSING SPACE CHANGE

Locality	Reason for housing space change	
	Pressure of household size	Other reasons
Adenta	1 (3.9)	3 (0.1)
Central Madina	43 (41.8)	0 (1.2)
Zongo	64 (62.3)	0 (1.7)

* Expected frequencies are indicated in brackets

The low frequencies prevented a Chi-Square analysis of the differences in reasons for undertaking housing space changes. The differences between the areas are clear. Some households in Adenta undertook housing space changes which are not related to increasing room occupancy levels. Thus this group

could afford such changes whereas Central Madina and all Zongo residents who undertook housing space changes did so because of increasing room occupancy levels.

Respondents observation or non observation of the effect of occupancy level on undertaking an intensification strategy or not provides basis for a behavioral analyses of the impact of household size pressure/stress on housing consumption behavior. Those who have undertaken some form of change by implication are those who have experienced the greatest level of stress and strain. Table 35 shows that household size pressures are the most significant stress inducing factor which provided motivation for undertaking some change. The small percentage who indicated other reasons like personal preferences also illustrate the effect of factors not related to household size. Table 36 illustrates the effect of household size stress on housing change. Housing change is therefore associated with a high level of household size stress. It is significant noting that there were respondents who undertook housing changes without experiencing household size stress. Preferences of heads of households explain this phenomenon.

TABLE 36

CROSS TABULATION OF HOUSEHOLD SIZE STRESS BY HOUSING CHANGE

Level of household size stress	Housing change	
	Housing change	No change
High stress	108 (53.3)	0 (54.7)
Low stress	3 (57.7)	114 (59.3)

Chi-square= 213.3 Degree of freedom= 1 Significance=.0000

6.2.7 A SUMMARY OF HOUSING INTENSIFICATION IN THE SOCIO-ECONOMIC NEIGHBORHOODS

A major hypothesis for this study is that the socio-economic localities identified will exhibit significant differences in level and mode of housing intensification.

It has been illustrated that:

1. Significant differences exist in room occupancy levels, with the low income Zongo having significantly high room occupancy levels compared to Adenta and Central Madina.
2. Significant differences exist in strategy of housing intensification or adjustment. Very few households in Adenta have undertaken any form of housing adjustment strategy and this is attributed to the relatively large available housing space. This observation is consistent with the findings of Follain and Jimenez (1985a). Differences exist between Central Madina and Zongo in terms of strategy of housing intensification. The relatively high income Central Madina is associated with physical modification of housing space,

whereas low income Zongo is predominantly characterized by "no economic cost" room conversions. Thus the data collected seems to validate the hypothesis regarding differences in level and mode of intensification.

6.3 ANALYSIS OF HOUSING INTENSIFICATION

This section attempts to explain the phenomenon of housing intensification strategies in the study area. The literature review undertaken, the conceptual framework developed and the observed relationship between socio-economic neighborhood and housing intensification provides some insight into the relevant factors of housing intensification.

The conceptual framework indicates that income, room occupancy levels, housing tenure, duration of residence in a dwelling, preferences and anticipation of future housing needs are factors influencing housing adjustment processes. This study also considers changes in household size as a factor of housing adjustment. It is expected that the larger changes in household size will be associated with housing adjustment as compared to smaller changes in household size. This study examines the role of income, available housing space, room occupancy levels, changes in household size, tenure and duration of residence on housing adjustments. An important aspect of this study was to discover the specific reasons for undertaking housing intensification strategies. The role of

preferences and anticipation of future housing needs are determined through an analysis of the reasons for undertaking housing adjustment.

6.3.1 INCOME AND HOUSING SPACE CHANGE

The general reluctance of respondents in declaring their primary incomes has been indicated in the section above. Thus, although data on incomes was collected, its reliability precludes its use in any analysis. Housing values provide a more reliable measure of the head of household's income. The most expensive houses are located in Adenta and the least expensive in Zongo. Consequently the socio-economic neighborhood can be used as a surrogate for income, with Adenta and Central Madina representing relatively higher income heads of households and Zongo associated with lower income heads of households. Education and occupation, which are general correlates of income tend to support the income differentiation between Adenta and Central Madina, and Zongo. Tables 32 and 33 can therefore be used to illustrate the impact of income on housing adjustment strategies. The high income Adenta heads of households have hardly undertaken any change because of their large housing space. Comparing Central Madina to Zongo shows that the expensive physical modifications are associated with the relatively high income Central Madina. Thus a positive relationship exist between income and the occurrence of physical modifications of housing space. However

as has been shown in the Adenta sample, this relationship is not observed at the highest income levels.

6.3.2 HOUSING SPACE AVAILABILITY/HOUSING TYPOLOGY AND HOUSING SPACE CHANGE

The housing changes that have occurred are generally related to housing types as indicated in the Table 37.

TABLE 37
HOUSING TYPE BY HOUSING SPACE CHANGE

Housing type	Housing change		
	Room Conv.	Room conv.with cons.	Extension
Compound house	56	2	0
Single storied unplanned	2	0	4
Bungalows	4	17	24
Storied building	2	0	0

As shown earlier, the compound houses and the single storied unplanned buildings have relatively smaller housing space and are also located on smaller land lots compared to the bungalows and storied buildings. A Chi-square analysis of space availability by housing intensification strategy is shown below.

TABLE 38

CROSS TABULATION OF HOUSING SPACE AVAILABILITY BY HOUSING CHANGE

Space Availability	Type of housing change	
	Room conv.	Room conv. with const. and extensions
Small housing space	58 (36.9)	6 (27.1)
Large housing space	6 (27.1)	41 (19.9)

*Expected frequencies are indicated in brackets
 Chi-square = 67.3 Degree of freedom = 1 Significance=.0000

Although income is an important factor, other practical considerations influence housing intensification strategies. Areas characterized by high housing densities and limited housing space such as Zongo show room conversions not involving any construction as the strategy adopted, whereas the areas with larger housing space show strategies which involve construction. Availability of land for instance is important for undertaking extensions. The bungalows, storied buildings and to an extent the unplanned houses have larger housing space and are located on larger lots of land which are more predisposed to extension and constructional works than are the houses in Zongo which are in very close proximity to each other and lack space for such changes. Room conversions involving construction is almost impossible in Zongo because of the lack of any extra housing space. Thus, the only change that can readily be undertaken is adding room functions to existing rooms. A cross tabulation of housing

space availability by strategy of intensification adopted, shows the larger housing space areas having a more than proportionate number undertaking a strategy involving construction, while the smaller space areas have a more than proportionate number undertaking some conversion but not involving construction.

6.3.3 ROOM OCCUPANCY LEVEL BY HOUSING SPACE CHANGE

The impact of room occupancy level (at the time of undertaking housing adjustment strategy) on housing space changes is examined. This variable has been described by Alfeld and Graham (1976) as the coupling variable for the POPHOU model. The relative effects of room occupancy levels below or equal the government recommended 2.5 persons per room and levels above this standard on housing change showed a significant relationship.

Table 39 shows a significant relationship between room occupancy level and the occurrence of housing change. A more than proportionate number of the houses characterized by a room occupancy level of more than 2.5 persons undertook some form of housing space change. A majority of houses with room occupancy levels of less than 2.5 undertook no change in their housing space.

TABLE 39

CROSS TABULATION OF HOUSING CONSTRUCTIONAL CHANGE BY ROOM OCCUPANCY LEVEL

Room occy. level	Type of housing change	
	Room conv./Ext.	No change
< 2.5	62 (80.9)	102 (83.1)
> 2.5	49 (30.1)	12 (30.9)

* Expected frequencies are indicated in brackets
 Chi-square = 32.1 Degree of freedom = 1 Significance=.0000

Cross tabulation of changes in housing space involving only construction compared to those without, by room occupancy level also showed a significant relationship (Chi-square= 15.7; Significance = .0001).

6.3.4 CHANGES IN HOUSEHOLD SIZE BY HOUSING SPACE CHANGE

The changes in household size between the initial household size and household size at the time of undertaking a housing adjustment strategy is analyzed to determine whether the magnitude of change in household size has any impact on housing intensification. If one considers housing space conversions involving construction as the only relevant form of conversion, a cross tabulation of this/no constructional change with change in household size shows no significant relationship. However when one includes room conversions without physical modifications, the relationship is significant.

TABLE 40

CROSS TABULATION OF CHANGE IN HOUSEHOLD SIZE BY HOUSING SPACE CHANGE

Change in h'ld size	Type of change	
	Room conv.	No change
< 2 persons	47 (58.7)	72 (60.3)
> 2 persons	64 (52.3)	42 (53.7)

* Expected values are indicated in brackets
 Chi-square = 9.78 Degree of freedom = 1 Significance=.0018

Table 40 shows that room conversions are associated with households who had increases of more than 2 persons, whereas those with increases of 2 persons or less did not undertake any change.

6.3.5 LENGTH OF RESIDENCE BY HOUSING SPACE CHANGE

The relationship between length of residence and housing intensification is also examined. The longer one has lived in a dwelling, the greater the likelihood of undertaking housing space changes. Chi-square analysis of the relationship between length of residence and the undertaking of an intensification strategy or not showed no relationship. However a relationship was shown between length of stay and whether physical modification of housing space had taken place. Respondents who had resided in a particular house for more than eight years were more prone to undertaken physical modifications than those who had resided in a place for up to eight years (see

Bourne, 1981; Seek, 1983).

TABLE 41

CROSS TABULATION OF LENGTH OF RESIDENCE BY PHYSICAL MODIFICATION OF HOUSING SPACE

Length of residence	Physical modification	
	Physical modification	No physical modification
< 8 yrs.	18 (28.2)	117 (106.8)
> 8 yrs	29 (18.8)	61 (71.2)

*Expected frequencies are indicated in brackets
Chi-square = 11.65 Degree of freedom = 1 Significance=.0006

6.3.6 TENURE OF ACCOMMODATION BY HOUSING SPACE CHANGE

This study sought to discover if any relationships existed between tenure of accommodation and mode of housing intensification/housing space changes. Owner-occupiers of housing may be motivated to undertake capital intensive housing changes to relieve room density pressures. Households with rental tenures may not be motivated to undertake similar housing structural changes for reasons of tenure insecurity.

Housing changes involving construction are classified as a group whilst those involving conversion without structural change is designated as another group. Room conversions without construction involved the creation of bedrooms. The structural changes involved the construction of bedrooms, living rooms and the expansion of living rooms.

TABLE 42

CROSS TABULATION OF TENURE OF ACCOMMODATION BY HOUSING CHANGE

Tenure	Housing space change	
	Room Conv.	Housing change with cont.
Owner-occupied	7 (30.0)	45 (22.0)
Rented	57 (34.0)	2 (25.0)

* Expected frequencies are indicated in brackets
 Chi-Square = 78.3 Degree of freedom = 1 Significance=.0000

The most common form of housing space change among the owner occupied households involves constructional works. 86.5 percent of this sub-group undertook some form of changes involving construction, while 13.5% had simply converted rooms from one use to another. The situation is different among rental tenure households with 97% of those who have undertaken any form of change simply converting rooms to another use. The calculated Chi-Square indicates significant differences in mode of housing intensification given the tenure of accommodation (see Speare, 1970; Pickvance, 1974; Seek, 1983 and Bourne, 1981).

6.3.7 HOUSEHOLD STRESS AND HOUSING ADJUSTMENTS

The effect of household stress can be observed in the reason given for undertaking housing space changes. Reasons for the observed changes in housing space is a most crucial variable since it explains the immediate cause of housing change. Reasons for housing space change are transformed to

provide a measure of the magnitude and type of housing stress. Those who have undertaken any form of adjustment strategy are those who experienced the greatest housing stress. Those who have not undertaken any change in housing space face less housing stress. Two causes of housing stress are recognized. One is household size stress and the other stress is related to head of household's preferences (see section 6.2.6).

6.3.8 A SUMMARY OF THE FACTORS OF HOUSING INTENSIFICATION

Data provided has shown the rapid population growth of the study area. This has been manifested in the increasing household sizes in all the three neighborhoods. Changes in housing space show a less than proportionate change when compared to changes in household size. The consequences of this are reflected in two factors. The first is increasing room occupancy levels and the second is the occurrence of household size stress which has resulted in housing space changes. Household size stress for instance has been the major factor mentioned by respondents as being the immediate cause of undertaking housing space changes. There are however other important factors influencing the strategy of housing intensification adopted. These factors are income, available housing space, room occupancy level, changes in household size, tenure, and duration of residence in a dwelling. Table 43 summarizes the relevant variables influencing housing intensification strategy in the study area.

TABLE 43

THE RELATIONSHIP BETWEEN HOUSING CHANGE AND FACTORS OF HOUSING ADJUSTMENT

Variable	Relationship with Housing change	Chi-square	D.F.	Sig.
Income	Significant	73.3	2	.0000
Housing space Av.	Significant	67.3	1	.0000
Room occ. level	Significant	32.1	1	.0000
Change in H.S.	Significant	9.8	1	.0018
Length of residence	Significant	11.7	1	.0006
Tenure	Significant	78.3	1	.0000
H.S. Stress	Significant	213.3	1	.0000

D.F. = degrees of freedom Sig. = Significance level
 Av. = Availability Occ. = Occupancy H.S. = Household size

6.4 LOGISTIC REGRESSION MODEL OF HOUSING CHANGE

The methodology section summarizes the usefulness of logistic regression analysis in examining the simultaneous effects of independent variables on a binary dependent variable. Three models are examined to provide a comprehensive understanding of the processes of housing adjustments in the study area.

The first model has housing space conversions/ extensions and no change in housing space as the binary dependent variable. The second model examines housing change involving

construction, and those not involving construction/no change at all. The third examines only the housing space change and has physical modification as one category and non constructional change as the other. Six independent variables are considered relevant. These are room occupancy levels, level of household change, length of residence, tenure, socio-economic locality and intensity of household size stress and strains. Socio-economic locality is used as a surrogate for income and housing space availability. The intensity of household size stress is estimated based on the assumption that respondents who have undertaken any form of conversion or extension to their housing space are those who have experienced the greatest housing stress. The concept of housing stress and strain is discussed by Seek (1983) and Brown and Moore (1970). In effect those who indicated household size as the reason for undertaking any housing space change are those who faced the most intense household size stress. This variable therefore captures the effect of household composition change on housing adjustment. All independent variables are categorized, one indicating the stronger effect of the variable and the other the weaker effect. For instance owner occupancy indicates a stronger security of tenure than rental tenure.

Table 44 shows a model for predicting the occurrence or otherwise of housing change. Variables 1 to 6 represent higher room occupancy levels (above 2.5 persons), higher

levels of change in household size (above 2 persons), longer periods of residency (above eight years), higher income levels (Central Madina and Adenta), higher security of tenure (owner occupancy), and higher household size stress. The column labelled B, indicates the coefficients for the model. The Wald statistic, which is a ratio of the coefficient to its standard error, has a chi-square distribution and is used to test the hypothesis that the coefficient is significant. With a significance level of more than 0.05, we cannot reject the hypothesis. As indicated above, the column labelled R illustrates the partial correlation between the dependent variable and the independent variables. The level of correlation for a variable depends on the effects of all the other variables.

The model for predicting conversion/extension against their non-occurrence shows that when all the independent variables are considered together, the partial correlation coefficient for each of them with the dependent variable is close to zero. The coefficient for each variable is insignificant (see Table 44). Thus indicating a less than average contribution to the model by each of the independent variables. Knowledge of whether housing change will occur or not requires consideration of each of the relevant independent variables determined through Chi-square analysis for instance.

TABLE 44
LOGISTIC REGRESSION MODEL FOR NO HOUSING CHANGE

Variable	B	Wald	Df	Sig	R
1 (ROL)	-.1136	.0000	1	.9987	.0000
2 (HC)	4.9602	.0075	1	.9310	.0000
3 (LR)	-.2027	.1035	1	.7477	.0000
4 (INC)	-3.0957	.0035	1	.9528	.0000
5 (TEN)	-3.7537	.0038	1	.9511	.0000
6 (HS)	-19.5983	.0346	1	.8524	.0000

The logistic regression model for physical modification compared to no constructional change/ no change provided useful insights (See Table 45). The cross classification table of the observed cases to the predicted cases by the model indicates that the model accurately predicted 95.56 percent of the cases.

Using the backward step model selection process, the model selects variables 3, 5 and 6 (length of residency, tenure and household size stress respectively), as the relevant variables for predicting housing constructional changes. A high room occupancy level of above 2.5 persons , high changes in household size and level of income are not useful in predicting the occurrence of the dependent variable. It is expected that higher income residents would undertake more constructional changes, however as has been shown, the

relatively high income Adenta residents have undertaken very little changes to their housing space. A consideration of such "objective" variables like room occupancy levels and changes in household size for predicting housing change is not useful. The "subjective" variable considered, individual household size stress, has a significant correlation with constructional change. Human preferences and its role in housing adjustments for example have been indicated by Edwards (1983), Seek (1983), Follain and Jimenez (1985a) and Pickvance (1974) among others. The model without this variable shows a lower level of prediction of the observed data. Only 80.44 percent of the cases were predicted.

Knowing whether the individual is facing a high level of household size related stress (using attitudinal scales for example) is useful in predicting housing change. It is this subjective effect on housing adjustment which has been observed by Rudel (1987), Seek (1983), Bourne (1981), Rossi (1980), Pickvance (1974), Chevan (1972) and Turner (1968). Security of tenure and a longer period of residency are also useful prediction variables.

TABLE 45

LOGISTIC REGRESSION FOR CONSTRUCTIONAL HOUSING CHANGE

Variable	B	Wald	Df	Sig	R
1 (ROL)	-.8242	1.6503	1	.1989	.0000
2 (HC)	-.6072	2.0282	1	.1544	-.0111
3 (LR)	.9667	5.2437	1	.0220	.1187
4 (INC)	-.5895	.5879	1	.4432	.0000
5 (TEN)	3.1216	13.5650	1	.0002	.2239
6 (HS)	3.2869	36.8236	1	.0000	.3886

The model described in Table 46 provided an overall fit of 91.89 percent. In predicting whether constructional change or non constructional change will occur as the form of housing intensification, the regression model selection process selected only length of residence and tenure as the relevant variables. A secure tenure is associated with the expensive intensification strategy involving actual construction. Length of residency is also considered an important variable. The longer one has lived in a house, the more the likelihood of undertaking the expensive housing space changes. The insignificant effect of income may be a reflection of the few housing space changes in the Adenta sample.

TABLE 46

LOGISTIC REGRESSION OF CONSTRUCTIONAL CHANGE/ NON
CONSTRUCTIONAL CHANGE

Variable	B	Wald	Df	Sig.	R
1 (ROL)	-.8305	1.5520	1	.2128	.0000
2 (HC)	-.4875	1.1471	1	.2842	.0000
3 (LR)	1.2280	4.8813	1	.0271	.1380
4 (INC)	.6580	.6330	1	.4263	.0000
5 (TEN)	3.3002	12.4452	1	.0004	.2628
6 (HS)	.8145	1.0848	1	.2976	.0000

In summary, the Logistic regression models have revealed which variables have the most significant impact on the occurrence of housing change. The model for predicting whether any form of housing change will occur or not could not isolate the significant variables. This may be the effect of the large proportion of households with varying characteristics who had not undertaken any housing change at all (93% in Addis Ababa, 42.7% in Central Madina and 24.7% in Zongo). In effect no clear pattern necessary for the selection of the relevant variables is revealed. However, when one focuses only on those who have undertaken housing change, the model identifies the most significant variables influencing housing change as, length of residence, tenure and level of household stress. The model which identifies physical modification as the only relevant form of housing change is useful in predicting whether housing

change will occur or not. Length of residence and tenure are identified as the most relevant factors influencing housing change. This study has indicated the role of in-situ adjustments as the major supplier of housing in Ghana. It is therefore essential that this process is made as effective as possible. Policy makers need to identify the variables which influence housing change and also those that can be influenced by policies. It is apparent from this study that security of tenure is the only variable among those identified, which can reasonably be influenced by policy makers. Renters of existing housing hardly undertake any physical modification of housing which would increase available housing space. Legislation which would guarantee some security through gradual transition to ownership will be useful. Such an approach will however be effective only in the public sector.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 SUMMARY

This study has examined the impact of population growth on residential land use. The issue of housing intensification was the specific focus of this study. The study area's physical growth has been related to the growth of the major cities of Accra and Tema in AMA. It has been shown that population growth is a major factor accounting for the expansion of AMA in general. The less apparent changes in residential land use expressed in terms of changes in form and usage of existing housing is seen as very important especially in countries characterized by lower standards of living and housing affordability. Data on the study area indicates that the population to houses ratio has increased between 1970 and 1984. This implies housing intensification.

The impact of rapid population growth on the level of housing intensification is very apparent in terms of rising room occupancy ratios and the occurrence of housing stress. Undertaking of the different modes of housing intensification strategies to meet household housing consumption needs is influenced not only by population pressure but by a number of factors. Thus it could be argued that population pressure provides motivation but the actual activity of housing adjustment is influenced by other factors.

Three main forms of housing intensification processes have been discussed. First, is the process of increasing room occupancy levels. Physical modifications involving room conversions and extensions, and room conversions without any form of construction, are the second and third processes of housing intensification observed in the study area.

A major aspect of this study involved the stratification of the study area into socio-economic localities/neighborhoods in order to provide a clear insight into differential housing conditions. Adenta, Central Madina and Madina-Zongo are identified as corresponding to high, medium and low income neighborhoods. The study showed differences in levels and modes of housing intensification among the neighborhoods. These differences are believed to have been influenced by the observed differing characteristics of the three neighborhoods. The factors of differentiation among the three areas include income, education, tenure, housing type and available housing space.

A major hypothesis of this study was that the neighborhoods will exhibit significant differences in level and mode of housing intensification. Data collected for this study verified the hypothesis. Compared to housing space, household sizes have increased more than proportionately. Room occupancy levels are increasing in the study area. The mean percentage increases in room occupancy levels of 39%, 20% and 69% for Adenta, Central Madina and Zongo respectively, provide

an indication of the relative levels of intensification in the study area. An examination of the level of housing intensification shows that Adenta and Central Madina in general presently have most households within the standard room occupancy level of 2.5 persons per room. A large proportion of the Zongo households have a room occupancy level beyond the 2.5 persons per room standard. Chi-square analysis shows significant differences in the three areas in terms of room occupancy levels. The mean housing space availability also shows that Zongo residents are worse off. This provides basis for anticipating the relative effects further increases in household size (population growth) will have on the three neighborhoods.

Differences also exist in the neighborhoods in terms of the undertaking of a housing intensification strategy. It has been observed that 94%, 43% and 25% of Adenta, Central Madina and Zongo have undertaken no housing stress resolution strategy whatsoever. Very few households in Adenta have undertaken an intensification strategy and this has been attributed to the large housing space available in the area. The adjustment strategies have mainly been undertaken by Central Madina and Zongo residents. These differences in housing adjustment strategies reflect the differing levels of housing stress in the areas. Adenta households in general seem to be facing less housing stress compared to the other neighborhoods. A comparison of those who have undertaken an

adjustment strategy showed that the expensive physical modifications in houses were done by the relatively high income Central Madina residents. Zongo residents were associated with the "no cost" room conversions.

The study also discussed the factors influencing housing space change using Chi-square analysis. Income is seen as an important factor. The socio-economic neighborhood is used as a surrogate for income. Thus Adenta and Central Madina correspond to relatively high income and Zongo is associated with low income. The large available housing space in Adenta is seen as an important factor influencing the observed predominance of no housing change. Central Madina and Madina-Zongo are the areas in which changes have occurred. The relatively high income Central Madina is characterized by physical modification of housing compared to Zongo which has room conversions not involving any construction. The predominant reason given for the observed changes is household size stress. Other reasons given for housing changes are related to individual preferences (solely in Adenta).

The size of housing and land space is seen as influencing housing change, with larger housing and land space associated with constructional changes. The length of residence data shows that the longer periods of residence are associated with physical modifications of housing space. Changes in household size and room occupancy levels also showed an association with housing change. The larger changes in household size and

higher room occupancy levels are associated with the undertaking of some form of housing space change and the smaller changes are associated with no change at all. Tenure has been described as a major factor of housing consumption. The undertaking of any physical modification to housing space has been shown to be strongly related to tenure. Physical modifications are mainly associated with owner tenureship.

To provide further insight into the effects of all the variables isolated, a Logistic regression model was developed. The model shows that it is not possible to effectively identify the most relevant variables influencing the occurrence or otherwise of some strategy of intensification. Choosing physical modifications as the only relevant form of housing change (since this involves expenditure of energy, time, materials and capital), the model indicates that level of housing stress, security of tenure and length of residency are the relevant variables influencing the occurrence of a strategy of intensification. In examining only the sample who had undertaken any form of intensification strategy, the model indicates security of tenure and length of residence as the most important variables.

Housing conditions in the study area were also examined to indicate the context within which rapid population growth and housing intensification are occurring. The context also provides basis for anticipating the effects further population growth will have on living conditions in the study area. Where

conditions are adequate intensification poses no problem. If conditions are inadequate health concerns become paramount. Housing conditions examined include physical quality of housing, available housing infrastructure and the housing environment. The responses of households to environmental problems are seen as very important in unplanned areas characterized by limited institutionalized resolution of environmental problems. Respondents live in the same unplanned area and consequently indication of attempt to solve a problem or otherwise provides an insight into the consequences of rapid population growth. Rapid population growth has a direct impact on housing environmental conditions. Refuse and waste water production and sanitation in general are influenced by the rate of population growth. Population growth also has an impact on available housing facilities especially where they are shared.

Physical housing quality analysis shows the use of durable materials in all the neighborhoods. The quality differences which correspond to the neighborhoods are however very apparent in the quality of the total housing unit and level of maintenance. The major renovations required (as indicated by respondents) such as those to the walls, roofing and floors are limited to Zongo.

Differences in housing infrastructure such as the availability of electricity, private taps, convenient toilet facilities, and drainage facilities are also very apparent in

the socio-economic neighborhoods. In all cases, Zongo residents show a lack of these facilities.

The study also showed differences in response to a major environmental problem, that of refuse disposal. Adenta and Central Madina residents, make regular attempts at burning their refuse, whereas it is not that regular in Zongo. These differences are also very apparent in the observed widespread presence of garbage at Zongo, compared to the other areas. Education is identified as the relevant variable affecting actual elimination of garbage, with the higher educated respondents undertaking regular disposal of refuse. The study validates the stated hypothesis:

That there are significant differences in levels of housing poverty and response to its consequences in the socio-economic neighborhoods.

It is therefore very apparent that rapid population growth and housing intensification in low income areas such as Zongo, provides special cause for concern given the lack of opportunities for reducing room occupancy levels, the quality of housing, available infrastructure and the existing environmental problems in the area.

7.2 RECOMMENDATIONS

This study has indicated that housing production is not matching the rate of population growth. The immediate reason for this state of affairs is that housing is not affordable

for the vast majority of Ghanaians in general. This has resulted in the intense use of existing housing stock and increasing room occupancy levels. Effective housing intensification/adjustment strategies to resolve housing stress is limited by factors like tenure and income as this study has shown. Effectively meeting housing needs from the existing stock of housing means increasing housing space and this basically requires an adequate level of income and ownership of housing. Adequate income and affordable housing for the majority of Ghanaians are therefore major needs. The low income Zongo residents in this study, for instance, have indicated their desire for housing which will provide their housing space and quality needs.

The structural characteristics of the developing world in general and housing markets and/or their organizational structure in particular are major problems which need to be addressed. These obstacles make housing unaffordable to the majority (See Agarwala, 1983; Malpezzi, 1990; Nientied and van der Linden, 1985: 319). The basic prescription of the World Bank has been to correct imperfections in housing input markets, in terms of the supply of urban land and services, and development of financial institutions.

Government involvement in housing production as a means of ameliorating the intensity of the housing deficit, has been associated with high construction costs, high housing prices and waste of resources. The World bank and other international

organizations recommend that governments' role in housing be restricted to ensuring access to appropriate technology, land and credit. Government housing legislation should be proscriptive rather than prescriptive (UNCHS, 1990, Turner (1976, 1978, 1981). This policy recommendation has been translated into sites and services schemes in many developing countries. These are, "... government sponsored packages of shelter and related services, which range from a minimal level of "surveyed plot" to an intermediate level of "serviced sites" to an upper level of "core housing" complete with utilities and access to community-based services" (Mayo and Gross, 1987). The World Bank has provided over US\$1 billion for sites and services and housing upgrading schemes between 1972 and 1981. The scale of these commendable schemes have however been very limited. Problems of affordability and diversion of services to higher income groups have been observed (Okpala, 1986: 213; Mayo and Gross, 1987: 305).

Adequate resolution of the housing supply problem requires higher levels of economic performance in the developing world in general (See Bassett and Short, 1980: 160). This research supports the idea that housing problems cannot be divorced from the general developmental problems of the developing world. Thus solving housing problems require government committed to development and concerned with meeting the basic needs of its citizens. Housing policies and programs in Africa have been discussed by Okpala (1986), Ofori (1989)

and Osuide (1988) among others. Policies have generally had little impact on improving housing conditions. The failure to meet policy objectives is a reflection of the lack of commitment and has shown consistently that problems of affordability inevitably arise.

Ghana's housing policy of 1987-1990 made useful recommendations for resolving housing problems. The policy shows the adoption of the self-help philosophy with government playing only a supportive role in housing activities. Strategies include:

1. Establishment of a coordinating board on housing and the decentralization of housing activities.
2. Establishment of a national mortgage scheme.
3. Reduction of interest on housing loans.
4. Introduction of tax holidays for building material industry.
5. Mobilization of funds from the public and private sector to support activities like research and development of local building materials.

No comprehensive evaluation has been undertaken to determine the success of this housing policy. This author has the conviction that such programmes hardly benefit low income groups. Housing can only be affordable to low income groups if their incomes rise significantly and when increasing use is made of low cost local building materials. Nientied and Linden (1985: 318) have observed that given the present

political economy of developing countries, it is the individual's economic position rather than government policy which will determine one's housing situation. Ebong (1979) has also indicated that building material costs comprise a substantial part of housing costs. Attempts at developing local materials have proved notoriously difficult. Meeting housing needs requires overall development and this is contingent on political will and commitment. "...Housing policies therefore cannot be presented in isolation from more general development strategies" (Burgess, 1978).

This study has shown that there is also the need for policies which enable the efficient provision of housing consumption needs from the existing housing stock. Home improvement loans are therefore crucial in this regard. Ghana's housing policy for instance fails to identify the predominant role of the existing housing stock in meeting housing space needs and consequently no strategy is specifically developed to facilitate housing intensification. Security of tenure has been seen as a major factor influencing effective housing adjustments. Policies which ensure eventual ownership of housing or some form of tenure security is therefore essential.

7.3 IMPLICATIONS FOR FURTHER RESEARCH

It has been shown that housing intensification strategies as a mode of adjustment to household housing consumption demands

has been a neglected area of research. It is therefore essential especially in developing countries to examine the nature of this phenomenon. Residential mobility should not be seen as a choice easily available to all households.

Improving living standards of populations and developing policies of mitigation require that living conditions be adequately understood in order to develop strategies that best improve the existing situation. It thus becomes imperative that empirical research on the relevant basic processes and activities of a population be undertaken instead of adhering to an academic orthodoxy. This researcher therefore advocates continued research into the relevant process of housing intensification as a first step in advocating strategies which would improve housing provision from the existing housing stock. This study has shown for example that tenure is a very important factor influencing intensification. It should be expected that tenants will hardly undertake to physically modify their living space even in the face of unsatisfactory housing conditions. This shows the relatively disadvantaged position of renters compared to homeowners and the need for housing strategies specifically for renters.

It is hoped that this study will stimulate an interest in the phenomenon of housing and residential land use intensification especially in developing countries characterized by limited housing choices.

APPENDIX 1

QUESTIONNAIRE

- LOCALITY 1. Adenta (Upper income)
2. Central Madina (Middle income)
3. Madina-Zongo (Lower income)
- PRIMARY MONTHLY INCOME OF HEAD OF HOUSEHOLD.....

HOUSEHOLD SCHEDULE

1. Please list below all persons who usually live in this household, whether present or not. Start with the Head of the Household

- 1..... 2.
3..... 4.....
5..... 6.....
7.....

2. What is the relationship to the head of household

1. Head 2..... 3.....
4..... 5..... 6.....
7.....

3. Indicate the sex of this person (1=Male 2=Female)

- 1..... 2..... 3.....
4..... 5..... 6.....
7.....

4. Indicate this person's age in completed years

- 1..... 2..... 3.....
4..... 5..... 6.....
7.....

5. What is this person's marital status (1=Never married
2=Married 3=Separated 4=Divorced 5=Widowed)

- 1..... 2..... 3.....
4..... 5..... 6.....
7.....

6. What is the highest grade ever attained by this person
(1=University 2=Secondary/technical/Vocational
3=Primary/Middle 4=None/illiterate 5=Other {specify})

- 1..... 2..... 3.....
4..... 5..... 6.....
7.....

7. What work does this person do most of the time
(1=Professional 2=Administrative/Clerical 3=Teaching 4=Artisan
5=Trading 6=Farming 7=Fishing 8=Unemployed 9=Other {Specify})
1..... 2..... 3.....
4..... 5..... 6.....
7.....

8. How long has this person been living in this particular
household
1..... 2..... 3.....
4..... 5..... 6.....
7.....

HOUSING AND HOUSING INFRASTRUCTURE SCHEDULE

9. Indicate type of housing occupied by this household
(1=Compound house 2=Single-storied bungalow 3=Storied building
4=Other {Specify}).

10. Indicate type of tenure of accommodation (1=Owner-
occupied 2=Rented 3=Rent-free 4=Other {Specify}).
.....

11. How old is this house (Let landlord/Owner be respondent
if available).....

12. How many rooms are there in this house. Please Specify
(Let landlord/Owner be respondent if available)
.....
.....
.....

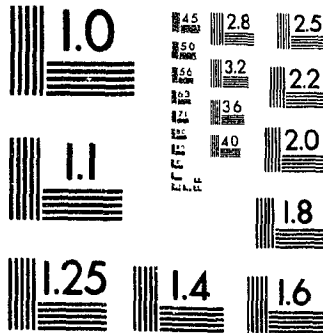
13. How many rooms are occupied by this household. Please
specify
.....
.....
.....

14. How many rooms were occupied by this household when you
initially settled in this house. Please specify
.....

15. Has the number of rooms occupied by this household changed
since you settled in this house (1=Yes 2=No)
.....

3 of/de 3

PM-1 3 1/2"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT



PRECISIONSM RESOLUTION TARGETS

PIONEERS IN METHYLENE BLUE TESTING SINCE 1974



15000 COUNTY ROAD 5, BURNISVILLE, MN 55337 USA
TEL: 612-435-7087 FAX: 612-435-7087 TLEX: 510009488

16. If Yes, how many rooms were occupied by this household before the change

.....

17. Please specify the changes.

.....
.....
.....
.....

18. Has there been any construction work/ room conversions/ renovations during the tenure of this household (1=Yes 2= No)

.....

19. If Yes, Please specify

.....
.....
.....

20. Who undertook the above (Q.19), and why

.....
.....
.....
.....

21. What are the walls of the house made of? (1=Cement blocks/burnt bricks 2=Corrugated iron sheets 3=Wood 4=Other {Specify})

.....

22. What is the floor made of? (1=Cement/Concrete 2=Tiles 3=Terrazzo 4=Earth 5=Other {Specify})

.....

23. Indicate the roofing material (1=Asbestos 2=Corrugated iron sheets 3=Other {Specify})

.....

24. What is the source of light for this household (1=Electricity 2=Other {Specify})

.....

25. What is the source of water for this household (1=Private tap 2=Shared tap 3=Well 4=Other {Specify})

.....

26. Indicate type of toilet facility used (1=Water Closet 2=Pan 3=Other {Specify})

.....

27. Is this toilet facility shared or exclusive (1=Shared 2=Exclusive)
.....

28. What type of toilet facility was used before the present type? Indicate reason for the change
.....
.....
.....

29. What is the mode of refuse disposal (1=Public dump 2=Personal incineration 3=Indiscriminate disposal 4=Other {Specify})
.....

30. What was the mode of refuse disposal before the present mode? Indicate reason for the change
.....
.....
.....

31. Does the house have a drainage facility? (1=Yes 2=No)
.....

Indicate the following

32. Aspects of housing which need repair
.....
.....

33. Presence of accumulated standing water (1=Yes 2=No)
.....

34. Presence of accumulated garbage (1=Yes 2=No)
.....

35. Please rank the facilities/infrastructure/room space you would like to have in this house (Kitchen, Toilet, Bathroom, electricity, water, drainage facilities, refuse disposal facilities, bedroom, living room etc.)
.....
.....
.....

36. Does the absence of the facilities in Q.35 bring about any environmental problems (1=Yes 2=No).....

37. If Yes, Please indicate in order of magnitude the major housing environmental problems in the neighbourhood related to the lack of housing infrastructure (Kitchen, Toilet, Bathroom, Electricity, Water, Drainage facilities, Refuse disposal Facilities, and quality of roads).

- 1.....
- 2.....
- 3.....

38. Comparing the present to when you initially assumed this tenureship, have the problems listed in Q.37 got better, same or worse (1=Better 2=Same 3=Worse)? Please indicate why

-
-
-
-
-
-
-

39. How have you dealt with the problems in Q.37

-
-
-
-

40. Given the funds, would you like to build a house in Madina (1=Yes 2=No)

-

41. If Yes, why would you build the house? (List in order of priority)

-
-
-

APPENDIX 2
CROSS TABULATION OF INCOME BY SOCIO-ECONOMIC LOCALITY

Income group	Socio-economic locality		
	Adenta	Central Madina	MadinaZongo
1	0 (10.4)	1 (12.0)	35 (13.6)
2	26 (39.3)	62 (45.3)	48 (51.4)
3	39 (15.3)	12 (17.7)	2 (20.0)

* Expected frequencies are indicated in brackets.
Chi-Square = 119.7 Degrees of freedom = 4 Significance=.0000

1= < C20000 2= C20000 - < C40000 3= > C40000

APPENDIX 3
EDUCATIONAL CHARACTERISTICS

Locality	Univ.	Sec/Tech.	Prim./Middle	None	TOTAL
Adenta	46	17	1	1	65
Central Madina	16	59	0	0	75
Madina-Zongo	0	28	45	12	85
TOTAL	62	104	46	13	225

APPENDIX 4
OCCUPATIONAL CHARACTERISTICS

Occupation	Locality			TOTAL
	Adenta	Central Madina	Madina-Zongo	
Professional	44	16	0	60
Administrative/ clerical	0	0	11	11
Teaching	0	14	9	23
Artisan	0	11	27	38
Trading	14	22	35	71
Contractor	7	0	0	7
Retired	0	12	1	13
Student	0	0	1	1
Homemaker	0	0	1	1
TOTAL	65	75	85	225

APPENDIX 5
LENGTH OF STAY IN PRESENT HOUSE

Locality	Length of Stay (in years)			Mode
	Mean	Minimum	Maximum	
Adenta	6.3	3	15	4, 7
Central Madina	10.4	4	19	11
Madina-Zongo	7.8	3	16	5
TOTAL SAMPLE	8.2	3	19	6

APPENDIX 6

AGE CHARACTERISTICS OF HEADS OF HOUSEHOLDS BY LOCALITY

Locality	Mean	Age Minimum	Maximum
Adenta	48	32	67
Central Madina	53	37	68
Madina-Zongo	43	26	67

APPENDIX 7
SEX DISTRIBUTION OF HEADS OF HOUSEHOLDS

Locality	Male	Sex	Female	TOTAL
Adenta	65		0	65
Central Madina	73		2	75
Madina-Zongo	79		6	85
TOTAL	217		8	225

APPENDIX 8

MARITAL STATUS OF HEADS OF HOUSEHOLDS

Marital Status	Locality			TOTAL
	Adenta	Central Madina	Madina-Zongo	
Never married	0	0	5	5
Married	64	71	71	206
Separated	1	1	5	7
Divorced	0	1	1	2
Widowed	0	2	3	5
TOTAL	65	75	85	225

APPENDIX 9
INITIAL HOUSEHOLD SIZE

Household size	Adenta		Locality		Madina Zongo		TOTAL	
	F	%	F	%	F	%	F	%
1	0	0	0	0	8	9.4	8	3.6
2	5	7.7	0	0	13	15.3	18	8.0
3	4	6.2	4	5.3	23	27.1	31	13.8
4	11	16.9	12	16.0	19	22.4	42	18.7
5	14	21.5	19	25.3	11	12.9	44	19.6
6	11	16.9	20	26.7	9	10.6	40	17.8
7	11	16.9	14	18.7	2	2.4	27	12.0
8	7	10.8	5	6.7	0	0	12	5.3
9	1	1.5	0	0	0	0	1	0.4
10	1	1.5	1	1.3	0	0	2	0.9
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

APPENDIX 10

PRESENT HOUSEHOLD SIZE

Household size	Locality							
	Adenta		Central Madina		Madina-Zongo		TOTAL	
	F	%	F	%	F	%	F	%
3	3	4.6	0	0	2	2.4	5	2.2
4	1	1.5	1	1.3	7	8.2	9	4.0
5	7	10.8	6	8.0	12	14.1	25	11.1
6	10	15.4	7	9.3	28	32.9	45	20.0
7	9	13.8	10	13.3	21	24.7	40	17.8
8	14	21.5	21	28.0	12	14.1	47	20.9
9	12	18.5	16	21.3	3	3.5	31	13.8
10	4	6.2	7	9.3	0	0	11	4.9
11	3	4.6	5	6.7	0	0	8	3.6
12	0	0	2	2.7	0	0	2	0.9
13	2	3.1	0	0	0	0	2	0.9
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

APPENDIX 11

FACILITIES AND ROOM SPACE REQUIRED BY RANK IN ADENTA

Facilities /room space	First	Rank Second	Third	Fourth	Fifth
Tarred roads	20	21	16	2	-
Telephone	3	2	1	-	-
Security system	5	3	-	1	-
Stabilization of power volt.	4	15	21	1	-
Stabilization of water supply	-	1	-	-	-
Refuse disposal facilities	33	24	4	1	-
Extra bedroom	-	-	1	-	-
Extra living room	-	-	-	-	-
Extra toilet	-	-	-	-	-
Extra bathroom	-	-	-	-	-
Better Vent.	-	-	-	-	-
Constructed toilet facility	-	-	-	-	-
Constructed kitch. facility	-	-	-	-	-
Constructed bathroom	-	-	-	-	-
Private tap	-	-	-	-	-
Drainage facility	-	-	-	-	-
Larger room space	-	-	-	-	-
Living room	-	-	-	-	-

Electricity - - - - -

APPENDIX 12

FACILITIES AND ROOM SPACE REQUIRED BY RANK IN CENTRAL MADINA

Facilities /room space	First	Second	Rank Third	Fourth	Fifth	Sixth
Tarred roads	6	18	14	6	-	-
Telephone	-	-	-	-	-	-
Security system	-	-	-	-	-	-
Stabilization of power volt.	3	20	13	1	1	-
Stabilization of water supply	1	4	9	1	-	-
Refuse disposal facilities	53	13	3	-	-	-
Extra bedroom	12	11	11	6	-	-
Extra living room	-	4	5	2	-	-
Extra toilet	-	1	1	-	1	-
Extra bathroom	-	-	1	1	-	-
Better ventilation-	-	-	-	-	-	-
Constructed toilet facility	-	-	-	-	-	-
Constructed kitch.-	-	-	-	-	-	-
Constructed bath. -	-	-	-	-	-	-
Private tap	-	-	-	-	-	-
Drainage facility -	-	-	-	-	-	-
Larger room space -	-	-	-	-	-	-

Living room	-	-	-	-	-	-
Electricity	-	-	-	-	-	-

APPENDIX 13

FACILITIES AND ROOM SPACE REQUIRED BY RANK FOR MADINA-ZONGO

Facilities	Rank					
	First	Second	Third	Fourth	Fifth	Sixth
Tarred roads	-	-	-	-	-	-
Telephone	-	-	-	-	-	-
Security system	-	-	-	-	-	-
Stabilization of power volt.	-	1	1	-	-	-
Stabilization of water supply	-	-	-	-	-	-
Refuse disposal facilities	4	4	16	1	1	-
Extra bedroom	24	21	6	1	-	-
Extra living room	-	2	-	-	-	-
Extra toilet	-	-	-	-	-	-
Extra bath.	-	-	-	-	-	-
Better vent.	-	2	5	2	1	-
Constructed toilet	22	15	24	9	1	-
Constructed kitchen	-	-	2	-	-	-
Constructed bathroom	-	6	5	3	-	-
Private tap	1	5	9	3	1	-

Drainage facility	-	1	-	2	-	-
Larger room space	-	1	1	2	-	-
Living room	31	24	3	-	-	-
Electricity	3	4	8	12	-	-

APPENDIX 14
INITIAL NUMBER OF ROOMS OCCUPIED

Number of rooms	Locality							
	Adenta		Central Madina		Madina-Zongo		TOTAL	
	F	%	F	%	F	%	F	%
1	0	0	0	0	2	2.4	2	.9
2	0	0	0	0	71	83.5	71	31.6
3	0	0	5	6.7	12	14.1	17	7.6
4	3	4.6	60	80.0	0	0	63	28.0
5	17	26.2	5	6.7	0	0	22	9.8
6	19	29.2	5	6.7	0	0	24	10.7
7	14	21.5	0	0	0	0	14	6.2
8	9	13.8	0	0	0	0	9	4.0
9	3	4.6	0	0	0	0	3	1.3
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

APPENDIX 15

PRESENT NUMBER OF ROOMS OCCUPIED

Number of rooms	Adenta		Locality		Madina-Zongo		TOTAL	
	F	%	Central F	Madina %	F	%	F	%
1	0	0	0	0	0	0	0	0
2	0	0	0	0	70	82.4	70	31.1
3	0	0	4	5.3	13	15.3	17	7.6
4	3	4.6	20	26.7	2	2.4	25	11.1
5	19	29.2	29	38.7	0	0	48	21.3
6	18	27.7	19	25.3	0	0	37	16.4
7	14	21.5	3	4.0	0	0	17	7.6
8	8	12.3	0	0	0	0	8	3.6
9	3	4.6	0	0	0	0	3	1.3
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

APPENDIX 16
INITIAL NUMBER OF BEDROOMS OCCUPIED

Number of bedrooms	Adenta		Locality		Madina-Zongo		TOTAL	
	F	%	F	%	F	%	F	%
1	0	0	0	0	71	83.5	71	31.6
2	0	0	5	6.7	14	16.5	19	8.4
3	4	6.2	60	80.0	0	0	64	28.4
4	28	43.1	7	9.3	0	0	35	15.6
5	21	32.3	3	4.0	0	0	24	10.7
6	10	15.4	0	0	0	0	10	4.4
7	2	3.1	0	0	0	0	2	0.9
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

APPENDIX 17
PRESENT NUMBER OF BEDROOMS OCCUPIED

Number of bedrooms	Adenta		Locality		Madina-Zongo		TOTAL	
	F	%	F	%	F	%	F	%
1	0	0	0	0	12	14.1	12	5.3
2	0	0	4	5.3	70	82.4	74	32.9
3	4	6.2	20	26.7	3	3.5	27	12.0
4	28	43.1	41	54.7	0	0	69	30.7
5	22	33.8	9	12.0	0	0	31	13.8
6	9	13.8	1	1.3	0	0	10	4.4
7	2	3.1	0	0	0	0	2	0.9
TOTAL	65	100.0	75	100.0	85	100.0	225	100.0

REFERENCES

- Accra Metropolitan Area - Waste Management Department. 1992. Improvement of the Accra Solid Waste and Night Soil Disposal System, 5 year Medium-Term Plan, 1992-1997. Unpublished Preliminary Report.
- Agarwala, R. 1983. Price distortions and growth in developing countries. World Bank Staff Working Paper No.57, New York.
- Alfeld, L.E and Graham, A.K. 1976. Introduction to urban dynamics. Massachusetts: Wright-Allen Press Inc.
- Asiama, S.O. 1990. Ghana. International Handbook of Housing Policies and Practices, Connecticut: Greenwood Press.
- Asiama, S.O. 1984. The land factor in housing for low income urban settlers: The example of Madina. Third World Planning Review, Vol.6, No.1 (Feb.): 171-184.
- Ball, M.J. and Kirwan, R.M. 1977. Accessibility and supply constraints in the urban housing market. Urban Studies, Vol.14, No.1: 11-32.
- Bassett, K. and Short, J. 1980. Housing and residential structure, alternative approaches. London: Routledge and Kegan Paul.
- Blalock, H.M. 1979. Social Statistics, New York: Mcgraw-Hill Inc.
- Bourne, L. 1981. The Geography of Housing, New York: Halsted Press.
- Brown, L. and Moore, E. 1970. The intra-urban migration process: A perspective, Geografiska Annaler, Series B, 52B: 200-219.
- Burgess, R. 1978. Petty commodity housing or dweller control? A Critique of John Turner's Views on Housing Policy. World Development, Vol.6, No. 9/10: 1105-1133.
- Casley, D.J. and Lury, D.A. 1981. Data Collection in Developing Countries. Oxford: Clarendon Press.
- Chevan, A. 1972. Family growth, household density and moving. Demography, Vol.8: 451-458.

- Department of Geography, United Nations Centre for Human Settlements and Town and Country Planning Departments. 1990. Demographic Studies and Projections for Accra Metropolitan Area (AMA). (Unpublished report).
- Dickson, K.B. and Benneh, G. 1984. A New Geography of Ghana. London: Longmann Group Ltd.
- Dixon, C. and Leach, B. 1977. Sampling Methods for Geographical Research, Concepts and Techniques in Modern Geography, No.17.
- Doling, J. 1976. The family life-cycle and housing choice. Urban Studies, Vol.13: 51-58.
- Dreier, P. 1984. The tenants' movement in the United States. International Journal of Urban and Regional Research, Vol.8: 255-279.
- Ebong, B.J. 1979. Urban Growth and Housing Problems in Nigeria: A Case Study of Lagos", African Urban Studies, No.4, (Spring): 71-82.
- Edwards, M. 1983. Residential mobility in a changing housing market: The case of Bucaramanga, Columbia. Urban Studies, Vol.20: 131-145.
- Follain, J.R. and Jimenez, E. 1985a. The Demand for Housing Characteristics in Developing Countries, Urban Studies, Vol.22: 421-432.
- Follain, J.R. and Jimenez, E. 1985b. Estimating the demand for housing characteristics: A survey and critique. Regional Science and Urban Economics, Vol. 15: 77-Statistical Services.
- Gilbert, A.G. and Varley, A. 1990. Renting a home in a Third World City: Choice or Constraint?. International Journal of Urban and Regional Research, Vol.14, No.1: 89-108.
- Gilbert, A.G. and Ward, P.M. 1985. Housing, the State and the poor: Policy and practice in three Latin American cities. Cambridge: Cambridge University Press.
- Goodman, J.L. Jnr. 1976. Housing consumption disequilibrium and local residential mobility. Environment and Planning, Vol.8: 874-885.
- Government of Ghana, Economic Recovery Programmes 1984-1986. (Unpublished report).

- Hardoy, J.E. and Satterthwaite, D. 1989. Squatter Citizen: Life in the urban Third World. London: Earthscan.
- Harloe, M. 1984. Sector and class: A critical comment. International Journal of Urban and Regional Research, Vol.8: 228-237.
- Harris, R. 1986. Home Ownership and Class in Modern Canada. International Journal of Urban and Regional Research, Vol.10, No.1 (March): 67-86.
- Hegedus, J. and Tosics, I. 1983. Housing Classes and Housing Policy: Some changes in the Budapest Housing market. International Journal of Urban and Regional Research, Vol.7: 467.
- Janice, P. 1981. Strategies for Squatter Settlements: The State of the Art as of 1977. The Residential Circumstances of The Urban Poor in Developing Countries, UNCHS: United Nations.
- Johnson, J., Salt, J. and Wood, P. 1974. Housing and the Migration of Labor in England and Wales. London: Saxon House.
- Kalton, G. 1983. Introduction to Survey Sampling, Beverly Hills/London/New Delhi: Sage Publications.
- Kish, L. 1967. Survey Sampling. New York: John Wiley.
- Konadu-Agyeman, K.O. 1991. Reflections on the absence of squatter settlements in West African Cities: The case for Kumasi, Ghana. Urban Studies, Vol.28, No.1:139-151.
- Lee, C. 1974. Models in Planning: An Introduction to the Use of Quantitative Models in Planning. Oxford/New York/Toronto/Sydney: Pergamon Press.
- Leeds, A. 1981. Lower-Income Urban Settlement Types: Processes, Structures, Policies. The Residential Circumstances of The Urban Poor in Developing Countries, UNCHS: United Nations.
- Malpezzi, S. 1990. Urban Housing and Financial Markets: Some International Comparisons. Urban Studies, Vol.27, No.6: 971-1022.
- Marris, P. 1981. The Meaning of Slums and Patterns of Change. The Residential Circumstances of The Urban Poor in Developing Countries, UNCHS: United Nations.

- Mayo, S.O. and Gross, D.J. 1987. Sites and services - and subsidies: The economics of low-cost housing in developing countries. The World Bank Economic Review, Vol.1, No.2: 301-335.
- Merrett, S. 1984. The assessment of housing consumption requirements in developing countries. Third World Planning Review, Vol.6, No.4, (Nov.): 319-328.
- Ministry of Works and Housing, Ghana National Housing Policy and Action Plan 1986-1990, (Nov.): 1986 (Unpublished Report).
- Nabila, J.S. 1988. Urbanization in Ghana. Population Impact Project.
- Nabila, J.S., Songsore, J. and Yankson, P.W.K. 1990. "Population growth and its impact on Accra Metropolitan Area". Paper presented at a seminar on: Accra: Planning for its future. Held in Accra from 21st-22nd Feb., 1990.
- Nientied, P. and van der Linden, J. 1985. Approaches to Low-Income Housing in the Third World: Some Comments. International Journal of Urban and Regional Research, Vol.9, No.3: 311-329.
- Norusis, M. 1986. The SPSS Guide to Data Analysis, SPSS Inc.
- Norusis, M. 1988. SPSS-X Advanced Statistics Guide, SPSS Inc.
- Norusis, M. 1990. SPSS Advanced Statistics User's Guide, SPSS Inc.
- Ofori, G. 1989. Housing in Ghana: The Case for a Central Executive Agency. Habitat International, Vol.13, No.1: 5-17.
- Okpala, D.C.I. 1986. Aspects of Urban Housing and Human Settlements, Policies and Strategies in Africa. Habitat International, Vol.10, No.3: 203-223.
- Onokerhoraye, A.G. 1977. The spatial pattern of residential districts in Benin, Nigeria. Urban Studies, Vol.14: 291-302.
- Osuide, S.O. 1988. Population Growth and Housing in Nigeria. Habitat International, Vol.12, No.2: 129-135.
- Pickvance, C.G. 1974. Life-cycle, housing tenure and residential mobility: A path analytic approach. Urban Studies, Vol.11: 171-188.

- Quarcoo, A.K., Addo, N.O. and Peil, M. 1967. Madina Survey. Institute of African Studies: University of Ghana.
- Rex, J.A. 1968. The sociology of a zone of transition. Pahl, R.E. (ed.), Readings in Urban Sociology. Oxford: Pergamon Press.
- Roistacher, 1974. Housing and home ownership. Morgan, J.N. (ed.), Five Thousand American Families: Patterns of Economic Progress, Vol.II, Ann Arbor, Michigan, Institute for Social Research.
- Rossi, P.H. 1980. Why Families Move. 2nd Ed. Beverly Hills, California: Sage.
- Rudel, T.K. 1987. Housing price inflation, family growth, and the move from rental to owner occupied housing. Urban Studies, Vol.24, No.4: 258-267.
- Saunders, P. 1978. Domestic property and social class. International Journal of Urban and Regional Research, Vol.2: 233-251.
- Seek, N.H. 1983. Adjusting housing consumption: Improve or move. Urban Studies, Vol.20: 455-469.
- Speare, A. 1970. Home Ownership, Life Cycle Stage and Residential Mobility. Demography, Vol.7, No.4.
- Steinberg, F. 1982. Slum and shanty upgrading in Colombo: A help for the urban poor? International Journal of Urban and Regional Research, Vol.6, No.1: 372-391.
- Strassman, W.P. 1978. Basic shelter in an urban framework: The experience of Cartagena, Columbia. World Bank: Urban Projects Department.
- Struyk, R.J. and Marshall, S. 1974. The determinants of household home ownership. Urban Studies, Vol.11: 289-299.
- Sule, O.R.A. 1981. Environmental Pollution in an Urban Centre: Waste Disposal in Calabar. Third World Planning Review, Vol.3, No.4: 417-431.
- Tipple, G. and Willis, K.G. 1991. Tenure Choice in a West African City. Third World Planning Review, Vol.13, No.1.
- Turner, J.F.C. 1981. A Discussion Paper on the Question of Government Intervention in Urban Settlement Types. The Residential Circumstances of the Urban Poor in Developing Countries, UNCHS: United Nations.

- Turner, J.F.C. 1978. Housing in Three Dimensions: Terms of Reference for the Housing Question Redefined. World Development, Vol.6, No. 9/10, 1135-1145.
- Turner, J.F.C. 1976. Housing by People: Towards Autonomy in Building Environments. London: Marion Boyars.
- Turner, J.F.C. 1968. Housing priorities, settlement pattern and urban development in Modernizing countries. Journal of the American Institute of Planners, Vol.34, No.6, (Nov.): 354-363.
- Turner, J.F.C. and Fichter, R. (eds.) 1972. Freedom to Build. New York: Collier-Macmillan.
- Twumasi, P.A. 1986. Social Research in Rural Communities. Accra: Ghana Universities Press.
- United Nations Centre for Human Settlements (HABITAT), 1982. A Survey of Slum and Squatter Settlements, Dublin: Tycooly International Publishing Ltd.
- United Nations Centre for Human Settlements, 1987. Global Report on Human Settlements, Oxford University Press.
- United Nations Centre for Human Settlements, 1990. Shelter For All: Global Strategy For Shelter to the Year 2000, Nairobi.
- Ward, P.M. and Macoloo, C. 1992. Articulation Theory and Self-Help Housing Practice in the 1990s. International Journal of Urban and Regional Research, Vol.16, No.1: 60-80.
- Willis, K.G., Malpezzi, S. and Tipple A.G. 1990. An Econometric and Cultural Analysis of Rent Control in Kumasi, Ghana. Urban Studies, Vol.27, No.2: 241-258.
- The World Bank. 1992. World Development Report, New York: Oxford University Press Inc.
- Yeh, S. 1981. On Characteristics of Urban Low-Income Settlements and Improvement Strategies. The Residential Circumstances of The Urban Poor in Developing Countries. UNCHS: United Nations.
- Yi C. 1985. Urban Housing Satisfaction in a Transitional Society: A Case Study in Taichung, Taiwan. Urban Studies, Vol.22: 1-12.