TRANSFORMATION IN HAUSA TRADITIONAL RESIDENTIAL ARCHITECTURE:

CASE STUDY OF SOME SELECTED PARTS OF KANO METROPOLIS BETWEEN 1950 AND 2005

BY

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DECLARATION

I declare that the work in this Dissertation entitled, Transformation in Hausa Traditional Residential Architecture: Case Study of Some Selected Parts of Kano Metropolis between 1950 and 2005 has been performed by me in the department of architecture, under the supervision of Prof. Schwerdtferger, F.W. and Dr, Popoola, J.O., of the department of architecture ABU Zaria, The information derived from the literature has been duly acknowledged in the text and a list of references provided, No part of this dissertation was previously presented for an award of degree or diploma at any University.

_____ _____ _____

Name of Student **Signature** **Date**

CERTIFICATION

This dissertation, entitled Transformation in Hausa Traditional Residential Architecture: Case Study of Some Selected Parts of Kano Metropolis between 1950 and 2005, by Kabir Gali Umar, meets the regulation governing the award of the degree of Doctor of Philosophy (Ph.D) in Architecture of Ahmadu Bello University Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

To my Parents, Students, Lecturers and all the patriotic Nigerians.

ABSTRACT

Housing has to satisfy both the initial human shelter need and the additional needs as they arise. Such additional needs may be as a result of changes in the original need; changes in economic status, socio-cultural needs, spatial needs or just the addition of new needs, as well as the availability or affordability of building materials. The change in needs serves as the genesis of all forms of spatial transformation in buildings.

In the light of the above, this study deals with five contemporary categories of Traditional residential housing, in design and construction of Hausa traditional residential buildings in some selected parts of Kano metropolis

The essence of this study is to explore the transformations patterns of Hausa traditional residential architecture in terms of concept, geometric form, building materials, and factors or reason behind such transformations and their impact.

Appropriate methodologies were used for the study of the Hausa domestic architecture as exemplified in the old city of Kano the methodologies include use of Kano metropolitan map of 1963 in the selection of wards and sample houses, through a purposeful quota sampling system of relevant samples the traditional protocols were observed in conducting the field work, while in the process and analysis spatial characteristics were recorded in an attempt to appreciate the qualities of the physical environment at all levels. This is done mainly by observation, oral interviews with ward and compound heads. And administering research questionnaires the use of photographs and sketch drawings with research assistants were employed

Undoubtedly the study reveals that: traditional concept are being continuously modified and transformed by new ideas, imitations economic status, spatial needs, educational

awareness, new materials which arise as a result of innovation diffusion and emerging educational and technological advancement of the community in the metropolis.

The study reveals that Zaures have been transformed from series of rooms to "I"or:"L" shape lobbies, with introduction of guest rooms and toilets, living rooms etc and the sizes/volumes, and height of rooms are been transformed. The concept of privacy and accessibility seems to be diminishing due to the influence of modern day architecture. Traditional building materials and techniques such as mud walls, of 600-1000 mm thickness change to 150mm-225mm brick walls, azara, thatched roof to timber, and zinc/aluminum roof. Timber doors and windows are4 change with metal doors and windows, executed locally and skillfully by trained craftsmen.

Similarly, in the geometric form, the study reveals that, the shapes, and sizes, which were irregular as an ill-conceived design produced by the degree of the construction know-how of the traditional builders, are currently taking regular geometric shapes and sizes.

The leading findings of the study reveals that; the contemporary prototype could not satisfy the house hold social relation and cultural values. And the research equally reveals that spatial organization in a typical Hausa man's house as a domestic unit within the compound houses is been replace with a single unit houses, and changes these (Transformation) are mostly due to factors like inheritance and economic status.

The study understand that socio-cultural values have been neglected in the design and production of contemporary buildings, particularly by omission, in the concepts of courtyard systems and zoning concepts in traditional Hausa compound. This signifies the tendency of total the loss of concepts and materials and methods in Hausa traditional residential architecture.

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CHAPTER ONE

GENERAL INTRODUCTION

1.00 INTRODUCTION

The traditional Hausa residential houses in the walled city of Kano and its environ, have in the last five decades, experienced some external influences which induced changes, and such changes can be seen in its traditional housing typology, socio-cultural practices as well as the overall urban built environments. The external influences include, the trans-Saharan trade within the African sub-region, contacts with Arab states, the impact of British colonization with the introduction of western education, public administration and the introduction of new or modern building materials; and in addition, the internal contact with people from various parts of Nigeria also facilitated these changes.

These contacts have profound and significant effects on the metropolitan man's socio-cultural and economic relationships, housing spatial pattern, materials and methods of construction, subsequently, the process gained momentum and reached its peak between the middle of 1970s, and the early 1980s, up to late 1990s. The rapid increase in the number of indigenes with western education, as well as the contact with other societies and the diffusion of innovation significantly encouraged the experimentation of the alien spatial concepts transformed into the present day contemporary house forms, and the materials conceived along with Western model. This trend continued beyond the end of the 20^{th} century, hence transforming the overall built environment of Kano metropolis and its building developments into what is termed "Contemporary Hausa Residential Building Typologies".

According to Umar (1997:18), Domestic architecture has long been the concern of geographers who relate human habitation to geographical and technological perspective factors. Anthropologists (Morgan 1881; Durkheim and Mauss 1902; Leroi-Gourhan 1945) were the first to point out how important local architecture, most especially in its houses, is to

the understanding of any civilization. This is why when African indigenous architecture was first given attention; it was in the context of the habitations of the subjects of anthropological studies by anthropologists, who were well aware of the importance of local architecture as, "an index to the structure of the family occupying it" Forte (1949:50), rather than by architects. Umar (1997)

However, it was as a result of this shift that in the 1970s African indigenous architecture, which until then was not regarded as worthy of serious study, began to attract academic attention. Even though other forms of African art, especially sculpture had for long been the subjects of serious studies. That African indigenous architecture was academically shunned, could be explained by theoretical, expedient and preferential reasons Prussin (1969-1995). First there is the problem of definition Ladd (1973:417). What is architecture? The dominant paradigm defined architecture in terms of the permanence, monumentality and originality, even though only a minute proportion of the built environment fits this definition in any epoch and milieu, modern or ancient Rapoport (1969), Pensvener (1976), Oliver (1987), Umar (1997).

When African indigenous architecture first began to be looked at academically other than from purely anthropological views, it tended to be by geographers. That is in the light of with solutions to physical factors, namely climate, topography, construction materials and the level of technology. The results were wide ranging surveys leading to generalizations and oversimplifications on indigenous architecture's multi-various nature and characteristics, despite the rich diversity of cultures even within such a small area of Africa like the political entity called Nigeria.

Similarly, Popoola(1984) asserts that, one can also appreciate the fact that the term "Gida" in its geometric form simply means a house but it also means a home, a building, family, household, place, facility, portion, a shelter, and a settlement to many people. A one room

house is more than a castle. It is a mans wealth and status, as well as the embodiment of his aspiration, which entails all that is necessary for the establishment and sustenance of his way of life. To him a person's wealth and status prevails when he has a definite house, of his own. Additionally, a person who lacks a definite association with a Gida also lacks a culture, as perceived by the occupants of contemporary buildings (contemporary archetype).

One of the first works and by far the most influential to make a strong case for the serious study of the non-pedigree, non-Western architecture and environment is the now classic work of Amos Rapoport (1969) House Form and Culture. The basic argument of this work is the agreement that there is a link between behaviour in specific terms or culture in general terms and the built form of a given milieu. Rapoport was able to demonstrate the inadequacy of the then current theories of the form of the built environment, from climatic determinism through material/technological explanations to theories of social factors, like defence and economics, and concluded that, "house form is not simply the result of physical forces or any single causal factor, but is the consequence of a whole range of socio-cultural factors, seen in their broadest terms" Umar (1997:20).

Hausa architecture however, has been recognized as a unique in many respects; its construction techniques, Daldy (1945), Moody (1967), Moughtin (1985), its wall decoration, Kirk Green (1964), and its architectural elements Prussin (1976 & 1986). However, in the true tradition of the dominant paradigm, the architecture of the Hausas under study is in the form of palaces, mosques, Dmowchowsky (1990), and a few houses of the affluent merchants and administrators, Foyle (1951 & 1952). But the bulk of the Hausa built environment is, and for long has been, composed of ordinary domestic houses that accommodate the citizens of its cities and hamlets.

This work aims to study the transformation in Hausa residential architecture. It will specifically be concerned with Hausa domestic architecture as found in the older parts of a

major Hausa urban centre; the walled city of Kano. This needs some elaboration. Today, like every major city in Africa and elsewhere in the so called "third world", the Kano built environment is composed of several forms of architecture.

Umar (1997) notes that, one could say with little fear of contradiction that the ordinary houses of the Hausas have not been studied in depth. For this, little can be said about their architectural layouts, much less on their socio-cultural dispositions. One would find it hard to make any definite statement about, for example, the generic and the differential forms of actual houses, as opposed to prototypes. Again not much is said about the way real Hausa houses are lived, perceived and related to by the inhabitants,

However, past researches revealed that Historical transformation or changes in concept and styles dates back to the renaissance period in mid 18th century, when architects questioned the 'classical cannons of Vitruvious'. By 1747, there was a split between engineering and architecture in Paris. This was considered as a decentralized mode of cultural resistance which was referred to as "regionalism". Between 1750 and 1990 there was a sudden increase in man's capacity to exercise control over nature. This awareness gave birth to new classical styles, which was recorded as part of the 'cultural and territorial transformation'.

However, international quest for discovery of new facts and materials has always been in existence, as it was evident in the cultural, territorial and technical transformation which metamorphosed into what was then termed "Modern Architecture" at the Bauhaus (1919-1932). This trend set researchers in 'motion' in search of new ideas. Such notable architects include: Walter Gropious (1887-1931), Frank Lloyd Wright (1867-1959). Louis Sullivan, (1886-1895). Hasan Fathy of Egypt. (1920-1980).

Other, notable architects who contributed their styles, ideas to changes in concepts and materials include "Le-Corbusier" who employed stone, wood and concrete in construction Pessac state bordeaox (1926), and Mies Vander Rohe, with his "German Pavilion" in

Barcelona (1929), All these trends led to the fact that the prime architectural symbol is no longer the dense brick and block, but the open box style where skeleton construction is enveloped only by a protective screen. Ejisun & Olaniyi (2003).

Dmowchowsky (1991) asserts that; Architecture is more than the totality of the transformation; man effects on his physical environment. Transformation may take place during a certain period, which goes against the common grain of culture, lifestyle, or the natural evolving environment.

According to Fike (1973), major colonial policies regarding the urban form, were put in place, i.e. the road network, drainage system, electricity and water networks, and all the important public buildings.

The first works that deal specifically with domestic architecture, are the two seminal works of Foyle (1951 & 1952). In the true tradition of the concept of architecture it deals with the house of a rich merchant in the Kofar Mata ward of the walled city and, the official residences of the colonial British residents and the district officer in Kano, respectively. Aside from the fact that these were by no means typical houses as found in the city of Kano, the works are mainly descriptive and technical, and lack any social content. In his later work Foyle (1959), deals with the general architecture of the region rather than domestic houses despite urgent pleas by some of the users of the houses, Mussom (1952:226-268).

Schwerdtferger (1971 & 1982), focuses on Zaria, one of the major Hausa cities in Nigeria. His works as far as this researcher is concerned, are the first and perhaps the only works to deal with Hausa domestic architecture in any greater depth. In general he is concerned with housing in all its aspects from production through perpetuation to reproduction. Specifically, he traces changes in domestic house form as a result of changes overtime, in family group composition on one hand, and domestic house construction and concludes that the ability of family group to choose and alter house form to suit their needs is contingent upon the

prevailing socio-economic forces well beyond the control of the family group, Umar (1997, 27).

“Prussin” (1968-70’s, 80’s, 1990) in several works stretching over two decades, extensively surveys the architecture of the region, in it’s various aspects, from its history, through its construction techniques to its socio-cultural basis. In its basic premises Prussin's treatment of her subject matter is extensive and varied rather than specific and focused. Consequently domestic architecture is discussed but passively.

“Prussin's” works lie in some of her assumptions which contradict certain socio-historical facts. A good example is in her treatment of the origin and development of what she terms Fulani-Hausa architecture, which itself is a misnomer Usman (1973). Prussin (1976;14 & 1986:200) accepts that the form of this architecture is unique in the whole of Africa and even acknowledges the Hausa builders as skilled earth workers who, "were indeed instrumental in the development of this architectural form. However, Prussin (1986-226) proposes that the origin of this form of architecture lies in the nomadic 'Fulbe building tradition'. Prussin (1986:206), another misnomer. Prussin's (1976:16) explanation is that the Fulanis, a nomadic people, initiated a revolution which led to the conquest of the Hausas, a sedentary agricultural people, and adapted their tent form for the earth walls of the Hausas.

Umar (1994) reported that: Clapperson, who visited Kano the seat of government in 1826, writes on the residence of the King as having, "several towers three or four stories high with windows in the European style but with glass or framework".Clapperson (1926:253). The German traveler Henrich Barith who visited Kano in 1851 left a vivid description of the architectural details of the King’s reception hall with its huge arches and magnificent ceiling Barth (1965). Another German “Paul Staudinger” made a similar observation in 1885, Moody (1967, 14), To accept Prussin's theory would be to accept that the “mat” frame form was transformed into the ‘baka’ form and, this was achieved by the nomadic Fulanis over a period

of less than a generation of the subjugation of the sedentary Hausas, while this is not entirely impossible, it is highly improbable, Umar (1997; 29).

The work of Moughtin on Hausa architecture (1984) is broad based, incorporating planning, construction and decoration. Here again his aim is to "determine those elements of urban structure which seem to be of more lasting importance… than the transitory beauty of architectural fashion". The work is more like an introduction to Hausa architecture rather than a detailed study of it or an aspect of it. As a planner naturally, his biggest contribution is in tracing the development of the Hausa settlement and in its attempt to trace the origin and development of this architecture, but the ideas presented are mere assumption unsubstantiated by historical facts. The penultimate chapter of the book, titled 'Architectural derivatives' is more speculative than factual. Statements are made without substantiating evidence. For instance it surmises that, "new ideas from outside (Hausaland) introduced from time to time" are responsible for the final form of Hausa architecture. Also, the mud wall though developed in the West Africa Sudan, "is more likely to have been imported from more advanced cultures" Umar (1997 30).

Perhaps the most accurate and, the most detailed work on Hausa architecture to date, is the work of Sa'ad (1981). In his dissertation, his presentation and treatment of the subject matter makes a unique contribution to the study of Hausa architecture. Sa'ad's main thrust is to understand the role of the individual creativity of the master builder of Hausaland in the origin and development of their architecture. He is able to demonstrate not only how the character of the master builder differ, but his work is also full of details on some important aspects of architecture that have implicit bearing on the study of domestic architecture.

Hill's (1966) work surveyes a suburban Kano settlement. As a sociologist Hill was more concerned with social institutions, problems and solutions, hence all the information on domestic life is discussed in this light rather than in architectural terms or details. Moreover,

the settlement in question even though close to the city, is more rural than urban. For this reason the findings of the work would be much more useful for comparative purposes rather than for the study of a Hausa urban milieu. Yet, a lot could be gleaned in terms of kinship, economic activities and social status, all of which are important aspects of domestic family life.

Denyer's work (1978), is another survey that covers the whole of Africa like the work of Hill discussed above. It seeks to establish the characteristics of building types, and taxonomy of building forms using historical and geographical perspectives. The work is extensive and full of generalizations, even though she testifies that, "one of the most frequent sources of error on questions of African architecture is the tendency to generalize from a very narrow base of experience. Theoretically it has nothing much new to its credit. The little research on Hausa architecture does not say much on its domestic houses.

Umar (1997), states that Frishman (1977), deals with the spatial growth of the Kano metropolis. His aim is to study the form and structure of the Kano spatial distribution in order to find, "the general principles guiding the distribution of activities and the relationship between their relevant variables" and the factors that influence their locations. He is able to identify the spatial characteristics of the city as well as trace its growth and development over a period of almost a thousand years; from the inception of the first indigenous kingdom to the end of 1973. Frishman concludes that the form and structure of the Kano urban area, "does not exactly resemble any of the patterns found in the urban areas of Europe and America. Overall he is successful in demonstrating the strong socio-cultural factors responsible for the urban form of the city.

Other works that directly deals with “Hausa architecture” and spatial culture, are the works of “Trevallion” (1966) Hull (1977) Frihsman (1977) and Nasti (1992) These works are concerned with planning, sociological, geographical and spatial growth in relation to the

economy. Oliver (1971) presents collection of essays by architects, planners and environmental experts on indigenous African Architecture, including the seminal work of Schwerdtferger on Housing in Zaria (1971).

Popoola (1984) states that, (Responsive Housing) spatial formation of the housing environment in Hausa land case study of Katsina Traditional Housing; he provides that the housing process did not try to meet all the anticipated users demand at once, prior to occupation instead the people were constantly building and rebuilding, maintaining, modifying, changing and building again (transformation) in an attempt to reflect the constantly changing social structure, in terms of family size and composition; hence the process encourages the development of the spatial organization and transformation of the house based on the immediate needs of the inhabitants. He also highlights the conceptual framework of housing environment and reveals that, the spatial morphology or organization of traditional houses is a reflection of the domestic unit within the gidaje (houses).

Similarly, the growth process in the spatial formation is reflected in the cultural values of the inhabitants, that, is the user centered traditional housing processes and form making procedures aides the people in Katsina in their attempt to provide housing environment that reflects their needs, values and attitudes.

Haruna I. (1987) in his contribution, attempts to create more awareness of traditional form of Hausa traditional architecture for designers, and stimulates thinking towards the exploration of the richness of the tradition and the contradiction of the imported trend to the socio-cultural setting, as well as the social effects that emanate from the imported styles, vis-à-vis the protection by the traditional styles.

Another work, worth mentioning is that of Trevor (1993) a researcher from Montreal University, Canada, who studied “Hausa Traditional Architecture” (case study of Zaria township). Umar (1997), studied the “Socio-Cultural Morphology” of Hausa Living Spaces

using Syntax method. He notes that; the house has four transformational stages of growth which we may be termed the minimal, prevalent in the mature and the optimum stages.

i. The minimum stage contains – daki, zaure, tsakargida and bandaki (kitchen) room, foyer, courtyard and toilet respectively.

ii. Prevalent stage – house expands to contain dakin girki (kitchen) rumfa and daki (two more rooms) possibly a second zaure.

iii. Mature stage – the house grows and is re-configured to include more family room and kofar gida (outer yard) one other toilet etc., possibly a turaka (private area for maigida).

iv. Optimum stage – the house grows to include upper storey with one or two room suites, as the case may be. It should particularly be noted that the stages are not uni-directoral in other word; it is possible to find a case where a house grows from the minimal to the optimal stage.

Similarly, this dissertation studies the transformation in Hausa traditional residential architecture of Kano metropolis (1950-2005), and observes that the spatial organization, as noted in the theoretical part, is not simply the spatial form or the structure but also, and very important too, the function each of the spaces performs in terms of human behaviour or human activity patterns

Popoola (1984) similarly, narrates that a historical approach to house form and structure often gives an impression of "changes transformation from primitive to vernacular and then to modern", as if every house form in every culture has to go through a four stage chronological time span. The Hausa house form structure has been developed by the people over a period of time in an attempt to solve some of their environmental problems; and to satisfy the basic needs which are still visible, the traditional housing process should provide the starting point in any attempt to develop new housing area for the people and thereby satisfy their needs and

values, especially the socio-cultural values of the people.

Additionally, it was noted that, in the early 80s concern for the liberalization of the economy led to gradual downsizing of government involvement in aspects relating to provisions, maintenance and delivery of goods and services. particularly housing, on the other hand transformation was also promoted by the new paradigm of economic reconstruction by the World Bank, on the basis of the argument that, public sector is inefficient in management of resources for public housing, and cannot do well in production and distribution, while the "private sector" is worth performing better particularly in distribution and management Ahmed (2005).

Generally, Nigerian traditional architectural styles, are similar in many ways, reflecting the different cultures and tradition of the people, as well as the climatic conditions. This diversity in architectural styles ranges from Hausa traditional earth architecture in the North to the traditional wattle and dub walls, and thatch roof houses of the South, as well as the 18^{th} century royal houses or palaces in the southern parts of Nigeria.

It is noted that; as far as the study of the history of Hausa traditional architecture is concerned, quite a number of difficulties still exist, especially, in assessing the transformation of architecture or building of a community, This is because sufficient information is still lacking in certain vital areas, as well as some of their basic institutions, a situation which persisted as a result of the absence of written materials or drawings which has to be replaced by the rich oral tradition of the people.

Furthermore, the study seeks to identify what entails Hausa traditional residential architecture in the sample houses surveyed during the initial years of construction changes and development after some years and the reasons behind such changes or transformation in the housing plan or layout, its geometric form and sizes, related to initial mud building material and subsequent increase or change, due to family increase or other social or natural factors,

and the overall spatial morphology of the sample houses and what influences the phenomena to the present traditional house form of Contemporary Hausa Residential Buildings. To be able to achieve this, one has to consider in broad term the historical and social aspects of the origin and tradition of Hausa people, the spatial concept and morphology of their domestic houses, the existing inter social relationships or nature of the family kinship, through the literature review. Furthermore, what other factors, such as innovation, diffusion, education introduction of new materials interaction and contacts with other people or parts of the country increase in population and other socio economic and environmental conflicts, have on traditional residential architectures and its settlements.

A very enthusiastic statement by a strong believer in the past glories of Kano old city, said that Kano old city is a center of commerce, a citadel of humanity, peace and embodiment of organized society, Umar (1997). However, as literary sources on Kano traditional architecture are scarce the bulk of the researcher's inquiry is carried out on the basis of physically surveyed buildings and administration of questionnaires or interviews in the fields work form the basis of data collection.

The study observes the need for the preservation and documentation of Kano traditional residential buildings for the education and appreciation of the future generation and hence saving the local tenant and materials from foreign assimilation for the people, society, and the nation at large.

The prospects of this research will however, be to provide the basic frame work for future research on documentation on Hausa traditional architecture and also highlight how contemporary architecture and materials have influenced the concepts of geometric forms, materials and construction methods as well as entirely changing the pattern of lifestyles in the traditional compounds and settlement resulting in several alternation and modification of building.

The study seeks to highlights the basis and stages for the significant transformation that occurred within the period (1950-2005) in various sampled Hausa traditional residential architecture, in which was discovered to be due to economic, inheritance educational awareness, interaction or innovation diffusion with other socio-cultural groups from other parts of Nigeria, neighboring countries and also with the introduction of modern materials and design as a result of British colonial contacts.

Similarly, it is noted that, during, the economic boom of the groundnut era of the 1920s and the oil boom era in the 1970s, Kano like most of the nation's urban centers, witnessed tremendous spatial expansions, Frifsman (1977), & Main (1988). There were new layouts as a result of economic prosperity. Naturally these developments changed the pattern of urban fabric. By 1985 the great era of urban expansion and reconstruction such as Naibawa, Rijiyar Zaki, Yankaba, Kurna, Kabuga Layout. were fully developed. This represents the contemporary Kano urban environment, Umar (1977). Perhaps such areas delineated contain the main samples of Contemporary Hausa Residential Building which this study focuses on.

1.01 Statement of Problem

The essence of the study is on the transformation from the Hausa traditional residential building to the current contemporary Hausa residential buildings with changes in planning concepts, building materials and construction methods. these changes may be advanced to economic factor, inheritance education, contacts , marriage and other environmental factors, the changes has however; affects the users or owners in both positive and negative aspect, in such that has improved the planning standards concept, The use of new materials and construction techniques; similarly it has strained or disintegrated the family kinships groups and social cultural relationships in family compound.

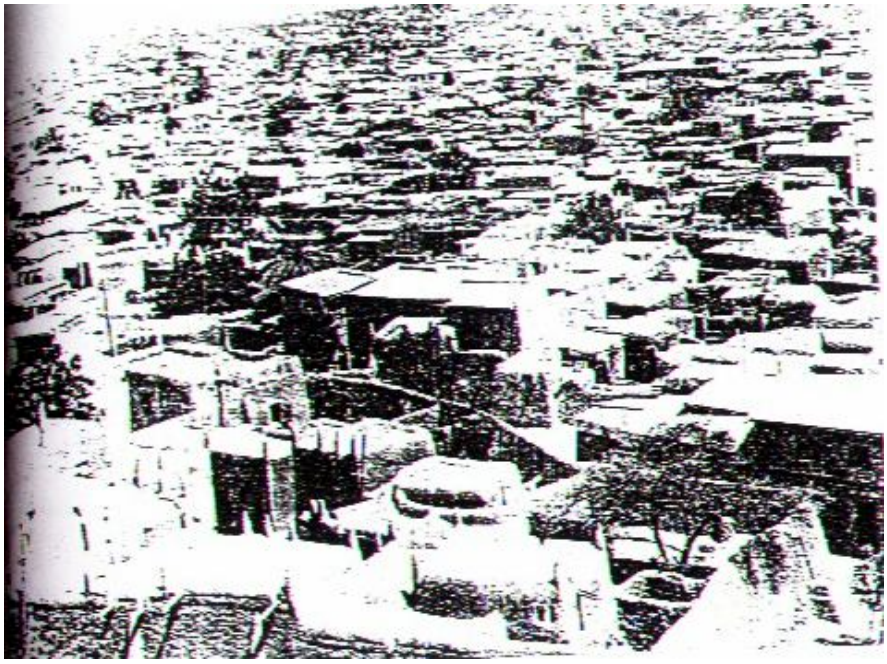
Hausa "Traditional residential" houses which provide shelter for the overwhelming majority of the urban population in Hausa land, Schwerdtferger (1982) reveals that: such houses are in

the process of undergoing continuous modification and transformation (in planning, geometry, and building materials). Transformed by spatial needs, new design concept economic status, educational awareness, new materials and emerging technological advancement in the construction industry, similarly, quite a number of few people decided to synthesize the aspect of modern building practice with traditional architecture, they use modern materials to create traditional forms, to cherish the dignity of traditional architecture Sa'ad (1986). This reflects the present (Contemporary houses), which this dissertation attempts to study as follows:

1. The concepts of zoning is diminishing and taking various interpretation in design and function.
2. Geometry of room shapes and size, which were irregular and ill conceived by the builder are presently taking regular and uniform geometry.
3. Thicker ‘mud walls’ to ‘thinner brick’ walls, Azara and thatch roof, to timber and aluminium roofing sheets, doors and windows to metal components etc executed by locally and skillfully trained craftsmen, “Dabe” mud floor finish to cement screed finishing.
4. Other transformation includes from series of Zaures (Foyer) to a simple (1) or (L) shape entrance lobbies.

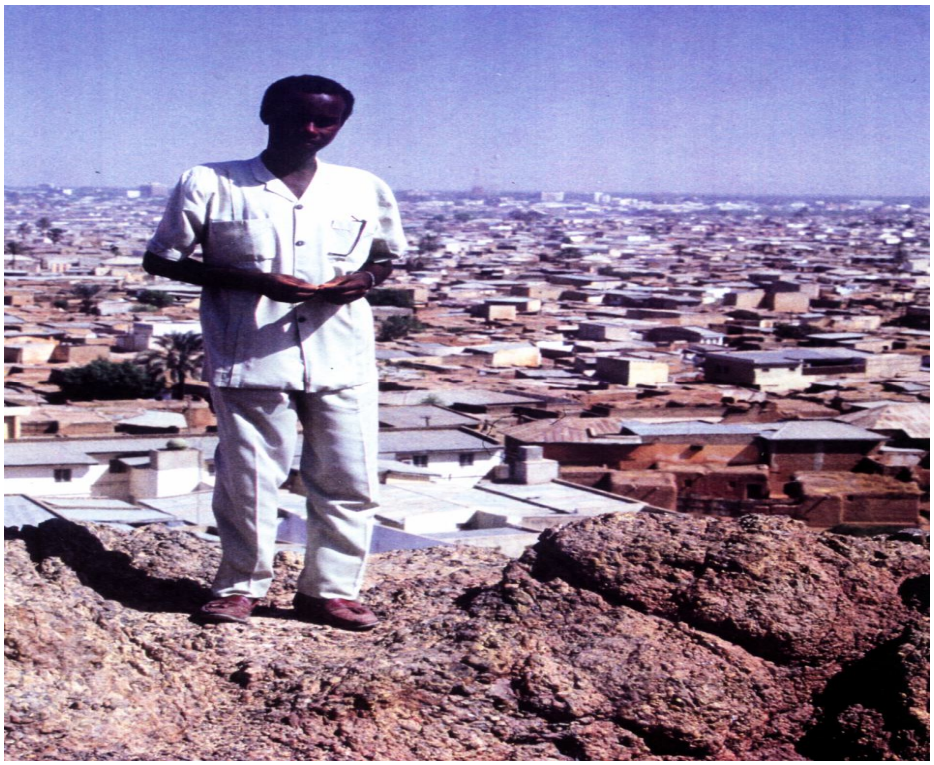
The use of modern building materials such as concrete or cement bricks, zinc roof materials etc in foundation; wall; roof, opening and finishing in place of traditional materials. Plate 1.01 A-D and 1.02 A-D, displays the distinct physical transformation in Kano Metropolitan environment, photographs by Susan Denyer 1960, and field work 2005.

Plate 1.01 (A) Kano-Old City (Around 1960) by S. Denyer



Source: Susan Denyer 1960

Plate 1.01 (B) Kano-Old City around 2005 by Researcher



Source: field work 2005

Plate 1.01 (C)(WESTERN VIEW) FROM DALA HILL



Source: field work 2005

Plate 1.01(D) SOUTH WEST VIEW



Source: field work 2005

Plate 1.02 Kano old city around 2005

(A) DALA HILL FROM GORON DUTSE HILL



(B)DALA QUARTERS KANO



Source: field work 2005

(C) (EASTERN VIEW) FROM DALA HILL



(C) (NORTH EAST) VIEW



Source: field work 2005

1.02 AIM AND OBJECTIVES

The aim of the research is to identify the various transformations in Hausa Traditional residential architecture, from 1950 to 2005 in Kano metropolis and investigate reasons for the transformation and to document, the processes of the stages of transformation over the given the period.

Similarly the research is to determine the extent to which these factors are responsible for such transformation, and the impact of family kinship and socio-cultural relationships in the Hausa family cultural setting.

OBJECTIVES

The specific objectives of this research are:

1. To conduct empirical study of the contemporary Hausa Residential building process in Kano metropolis, analyze and evaluate the traditional residential buildings from 1950-2005 through existing literature reviews using relevant and suitable documents
2. To Carryout fields work in some selected traditional residential areas in Kano Metropolis and to document on the present day existing traditional domestic houses an update design in concept and modification.
3. To identify reasons for changes or transformation in the traditional family compounds, ranging from wealth, economic status, death and inheritance, space requirement, educational awareness, and the influence, of Modern/Western style of architecture.
4. To identify stages of transformation ranging from 5-10-20 years in concept and building materials, and establishes a basis for the alteration or modification of the residential design.
5. To Assess the relationship between old “traditional residential” houses and

modern, or contemporary traditional residential houses otherwise known as Contemporary.

6. To Identify differences between traditional 'mud-house' and 'modern brick' houses (if any) in terms of cost of materials and construction strength and durability, construction and maintenance period, thermal comfort, as well as functionality and convenience etc.

7. The study seeks to Provide reliable information from analyzed data for the future that would assist in up dating Hausa traditional architecture; design, concepts materials and construction method of contemporary types.

The study seeks to explore and document the gradual or current transformation of the Hausa traditional residential architecture in stages, and periods, which they occur and to also look at the various design and construction materials. It will also attempt to establish the validity or otherwise of the reason for changes in Hausa Traditional residential architecture as investigated by previous researchers. The research also aims to understand the present role of traditional craftsmen, such as mason, carpenters, metal fabricators etc. and investigate proceeds of skill acquisition to suit modern times, with a specific focus on the present Contemporary Hausa Residential Building typologies from 1950-2005 within Kano metropolitan.

1.03 RESEARCH QUESTION

Adetoro(1986) citing Kerlinger (1973) states that; a problem is not a question, which is not directly testable. What is testable is the hypothesis that is generally deduced from the research question. This study has attempted to test and to prove, the assertion or confirmation made in attacking the problem in order to achieve this, all the possible testable information are examined.

It should be noted that the research problem is about transformation in "Hausa Residential

Architecture" and the factors responsible for such transformation and the degree in which the users and owner's socio-cultural values have been affected or neglected in their housing environment.

The study assumes that large compound residential houses and nuclear (smaller) residential houses have been transformed in the concept of geometric form materials and construction techniques, hence the changes or transformation are advanced or linked largely to contracts inheritance, wealth new material status education, innovation, diffusion, as well as natural or environmental factors to the extent that it evolves, develops and functions in the present contemporary archetype, or building topology.

The research questions are:

a) What are the factors responsible for the transformation?

b) To what extent are the users socio-cultural values effected

c) What are the stages of the transformation?

d) To what extent and stages do the transformation in the traditional housing environment occurs?

e) Does it reflect the need and socio-cultural values of its inhabitants those who occupies different categories of contemporary Housing Settlements.

f) If the study reveals the degree at which the changes or transformation relates to; inheritance, wealth etc., and to modern building materials, an attempt will be made to suggest that in the next 10-20 years from the findings that less than 10% of Hausa man's house will be left and larger number of traditional housing **(Contemporary Archetype)** will minimally hardly reflect the socio-cultural values of the owners or users.

The study attempts the following investigations:-

1. Occupants Source of ownership

2. Circumstances that led to the demolition and rebuilding.
3. What are previous building materials, form and concepts?
4. Present concept, room sizes and shapes and building materials.
5. What are the present changes in Zaure or sizes of rooms, courtyards?
6. Number of occupants per room and household.
7. Current/present geometry form, planning, materials and evaluation treatment.

Why for instance, abandoning traditional methods and concepts for new materials and forms, and materials known as contemporary. The study attempts to establish reasons for changes/transformation as predicted in the research problem and documents same on the present residential houses, and advantages of contemporary buildings of residential houses in terms of cost, durability, and comfortability.

1.04 THEORETICAL FRAMEWORK

Characteristics of Typical Hausa residential Houses

According to Sa'ad (1986)The basic component delineated from the analysis to come up with a design of a house that would meet the approval of Hausa man is to fulfill two basic pre-conditions, firstly –House accommodates a single family to a large family. For instance (Big House) almost invariably these families have agnatic relation.

Secondly, the house has to be conceptually sub-divided into Cikin Gida, (Inner core) "tsakar gida (central core) and waje (outer core). The house has to be flexible, enough to meet the spatial requirements of a family whose size is traditionally never static.

Other features include, thicker walls, smaller openings, with external finishing in mud Makuba with engraving design and Zanko or Kashin Magani at the top of the building beautifully expressing the aesthetics of "Hausa Architecture" **Sa'ad (1986),** this is a characteristic of a typical Hausa house in both rural and urban environment **Umar (1997, 251).**

The theoretical stance of this study is that, strong relationship exists between spatial transformation (analyzed, variables, i.e. geometric shape, and form, planning concept building materials and construction method) and socio-economic factors (analyzed variables, i.e. income, inheritance, Western education, marriage, lack of space and new materials) to the extent that the magnitude of transformation in Hausa traditional architecture is as a result of the Socio-cultural, economic and educational dynamism of the society. At the same time it is possible that the different ethnic and occupational group may well adopt an archetype, termed **(contemporary**) Kano Archetype.

The study may lead to the design of a house a contemporary house and materials. And formulate design theory and data on average geometric sizes, form, scale, and proportion, materials and standard form of construction of Hausa traditional residential architecture as successfully achieved by Paladin in 18^{th} century architecture and Hassan Fathy of Egypt in the 20^{th} Century architecture.

1.5 METHOD OF STUDY

To determine the extent of the contacts and the innovations, brought by it, and the diffusion (sub-division due to inheritance, wealth, education, natural or environmental factor) it influenced, the transformation of house forms in Hausa traditional residential architecture, in terms of planning concept, geometric form, building material, and construction techniques, and how it evolved, developed and functioned in stages and period in the process of the transformation to contemporary archetype, the past needs to be known, understood and evaluated through the literature review of past researches. This is necessary for the evaluation of the transformation in Hausa traditional residential architecture which are attributed to or advanced to the several factors earlier stated.

The initial concept, geometric form, number of rooms, materials used and construction, the family size or occupants will first be considered in both large family compound and nuclear

family houses

Then, the subsequent changes (transformation) spatial formation In 1-5-10 year period in 2 (two) or more stages in family size, number of rooms, material use vis-à-vis then the reason for such changes as well as the social effect on the house hold, related to the social physical and economic structure will follow.

Having considered the various aspects of both the dependant and independent variables, analysis and comparison will be made in order to highlight the differences in form, material, and construction as already mentioned other factors which have no doubt influenced the transformation will be discussed in subsequent pages of data presentation. Although these factors were not initially within the scope of this investigation, they are vital parts which occurred and would render this study incomplete if they are not taken into consideration, while carrying out this study several problems were encountered, among which were the problems of inadequate information due to lack of written records of sketch drawing of the sample houses, Thus it was necessary to design a comprehensive questionnaire, this helped to obtain the information for analysis.

The research was designed to survey 1010 sample houses out of 53 wards; in eight metropolitan local governments covering a period of 12 weeks. The first two (2) weeks, are used for reconnaissance survey of the relevant sample wards, and extending traditional protocol towards heads, compound heads etc. eight weeks for field work while, the last two (2) weeks were used for the compilation of data information for analysis and comparison, the first plot survey was conducted using a purposeful; quota sampling and using personally administrative questionnaire, with the help of forty(40) research assistants through out the exercise.

Sample houses were identified, (mostly large compound house of rich merchants, learned peoples, ward head, compound) etc. documented by means of drawing plans and elevation as well as photographs. See details in the chapter five.

1.06 PROCESS OF TRANSFORMATION

Popoola (1984) reveals that, change by transformation in traditional residential household from the sample group shows the basic characteristics of the house spatial transformation in the traditional housing areas. Attempt is made to divide the transformation into simple step. It should be remembered that there could be variations in terms of details as to the formation process of each Gida, the parents build house for the eldest son.

It is an obligation or tradition for each father to make provision, at least a simple room/parlor, for a son that is going to get married. Since the wife normally moves to the husband's house it is necessary for the husband to have a Gida or a portion of it where he stays with his wife.

In a situation of sufficient land, a father is expected to construct an apartment for his son who is married. The Gida might have the perimeter wall, one Zaure and one Daki (room). The land used in this case would be part of the "family land" around the father's house. Similarly when land subdivision or transformation continues for some generation it gets to a saturation point when it can no longer be subdivided, that is it reaches its optimal stage.

The death process of house spatial formation is, when a house reaches the mature stage of the growth cycle in its spatial formation. It can break up into units to start the cycle again, but when the owner of the family units fails to occupy his unit' that unit goes through a death process it is clear that a Gida could go through a death process when, either due to the death of the owner or due to a long absence from home, the house is left empty for a considerably long period of time. Soon the roofs of the house would cave-in and later the walls would collapse due to lack of yearly maintenance normally carried out in occupied units. After some years the building would be reduced to heaps of soil.

Popoola (1984) asserts that; one may conclude that in traditional housing areas, the spatial organization of the house, at any point in time, reflects the family composition within it since the family structure is reflected in the spatial organisation of the house One may also

conclude that the spatial formation of the house goes through a growth and a death process. The growth cycle moves from the youthful stage of the nuclear family to the middle stage of the composite family unit and then to the mature stage of the collateral agnate before the units break up to start the growth cycle again. The spatial formation of the house may go through a death process when the unit is left unoccupied for a long period. The buildings collapses leaving heaps of soil. Such a dead house can however, be revived when the children of the last owner occupy the site by inheritance, and transforms it to suit their need; in space, material and time.

It is therefore clear, that the contemporary traditional house of Kano metropolis and spatial formation of the contemporary is a clear reflection of the family structure and the size and it determines the limits of spatial organization.

The study reveals that in the Contemporary Hausa residential building the users are therefore the principal actors in the design and construction of traditional building and each family is not necessarily in full control of the shaping and reshaping process, but However; the traditional builder and craftsmen aid in the design and construction of the housing unit. Their role is however not only limited to constructing the structures to meet the expressed needs and values of the users, but to build within the available land and limited resources of the owner. The ease with which the Gida (house) is shaped and reshaped can be attributed to both the nature of the building materials and the progressive development procedure.

1.07 SCOPE AND DELIMITATION

Twentieth century, Hausa residential building consists of both homogenous and heterogeneous materials which could be classified in three typologies:

a) Purely traditional b) purely modern c) Contemporary type.

The scope for the study is within the practice of Hausa traditional residential architecture as specified in Kano metropolitan area, in terms of design concepts, building materials, and

construction methods. However, particular attention will be given to category (c) that constitutes majority of the sample of the Contemporary Hausa Residential Building aspects specified for the study to be examined including buildings re-built in new designs, and new materials in new forms, due to the specific reason.

The study is limited to Hausa traditional residential buildings transformed by new designs and materials in Kano metropolitan area and focuses specifically on houses of heterogeneous character in building materials (mud/bricks) that have undergone partial or complete transformation.

Although the findings of this study may be used to generalize the changes or transformation in Hausa traditional residential architecture, the research will only review and document on the topic in the state and make appropriate recommendations for further researches on Hausa traditional residential architecture. Similarly, certain problems were encountered, but, did not limit the extent of the plan of action as enunciated in the field work proposal. Initial proposal for the strategies of protocol was from the emirate council to district heads down to ward heads and compound heads to survey individual houses, but it seemed too in efficient and time consuming such that it even extended the initial programme by one week. Interestingly enough we changed the strategy to (HOD works and HOD health) of the local governments then to the district heads, to ward heads down to compound heads, and a method we found to be efficient and very successful, by-passing the bureaucratic systems of the tradition. Where it is difficult to measure plot sizes and rooms of the houses surveyed we estimation method issued, that is, the dimension of rooms and other defined spaces were estimated. In some cases not all the household owners (Masugida) allowed their houses to be surveyed, let alone allow themselves to be interviewed. Luckily enough, their children listened and attended to us; being that they are educated to a certain level. Similarly, language and Communication problem was minimal due to the fact that all the research assistants were educated at least to

diploma level.

However, to check the efficiency of this method, houses were selected and measured first by estimation and then more accurately by using field tape. The predominant plot sizes and layouts of particular areas were compared and computed.

Furthermore, the research team experienced shortage of funds, lack of favourable response, particularly, by some ward heads and compound heads, in getting accessibility to some houses, coupled with excessive heat and fasting in the Ramadan month (Hijra 1426)

1.08 MOTIVATION OF THE STUDY

Motivation for this study, came from the review of previous researches and documentations in Hausa traditional residential architecture with its appreciation in high spirit as "William Morris", in 19th century states that historical traditional buildings represented the true conception of history and that "past is part of the present", and added that; it is not only important to define the "history of building", but also to return it to its original character. In other words, the architect should determine the possibility and the period of the greatest perfection of a building.

Similarly, Violet Deluxe, (1914). acknowledges; personal observation, interest and professional concern, as prime motivators personal, as a designer and a site supervisor, in redesign and the reconstruction works of several various traditional residential houses within Kano metropolitan area, as well as my interaction with craftsmen, such as, builders, carpenters, painters etc on the emerging new trends in design, construction and new materials of present day traditional modern houses (Contemporary) and the mode of acceptance of this type of residential houses motivated the study of the spatial

Similarly man's relationship with his physical setting, within the housing environment, is a one way relation in which man shapes or transforms the environment, Man as a constant and the shaped environment being a variable, The relationship is a two-way interactive process in

which each influences the other, housing whatever, its form, has to be related to context.

Additionally, the spatial growth of Kano follows a certain historical continuity such as the older units or wards of the city are likely to house the descendants of the more indigenous Kano people, some earlier studies of Kano Paden (1973, Perchonock (1976) seem to indicate this Umar (1994 p.88).

1.10 Definition of Terms

Hausa Architecture: means structures of buildings produced by traditional master mason of Hausa land in styles of building characteristics; processes and construction techniques involved and associated with the built environment in Hausa land.By **"Aesthetic"** means that, it is involves in the creation, appreciation of criticism of works of art or architecture in relation to other human activities and interest **Sa'ad (1981).**

"Traditional" refers to institutions, techniques, physical structures, customs practices norms, cultures of Hausa society that prevailed prior to colonial encounter.

"Modern" simply refers to concepts techniques, materials, approaches or attitudes in colonial or post-colonial Western styles in Hausa land/society.

"Contemporary" means domestic buildings in improved or modern concept and materials **Kabir (2005).**

COMMON TERM IN HAUSA TRADITIONAL BULDING

Kofar gari	City gate	Ganuwa/Badala	City wall
Kofar gida	Front elevation	Bayan gida	Rear/side elevation
Tsakar gida	Court yard	Kasuwa	Market square
Dandali	Town/waard square	Zaaaure/soro	Entrance toyer
Turaka/Shigafa	Master area	Cikin gida	Family area
Katanga	Compound fence	Makota	Neighbouring houses
Tungo/Haya	Acess way	Gidan sarki (fada)	Emirs palace
Gidan mutanda	Museum	Tit	Major road
Kotu (Layi)	Court	-	-
Gida	House	Makaranta	School
Kududdufi	Pond (water long area)	Garu/Bango	Wall internal/external
Taga	Window	Daki da ruma	Red room/pallor
Rufi	Roof dome flat	Kofa	Door
Dabe	Floor	Shafe/feenti	Plaster/painting
Ado/Zane	Decoration	Dagi	Northern knot
Kwatami	Waster water line/pitch	Lantarki	Electricity
Famfo	Tap water	Itache/katako	Wood
Farar kasa	White wash for painting	Makuba	Brown earth for finishing
Sura	Drawing	Bula/tukuba	Mud/native brick
Unguwa	Waard/area	Maigida	House hold head
k/Hukuma	Local government	Dan Boto	Peak in roof

1.10 DISSERTATION FORMAT

The dissertation is a result of the synthesis of field and literature materials, the field research was conducted in September and October 2005, and is presented in (three) major parts:

Part one (chapters 1-4) deals with preliminary contextual issues of the study in the general introduction, in it discusses upon theoretical issues the problem of the study, aims of the study, research questions, method of study, scope and limitation including overview of the approaches to the study in residential architecture, It also discusses upon theoretical issues, the problem of the study, aims and objectives of the study as well as anticipated results. It also deals with research settings, methodology, samples, research questions and the study area of Kano urban spatial characteristics, including an overview of the approaches to the study of transformation in its residential architecture this chapters, might be of interest to the readers to perceive quickly the overall concept of the study, it deals in depth with the presentation of the research methods and approaches, the first section present data on qualitative paradigms, quantitative paradigm and type of surveys sampling frames and description of methods of data collection and analysis, the from primitive architecture to regional context of architecture to the national level of Nigerian traditional architecture, down to Hausa traditional architecture, tailored down specifically to Kano metropolitan residential architecture, through literature reviews and other physical environmental parameters. These are narrated in subsequent chapters, it also discusses the scholarship of Hausa traditional architecture as revealed by previous researches.

Part two chapter 5-8of this study deals exclusively with study area the research finding and explanations (explananas and explanandums) thereof, of what is termed contemporary architecture; it also present a design theory and data for contemporary building, as well as the materials for such archetype, similarly it also highlights Contemporary Hausa Residential Building construction in brief, the final part delineates characteristics of Contemporary Hausa

Residential Building, as revealed by the analysis, in chapters VI, VII, and VIII. provides a theoretical framework of Contemporary Hausa Residential Building archetype, a speculation on the future trend of Hausa traditional architectures and the abstraction to guide design and researches on Kano residential architecture, in contemporary archetype. As well as the physical and historical characteristics of sample wards, the spatial formation of some sample houses. The next section presents data in a plan form of selected houses surveyed in terms of geometric form concept materials and stages of transformation as classified in categories A, B, C, D and E respectively.

Part three which is the final chapter, chapter nine presents the conclusion, summary and recommendation of the findings Additionally, three important aspects of contemporary archetype or architecture, are also highlighted, notably the planning concept, materials and construction, decorations and aesthetics, in the treatment of which traditional Hausa architecture seems to perish. The dissertation also attempts to propose a designed data and speculate the situation with regards to the future of traditional Hausa residential architecture. Finally completed with list list of references and appendices.

CHAPTER TWO

RESEARCH METHODOLOGY

2.01 Introduction

The desire to carryout a piece of architectural research implies that there is a subject or object to be studied, or there is a question to be answered, which invariably the research will at least attempt to provide an answer to a basic understanding of the subject in question of either simple or complex phenomena in one's environment. The first thing to understand should be the general concept of research methodology, followed by how to conduct a pilot study after selecting the problem area. Adetoro (1986) notes that, another essential aspect of the work is the preparation of an acceptable research proposal in order to produce a readable and logical final report. Perhaps, research design simply means: design of a strategy for finding out data or information. The study consists, basically of two major aspects: firstly, selection of a topic and a paradigm – the paradigm consist of both theories and methods, although they evolve and differ by discipline or field, Philip (1987). Secondly, precisely determine methods i.e. the best or efficient and reliable way to do it. The focus of the study which is the central concept of the subject to be examined may probably emerge through an extensive literature review, and suggestion from colleagues, research advisors or be developed through a practical experience.

Once the researcher is comfortable with the focus, the next decision involves distinguishing and selecting between qualitative and quantitative methods Both methods have roots in the 20^{th} century philosophical thinking, However, it is significant to understand and clarify the assumptions for which writers have contrasted them on several dimensions, such as follows: Guba and Lincon (1988), and Firestone (1987) Creswell (1994).

2.02 The Quantitative Method - consists of 'experiments' and 'field survey' of samples houses while the qualitative methods include, ethnographic studies, grounded theories, case studies and phenomena logical studies, Creswell (1994). Both paradigms and methods could be suitably used in Architectural Researches.

To achieve this and find a balance in the research concerning numerous and diverse information, it is necessary to establish a strategic approach which will help to construct a logical sequence of research on how to find out data for proper analysis of results, confirming their correctiveness and reliability.

Kerlinger (1977), describes research design as the plan, structure and strategy of investigation conceived so as to obtain answers to questions and to control variance. It sets up the framework for adequate test of relations among variables. It is the blue print of architects and engineer and it is necessary to describe any experimental process, programmes or procedures, and explain control, which will be applied.

However, Borg and Gall (1971) believe that it is a situation or phenomena that a researcher is investigating, such as correlational, experimental, historical, or observational; to achieve the objectives of this study a qualitative approach will be suitably applied as it will be discussed briefly.

2.03 The Qualitative Method – is concerned with attributes of architecture in question, it attempts to present means of encoding and hence, comparing the underlying intangible but expressive cultural features. The Influential work here is that of Glassie (1975) i.e. folk housing in Virginia. Like Glassie, the works of Mitchell (1975) and Sinny (1978), focus on the configurational qualities of building abstracting in what they termed Parametric Shape Grammar (1975 and 1978) respectively. According to them, Shape Grammar can be defined against alphabets of shape and general language of shape.

Steadman's work (1983) also explores the generative configurational properties of

rectangular building plans and their limitations. Various methods of transforming rectangular or regular plan shapes through, addition, subtraction, dissection etc are explored. Although, mainly theoretical in approach, Steadman discusses the possibility of applying the principles outlined in design and analysis of historical buildings. A later collaboration with Brown did demonstrates how to understand the relationship between the different plan configurations and the forces, social, economic, functional and technical that shape them Brown (1987).

Umar (1997:72) notes that the two new ways in qualitative approach to the study of domestic architecture are the methods of fractural distribution analysis Beuchuefer and Boull (1995), and structural logic Coudat (1995). The aim is to discover mathematical shapes that display a cascade of never ending, self similar, metering details and analyze visual characteristic of the traditional domestic architecture. In Turkey, their findings are that traditional buildings are built in ways that they maintain the textural depth that nature displays, and hence, compared to modern housing schemes are closer to nature (Umar 1997).

The method of structural logic aims at identifying and ordering relative values of architectural elements that structure a particular domestic architecture, once identified the elements that constitute the structure of domestic house, could be used to assess the degree of stability and sustainability as well as the degree of flexibility of cultural tradition because of the hypothesis:

a. The number of forms that can be an architectural element one may assume is a function of its transformability. The more the variant the easier and quicker the change.

b. The more the balance between the physical and the socio-cultural importance of an architectural element tend towards the physical, the easier it can be changed.

In addition, its theoretical assumption, concludes that there is a strong correspondence between the degree of changes or transformation of architectural element of building and the

socio-economic as well as the cultural sustainability of a given family or society.

The historical process of transformation of Hausa traditional architecture in urban centers may differ from similar processes in the other parts of the country (i.e. Southern and Eastern part and probably Northern central states). These basic differences will be traced through literature review. Comparison will be made to assume a common similarity of transformation in house form. Reason or basis for this transformation will be investigated, so as to justify the transformation as well as the validity of influence for such phenomena.

To achieve this, and to find a balance in the research concerning numerous and diverse information. It is necessary to establish the methodology of study that will help to construct logically, the sequence of research on how to find data and make proper recommendations.

Umar (1997:69) notes three methods for the study of building as artifacts and by extension domestic architecture which are; descriptive, evaluative and qualitative. However, in actual terms, these three approaches are mutually exclusive in many cases because they supplement and compliment one another. What distinguishes one study from another is the degree of emphasis.

However, in architectural terms both “old and new” existing building develops in a region or locality as a result of the introduction of new ideas and materials by colonial masters. Perhaps the earliest work on domestic architecture in the descriptive paradigm is the work of the Renaissance architect, Sebastiano Serlio (1978), which is a catalogue of various native houses in Italy. From the grand house of the king to the most humble house of a poor artisan, many of the works followed the steps Serlio in two camps i.e. the works of Pensvener (1943) and Brunskill (1987) are two good examples of formal and typological approaches respectively, Dmowchowsky (1990).

The evaluative approach aims at understanding and explaining the architecture of a society, in terms of its relationship to the socio-cultural milieu, in all its complexity, Cresswell (1994) an

example of this is the work of Bennie and Buchar (1933), which attempts to trace the developments of house form, from the earliest times to the beginning of its century. However, there have been many good evaluative works that systematically explored the role of architecture in determining social function, enhancing social relations and interaction and vice versa, as noted in the works of Mercer (1975) and Smith (1975) to the congruence of socio-cultural factors, Schwerdtferger (1980), family kinship relations, Wilk (1990) gender relation, and economic development cycle relation, and social organization Kent (1990). Some of the most promising advances in the field of domestic architecture were made through this approach. Dmowchowsky (1990), also attempts to describe in detail, Nigerian traditional architecture for both the three regions in separate volumes, whereas historical process of transformation in Hausa traditional architecture may differ from similar process in the other parts of the country (i.e. Southern and Eastern parts of the country).

However, the methodology used for the study of the Hausa domestic house, as exemplified in the case of the old city of Kano, includes:

- Selection of houses
- Conduct of field work
- Process of analysis.

In the course of the field work, the study sequentially analyzed selected samples, in the following order as detailed in the questionnaire sample:

1. General historical background of the ward and compound itself in terms of socio-economic status, political and service amenities.
2. Changes in geometrical shapes, such as in plan, internal dimensions, wall thickness and height. Initial geometrical shape or house form will be investigated at periodic intervals between 1-5-10 years up to the present geometrical form. Moreover,

an anthropological relationship, in family compound will also be studied, such as husband/wife sharing of rooms or otherwise as well as wether there is any increase or decrease in number of rooms, number of persons per room, room sizes and the overall compound area.

3. The Changing form in building materials, such as from traditional mud brick and Azara for roofing to a cement brick, and timber, and also the preparation or delivery of materials as well as construction methods or techniques involved.

In the process of conducting physical surveys, the study through organized oral interviews and questionnaires obtained and established reason for the gradual or instant transformation of the compound.

2.04 Primary Source: In addition, the study explores the overall spatial morphology of building forms by a general reconnaissance survey, of the overall housing configuration of particular wards undertaken within the specific focus on samples of traditional mud building and modern bricks blocks buildings. This will also involve survey of selected houses within Kano metropolis and it's environ, such as Sharada, Dorayi, Rijiyar Lemo, Yankaba, Naibawa, Hausawa etc. These areas are part and parcel of the eight local governments, which constitutes the metropolitan township. Other selected towns in northern Nigeria include Katsina, Zaria, Daura, Dutse etc for comparative study through pilot survey and literature reviews

Questionnaires and oral interviews were used in the processes simultaneously, in the various family houses as well as ward heads and community leaders. Furthermore, a comparative analysis between old city and its outskirts settlements will be made. And attempts to establish reasons for similarities in house forms on the overall configuration, as Hausa traditional residential settlements will also be undertaken.

The study generally employs house to house survey based on purposeful samples of houses

that are termed contemporary and use of questionnaires. See appendix xii question asked will involve different aspects, like tenure ship or ownership history, initial construction, and reasons for changes. A comparative analysis between the past and the present will be made.

2.05 Secondary Source: Secondary source involves literature reviews, which will invariably provide a vital information and justification for Hausa traditional residential buildings in terms of concepts and constructions. Moreover, it will also provide the basic for analyzing the periodic or gradual changes that occurred within the stated period. As a theoretical and design framework for the research,

The response will be ranked on scale, correlation, regression, analysis recreation etc) which will there after be interpreted.

Survey of Houses

1. **The Internal include:**

- Measurements, geometry of spaces and
- Building materials, and design concepts etc

2. **The Externally include:**

- Elevational treatment, finishing, decoration neighbouring houses, relation, openings etc.

2.06 Intensive Survey (Internal)

In the process of extensive surveys, it will be seen that certain form recur and differ drastically. Such forms or samples should be selected for intensive surveys. The study involves careful observation and measurement of rooms, geometric shapes and sizes, walling materials, and thickness, door and window types, floor finishing, internal roof finishing, as well as construction methods employed. Internal concept of zoning courtyard system, occupancy ratio and other amenities should also be observed and recorded, likewise stages and period of development or transformation will be noted in three distinct processes i.e. measuring, sketching (plan and elevations) and physical analysis. Care will be taken to avoid

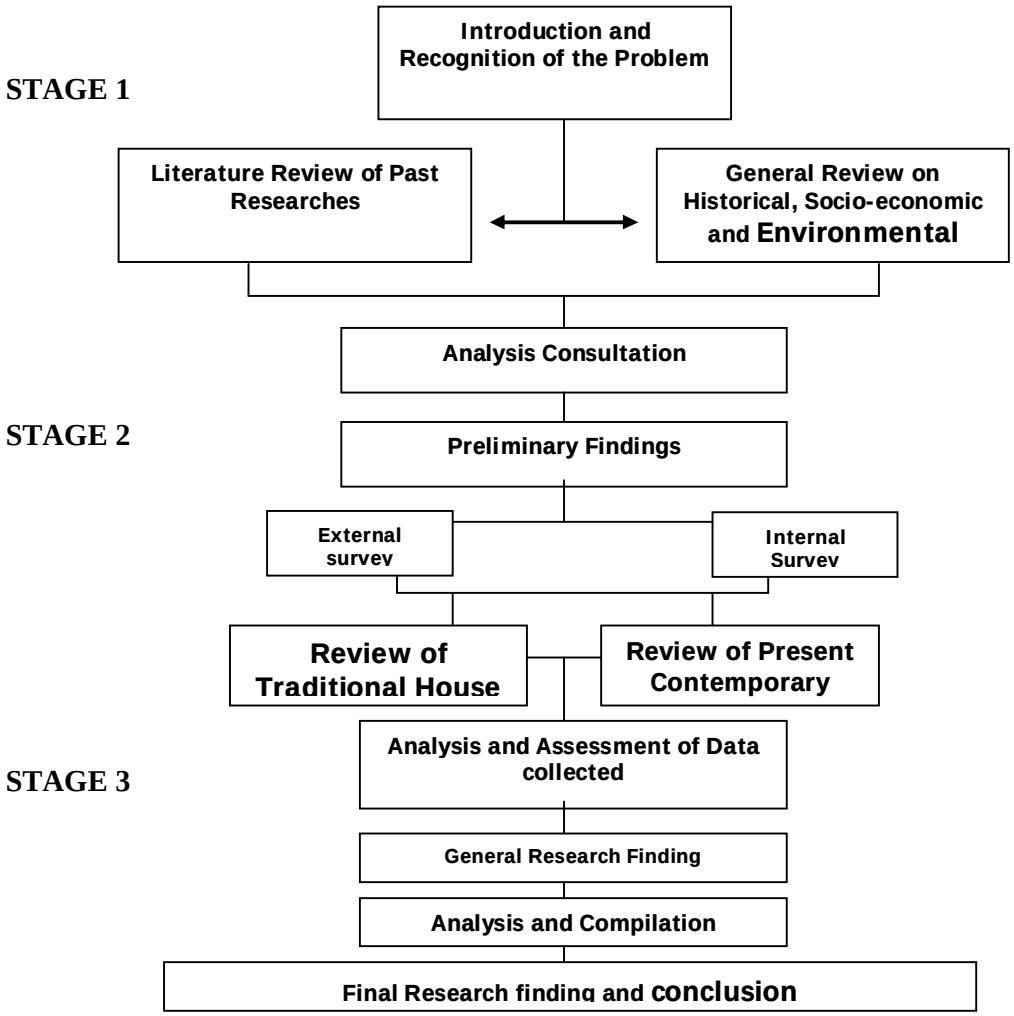
error in figures and complexity in sketches. Both external and internal survey should be accompanied with photographs and elaborate drawings where necessary.

2.07 The Extensive Survey (External)

This consists of general reconnaissance survey of the actual demographic area selected, which is controlled by method of sampling i.e. random, cluster, purposeful, structured etc. This will enhance reducing subjective elements and assist in comparison of materials or samples between different parts or wards.

The sample selected can be identified as "inner core, outer core or periphery" of a house or compound. The system is basically intended to collect the information of the exterior of the building, which will include walling materials, roof types, and façade opening elevational treatment and decoration, etc as well as street and neighborhood relationships in wards.

PLATE 2.01 METHODOLOGICAL APPROACH DIAGRAM



2.08 Research Methods.

2.85 The questionnaire is used as an instrument for the study intended to collect data on demographic and perceived attributes on the subject. The questions will be interpreted from English to Hausa when necessary and will be conducted orally. The questionnaire is divided into six sections A-F:

Part A – Consists of general identification, data and characteristics of compound location.

Part B – Contains data on services and amenities in the compound.

Part C – Contains nature of construction materials in the compound and modifications.

Part D - Contains structured interviews to obtain clear and desired information.

Part E – Contains information on rooms areas and geometrics shapes, no number of occupants and general information about the area or ward.

Part F – Contains initial period of construction and maintenance records and relationship with neighboring compounds. And Provides space for sketch plans and elevation of the compound houses surrounded and general remarks.

During the field trips, photographs of both exterior and interior were taken and also a request for a building plan (if any). Was made the questionnaire is used as an instrument for the study designed to collect data on the subject matter.

The second method employed for the purpose of collecting mainly the primary data is through preliminary sketches of sample houses and personal interviews conducted by the researcher and his four (4) assistants. The aim is to obtain information by either experiencing situation or oral information.

2.09 Sampling Frame

A sampling frame for the survey in Kano considered essential is a non probability sample method which was used in selecting the sample group, **Peil (1976)**, identifies three types of the non-probability sample methods: accidental, quota, and purposive, sampling. Two of the

methods were used. Thus, a purposive quota sample method was used because of the following reasons;

- All the eight local government in the Metropolis are to be covered, but not all the wards in each local government (i.e. in Fagge Local Government (4) wards out of (12) wards are selected for the fieldwork).
- The entire four residential districts with over 200 registered wards **Kwalli (1994)** were to be covered. However, 53 wards were selected for the study; thus, a purposive sample procedure was used in selecting the wards that contain "contemporary archetype".
- A purposeful quota, sampling procedure is used in selecting the household so that important source of homogeneity in the residential structure could be established in the sample group. However, in a situation where a small sample is taken from a rather large population, the quota sample is considered as being most appropriate.

2.10 Population and Sample Size

Kano state has (44) local government councils, (LG guide 2001). According to 1991 census, the state has a population of about 5.6million; the sex ratio is slightly male skewed with 50.7%. The gross population density is in broad terms decline away from the metropolis. On the other hand, it attracts substantial number of immigrants being the seat of government and center of commerce, investment, and education, The eight local governments that constitute the Kano “Metropolitan” area are Fagge, Gwale, Tarauni, Municipal, Kumbotso, Ungogo, Dala, and Nassarawa with a population of over three million and 60% built up residential areas. They have been chosen based on the followings:-

1. The eight (8) local governments of Kano metropolitan area consist of over 200 registered wards according to 1991 census, whose inhabitants are middle-income earners.

2. They contain more than 90% of the sample needed for the study.

3. They exhibit traditional setting in an improved or modernized format in town settlements.

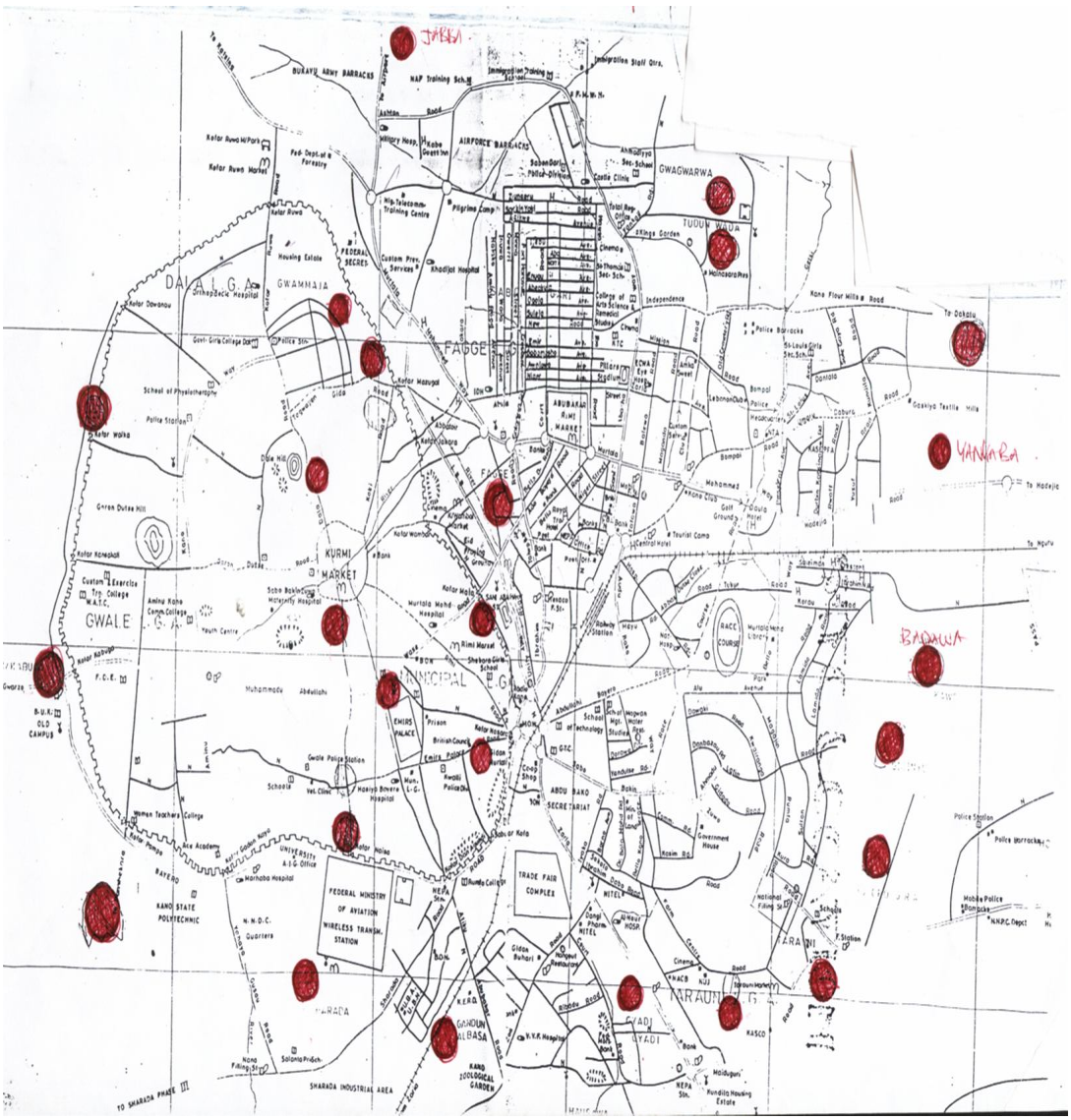
4. As the commercial and industrial nerve center of the state capital, they produce all necessary building materials for all types of construction in residential houses.

These local governments are considered adequate samples or representation; that have undergone a substantial and tangible transformation in traditional residential houses.

For convenience, and simplicity the administrative demarcation of Kano into sectors based on the four cardinal points, North, South, East and West is used in order to select houses for analysis, the city wards or (metropolitan ward) within the eight local governments areas were first identified, a representative of sample wards was randomly and purposely selected from the four section of districts of the metropolitan. Initially, twenty (20) students of the Kano State Polytechnic Department of Architecture were recruited as research assistants; subsequently five (5) research Assistants are recruited from each local government (male (1/2), females (3/4)), as the case may be, from Works and Health Department They were given basic training on survey of houses measurement, drawings and questionnaire administration.

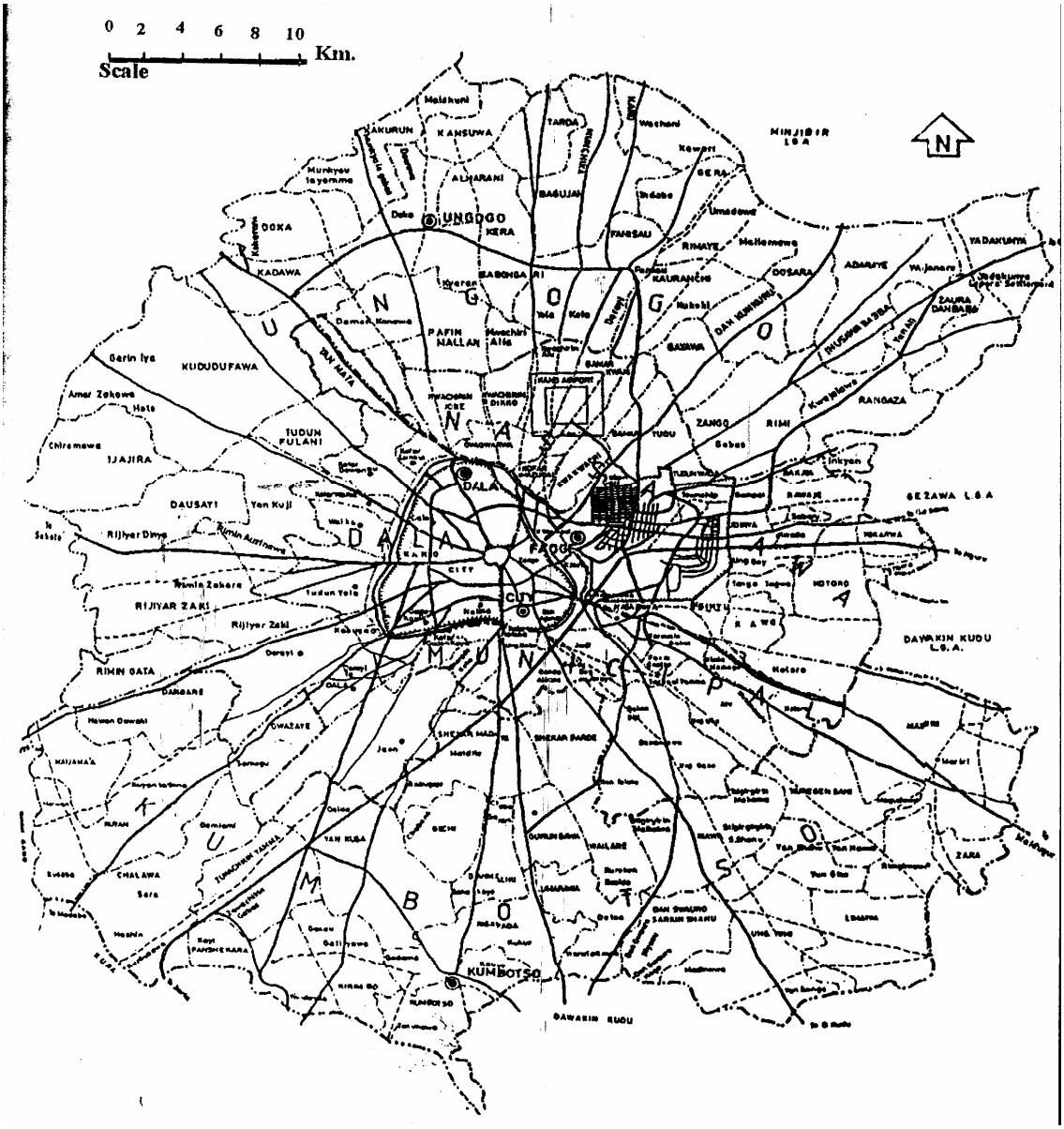
A minimum of 16 and 40 houses maximum, on each ward was purposely selected for the survey. A total of fifty three (53), wards out of eight (8) local governments, making a total of 1010 houses, consisting of 4,243 rooms and 10,772 residents were surveyed. However, only 969 samples were suitable for analysis. (See appendix one), “Data collected” are analyzed under the major heading from the questionnaire.

Plate 2.02 Kano Metropolis – showing location of surveyed ward (areas)



SOURCE: field work, September/October 2005

Plate 2.03 Kano Local Government Areas 2005



SOURCE: Umar (1997)

2.11 Research Techniques

Adetoro (1986 p4) states that, generally, the research technique allows for reflective thinking which is composed of both inductive, and deductive reasoning. Deduction is the translation from theoretical to operational and further to statistical levels, while induction is the translation of statistical results into theoretical inferences. Similarly, **Popoola (1984) p107** cites peil, and states that research techniques can be exploratory, descriptive, casual, experimental or comparative. Bearing in mind the research question of this study there is the need to use both the casual and descriptive aspect to be able to answer the question raised.

Two research techniques were utilized in Traditional Housing Areas of Kano Metropolitan. Thus the design was first descriptive then causal. The descriptive aspect is to describe the transformation process and pattern of the Hausa Traditional Housing Environment of Kano Metropolis with a view to understanding the transformation process.

The casual aspect is an attempt to identify the main (variables) that have undergone various transformations in the spatial formation patterns. The description of the Hausa traditional housing practices is also considered necessary to elucidate some of the issues raised. However, it is considered essential to collect sufficient quantifiable data for analysis.

It should however, be noted that in dealing with existing housing environment the casual techniques is used to reconstruct what happened in term of causes rather than following the model or experiment, in which the "researcher arranges for certain things to happens and observe the results. An attempt is therefore meant to show the main causes of the reasons for variations or transformation in the basic form of the house.

2.12 Method of Data Collection and Analysis

The research will be essentially descriptive survey in which sketch plans and elevations will be used to describe forms. Detail measurement and elevational treatment of compounds surveyed and questionnaires will give other empirical data that will be used to find meaning

and obtain the understanding of present conditions. Adetoro (1986) and Osuala (1987), states that descriptive research gives a picture of a situation, in particular buildings or built environment.

Based on the nature of this research, the workability as well as effectiveness of its instruments and methodologies, it's used responses, results and samples will be categorized into groups and tabulated using the qualitative method of data analysis which will be employed in describing planning pattern materials and construction techniques in the contemporary buildings among other things. Deductive reasoning will be employed in analyzing and understanding the contents of some documents; interviews and data collected will also be presented and interpreted.

An introductory letter was obtained from the department of architecture and required number of copies produced. This helped in introducing the researcher into the various wards that need to be visited. Photographs were used throughout the research period.

The findings are later consider together in a short comparative study in an attempt to propose a design theory and data for a contemporary residential house and identify its potential building materials and construction techniques as contained in subsequent chapters.

The next chapter three gives a details on literature review and description of Hausa traditional architecture from old stone age, mid-stone age, to new stone age down to African traditional architecture the evolution of regional architecture in conformity with local values, concept, materials and technology, a brief introduction to Nigerian traditional architecture from pre-colonial times to post colonial developments.

CHAPTER THREE

LITERATURE REVIEW

3.01 Approaches to the Study of housing and Residential structure

'Architectural Research', is a research of new ideas or concepts, new building materials and construction techniques about a built environment; It could be approached basically in three broad methods for study of buildings as artifact. Umar (1997 p.69) and by extension domestic architecture. It could be descriptive, evaluative and qualitative, Saad (1973, 42). However, in actual terms, these three approaches are mutually exclusive in many cases because they supplement and complement one another, what distinguishes one study from the other is the degree of emphasis and variation and it is these approaches that justify the bases for a definite and verifiable data offering hypothesis which may be a practical and speculative reasoning, words of Martins (1967). The phase of the research as a planned structure and strategy of investigations conceived to obtain answers to research question and set out a framework for the research and relating them to other variables Osuala (1991). Eventually, the reader evaluates the findings and perceives conclusions; Adetoro (1977) gives a list of research variables to include the type of research, type of data to be collected, the scope and the research questions, and according to Kerlinger (1973) survey and descriptive researches can be classified into the following methods of obtaining information by:

1. Experiencing the situation directly
2. Oral information from individuals

Similarly, architectural or any built environmental, research, is a systematic process, from the onset is necessary, for the purpose of this study to apply both extensive and intensive surveys together with personal interviews of occupants, particularly Household heads and ward heads, physical measurements and sketches, will also be used. The face to face interview was conducted based on constructed questionnaires throughout the period of surveys of the compound.

According to, Popoola (1984), the diversity of approaches to the study of housing is an indication of the manifestation of the complex nature" of housing problems which in turn makes the study of housing a complex matter. Housing is therefore a subject of interdisciplinary study reflecting the multidimensional nature of the subject. The diversity of approaches also reflects the differences in the interpretation of facts and phenomena in relation to housing. Even when the same pattern of reflected light beam is obtained form one single position of the crystal, the interpretation of the pattern obtained can also account for differences. Few of the approaches will be discussed in brief below.

3.11 Ecological Approach

The ecological approach, also known as the Chicago School Approach, was first developed by a group of sociologists based in Chicago, and it is "mainly concerned with the spatial patterns of residential structure". It is an evolutionary approach to the study of human housing and settlements and was first applied to a particular city, Ekistics has emerged as a new approach utilizing as much of the ecological perspective as possible.

3.12 Neo-Classical Approach

This is an approach that emphasizes the economics of housing within a free market system and defines housing problems in terms of the preferences and needs of individual consumers within the free market system. It is based on the "analysis of utility maximization on the part of individual consumers in an atomistic housing market", and relates housing costs, transport costs and income level together to a framework in an attempt to predict the location of individual households within a settlement. The approach "draws its theoretical guidance from neoclassical economics for the sake of maximizing utility in housing, Popoola (1984).

3.13 Institutional Approach

While the ecological approach emphasizes the ecology of housing and neoclassical, the economics of housing, the Institutional Approach emphasizes the role of housing agents and managers within an institutional framework. The agents within the institutional structure are then identified as institutions, organizations and individuals involved either directly or indirectly in the housing supply process.

3.14 Marxist Approach

This approach also involves a shift in the kind of questions posed for analysis and in concepts and methodology. It "draws upon historical materialism" and focuses on housing as "a commodity in a system of commodity production. The commodity is for the "production of surplus value and a means of capital accumulation".

However, this study is based on this view that to a great extent "the context of man-environment relations is considerably broader than the consideration of any one perspective". Its beginning can be traced to the period of the rising dissatisfaction with the inability of the factorial ecological approach to explain issues like how housing spatial patterns were created, maintained and changed.

3.15 Man-Environment Approach

Man-environment approach is an attempt to "ensure that a planned environment preserves its essential characteristics and satisfies those who live and work in it". It is thus a study of the dynamic relationship between man and his environment and such questions as these are equally asked:

- What do people do to their environment?
- How do people understand their environment?
- What effects does the environment have on people?

Environmental psychology, on the other hand, became a recognizable field of study in the early 1960s. It is concerned with establishing empirical and theoretical relationships between

behaviour and experience and the physical environment.

Using the man-environment approach, the research will therefore, emphasize man's activities in transforming and reshaping the housing environment and the implications of that for the design and creation of the built environment. It is accepted that "man builds the shells and thus creates the container which holds human activity" Popoola (1984),

3.02 Shelter Provision - 'Shelter' is not limited to human beings alone. It extends over a large number of species and types of living organisms, e.g. shellfish and spider create their own dwelling from secretion made by themselves, birds construct nestle of sticks and twigs and vegetable fibres; ants build elaborate excavated communal dwellings with different chambers set apart for different uses. Some build nestle structures of weed. Smaller mammals excavate communal dwellings home for themselves, which vary from the single cylindrical of woodchuck to the elaborate chambers of moles and prairie dogs; beavers construct their houses on trees and branches. Chimpanzees and gorillas among the highest of apes, build rough shelters of leaves and branches for their families, sometimes too, these shelters are of considerable engineering complexity. The hanging birds' nest is well known with their strong closely woven textures.

The projecting nest of clay of various members bring in the principles of 'cantilevering' or 'bracketing' and the cohesive strength of clay itself, the ability to erect adequate shelters against weather elements and enemies, may infract be, the specific element which controls the survival of some species in the relentless struggle of evolutionary life, Hamlin (1953:1).

However, not only is the building instinct highly developed and wide spread, in the animal world, but also, there are many evidences of a sense or an emotion which approaches the aesthetics, Crows collect and brighten the object as though they are in them. Apart from their possible usefulness, the beginning of structural ability and aesthetic feeling in the tower of animal world, may be quite justified, that even the primitive man, who biologically is in such

an advance over the tower of forms, the same two instincts exists, and very slowly he blends them, in varying degrees with almost all of his activities.

Similarly, primitive man seems not to have remained permanently satisfied with mere utility; he sought from early date to impress "form" upon them; and perhaps, when he scratched things on the surface and polished stones, 'pore' decoration begun. During the Neolithic age it was the integration of the constructing instinct and the creative or expressive art instinct which gave rise to what is call architecture. Just as man has come to desire beautiful utensils; so he designs beautiful shelters Hamlin (1953:5), it is the history of these shelter that men have built for themselves and for their gods, for protections against the weather and against hostile men or animals; which is the true history of architecture.

The history of architecture becomes much more than a progression of crystallized related forms called 'styles', it is also a history of way of life, a chronicle of the rise and development and decadence of building techniques, and expression of what men thought of life and death of each other.

According to Hamlin (1953), building forms are sensitive to changes in forms and purposes, as well as building materials. They are equally sensitive to changes in religious or social ideals. It is in the course of this long developments of ten millennia and more, that mankind has developed several important building types and several contrasting methods of construction which are so universally found, perhaps man's first building efforts are probably at individual hut or house usually in curvilinear or rectilinear forms, although the round or square hut is essentially a primitive house form; it persists into times and cultures of relatively high state of development and transformation as in Africa. It consists of a great agglomeration of circular hut units some of great sizes, of vertical mud walls with very low entrance door in mud plaster, in the Neolithic and Bronze Age. Round huts are built in connected groups each forming a complex dwelling regularly arranged in rectangular pattern,

such as were seen in the ruins of Neolithic towns as well as Hausa traditional domestic architecture.

As skill in mud and stone building increases, building materials are more and more carefully prepared, and shaped. This process makes it possible to build vertical walls below and gradually curving the interior to give the type known as 'Beehive hut', a form long preserved in Greek and African regions.

Combination of mud or stone walls, with roof of timber covered with earth or thatched, are common to primitive or Hausa traditional residential buildings. This shows their origin in the round hut, but the additional freedom gained in the use of timber leads the traditional builders in search of roomy interiors, creating oval or rectangular forms with curved ends. Foundation are laid horizontally at the base of the wall, with housing making fights inevitably house with mankind fought against one powerful factor i.e. gravity, in a sense that all buildings encounter a struggle between the forces of gravity pulling things down by the roof loads and the strength of materials used to bind element.

To build any shelter whatsoever, to some extent; architecture has seemed above all an art and a science dealing with gravity and materials.

Hamlin (1953:12) quotes Shopenhaur; say architecture is beautiful because, it expresses dramatically yet impersonally this constant battle; the sense of emotional tension, resulting from the conflict of the force of gravity with the strength of the buildings man has built.

However, four basic principles have been discovered in the course of long development of building, by means of which sheltered space, opening in walls upper floors can both be covered over safely with floors (mud and azara) roofs in timber. These are usually termed post and lintel construction, corbel and cantilever, arch and vault 'Daurin guga' domestic shape roof construction truss (azara), these principles are also typical and elaborate in Hausa traditional residential architecture.

Modern mathematical analysis and the definite knowledge of the quality or strength of all types of materials both in compression and in tension, have allowed mankind to build roofs over vast areas and to develop a great degree of perfection and elegance. As man's civilization develops, so his wants increases the space which Man thus encloses to form his shelter was seen not only in one thing but in many things. Essentially, the quality of enclosed space remains perhaps the primary quality in architecture. Its exterior generates exterior appearance of buildings, just as in the interior arrangement, their beauty is within and their efficiency with the growing complexity of man's wants. Architecture has developed a matter of beauty of emotional and intellectual satisfaction, complementing and even adding usefulness to it.

Vitruvius enunciates that; convenience, beauty and construction are the three great elements of architecture, the interpretation of which produces all the buildings mankind created today right from the beginning of civilization, Hamlin (1953:16).

3.03 African Traditional Architecture:

African Traditional Architecture dates back to early times, sometimes referred to as vernacular architecture; it demonstrates how architecture is designed to respond to societal needs. At the same time it is one of the world's oldest and richest traditions the world ever had; almost the only one that still survives from the dawn of human history. It works on traditional village scale, rather than global architectural styles, Prussin (1974) African representative model and concepts chosen from various parts of Africa may lead one to a unique concept of African style.

African architecture has been described as a direct evocation of its physical environment. It is extremely stylish, not from abstract aesthetic notion, but from the basic needs and images the building it has to serve to the same degree. Despite the fact that the continent boosts diversity in climatic condition, regions, peoples, and traditions, these differences are accommodated in

its architecture.

The available building materials also vary from mud and thatch to stone. They change design based on the particular region, like the way American architecture and other parts of world changes regionally.

The Sub-Saharan African produced target scale of works, but on the whole, do not have architects in traditional African building; instead it's the intelligence of the master builder who combines a certain function as one is impressed to love all by the symbolic imagery of traditional African building. However, using mud may have certain technical disadvantages but it is probably the most expensive of all materials, in maintenance cost, it does not only lend itself brilliantly to cornice decoration, but the very shapes of the buildings express their function and ideology marked by anthropomorphism. The house not only housed its owner (and marker) it expresses his or her stage or status in life, and is closed down at his or her breath Eagle wood (1996).

The architecture is adapted to suit the needs of the group's houses, which erectes the styles of the community and perfects over many generations. As a result there are no evidences of trained architects and much of the information in building design and techniques are passed down to generation by oral instructions.

In addition, African architecture is defined by the religious and social order of the people. This is evident in its temporary and perishable nature, which did not exist in any homogenous material culture or house throughout Africa. The building of houses in African communities where everyone gives his assistance and the only remuneration is a feast, the sampling technology from the shape and method of construction to the ornament and decorations, used to distinguish roles in the industry.

3.04 Evolution of Regional Architecture

'Regional architecture' had existed prior to the arrival of the colonialists, and that the

traditional settlement of a region according to Ralph (1990) is to be "the means of shelter identifiable with an area, and may house a large number of the inhabitants". Most of the traditional towns in Nigeria, like elsewhere, have evolved with strong socio-cultural and spiritual influences. These houses are found in the older districts of the towns. It is interesting to observe that the traditional towns planning among the regions show remarkable similarities. For instance Ralph (1990), when describing Yoruba town observes that it is "circular in shape and, resembles" a wheel; the Oba's palace being the hub, the town wall, the town wall, the rim, and the spokes a series of roads radiating out from the palace and linking the town to other centres. This concept shares similarity with traditional Hausa planning, where also the dominant features are the Emir's palace as it is today in the city of Kano.

However, today the planning of new towns does not reflect this cultural setup. It has been replaced by the military grid town planning, which has no defined values for the community. There is no feeling of neighbourliness and togetherness, which had characterized the traditional communities. Odumodu (1990), points out that today what we witness is lack of sense such as indifference, loneliness and insensitivity.

However, Haruna (1990), submits that on the level of dwelling unit, have three main factors that influence the traditional dwelling units include environmental, religious and cultural factor. However, today these factors are not sufficient to influence the design of dwelling units, and the changing contemporary modern trends in addition to the tradition. It is a known fact that life is dynamic. It keeps changing; the lesson that changes is a permanent culture. This fact is real and concrete; such that modern trend therefore cannot be ignored.

The question now is; how do we achieve the design of regional style? To begin, perhaps, a survey of contemporary vis-à-vis the traditional forms should be carried out.

Qurix (2004) identifies two different schools of thoughts, which emerged towards finding a regional identity. These are the trado-regionalist and the modern regionalist. As might be

expected the trado-regionalist believe that regional identity should be based on traditional architecture, while the modern-regionalists think that regional identity in Africa should be based entirely on modern forms. Given these two different approaches, it suggests that a truly regional identity in Africa needs both approaches. Today, for architecture to be really functional and efficient we may have to find some way of combining the traditional and modern contemporary concepts.

The task then, is to find some means of ensuring that, each can contribute the best towards the realization of a regional identity. However, there is danger that may loom over the exercise of seeking a regional architecture in Nigeria. Seeing as experience of even modern architecture in style in our cities. as Qurix (2004) points out, reveals an inconsistency of styles, lack of clarity of expression and incoherent use of materials. The picture is more ugly looking at the other side of the coin. Traditional architecture apart from being abandoned and forgotten has few practitioners and professionals who actually understand it in its original essence.

Given these setbacks, perhaps, one may have to employ the use of models to guide and inspire to our imagination. Model, in this sense, refers to an elaborate analogy or assemblage of analogies. It derives its meaning from ideas which otherwise would be difficult or impossible to comprehend. Broadbent (1981), perhaps the Nigerian embassy and Saudi Arabia may be considered as coming very close to a model for regional identity. In Nigeria, it is an expression of Northern traditional architecture, with its finishing and appearance, while the timber pergola is a Southern expression of architecture of Southern Nigeria. It is the forms and shapes that are expressive of the architecture.

3.05 Nigerian Traditional Architecture

Nigerian – arts and culture reflects: religious and European influences, it ranges from the North African inspired mud-houses of the Hausas to the sprawling Yoruba compounds that

accommodates several branches of an extended families or kinship groups. Such dwellings are often decorated commonly or uniformly with distinguished regional decorative elements e.g. Emir's Palace Zaria and Kano and a unique geometric forms, While the Yoruba houses and palaces features elaborately regular form; with a verandah covered by projected roof, supported by timber post and lintel in a single or double bunking room concept.

Some older homes in Lagos and Ibadan have a distinctive reflection of colonial masters house in two storey form designed and constructed with imported cement blocks and timber materials known as Brazilian style; introduced by slaves repatriated from Latin America in 19th century, Roberts (1997).

The Hausa occupies northern part of Nigeria, to the South of Sahara, No doubt Islam; climate and local materials have shaped the architectural building forms, and settlement patterns of the Hausa states. The ancient walled cities of Zaria Kano, Daura, Katsina etc, where the capital of the powerful Hausa states emerged during the 14th century. The medieval Hausa rulers and merchants sponsored the building of ancient walls and gates; and prominent buildings in Hausa architecture which includes palaces, markets, domestic houses, schools, royal houses, which vary in design and are flexible in adopting local architectural requirements to its needs.

3.06 House for dwelling

Man determines what a house for dwelling is and the notion "dwelling" is entirely subjective. Popoola (1984) reveals that a dwelling is only a dwelling not when it has certain form; not when it fulfils certain conditions which have been written down after long study; not when certain dimensions and provisions have been made to comply with municipal by-laws; but only and exclusively when people come to live in it. The Fulani make shift tent structures and the Hausa mud huts as much the dwelling of the Fulani and Hausa peoples of Nigeria as the Igbo is for the Eskimo.

Since it is the "human act… of dwelling that determines what a dwelling is, dwelling is first and foremost a relationship between people and environment, that is, between the user and his housing environment. Such relationship arises from the common actions of daily life of the users of such environment. The relationship network usually generated when man creates or structures his housing environment will be considered. While a house for dwelling is a space or series of spaces usually enclosed, that is, a product and a physical entity. Housing on the other hand is here accepted as a process involving man and his housing environment.

3.31 Planning Pattern

The landscape of early Africa was made up of small societies; with commonality, such that their livelihood was dependent on their farms or herds of cattle, sheep and goats. The societal constraints dictated the distribution of wealth and the conformity of each member to the asset of norms.

The plan (pattern) of taboo of the buildings was influenced by many different forces such as:

1. Nature of crops
2. Seasonal nature of activity
3. (Family kinship)

Since, the term village indicates family grouping pattern than buildings, some villages were not evident from the ground, but expressed physically the social structure of the group of people living in them. The physical layout was also based on religious reasons and traditional norms, imaginary lines and separate relations. Divisions were made along generational lines the proximate generations were built separately and alternated generations were built together. The layout of villages was usually symbolic while villages were in square with the houses around the circumference and open spaces in the center; in the middle for other household activities.

Three categories can be distinguished as follows:

a. Tree Organic Plans – These are typical residential compounds in two density areas with spaces for extension. Within compound walls there occurs a continuous process of deconstruction, construction, or restructuring of these compounds in direct responses to the changes in family composition resulting from birth, death, marriages, divorce, inheritance, disputes, economic status and others.

b. Compound Cellular Plans – These types of compounds are found in high-density areas like market. The common features of these compounds include small size courtyards, shared party and two storey building rooms. The functions are interchanged or adopted for new uses in responses to changes in family composition. These include public places such as large halls, mosques, courts, housing, public facilities usually surrounded by open courts with defined boundary walls.

3.07 Spatial Organization and Social Structure,

Popoola (1994) reports that traditional family development cycle can be considered in four stages, existence, growing, expansion, and decline: Similarly the field study also reveals that, in traditional housing areas, three basic types of domestic groupings of the family existed. Only one type of domestic grouping exists in any particular household at a time.

i. **Nuclear family unit:** this unit will consist of a man, his wife or wives and their children with one or more relatives, usually of the man. Such relatives were found to be either a widowed mother of the man or his divorced sister.

ii. **Composite family unit:** the composite family unit consists of more than one nuclear family within the household (not a house) and the unit will include the man, his wife or wives and their young children, plus his married sons, their wives and young children. One or more relatives, usually of the man, may also be part of the composite

family unit. The study notes that it is these composite family units that have transformed to independent house nuclear family units.

iii. **Collateral agnates family unit:** A household in which brothers, who may be consanguine brothers, live with their wives, young children and one or more relatives is a collateral agnates unit. Although such family unit is seen by the people as a household, each nuclear family lives in a separate apartment within the household. This has become the present day **contemporary houses** it is clear, however, that these three domestic groupings do not reflect alternatives but in fact a growth process in the family unit, starting with the nuclear family, to the composite, when the sons begin to get their own wives, to the mature stage in which, after the death of the man, his sons now form a collateral agnates family unit. Unit one leads to unit two and unit two may lead to unit three after the death of the first household head, and unit three then breaks up to form new family unit cycles.

Each, household is therefore, a reflection of the stage of the growth process, to generate or transform to contemporary houses. In an attempt to answer the question of how the different domestic groupings mentioned above are represented in the spatial organization of the different houses it was discovered that the spatial arrangement of the houses also goes through changes reflecting the changes in the family structure.

However, one may also conclude that the spatial formation of the house goes through a growth and a death process. The growth cycle moves from the youthful stage of the nuclear family to the middle stage of the composite family unit and then to the mature stage of the collateral agnates before the units break up to start the growth cycles again. The spatial formation of the gida may go through a death process when the unit is left unoccupied for a long period. The buildings may collapse leaving heaps of land. Such dead gida can however be revived when the children of the last owner inherits and occupy the site, and determine the

spatial organization of the gida.

Similarly, in another Hausa Birni, Zaria City, it has also been observed that the spatial organization of the Hausa gida reflects the social composition and size of the family unit within the gida. In his study of Hausa housing in Zaria city, Schwerdtfeger (1982) notes that: "continuous process of destruction and rebuilding of the compound is a direct response to continuous changes in the composition of the family that occupies it".

In his study of housing in Northern Nigeria, Moughtin (1984) has also observes the responsiveness of the spatial organization of the Hausa gida to the family structure within it. He remarks that the "perfect match between the changing needs during the life cycle of the family and the organic nature of the house form is a feature of the Hausa house".

Interesting to note that changes (transformation) in the social structure of the family units lead to changes in the physical spatial organization of their housing environments. The study in the transformation process, is in full control of shaping and reshaping process. Since there are societal norms to comply with, the process does not lead to a laissez-faire situation.

Popoola (1984) continues in similar vein and asserts that; traditional builders and craftsmen aid in the construction of the housing units. Their role is however, limited to constructing the structures to meet the expressed needs and values of the users. The ease with which the gida (house) is shaped and reshaped (transformed) to reflect economic status and cultural values can be attributed to both the nature of the building material and the progressive development procedure of the house.

3.08 Progressive Development Process

The housing process in the form of progressive development process (transformation) does not try to meet all the anticipated users' demands at once; instead the people are constantly building and rebuilding, maintaining, modifying, changing and building again in an attempt to reflect the constantly changing social structure, in terms of family size and composition the

study envisages and confirm the previous research statement.

The process encourages the development of the spatial organization and transformation of the house based on the immediate circumstances and needs of the inhabitants and owners.

Maintenance is not considered to be a nuisance but as part of the process of reshaping the environment, either in terms of finishes or in terms of the addition of units.

Thus, in a dynamic process in which both context and form change together, they will stay mutually well adjusted because of the progressive development procedure of shaping the environment.

Popoola (1984) reports that, the non-permanent nature of the building material, coupled with the progressive development procedure of the spatial formation of the Hausa house, are greatly responsible for the building form that can expand and contract as required. Still a valid statement since the Hausa housing form is the expression of content, function and structure, all of which are much more important than the form itself. One may conclude that the contemporary residential housing in Kano, reflects a social structure, stresses some cultural values and satisfies some psychological needs and it is also based on the available resources and the traditional building skills of the people.

On the other hand colonial masters houses in the north portrays that the materials used in their construction are a unique reflection of royal houses in one storey form, designed in western style to suit the colonial masters requirements and constructed in traditional mud walls and roof structure, and imported timber, door, cement floor finishes and toilet fitting and zinc roof (i.e. gidan dan Hausa, be-minister, and Makama) introduced by the resident colonial masters Kabir (2003).

3.09 Post Independence Development:

In Nigeria, before its independence in 1960, the most notable architectural form was a 'Badagry' story building of 1885. Then the term moves from regionalism in architecture to

modernist architecture. Similarly, colonialism has been the major cause directly or indirectly of the major changes or transformation in the architecture of Kano in particular, and Hausa in general, Sa'ad (1986). However, these changes are reflected more in the appearance rather than in the configuration of space in Hausa domestic architecture. This does not mean to say that there are no changes in the form of Hausa traditional architecture or that the changes are not substantial, but however, these changes or transformation are superficial or dimensional rather than morphological.

The appearance changes but configuration is "Musta–tandis" constant Sa'ad (1986). However, few positive changes came after independence in the form of a revival of traditional architecture. But neither the political will, nor the genius of individual architects or builders is geared towards legitimizing indigenous building heritage.

The oil boom associated with agricultural products such as (cotton, groundnuts, hides/skins) etc in the late 1950s and late 1960s in the northern part of Nigeria enabled the rich individual to afford to use imported materials in building construction. The new materials such as timber, corrugated iron, steel doors/windows (critical hope, and tropical morels), proved more durable and required less maintenance than traditional materials. The construction technology proved more reliable and easily acquired than traditional methods. The changes however, begun when both traditional architectural materials and traditional builders themselves, could not sustain the disastrous effect of this competition with modern materials and technology. But quite a few master builders decided to synthesize aspects of modern building practice with traditional architecture. They use modern materials to create traditional forms to cherish the dignity of traditional architecture, Sa'ad (1986). This reflects the present contemporary building, which this dissertation attempts to study.

Example of such forms includes:

1. The magnificent Daurin Guga Ceiling

2. The splendid interior decoration, with reinforced concrete and cement grout, instead of mud plaster to use modern lead, paints instead of traditional colors.

3. Chisel and trowels replace fingers in shaping decorative pattern while brushes replace brooms in paint. The architecture thus created attains a formal and symbolic identity as authentic traditional format in modern developments.

It is interesting to note that; Kano has through, its history been one of the major cities of Africa before its rapid growth in 20th century. The inhabited quarters of the city are densely populated, the physical landscape shown in plate 1.01 and 1.02 and 1.03 and 1.04 looking down towards Dala Hill on which the city are formed, by Denyer (1960) and researcher Kabir 2005) shows a remarkable difference or developmental changes from its appearance a bit of comparison justifies the degree of transformation in the townscape of the city.

Similarly, the city wall and gate are the first casualties of British occupation of Northern Nigeria, since they are not to be repaired or maintained by treaty Moody (1969). These monuments the gate and the wall deteriorated rapidly some eventually collapsed and few reconstructed in gravel stones e.g. Kofar Wambai, Kofar Mata, (1985-1990). Some were later reconstructed in concrete and cement blocks. K/Nassarawa, K/Mazugal, K/Wambai, Kofar Ruwa etc. This signifies a remarkable changes or transformation not only in residential houses, but also in the city gates.

1. The engaged colonial/column ‘Dogari’
2. The use of wide windows with wooden shutters
3. Zinc roof with modern rafters.

In addition to the Hausa mason (magina), these have a common feature of “modern traditional Hausa architecture. The introduction of cement as a building material was limited to flooring alone, attempts to use it as plastering material proved abortive and was abandoned early, sSa'ad (1986).

Moreover, the pervious nature of mud as building materials leaves little evidence for historical reconstruction of Hausa traditional architecture. The accurate date of its development is therefore difficult to achieve with any degree of certainty. Nevertheless, we can draw references from the writings of early explorers and travelers, such as Leo, Africannos in the early 16th century i.e., Clapperson (1956) who came to Hausa land at the beginning of the 19th century.

CHAPTER FOUR

HAUSA TRADITIONAL SETTLEMENTS, BUILDING MATERIALS AND CONSTRUCTION METHOD

4.01 Genesis of Urbanization in Nigeria

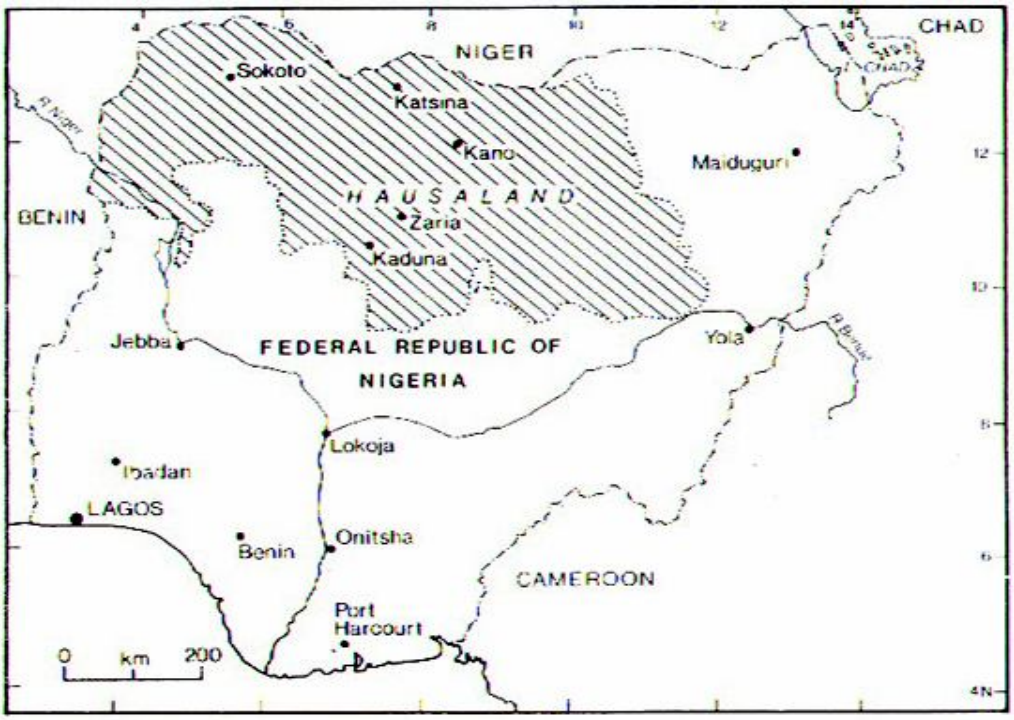
The information on 'Urbanization in Africa' in pre-colonial period is very scanty. It is generally known that the Northern part of the continent especially the Nile Valley was an important urban centre, several centuries B.C. The urban Development of the African coast of the Mediterranean brought to life Carthage, Hippo, Reggius, Leptis Magna, Cirene, Therpsus, Utica and others, which established live trade contacts not only with the other parts or cities of the Mediterranean but opened trade routes to the interior of African continent. "Berber pastoralists" were the agents in those early trade contacts. The arrival of Arabs and their control over North African coast in the seventh and eighth centuries finished the European domination in this area and was a unifying element for the people of the region. Furthermore, the migration of Arabs through Sahara which spread Islam southwards into the continent took place during twelfth century, Gndiazki (1984).

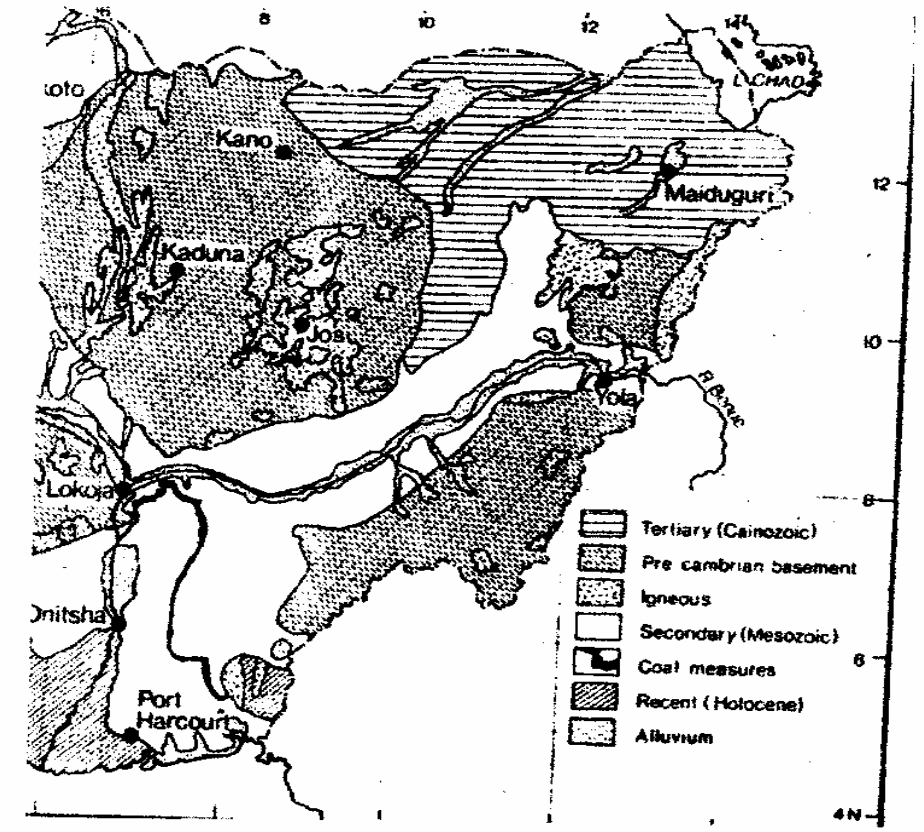
4.02 Pre-Colonial Urbanization in Northern Nigeria

The present day territory of Northern Nigeria came to life in history from the part of Hausa land, Fulani Empire and part of Borno Empire.

Hausa land and the part of Fulani Empire can be defined, roughly as the territory from Agades and South of Niamey to the north of Borno, Kanuri land to the East, Kaduna and Plateau States to the South and the land of Djerma and Songhai to the West.

Plate 4.01 map showing parts in Nigeria.





Land and survey dept Kano (2005)

Oral sources suggest that, at the end of the tenth century, there existed in Hausa land seven cities or states: Daura, Kano, Zaria, Gobir, Katsina, Rano and Biram. It is believed that Daura, the oldest of these towns was the cradle of Hausa civilization. Though, it never, for once became a political or commercial centre of Hausa land like Kano or Katsina.

The other important urban centres in Hausa land were Nupe, Zamfara, Yawuri and Kebbi. Though the city – states, from the beginning of their existence, had trade contacts with the outside world. The arrival of Islam in thirteenth century accelerated the growth of these urban centres and ensured their prosperity. Kano and Katsina viewed with one another as chief market centres for the trans-Saharan trade and latter, in the eighteenth century, was renown throughout Sudan as a centre of learning; Zaria became the chief slave raiding state. In the sixteenth century, the part of Hausaland was conquered by the Borno. The eighteenth century was the theatre of the wars between Hausa states.

At the beginning of the nineteenth century the nomadic Fulani under the tutelage of **Usman Dan Fodio** declared a Jihad or Holy war against Habe Hausa Dynasty and conquered almost all of the Hausa land and some parts of Borno and Sokoto, The little hamlet before, between **1805** and **1818** raised to the rank of major administrative urban centre, then Gwanda, Gombe, Katagum and Wurno also came to significant power.

Kano became the main international commercial centre of this region as some other towns evidently deteriorated during the Fulani Jihad. Trade contacts were established with Egypt, Tripoli, Tunisia, France and Italy and through them with Spain, Germany and countries of the North Sea.

Barth (1965) indicates the variety of goods imported through Sahara, the most important of them being copper products, sugar, gunpowder, textiles, beads and needles and export included skins and hides, and most important slaves.

The Fulani Empire established over the region of its influence with effective central

administration of the sultanate brought about relative peace and prosperity. The towns, which did not perish during Jihad, flourished during the rule of the new lords who themselves became quickly "Hausanized" occupied the palaces of former Hausa rulers, accepted their customs and style of life.

4.03 Urbanization in Northern Nigeria in Colonial Period.

The introduction of colonial rule and administration came to northern Nigeria from the south. In January 1900, Frederick Lugard proclaimed the British Protectorate of Northern Nigeria, but the effective control of the British over this part of the country was established after the military campaign of 1900-1904. The next sixty years of the British rule affects the urban growth and development of northern part of the country.

'Lord Lugard' found in Northern Nigeria, an organized system of Moslem Emirates formed from former Hausa States as a result of the Fulani Jihad. The States were administered by the Emirs as they were then called are the justice was delivered by Alkalis, who were learned in Shariah Law. More so, taxes were collected, according to tradition. In short, it was an organization acquainted with native population and its customs. The only thing needed was little adaptation required by European government based on British principles.

In 1914 Northern and Southern provinces of Nigeria formed a single country but they remained under different forms of administration: Southern Nigeria was governed with the aid of partiality elected legislative council while the protectorate to the north remained under jurisdiction of a governor.

The development of Northern Nigeria was however, closely connected with Southern part of the country, especially that the greatest efforts of the colonial government in the urbanization policy lay in the South-East of the country.

The introduction of railway line from the South brought the life to the trade contacts with the Northern region. In 1917 Kaduna town was founded as the administrative capital of the

Northern Nigeria. It took advantage of both the Lagos – Kano railway lines and Kaduna River, and became a major rail road and river junction. Its other advantages included a good agricultural soils extensive savanna plain land for urban expansion, and a good water supply.

The other existing town of Northern part of Nigeria located along the new railway lines developed quickly due to the trade with the South and overseas through ocean ports. Groundnuts, skins and hides, cotton and minerals were the main products exported from this part of the country.

In this approach, land or plots were allocated and furnished with access roads, drainage, water, sewage, electricity and variety of individual and community services. Particular attention was paid to locating projects within easy reach of major markets and employment opportunities, and to bringing activities and jobs to the project areas.

Secondly, the essence of "squatters upgrading" is to convert the existing traditional housing stock, particularly in the serviceable areas, relative to central locations where the residents can maintain their current accessibility to work, schooling, and micro economic activities etc.

But in addition to improving the dwellings, the aim was to include additions and improvements to services and facilities within the entire neighborhood.

4.04 Traditional Hausa Settlements in Nigeria

The indigenous traditional system in (Nigeria) can also be described as, the traditional way of living based on family organization, historically developed building typologies and methods, through the use of available local materials, climatic conditions and religious convictions of the inhabitants.

The 'core' of a compound is in fact an open courtyard; the family spends greater part of its life. This is the place where children may quietly crawl or play undisturbed by passing vehicles. There one may chat with the other members of the family, there in attached space the food is prepared and eaten, and there one may sleep during hot nights.

The division between external and internal spaces is definitely accentuated in Hausa Islamic architecture influenced by **Purdah** – the seclusion of women.

In the other parts of the country although religion does not impose such strict division that even there the function of the compound and its internal courtyard is well accentuated in the layout. The other characteristic features of Nigerian compound are that it grows together with the family. It may start as one or two rooms or huts and as the family size and fortunes increase the other spaces are successfully added. There is even an old saying that "the day you stop building your house you will die" popoola (1984). **John Turner** describes the indigenous system of housing as the process intimately related to the user's needs and finances, and vary much in the users control.

4.05 The Hausa people of Kano

According to oral traditions, Hausa people traced their origin from their great ancestor **"Bayyajidda"** who founded of seven Hausa states, namely:- Daura, Biram, Katsina, Zaria, Kano, Gobir and Rano, the great Kano people are known to have migrated from a village called Gaya these people (migrators) known as Abagayawa first settled in Dala area within Kano municipality and degenerated into compounds.

Kano people are predominantly Muslims and Hausa speakers, therefore, religion has a significant influence on their traditional, social and cultural set-up of the society as well as their architectural forms and concepts.

The main occupations in Kano are farming, trading, handcrafts, weaving and dying etc. The metropolitan city serves as the commercial nerve center of the state and the entire northern Nigeria. Its commercial and economic status has a lot of influence on compound houses.

4.06 Historical Background of Hausaland

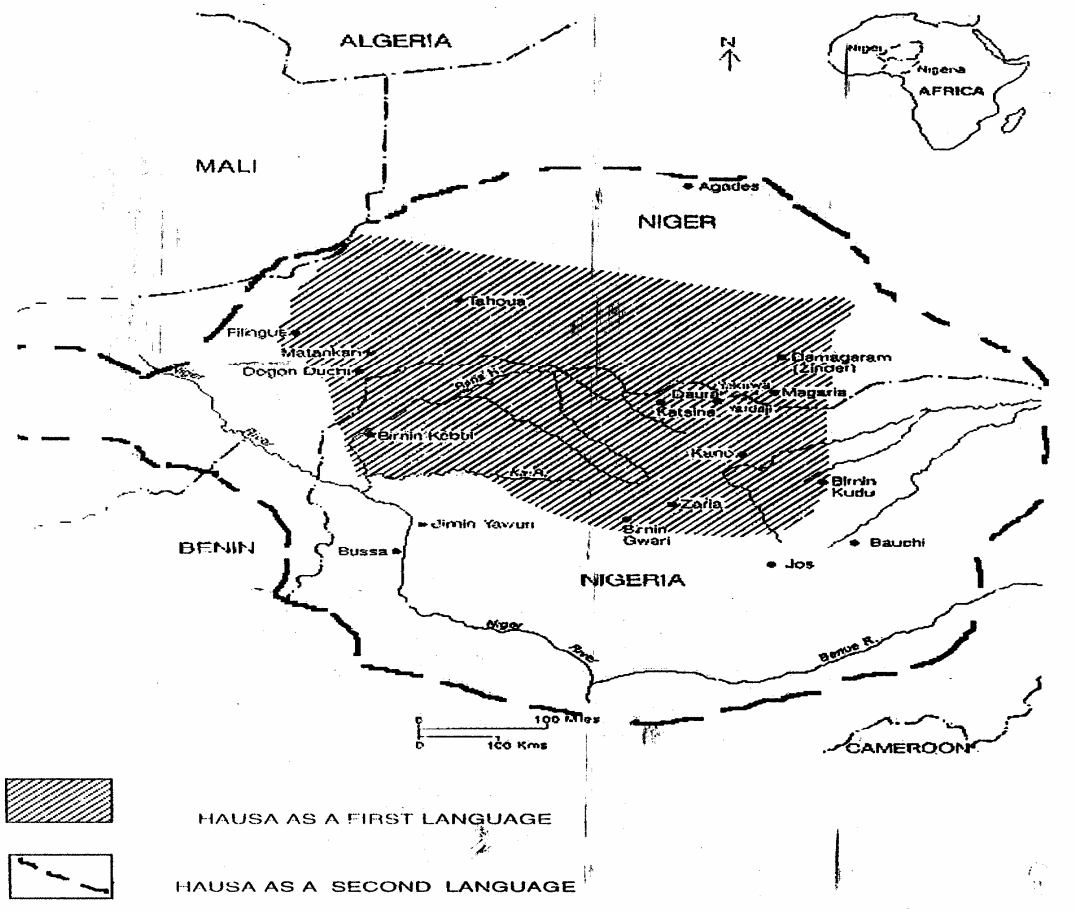
Hausaland, the present heartland of Hausa people is situated between the confluence of the Rivers Niger and Benue that is the Northern part of Nigeria; it extends approximately from

North-East latitude 3.5^0 and to the South East longitude 11.0^0 or 884sqm.

The Hausaland namely consist of the following states, Kano, Katsina, Sokoto, Jigawa, Bauchi, Daura, Zaria etc. Historical records of Hausaland is divided into four periods: the Habe Kingdom, which lasted from the 15th century to the end of 18th century, the Fulani Empire 1804-1900, the colonial period 1900-1960, and the period of the Independence of Nigeria to date.

The origin and early history of the Hausa people are obscure, but it seems probable that during the 19th century, several waves of immigrants from the East came into the area, which is now part of the Northwestern Nigeria.

Plate 4.02 Map Showing Kasar Hausa (Hausa Land)



Source: Umar (1997)

4.07 Socio-Cultural

The Hausa culture and tradition as in anywhere else has lately been subjected to western influence due to modernization and globalization. The Hausa culture of the people of the walled city of Kano Metropolitan is exemplified in the mode of conduct and behavior of the people; the culture emphasizes on family kinships, morality and the social ethics. In most households in the Metropolitan Kano, large extended families are seen living in one compound, this is one of the typical forms of Hausa culture and tradition, Dmowchowsky, (1990). However, presently at late 20^{th} century, the scenario is different, the houses are becoming nuclear family house alone. Quite a large number of houses contained 2-6 persons per house. Granaries, if any are always located in the central courtyard also the central courtyard has a pit latrine, washing place, rearing (animals) place, a well and other household activity space, the height of the compound boundary wall are raised high enough to prevent passers by from seeing what is happening in the compound, as there are openings on the external wall at high level window, Schwerdtferger (1984).

4.08 Early Birane (Cities) in Hausaland

The origin of urban centres in Hausaland is obscure. The early development of the Birni (city) could be traced back to the period of the Habe kingdoms. The development of the Birni, according to **Smith (1976)** was as a result of a centre of attraction becoming an urban settlement with a population comprising many groups of diverse origins lacking kinship relations one with the other. The growth of a birni (city) was therefore, as a result of immigration of groups of people and individuals into the centre of attraction rather than simply the natural increase of a community. The intertribal wars, during the Habe kingdoms also contributed to the development of birni (walled city) as a place of refuge against attacks from enemies. The development of the birni was therefore linked with the political status of the city state of the Habe kingdom in which Kano City is one of the largest and commercial

centres of the Hausa cities in Northern Nigeria.

4.09 Settlement Patterns in Hausaland

In considering an analysis of the spatial formation of the Hausa Housing Environment as well as its transformation, one requires an understanding of the settlement pattern in Hausaland. Okafor (1974) notes that the variations in settlement pattern tend to coincide with ethnic differences, thus ethnicity appears to provide a convenient framework. Hausaland in Nigeria is broadly within the region of nuclear settlements, with some major urban centres and few dispersed rural settlements.

The differentiation between urban and rural settlements in Hausaland is not decided matter. Since the people normally view the urban settlement as part and parcel of the surrounding rural areas and rural lifestyle, called Anguwani much like the rural communities.

Popoola (1984 274), reveals that the rural landscape is dominated by nuclear villages, with the possibility of some isolated compounds. The villages are usually old and some still have the remains of the old settlement walls. The isolated and dispersed compounds are associated with more recent settlements having strong link with some nuclear settlements not far from such dispersed settlements. There are basically three traditional settlement types in Hausaland. These settlement types form a hierarchy and will be discussed.

Kwauye

A. **Kwauye** (village) is only found in rural areas. An urban dweller will normally detest being referred to as from the kwauye (village) that is basically a collection of patrilinear family groups, in a neuclear hamlet, organized for agriculture. The farmland (gona) is contiguous and separated from that of other kwauyuka (villages) by waste (daji).

B. **Gari –** a gari is larger settlement, in the form of a township, consisting of distantly related family groups and some strangers. A gari will normally have a

collection of anguwanni (wards) consisting of homogenous groups, based on family ties or common religious or occupational roles.

Perchonock (1976), notes that the introduction of the use of iron into Hausaland was probably a factor in the growth of such towns. Two other factors associated with the development of garuruwa (towns) are:

i. The availability of extensive fertile farmlands for agriculture;

ii. Sites selected based on religious consideration. Some locations became centres associated with the cult of certain iskoki (spirits) and thus attracted larger number of immigrants who formed garuruwa (towns).

A gari (town) does not have wall fortification and it is likely, according to Smith, that "the fortification of some garuruwa were associated with wars post-dating the foundation of the states in Hausaland.

c. **Birni** – A Birni (City) is cosmopolitan with people migrating into the centre from diverse groups. It is always a walled city and its fortifications appear to have been an essential element in the emergence of such cities. The walls also encircled farmland, in case of protracted siege against the birni.

Some of the birane (Cities) became centres of political power or capital cities of the Hausa city states. A discussion on the birane (Cities) in Hausaland will involve a consideration of the political situation in Hausaland. Some traditional Hausa birane (cities) will be considered in relation to four periods of Hausa political history.

4.10 The Evolution of the Hausa Traditional House

The evolution of the house, in Hausaland, consists of four stages of development periods. Due to lack of written records and the destruction of the few records that existed, during the religious and intertribal wars, it is difficult to explain for certain the early development of the gida (house) in Hausaland.

1. Early Model,
2. Trans-Saharan Model,
3. Colonial Model'
4. The Modern Model

Explorers of this part of Africa observe that, the early Hausa gida consists of round mud huts with thatched roofs. This could be the indigenous building type in Hausaland, before the coming of Islam. Since the main occupation of the early inhabitants was farming, the gida had large granaries, cylindrical in shape made of mud on stone feet and with thatched roofs. Other models include Tran Saharan model, colonial model, and the modernization model.

4.11 The Forces of Modernization

In the traditional housing areas the forces of modernization have had no great effect on the traditional lifestyle and the house form. The houses in the traditional areas of Kano for instance, are courtyard mud houses with only one front entrance door through the Zaure. An earlier survey in Kano by **Daldy (1945), Denyer (1976)** reveals that for the whole of Birnin Kano the residential buildings are mostly of mud. The basic spatial organization of the housing environment is still the same but some modern services and utilities have been introduced into the housing environment.

Human Spatial Needs

According to Popoola (1984)Man's house for dwelling is created to satisfy certain human needs and such needs would include the following:

- Biological – to provide shelter against weather and other intruders.
- Social -To define certain human relationship pattern.
- Psychological – to provide such things as privacy and defined territory.
- Cultural – to satisfy certain human values which may be real or symbolic.
- Political – to provide status symbol.
- Economic – to provide financial benefits.

This needs form the basis of concepts of Hausa traditional residential architecture as establish through literature review. A house for dwelling has, to satisfy both the initial human needs and the additional need. Such additional needs may be as a result of changes in the original needs or just the addition of new needs.

Spaces, whether housing spaces or others, according to Popoola (1984.53), provides us with ways of identifying, reflecting, and acting on important issues in life. He has also noted that people living in fundamentally different environments learn to see space differently. One can therefore identify two parts to housing spatial needs.

The first part to traditional housing spatial need is the physical construction of space. This relates to the real physical space which may also be an enclosed space, a semi-enclosed space or an open space. Thus, it can be defined by an actual physical boundary. Man needs such spaces to sit, stand, and move around and to do other things, and unless he has this minimum space, his satisfaction and survival are endangered.

The second part is the psychological construction of space based essentially on perceived spatial needs which are culturally defined. This part relates self or personality to space and it can be defined in terms of security, privacy, density and others.

While the physical construction of space is real and can be quantified, the psychological is culturally defined and difficult to quantify. Space is therefore a psychological as well as a physical variable. Man needs space to meet certain physical needs, without which he may not survive the satisfaction of culturally defined psychological needs that have been created by him for his satisfaction as an individual and as a member of a cultural group.

The physical construction of space in relation to the housing environment is basically an objective spatial need. It can be defined and it can be measured, for instance, in terms of so much volume of space for standing, sitting or sleeping. It can therefore, be related as actual physical measurement, and it can be seen as the human spatial need imposed by nature.

The psychological construction of space by man is essentially subjective in nature. A small part of this subjective spatial need is measurable using probability law but a greater part is very subjective and immeasurable. Such subjective spatial needs are created by man, and are culturally defined. However, the designer and the planner can quantify human spatial needs in relation to a house for dwelling of a family. But in the case of Kano traditional housing area, it should be possible to see the considerable influence of the subjective spatial needs.

Doxiadis, has postulated that at the level of a house for dwelling the subjective need may take as much as 50% of the spatial needs. It is therefore, essential for the designers and planners of any housing environment to take into account both the subjective and the objective spatial needs of the people. In a natural setting, that is in a natural relationship network, man is motivated by both his objective and subjective spatial needs to create a housing environment that meets his needs and provides a good fit between context and house form.

According to Popoola(1984), In considering the housing environment of any group of people, one is not only dealing with the real physical spaces which are objectively defined but also with, as much as half of the total spatial needs that relate to the perceived world, which may be real or symbolic but which are culturally defined. The issue of a hierarchy of spatial needs which only considers the physical objective needs will not be appropriate, at least for Hausa residential architecture in which it is apparent to the culturally defined psychological spatial need of women's privacy is given a top priority.

In considering the housing spatial order, two aspects of the housing environment will be considered. The first is the internal spatial concept and geometry which gives that collection in order, and places the individual in relationship to the people who live in the house for dwelling. In the case study, ten traditional compound houses in selected places will be considered in relation to their internal spatial transformation.

The second spatial order is the external spatial order which locates the house for dwellings

houses of internal spatial order in public spaces. Kano traditional housing area for instance, gives an impression of orderly housing units.

Rapoport (1976), has defined spatial organization as the planning and designing of spaces for different purposes and according to different rules, which reflect the activities, values and purposes of the individuals or groups doing the organizing. Spatial organization therefore, stresses the relationship between people and things, people and people, things and things and the spatial pattern so formed.

One is in essence dealing with, firstly, the issue of spatial relationships in spatial organization, and secondly, the spatial patterns that are formed as a result of such spatial relationships.

4.12 Traditional Housing Spatial Morphology

Spatial patterns reflect social processes, and spatial relationships reflect social relations, Man's housing spaces are organized according to their context. There is therefore, a spatial organization which gives rise to a spatial order in man's housing environment.

It was noted that, man's spatial order is not universal since, according to **Rapoport (1976),** one group's order may be another's disorder". One way by which one can understand the spatial order of the house for dwelling is through the preparation of a pattern which may relate individual's behaviour or activity patterns within spaces in the housing environment.

A house for dwelling is orderly, or it can be made orderly. If there is no form of order in a house for dwelling, it becomes almost impossible to classify the components. By nature the house for dwelling is a composite issue and there is therefore the need to find out a system of classification that will include all the dimensions of the form and structure of the house. Such form of classification is essential for a systematic study of the structure of a house meant for dwelling because. House form is an expression of function, content and structure of the house for dwelling. According to Popoola (1984) Thus, a classification on the basis of the functions

and operations, content or elements, and structure of the order of the house will deal with the composite nature of the house and will be useful for the analysis of housing spatial morphology summarily presented as follows:

i. Classification by function and analysis

ii. Classification by contents or elements (to include fixed feature elements, semi-fixed feature elements) and

iii. Classification by spatial structure or orders.

While the traditional house can be seen in terms of the four parts, each spatial unit in a house can also be seen in terms of the parts. Here also one will need to consider the problem of the scale of observation.

People relate to the parts based on their role within the whole unit. Man, for example, acts and behaves in a different way if in a homogenous area, a central area, a special area or a circulatory one. Each part of the structure has to be understood in terms of their functions and operations and each part has to be related to the other parts to be able to understand the functioning of the whole. Popoola (1984) reports the following:

i. **Homogenous units:** these are areas which appear as its main parts. In a housing cluster the houses will form the homogenous parts, while in a house the bedrooms or sleeping areas will form the homogenous parts.

ii. **Central units:** these areas are those serving other larger areas all around them with special functions. The function of the Central unit would include social, producing, commerce, entertainment or recreational.

iii. **Circulatory units:** these areas make a provision for the movement of people, goods and information within it, as well as between it and other.

iv. **Special units**: Doxiadis defines these areas as those which are neither homogenous nor central, but form part of the basic circulatory system. For a house

the toilet and the kitchen would be considered as special areas.

However, it is regularly observed that this phenomenon is not observed in the contemporary traditional housing settlements that are being traditional in nature and content.

One may also conclude that, the spatial formation and transformation of the house goes through the growth and death process. As a result of inheritance sub-division/the growth cycle moves from the youthful stage of the nuclear family to the middle stage of the composite family unit and then to the mature stage before the units break up to start the growth cycles again. The spatial formation of the gida may go through a death process when the unit is left unoccupied for a long period. The buildings will collapse leaving heaps of soil. Such dead gida can however be revived when the children of the last owner inherited and occupy the site.

4.13 House Form Making Process

It should be noted that man has always been the "maker, the creator of his own environment, both at the individual and the social level, which is recognition that the environment is a human creation; that the environment is an artifact.

Such creative role of man makes man different from other organisms since "the extent to which we shape our environment is unique. The creative role of man also generates a network of relationships some of which are natural and others unnatural.

Rather than simply asking a question on what people do to their physical environment during the process of structuring it, which can be so varied that a generalization may not be easy, this part of the study will consider what relationship and possibilities man's creative role can generate. The ways by which man structures his physical housing environment, that is the organization of the production methods, create a network of relationships between man, the user, his housing environment and others who aid him in the creation process.

For easy understanding, six types of the relationships are considered under the group of

natural relationships, and one type of non-relationship, although in reality there could be a mixed-up of some of the types. This classification tallies with that of **Habraken** in which he has three individual and three collective types for the natural relationships and one general type for the non-relationship group.

A. Natural Relationship Networks – individual users, individual user type I – User Designs and User Builds.

This is the simplest organizational setup since man, the user, creates his housing environment. It is also the most natural and the most direct system of relationship that produces the simplest relationship network.

Man, the user, conscious of his needs, values and aspiration, translates such into a design proposal for a house. He then sets out to build the house for dwelling. But his design proposal is based on a pattern language which is common to the cultural group. The house is not designed first; since the drawing of the flat has no part in the process, but it is conceived as it is built, like a piece of modeling clay.

4.14 Constructions methods

A simple process of housing construction in Kano Metropolitan Housing areas includes the following steps:

- Land acquired is usually a portion of the family land that had hitherto been used as farmland.
- With a rough idea of what the first spatial arrangement of the new gida (house) will look like, but with no architectural building plan, the perimeter wall is constructed by the builder or the house owner. The wall will enclose the area for the gida (house) with some space left in front for the zaure. The perimeter wall is built first to demarcate the land required for the new gida (house) and to screen the interior space from public view.

- The first zaure, which has the only entrance door from the road into the gida (house) is constructed. If the owner can afford it, he builds two or more zauruka.
- Towards the opposite end of the zaure but within the perimeter wall, a rectangular building is constructed. This building may contain two or more rooms called dakunna (rooms) (singular-daki). The very poor man may build only one room – daki. Normally each wife requires a daki (room) to herself and the number of wives the man has may determine the number of dakunna (rooms) to be built.
- A small part of the perimeter wall is fenced up, with a door opening, to provide space for a pit latrine and a bucket shower space.
- A well is dug to provide the water for all the household needs. If there is no source of water supply for the building construction, the well is dug first, before any construction work on the site, to provide the water for the building works on the site. A built-up kitchen is uncommon; cooking is usually done with the Tsakar Gida.

Although the first stage of house constructed is completed when the family moves into the gida. The gida goes through a process of reshaping right through its lifespan sometimes involving major spatial restructuring. This aspect is what is now being termed as the transformation in traditional residential houses.

4.15 Hausa Traditional Building Forms, Materials and Construction

Basically, when any architectural piece is broken down into its elements, the same old geometrical shapes would result, yet distinction could be made into the manner in which these shapes are employed. In Hausa traditional buildings, mud wall and thatched roofs construction employs a variety of simple geometrical shape, such as circular, half spheres

cylinders cones etc., as practiced in modern contemporary architecture. These include subtle interplay of three dimensional shapes enhanced by light, shapes and shadow in modern approach, these applications could be seen in several forms. Space and organization building, forms are manifestations of continuous struggle to shape immediate environment to suit the cultural and environmental needs within technological means at disposal.

4.16 Traditional Building in Kano Metropolis

The construction of residential or public traditional mud house, building in Kano metropolitan city, is carried out by locally and skillfully trained craftsmen, who mainly use indigenous materials and traditional building techniques.

The art of mud building is an inherited craft, the older and skilled builders instruct only their own children from generation to generation. The method varies slightly from city to city i.e. Zaria – Kano **Daldy (1945).**

In addition, Islam has no doubt influenced the layout of compounds particularly in the urban areas of Hausa land. Polygamy and different mode of religious marriages have laid a great emphasis on complete or partial seclusion of women, which requires a high degree of privacy combined with genuine desire for security. These concepts have produced in the present compounds structure with several courtyards, segregating the spaces notably as the Haremlik area (women's wing) Salemlik area (men's wing), 'Zaure' (Foyers) usually surrounded by high mud walls. Similarly, the production and cost of traditional building varies enormously in terms of functions of the building, complexity in design materials and techniques of construction used, in the site location. The political or socio-economic status of the client significantly influences or rather dictates the choice of construction and finishing materials, Traditional residential building in Kano metropolis could be classified into the following:-

i. Private residential building
ii. Royal houses

iii. Colonial houses – Gidan Danhausa, Gidan Makama, Gidan Be-Minister.

iv. The public building, which comprises – mosques, prisons, market, schools, city walls and gates.

These typologies could be distinguished by certain characteristics ranging from their sizes, forms, and locations, the construction of these traditional buildings rest almost entirely with owners' occupants' initiatives.

The period between (1901–1940), saw the traditional 'Magina' fully participating in the construction of prisons, schools, hospitals, court offices, blocks and in addition, residential quarters. These quarters for European colonial masters are being delegated by the Emir or district heads. Hence, availability of materials and labour, is governed by their sizes, composition, and economic status of the owner or the significance of the building.

It is worth to note, that Hausa traditional building and technology is in the process of gradual change or transformation that the present system has provided a dignified built environment with many beautiful buildings of architectural merits, hence, people are making good use of foreign building materials, Sa'ad (1989).

4.17 Concept of Environment

The term environment is a very loose one. It is necessary to define it as a blanket term covering all phenomena external to man. Environment is being used and to confine oneself to that specific aspect while bearing in mind that other aspects of the environment influence the specific aspect that may be used.

Rapoport (1974) has defined environment "as a series of relationships between things and things, things and people, people and people." These relationships are orderly, that is, they have a pattern and a structure. While relating the environment to man, however, it is essential to differentiate between the external world of physical reality and the perceived environment. The differentiation between the external world and the perceived environment was first

proposed by Kirk in (1951). It differs from the early conception which related human behaviour directly to the environment. Kirk (1974) considered the external world as the 'phenomenal environment' and the perceived environment as the 'behavioural environment. Man's behaviour therefore, takes place within his perceived environment which is organized and evaluated within the phenomenal environment. Perceived environment is thus a part of the external world of reality, Popoola (1984).

Moughtin argues that "the way we see the world around us is as much a part of our culture as the way we dress or eat. A similar classification of the environment has been put forward by Rapoport in which he differentiated between the 'effective environment and the 'potential environment'. The effective environment is the total or all embracing environment and this will include the physical, social, economic, political and axiological environments. The potential environment on the other hand provides possibilities or cues for behaviour. The physical form and structures of a house, for instance is only a potential environment. When the term 'housing environment' is used, it should be seen as the aspect of the potential or perceived environment which provides cues for human behaviour.

It is however, recognized that the "physical environment that we construct is as much a social phenomenon as it is a physical one." The constructed world… is simply a particular expression of the social system that generally influences our activities and relationships with others. Such housing environments perform three functions among others: they provide the necessary behaviour settings, maintain the physiological state necessary to sustain life and behaviour and support psychological states, Popoola (1984).

4.18 Man and Environment Relationship

The relationship of human beings with their environment is a subject of widespread concern. Despite, the diversity and quantity of current investigations, certain central issues usually emerge:

- Human beings alter the characteristics of their environment by creating built forms. Altered environments or built environments operate reciprocally to influence the lives and actions of human beings.

In any issue of relationship, there are, at least, two interacting factors or forces. In this study one will need to consider the user and his house for dwelling. The tendency among house builders and designers of the housing environment is to see the relationship between the two forces as being essentially a one-way relationship. It is therefore, essential to "appreciate the complexities of the interactions we have with our physical surroundings.

4.19 Compound Structure

Kano traditional residential architecture can be described as an 'artwork' of man's struggle to solve his essential need for shelter. In a society with a specific type of family organization, distinctive economy, social and religious injunctions; the compound house serves as a local nucleus of most family activities for a systematic social, economic and religious interaction. Religious and tribal factors have a great influence in the traditional set up of the society and their general activities.

The planning and designing concepts are in conformity with the traditional setup of the local builders, the exaggeration of private and public areas within the compound that is based on religious and cultural norms.

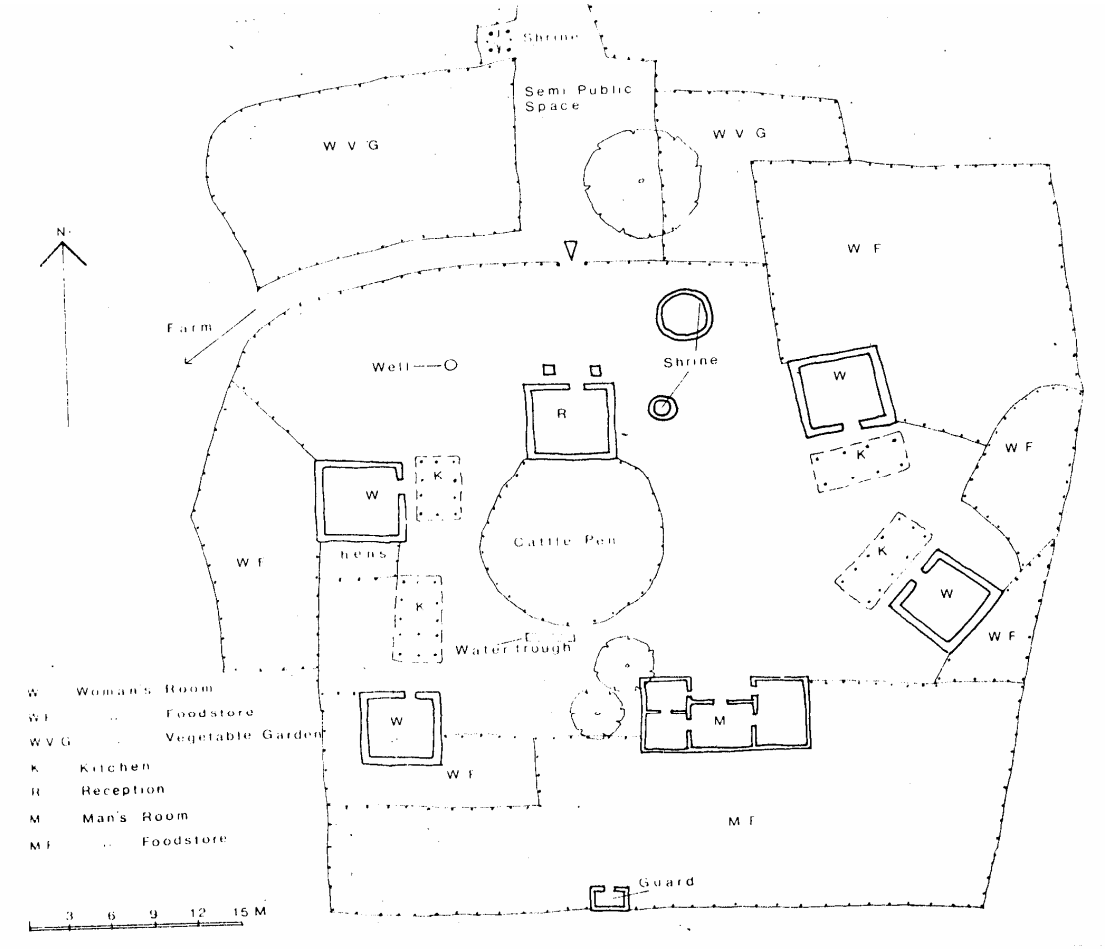
However, Sa'ad (1985) notes that the need for privacy is stressed in every compound. The high compound walls just as the "Ganuwa", physically and conceptually divide the "Birni" into ('Cikin Birni' and 'Waje'). This dichotomy is reflected in family compound houses into "Cikin Gida" (family) or (Iyali) wing. The Shigifa, the dominion of Maigida and the alien wing outside "Waje", are distinguished as private, semi-private and public areas.

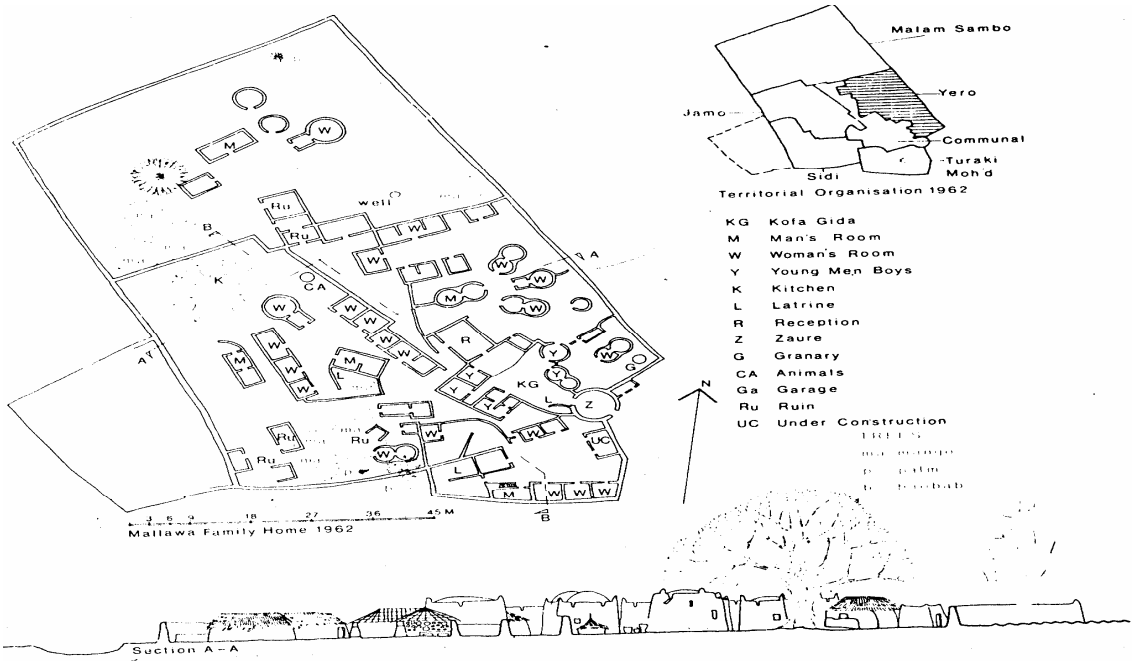
Similarly, the hierarchy is starting from the 'Zaure', which could be circular, square or rectangular in shape culminating into the minor, court "Cikin Gida". The Zaure (Foyer)

serves as guest reception area and functions as a link between inner court and the public world of the street. The semi public or the fore court occurring just between the 'Zaure' and Guest lodge or adolescent male children or (Servants) of the family. A semi private inner entrance hut to "shigifa" links the fore court with "Cikin Gida" which is the most important part of the compound open only to the compound head, male and elderly members or relatives of the family within the Cikin Gida there, may be household units in such a way that none transgressing into the privacy of others.

Despite the fact that; polygamous marriages, economic status and inheritance have no doubt, contribute a significant influence on the layout and transformation of residential compounds particularly in the urban areas of Hausa land, this lays a great emphasis on complete or partial segregation of family members accordingly.

Plate 4.03 A Typical Hausa Compound





Source: Sa'ad (1986) and Dmowchosky (1991)

4.20 Modular Concept of Building

Plan size and building height have no set of rules governing them. However, modular disciplines or concepts are conferred on the builder based on asset of preferred dimension, that is largely determined by the constructional processes, as reference model to the builder, the arches height for instance, is determined from shoulder of head height, while the complete height of a man with an unraised hand is usually measured by the height of a tall building. The maximum height of a single storey wall is sometimes determined by the height to which (Tubali) could not be thrown to the builder sitting astride the top of the wall.

4.21 Mud - Walls

As vertical elements of mud with thatch, grasses and other mixtures of the blocks are called Tubali, with slender or triangular shape of about 100mm-200mm and a height of about 300m. The mud walls are constructed with about 6 (tubalis) at the bottom and getting thinner to the top with two tubalis to ensure strength and stability. The wall achieves good thermal capacity at all seasons. During cold season interior is warm and comfortable, due to thermal ability of

the of mud wall. It is used in almost traditional buildings within the walled city of Kano.

The traditional tendency was to make walls thicker than its structural necessary, this was made partly to be on the safe side, because thick walls make inside room cooler partly because slave labour was cheap. A buttress (Dogari), is often added to wall when it begins to crack but is never included in the original design, Daldy (1945). Moreover, failures in wall such as cracks collapse or wearing is rarely identified talk less of taking preventive measures during the construction works.

4.22 Construction Methods

Various methods and principles are employed in construction of different types of structures which can be classified into two headings-

a. Temporary structures b. Permanent structures

a. Temporary structures

Cornstalk walls – theses are temporary walls made from guinea corn stalks that are tied together with bands of string and locally woven rope (igiya). These structures are usually maintained annually after rainy season for additional strength and stability.

b. Permanent Structures

Permanent structure shape made up of mud block/bricks Tubali, with (350x150mm) and tubali (100mmx150mm) sizes, the foundation is dug about half a meter (500m) depth to penetrate below loose topsoil. The Tubali is laid in course, each of which is covered with a specially prepared mud mortar for joining and bonding until the wall reaches a required height. The bottom is thicker with about 600mm width and getting slender to the top of about 200mm thickness.

These bricks are made from excavated earth mixed grasses (other ingredients) with water thoroughly mixed for few days later. The mixture is moulded into required bricks or Tubali left in the sun to dry before being used in any wall construction. See plate 4.03.

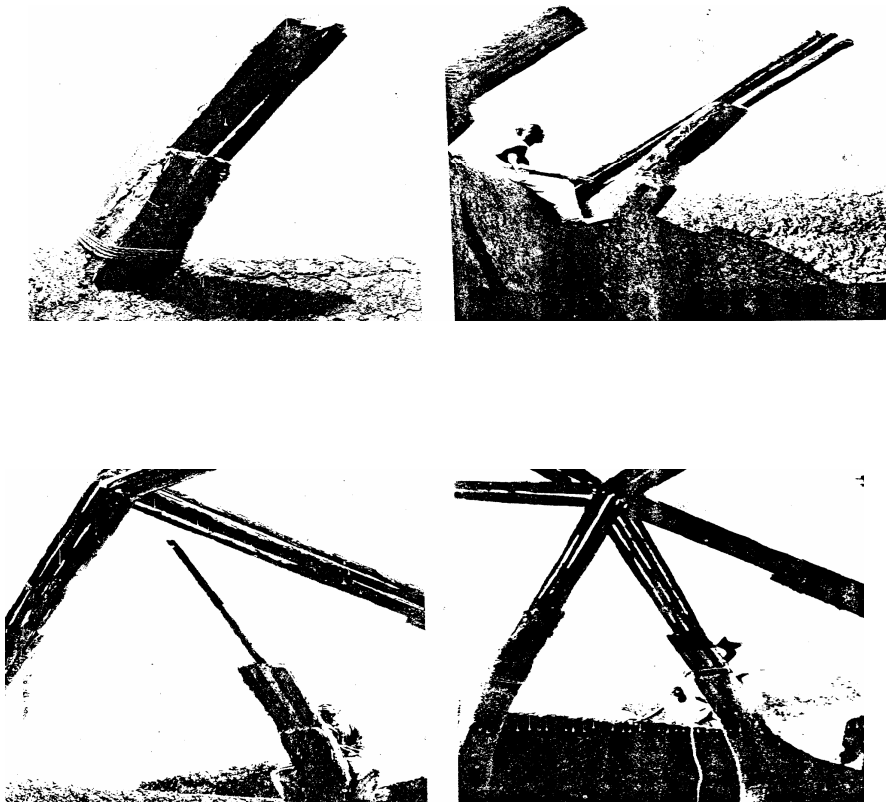
4.23 The Roof

The traditional builders consider the roof as the most challenging and rewarding part of the building. This seems to be justified considering their efforts. Technology and decoration that are applied to most basic types of mud roofs are formed by spanning at 1.8m wide space with azara supported at both ends by mud walls, wider span of 2.7-5m and this could be spanned by introducing corbels of mud at the top of the wall which projects about (45cm) to form the face of the wall again it is reinforce with azara rooms size that is further increased to 40 on by placing azara diagonally across the rooms or horizontally on the opposite span of the rooms, it serves as beam supporter for the large rooms of the roof which may be supported on a series of columns connected by azara beams in a grid-like configuration while intersects are filled with azara that simply spanned and trabeated.

4.24 Mud Roofs

Basically, there are two types of mud roof, which may be either pitched flat or domed shape. The flat roof is mainly constructed for rectangular or square room not larger than 3x4m. The palm or Azara beams are set side by side across opposite walls that extended progressively inward until the roof is covered by the grass mat or (Azara) which is spread, and covered with mud mortar of 5cm-15cm thickness. The external surface of the roof are then polished or finished with thin layer of water roofing plaster mixed with makuba, see plate 403:

Plate 4.04 Stages in the Construction of a Mud Roof



Source: Dmowchosky (1991)

4.25 Dome Shape Roofs

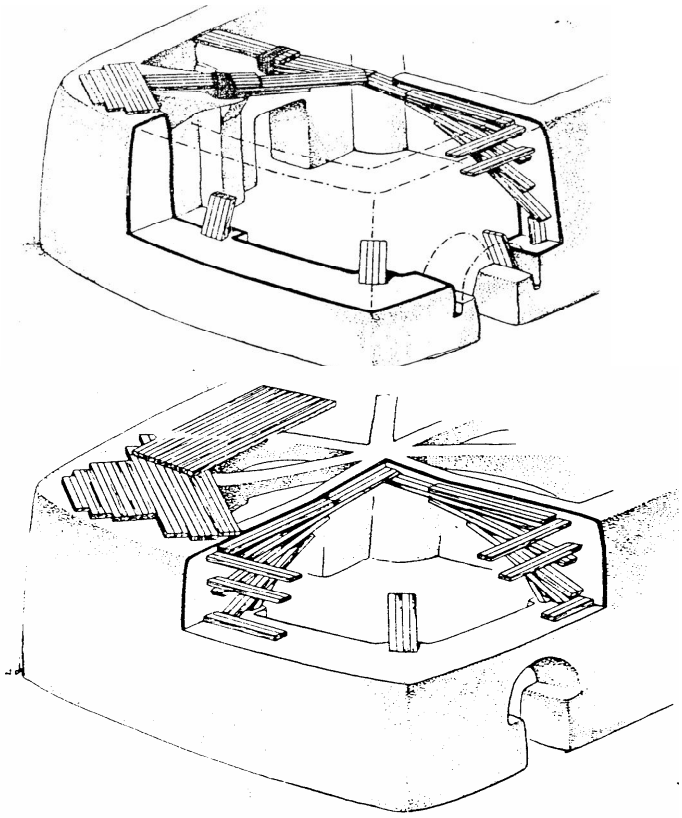
Larger room span, are covered with mud domes supported by wooden arches that sprang from the opposite walls. Open bays are laid out with beam and covered with grass mat (zana) with mud mortar, mud roofs are drained by sufficient spout, which are made of metal that projects outwards in order to prevent the splashing of rain water from damaging the walls.

4.26 Mud Arches and Piers

Mud arches and piers consist essentially, series of reinforced mud corbel, on top of one another which is supported on piers, to span spaces larger than 3.0m each that later (Kafi) be enforced or tied to proceeding one, horizontal Azara/biko is used to complete the arch, while vaults and domes that are of two or more arches is built at right angles to each other, the

diagonal length of Azara are laid across the corners of the room as a triangular platform is formed. The arches and beams form a rigid framework on which the azara (rafters) are placed, on mats and strain that are used to cover interstices (spaces) between the rafters and double with mud, the piers support the azara beams and vaulted arches to achieve structural stability, they break distances over the azara span that are focus for decorative motifs and sometimes grooved for visual or structural reasons, they are and surrounded by a simple capital consisting of two or more azara cobbles used in order to increase spacing between the pairs; Double beam is then made horizontally from cob of a pair to the other up to about 2.7m i.e. Emir's palace and mosque in Zaria, the arches described above do not only sprang from walls but also form pairs.

Plate 4.05 A Section Showing Reinforcement of Azara Beams



Source: Dmowchosky (1991)

4.27 Material and Constructions

The production and cost of building mud varies enormously, due to the function of the building material used, as well as technology and method of construction that are applied to the site location and design, political and socio-economic status, of the client significantly influence rather than dictates the choice of materials and construction.

Accordingly, Hausa people in Kano metropolitan have improved on the local and traditional on architecture using materials found in their locality, such as mud, azara, thatch etc. Although, the building process is dynamic; the present system has provided an eleveted environment with many beautiful structures and architectural merits, using locally acquired building materials such as the followings:

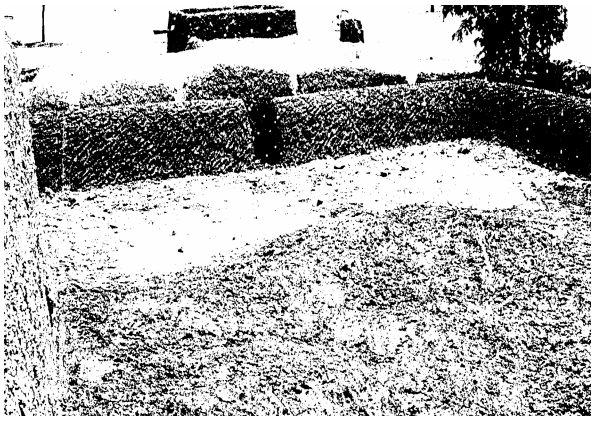
- Earth and clay — chafe plaster
- Azara beam and stick — stone or marmara
- Corn stalk and thatch — reeds and grasses
- Tubali and mortar — rope, corn mat, asabari
- Water for mixing — white wash/red earth.
- Makuba — Brown Material

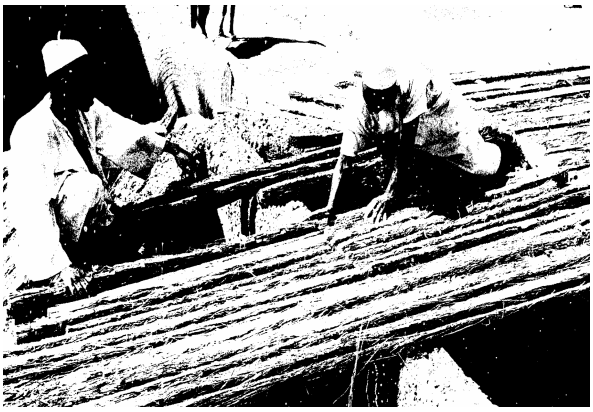
Plate 4.06 Mud Bricks Tubali and Azara





Source:Dmowchoesky (1991)


Source:Dmowchoesky (1991)

4.28 Earth and Clay

These materials have been in used time immemorial in the construction of walls, roofs and floors. The materials are excavated from the nearest bored, pit or subsoil near the building site, derived from genuine cornstalk and thatch (zana) used in construction of temporary walls. These types of structures have to be maintained periodically especially after rainy season.

4.29 Decorations

One of the most striking features of Hausa architecture is described as external decoration in building, which usually surrounds doors, and outer faces of the wall facing the street.

These features of traditional architecture are divided into four categories:

a. The first one is made by modeling the fresh mud plaster manually into Arabesque feature.

b. The second is by cutting ornament into wet cement or mud plaster

c. While the third is by plastering the wall with makuba deriving from (Dorowa) and

d. And finally the fourth is by painting on plain white wall.

These features of the traditional architectural masterpiece are believed to be the demonstration of wealth and social prestige that naturally attracts the attention of every visitor; it also stimulates a visitor to want to know and speculates about their origin. Also seems to be appreciated for its own sake of inspiring source of the private pleasure.

4.32 Horizontal Features

Hausa compounds are always surrounded by vast, almost unbroken stretches of walls. The relative dimensions of the stretch to the rise of these walls are constructed of mud such that, the horizontal is often excluded by these compounds by introducing build eases and grooves. The traditional builders, hence, manage to break the monotony of these vast horizontal

stretches by bending the member inside the mud walls as hidden supportive columns.

4.33 Vertical Features

These can be compound walls, or city walls, with enormous height to provide privacy for indoor; and security for the inhabitants, who are mostly wealthy individuals or royalist. They also express power or status of the occupant. The city walls, gates, also towers up massively and express the power and dominion of the state over the surrounding lands. The ‘Zaure’ built on generous proportion and richly adorned with decretive motives, which celebrates the entrance to an abode.

4.34 Other Salient Features

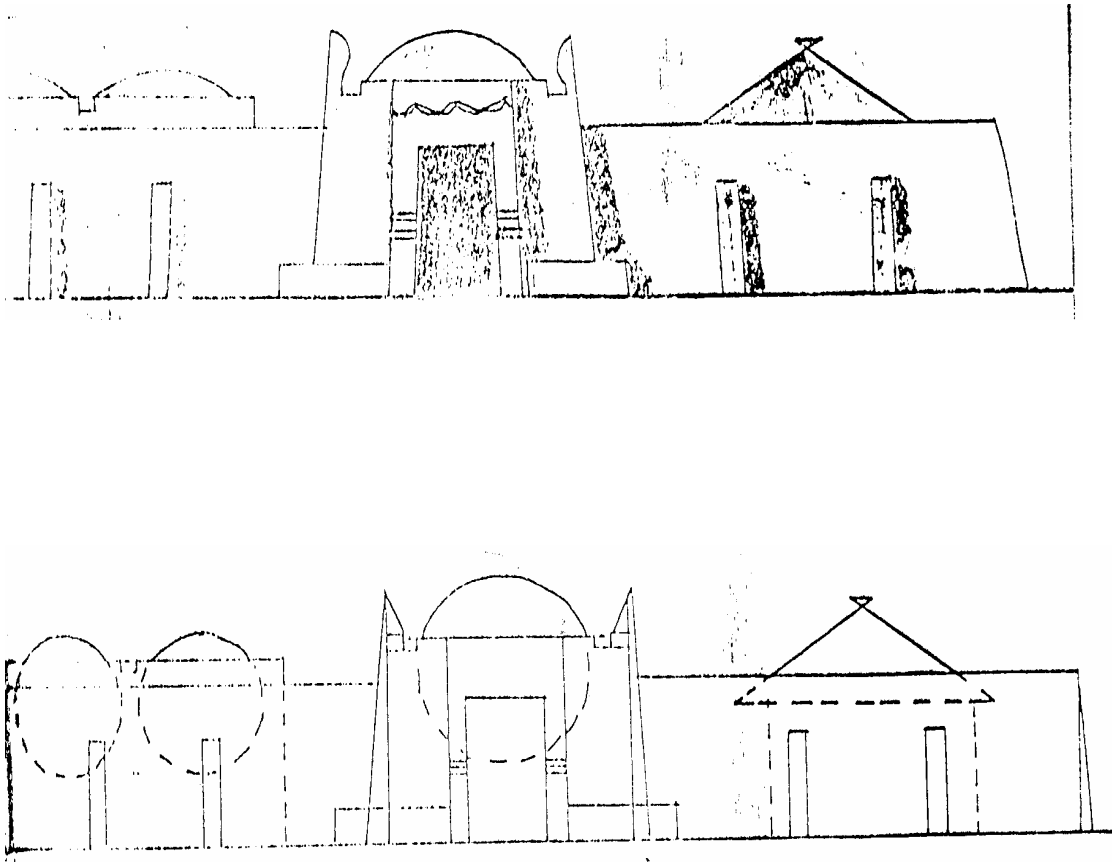
Pinnacles ‘Zankwaye’ are inevitable features of Hausa architecture coming in different shapes and sizes and imparting character and beauty to traditional building. They were originally reinforced projections around which ropes over were hitched to aid builders in climbing up unto the roof during construction or repair works. Over the time the pinnacle (Zanko) has come to be accepted as a mark of aesthetics without which the building is considered incomplete (Sa'ad 1986). Similarly, a building without (Zankwaye) is described by a master mason as a bull without horn, a man without a hat, a chief without his headgear, among other things. Pinnacles reflect the mood of a building or the builder by being exquisite elegant, brutal, sharp or dull.

Joisting out from the surface of the parapet Rawani are the tabular or semi-tabular water spouts (indararo) made of metal or asbestos cement/fired clay, casting shadow on wall with retreat of the day.

The ‘Dakali’ is a solid seating platform running outside and along the base of the wall especially those at frontal face of the house or Zaure, when employed along the entire facades of a compound, the impression on a platform upon which the whole compound rest is excluded.

Openings- The needs to abate the effects of intense isolation and harsh harmattan wind indoors, coupled with the need for visual privacy, have greatly reduced the size of openings and the use of windows in traditional Hausa buildings in Kano metropolitan and its villages. The sustenance of habitable indoor temperature is not overtly dependent on ventilation, but most on thick mud walls. Air exchange through windows only becomes necessary to mere slits or punctures in the wall, which takes decorative, shapes or replicated to form screens. Doorways are usually rectangular except in some ostentatious instances where or when more monumental are employed.

Plate 4.07 A Typical Hausa Building Exuding a Subtle Interplay of Three Dimensional Shapes



Source: Sa'ad (1986)

4.35 Motifs

Hausa building motifs symbolizes the climax of the feeling of celebration that reigns inherently in a traditional builder at work. Being expressively of man and nature, these motifs are done with much relish and colour as the painter, which shows on his piece of canvas. Motifs could be mounded on belief patterns impaled or scratched out once painted or textured with alternation of smooth and rough finishes. They are mainly focused on the vault: piers, pinnacles, zaures or interior walls, and around doors and windows, The entire front facades are sometimes completely decorated with motifs. Hausa motif could be categorized into four classes by virtue of their origin as follows: **Sa'ad (1989).**

a. The abstract geometrical patterns – triangles, circles, squares, rectangles and the rest employed in repetitive and symmetrical designs.

b. Faunal and floral motifs thought, Islamic influences have imposed inhabitation in the representation of animal and human figure the practice still persists.

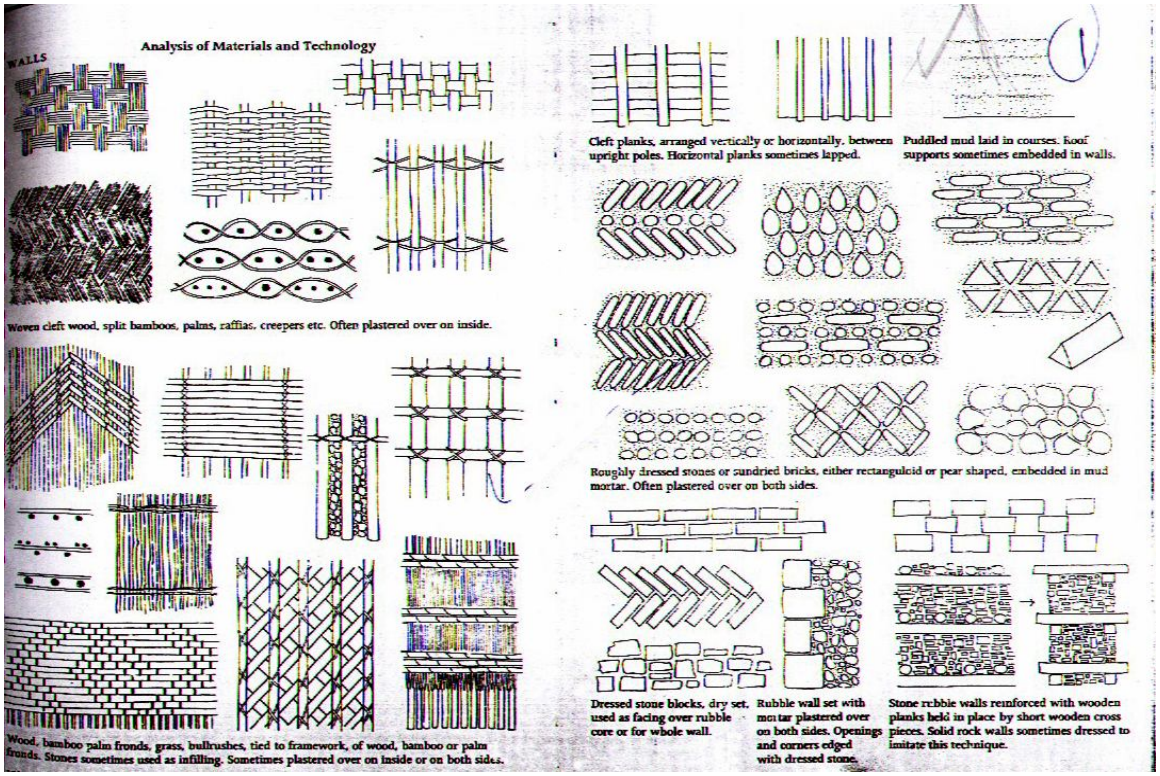
c. Actual objects – examples of these are the Qur'anic slates, kettles, knives etc.

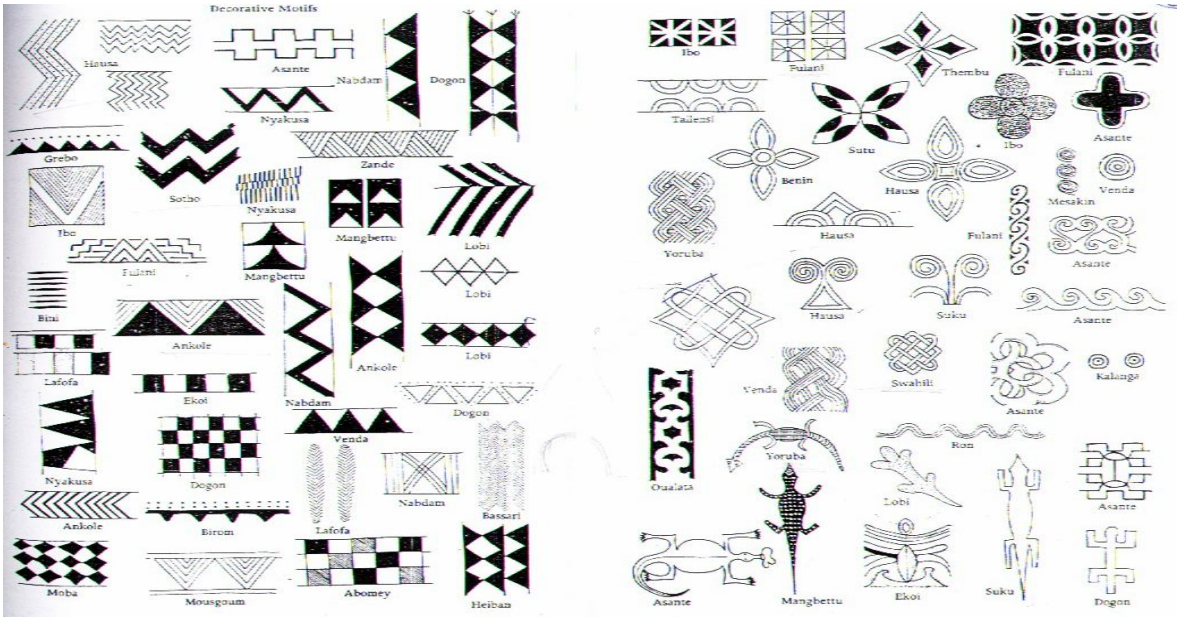
d. Calligraphy – inscription in Arabic are the most common types – other motifs include mythological or the temistic origin, good example of this motif are displayed in the emir's palace of Daura and Kano.

4.36 Interior Forms

This documentation may sound incomplete without mentioning the interior form of Hausa buildings. It is generally characterized with vaults and piers decoration on walls, fishy shadows slits and punctures archways and motifs in various sizes and proportions to interact and impress on the beholder of the awesome qualities of the interior space.

Plate 4.08 Motifs and Decorations in Finishings





Source: Sa'ad (1986)

However, chapter five will proceed to present the study area and general data collected; the aim is to build a data base which can be statistically and logically analyzed, and this is largely to address the research questions set out in the aim and objectives. Finally, it explains historical and physical characteristics of some selected wards.

The findings are later considered together in a short comparative study, in an attempt to propose a design theory and data for contemporary house and identify its potential building material and construction technology as contained in the subsequent chapters

CHAPTER FIVE

DATA PRESENTATION

5.00 STUDY AREA:

The first task in the study was to verify the definition of the boundaries of Kano metropolitan under statuary law of KASSEPPA (Edict of no. 13 of 1989), which support the identification of sample wards within the jurisdiction of Kano Metropolitan Area (K.M.A).

Kano state lies between latitude $10^0$30' N and 13^0 N, and between longitude 7^0 40'N, and $10^0$35'E urban Kano (metropolitan) lies on latitude $12^0$03N and longitude 8^0 32'E and on 1,549 feet above sea level as put by Trevallion (1963). He also observes that this phenomenal growth and transformation is a continuous process, that greater Kano metropolitan should be anticipated

Indeed by the time colonial masters came in early 20^{th} century, what constituted Kano city and its environ virtually encompassed by the city wall was contained within 17.5 sqkm. Today, Metropolitan Kano is contained within 60 sqkm including the declared urban area in accordance with Land used Area(LUA), while the built up metropolitan is contained within 48sqkm Marafa (1991: p.23-24). See plate 5:1

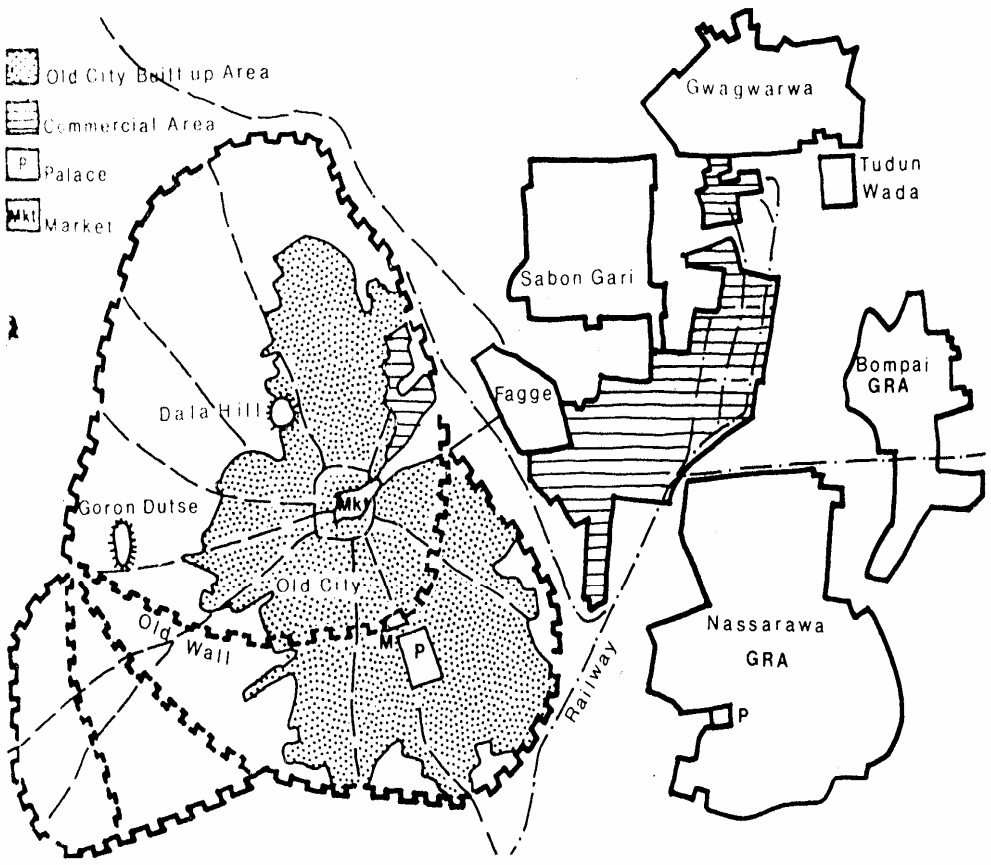
According to Zubairu (2004)**,** the city is located in Northern part of Nigeria – on Latitude 12^{0N}02N' and longitude $8^0$32^{0}E, and it is approximately 400km north of Abuja the Nigeria's capital of, Kano Metropolitan lies on altitude of 450 metres above sea level. It is about 300km from the boundary of Sahara to the North-East, there are two prominent hills within the metropolitan city Dala and Goron Dutse hills, climatically it is influenced by the tropical continental climate with a mean annual temperature of about 20^{0c} and an average annual relative humidity of 50% with 2% marginal spatial variation.

Similarly, Umar (1997) notes that the modern Kano Urban Territory covers an area of about

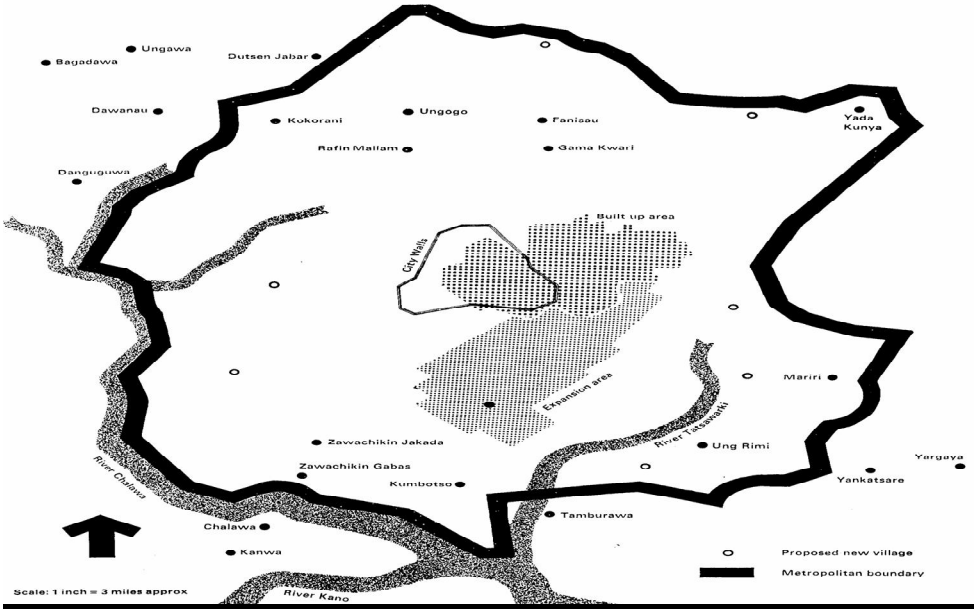
170km^2, approximately 15% of this area (about 2500 hectares) form the gross residential area of Kano Metropolitan, which accommodates a population of almost 6 million (1991 census). Physically, it is composed of 2 main areas; namely the Birni or Cikin Badala (walled city), Wajen Badala as (outside city) the township.

The suburbs or Wajen Badala settlements includes several suburbs to all both the cardinal axis or North, South, East and West of the walled city. The oldest is the suburbs of Fagge established in the 12th century, as a camping ground for Northern Traders of the town due the North of the Sahara. It has been and it is still inhabited mainly by Hausa people including many who migrated from the walled city.

Plate 5.1 Greater Kano and Metropolitan Base Map



Source: Umar (1997)



Source: Umar (1997)

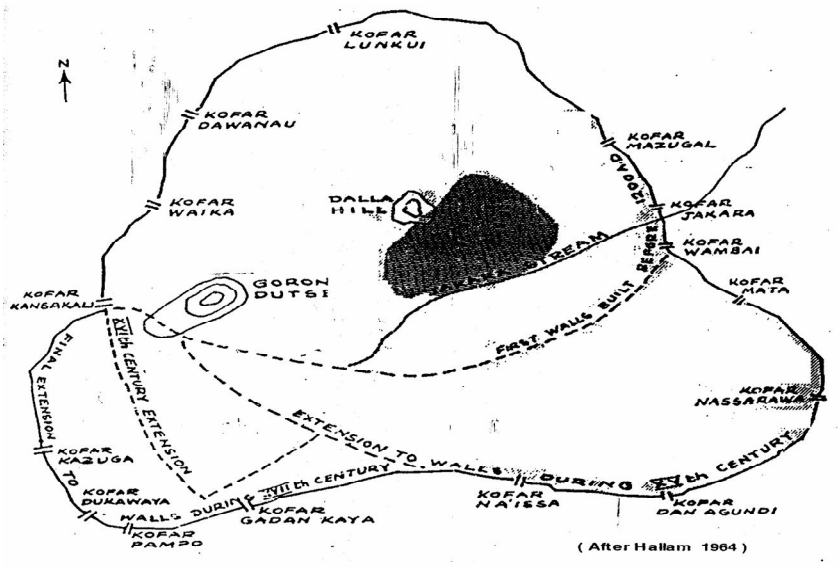
The Sabon Gari suburb; which was established in 1914 to cater for the people that are mainly from the southern parts of the country who came mostly with the arrival of the railway services Frishman (1977.98) is still inhabited by ethnic tribes from various parts of the country, Zubairu (2004).

Other suburbs include, Tudun Wada and Gwagwarwa and their recent squatter extensions of Tudun-Wada and Dakata Main (1990). Although these have a mixture of various ethnic groups; the Hausa are still the pre-dominant inhabitants, Umar (1997 p44).

In recent years, Kurna, Rijiyar Lemo, (the North of the walled city,) have grown as contemporary residential areas as a result of Government's Physical Development Plan in the 1980; under the greater Urban Kano Development Plan.

The township consists of the suburbs of Bompai and Nassarawa to the East of the walled city, and which constitutes the former colonial seat of government Included also in this area are the former villages of Gyadi-Gyadi, Hausawa, Hotoro, Tarauni and Naibawa to the South – East, In addition, there are other new residential areas of Hausawa, Sheka, Massalachin Murtala and Sharada to the south-west of the ancient city.

Plate 5.2 Kano City Wall Growth



Source: Travellion (1960)

Kano is the primate city of its economic region; it is the largest town in Northern Nigeria and the third largest town in the federation of Nigeria. It's the capital of Kano state, which was created from the defunct northern region of Nigeria. In May 1968, the regional structure of the country was dismantled and in its place, 12 states were created to constitute the federation units of Nigeria. From that date up till 1991, the state had 4 Emirates, viz: Kano, Gumel, Hadejia and Kazaure emirates. This was a structure upon which the native authority was built. However in 1991 another exercise of state creation by the Federal Military Government divided the state into two equal parts i.e. Kano state and Jigawa state. Furthermore, in an efforts to ensure rapid development of the rural areas, and to bring the people nearer to the government, the Rimi and Abacha Administration in 1982 and 1993 respectively, created additional local governments Fatima (2005).

Kano state has forty four (44) local government areas with a total population of 6,876,507million going by the 1991 National Census; this makes it the 2nd most populated state in Nigeria. It's boarded by Kaduna, Katsina, Jigawa and Niger Republic, due south and north respectively.

The phenomenal growth (see plate 3.09 both real and anticipated), has influenced the preparation of **Trevallion** plan in **1963** (a 20years development plan 1963-1983) with a view to setting in place a statutory framework that would guide, influence and control the development of metropolitan Kano. However, the desired goal could not be achieved due to lack of proper and effective implementation of this plan. The establishment of British Military Administration in 1903, and the continued influence of the colonial administration as well as the eventual attainment of Nigeria's political independent in 1960, introduced a new focus outside the walled city of Kano.

This and little the immediate effect upon the trend of physical development, had no doubt acted as a catalyst for development for non-Hausa speaking people in the later year as well as outward expansion into adjoining villages in adjacent local government, such as Fagge, Nassarawa, Ungogo, Gwale, Tarauni, Kumbotso, and Dala. Presently, metropolitan Kano consists of all lands within the radius of 32 km from Kurmi market according to edict No. 15 of 1990. In addition, the edict further classifies all lands within a radius of 16km from each local government head quarters outside Kano metropolis as urban land (Kasseppa bye laws 1990).

5.01 Spatial Organization

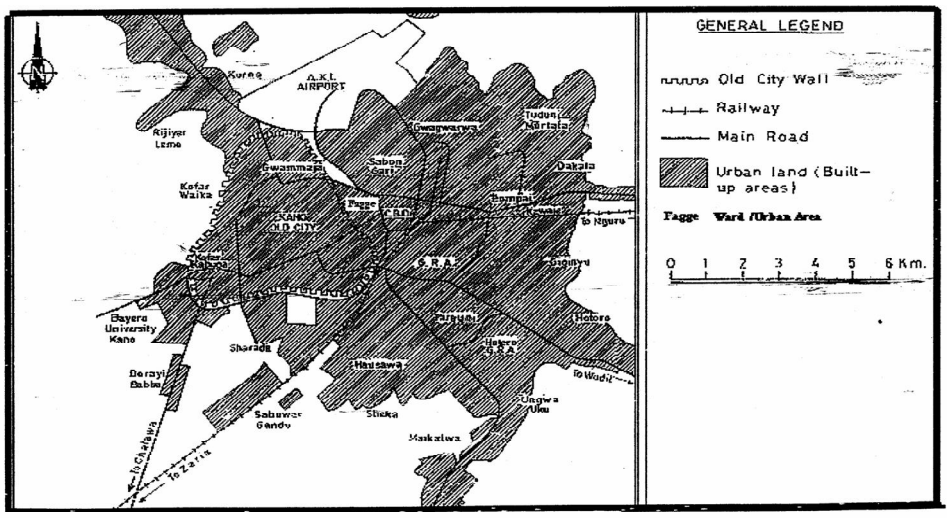
To determine the extent to which the Hausa traditional architecture has been transformed as well as its physical spatial growth and changes. And also determine to what factors have influenced these changes, it is necessary to evaluate the past. Spatial growth begins in 15th century during the reign of Rumfa; ten wards were created namely – Zango, Jingau, Aheshe, Madabo, Darma, Makama, Chediya, Dama, Cigari, and Shehima. Within this broad section there were sub-sections with distinctive characteristics sub-divided into 125 wards; which constituted four districts (Fukoki) North, East, West and South that were headed by a district head that receive orders from the Emir as an administrative area. **Liman (1976).**

However, with the coming of colonial masters during the regime of Abdullahi Bayero around (1903-1926) the following quarters were established: Sabon Gari, Nassarawa, Brigade, Bompai, Tarauni, Giginyu, Gyadi-Gyadi, Kurna, Sharada, Tudun –Wada, Dorayi and Challawa. Each was established under a specific circumstance and the settlements were outside the traditional city wall (Ganuwa) which was to be studied as the Mian areas where transformation was conspicuously evident. More districts were created with each division having at least 25 wards under its control. They include Dala, Wambai, Galadanchi and Dan Agundi Quarters. These wards were established due to the increase in population explosion and commercial activities resulting in the creation of new settlements outside the city wall. Presently, Kano Metropolitan consists of over 200 registered wards within and outside the settlements **Kwalli (1994).**

The city of Kano in the olden days was fortified by high reaching walls punctuation in its continuity by eleven gates. These walls now make a distinction between the old city and the new city settlement (cikin gari and sabon gari) constitutes six district zones of present day Kano metropolis. Through these gates run major roads (Gwadabe), which converge at the hub of the city characterized by the palace, court, civic center, open square, markets, mosques in some cases, some cities are bifocal with palace and markets as the foci.

Similar roads and alleys (Hanyas) spring from these major roads forming a profuse network of roads, which terminate at open space known as neighborhood culture centers (Dandali). The Dandali is the breathing spaces of a close knitted system of compound serving as spaces for parking vehicles, praying, trading, cultural performance, meeting and relaxation under canopies formed by trees, see plate 5.03.

Plate 5. 3 Kano Urban Areas 1994



Source: after main 1988: Liman 1991 & Umar 1997,

5.02 Climate and topographical factors

The state has an arduous climate, with relatively wide and rapid changes in temperature and humidity. It consists of three different seasons (i.e. harmattan season, rainy season and dry seasons), the harmattan season is characterized by sandy and dry wind, blowing down from Sahara. The average temperature tends to drop during the harmattan periods, because from December and to the end of February, its generally cool in the early morning and evenings. The dry season usually occurs from March to May and it is followed by a rainy season last to September.

Annual rainfall ranges from over 1000mm to the extreme 500mm a little over than 800mm in the extreme north; mean temperature ranges from 26-33. These climatic variations have significant effects on the life style and activities of its inhabitants and also on the building materials and construction techniques of traditional residential buildings as well as the overall build environments, which the study will attempt to analyze.

5.03 Climatic Condition

The variation of dry season and wet season basically expressed the climatic condition of Nigeria. The seasons vary between the different zones of the country, depending on the

movement of air mass. Kano state falls mostly within the Sudan Savannah Zone bounding on the south and the Guinea Savannah Zone. It is a semi-arid and region lying very close to the Sahara Desert (about 800km away).

The two climatic seasons are characterized by the hot, rainy season and the cold dry season. The hot season ranges from May-September. The dry season deteriorate and characterized by the dust haze known as the Harmattan which affects visibility between December and February.

5.04 Temperature

The temperature of Kano state ranges from 33^0c and 15.8^0c. It falls as low as 10^0c during the Harmattan between December and February and the mean annual temperature is approximately 20^0c. Similar it is experienced during hot, wet and cold dry seasons. During the dry season, the days are characterized by cloudless sky and hence, intense solar radiation, subsequently, heat discomfort. During the harmattan seasons, the days and nights are cool and cooler respectively.

Nigeria lies between Lat 4^0N and 14^0N of the equator and 3^0E and 15^0E of the meridian. Annually, the sun is vertically overhead on two days (i.e. March 21st and September 23rd). Kano state being within the tropics, the mid-day sun varies very little from its vertical position at noon day. Days and nights are virtually the same throughout the year. Since the sun rises and shines in a relatively vertical path, refracted sun light that is usually received is short. The result of this direct sunshine, consequently causes; intense, glare, discomfort and unpleasant situation.

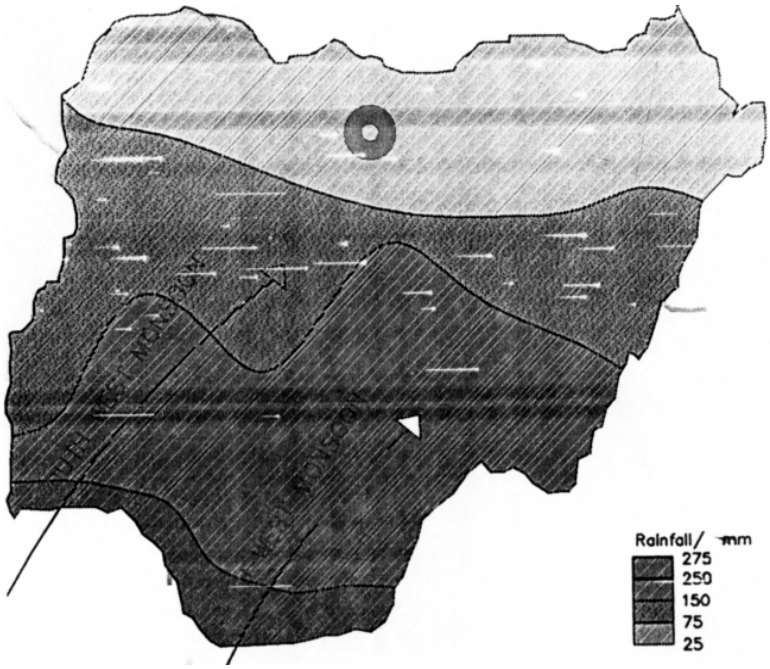
Therefore, sunshine affects the choice of building elements as shading device, detailing and finishes.

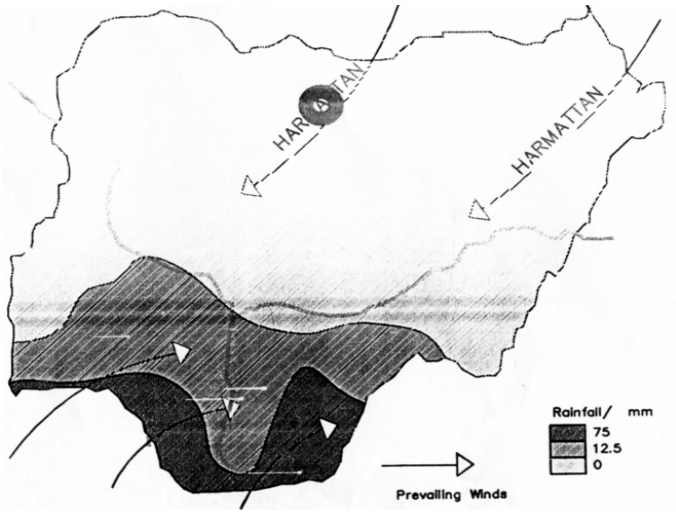
5.05 Rainfall

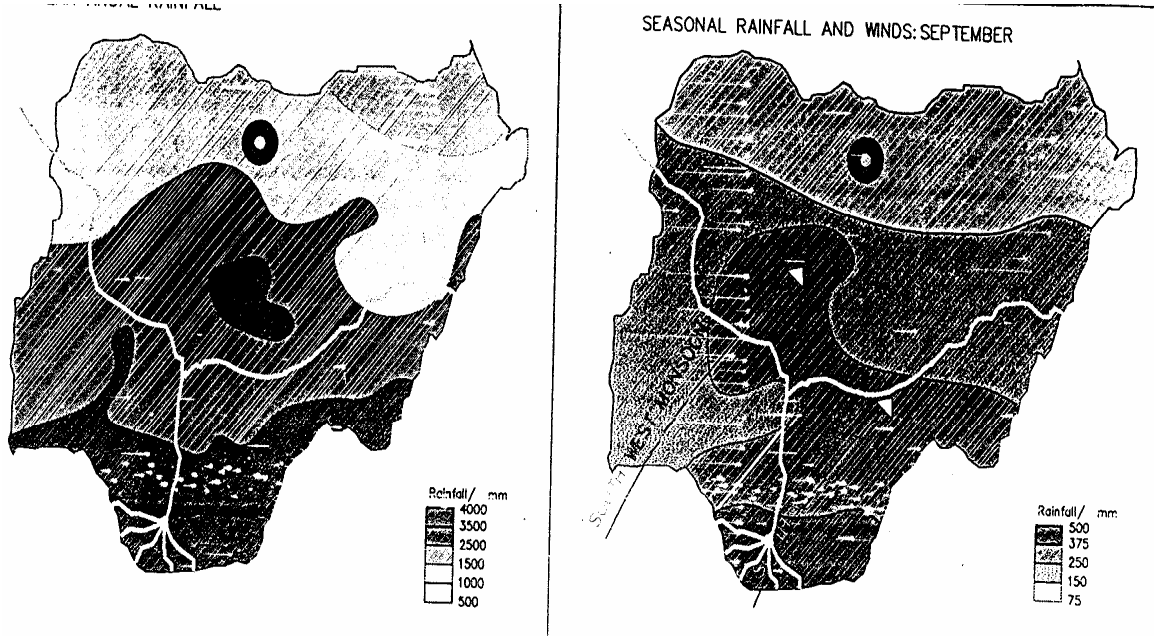
In respect to Nigeria in general, annual rainfall declines inland from the coastal region to its

lowest in the northern boundary. Wet season in Kano state usually starts by late March and sometimes ends early in October. It used lasts for at least four months, with an average annual rainfall of between 500mm-1200mm which is similar to that of Jigawa state. Rainfall variation in Kano State is normally lowest between November – March during the cold and dry season. And it is usually Highest in August with possible floods occurring along major streams, see plate 11.

Plate 5.4 Kano Seasonal Rainfall and Winds







Source: Metro Dept AKIA (2005)

5.06. Relative Humidity

In Nigeria, coastal regions have the highest relative humidity throughout the year. This decreases northwards as the influence of the wet southeast decreases. Around August, the highest values of about (80-90%) and (76-86%) are found in the Southern and Northern parts of Nigeria respectively. While between November to March, the lowest values of approximately (60-80%) and (10-30%) are found in the South and North respectively. Kano state being Northward has relative humidity that decreases firmly and also unexpectedly with seasons. However, around January/February, the lowest values of about (10-20^{0}c) are found.

5.07 Sun Pattern

Sunshine: There is no significant variation in the hours of day light and darkness in view of the location of the site in the tropics where the sun shines for about twelve hours daily.

For more than 95% of the year, Kano Metropolitan experiences a relatively uniform spilt of 12hours of darkness. A minor variation of 35 minutes of daylight of darkness could however occur when the sun is overhead at the two extreme tropics of Cancer and Capricorn in June and December respective. The sun always rises at the down of the day, from the eastern part

of the site and sets at the western part. Daily sunshine hours are affected strongly by the seasonal characteristics of the atmosphere attenuation by cloud and rainfall. Hence in the month of November through January, sunshine is experienced of about 9 hours daily.

5.08 Wind Pattern

The prevalent winds in the area are south west and north east trade winds. As a result of the precedence of these winds prevalence, building roofs in the metropolitan city are normally designed with enough over heat to reduce the ripping effect of rainstorm and wind force. Also building should be designed to take advantage of the prevailing wind direction. In Nigeria, there are two most prevalent wind masses, first is the Northeast (its variant are North and East winds), second, is the Southwest (South and West winds). These masses are most prevalent in the southern region. However, the former originates from the Sahara Desert hence, carries dry dust (15-45%) of the winds blow from the North during harmattan, while the latter is from the Atlantic Ocean with moisture and rain.

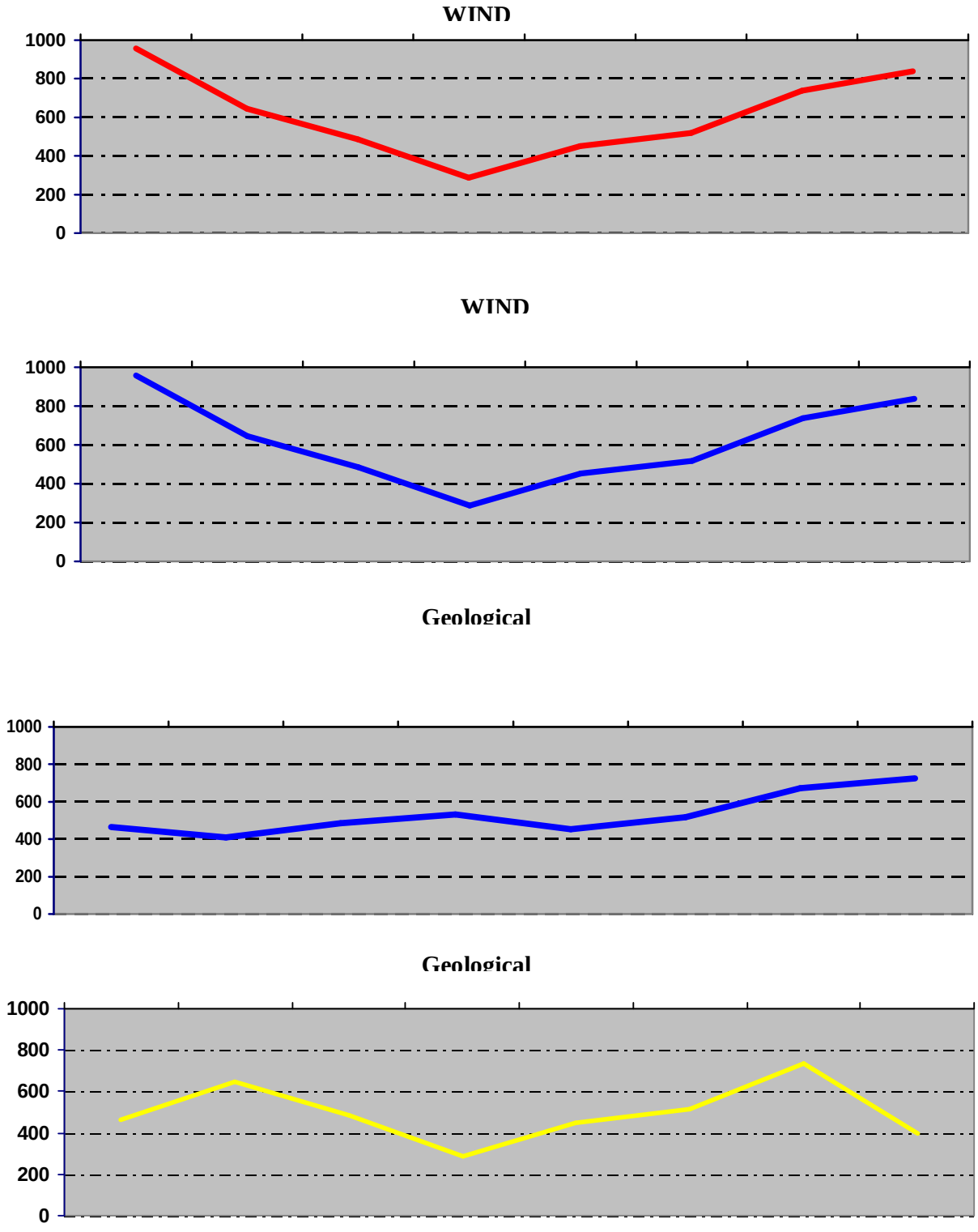
5.09 Vegetation

The vegetation of Kano region is predominantly made up of mixed Sudan (Savannah) woodlands and partly semi-evergreen forest in the North and Southern parts of Kano state respectively. Other areas comprise of scattered grasses and shrubs. As such, where the terrain or soil type is unfavorable, only a few trees are adapted to such condition.

5.10 Geology

The state is underlain primarily by sedimentary rocks formed over a long period of time. They comprise granites, met sediments and Basement Complex that are mainly made up of coarse, fieldspathic grits and quartz pebbles common in some areas. The basement complex consists of granite gneisses, coarsely crystalline and prophylactics granites.

Graph 5.1 Wind/Geological Diagrams



Source: Metro Dept AKIA (2005)

5.11 Historical Information and Physical Characteristics of some Selected Wards within Kano Metropolitan

A brief description is given for some selected wards based on their particular physical characteristics within and outside the old city wall. In accordance with (item 4 and 5) of the questionnaire, these were random and purposeful sampling as highlighted in the methodology and are associated with prominent sample of Contemporary Hausa Residential Building typologies as identified in the Metropolitan Map.

i. Gyadi-Gyadi – Established around 1950, during the construction of Ja'oji Estate, and subdivided into North and South (Arewa and Kudu). 90-% of the houses are storey buildings in mud and cement bricks; it is one of the initial government layout designed in plot size of 50x50, 50x75. As a resettlement, area in the early 1970^{s} from the present Audu Bako Secretariat Complex initially it is one of the ward that exhibit transformation in plan form. Zaure numbers and shape in square □ or rectangular form 100% of the sample takes these shapes (i.e. samples GYD 016 and 017), ward/area where moderate or average room size are allocated, of 10-16sqm.

A ward where external verandah with balustrade at the overall length of the house is at frontal face or elevation or on two opposite sides or even on four sides of the houses it is also noted that 80% of the houses have Shagos/shops facing the exterior, used for guests accommodation or commercial activity.

ii. Dala:- Dala is the name given to one of the ancestors of the "Abagayawa" known as the original indigenes of Kano Palmer (1928. 97). It's been associated with iron smelting and smithing, and "Tsumburbura Shrine", according to Palmer (1928-27) and Dokaji (1958). The fenced tree called Kaguwa, was located not far from the foot of Dala Hill, until it was destroyed by Sarki Tsamiya (1307-1343), it was found to be a prime area by barth when he visited Kano in 1851 Umar (1997).

Dala ward is a settlement at the bottom of hill, with gentle slope of about 2.0-3.0mm due east and south direction, comprising (Yankilishi, Alfanda, Madabo wards) and about 2.0mm due north toward Gwammaja road while due West is a deep and dirty water body of about 6.0-10.0m below ground level. The soil is reddish, sandy, gravel and weak for foundation, 80% of the houses are one storey buildings built in with mud and cement brick, roofed with zinc roof, due to increase in population most of the buildings at the edge of the hill are refilled and raised to meet the required floor level. To avoid flooding of water from Dala hill during the rainy season, House forms are still traditional. Transformation is observed largely in bigger family houses (Babban Gida) that are sub-divided (i.e. Alfanda house) and re-built due to inheritance by the descendants of the deceased compound head, sample DL 531-570**.**

iii. Babbangiji:- located in Tarauni local government accessed through Massalachin Murtala road due South-West of Kano Metropolis. According to Mai Unguwa Ismaila, one of the prominent Contemporary wards in Kano Metropolitan areas with modern layout plots of 50x50, 50x75 established in 1980, during the alhaji Abubakar Rimis Administration as the resettlement layouts for people or occupants at the present Aminu Kano Teaching Hospital along Zaria road.

The ward consists of Hausa/Fulani ethnic tribes and other tribes from Northern part of Nigeria, they are mostly craftmen builders carpenters, and small scale traders and low income workers there are, no market spaces only one clinic, primary school and a newly established Junior Secondary School for boys and girls. With good wider road networks, but poor drainage system, being at lower level or about 2000mm below ground level, see sample BBG 051-75.

iv. Unguwa Uku:- located in Tarauni local government accessed through Zaria road due South-West of Kano Metropolis. Historically, the name originated from three Fulani compound heads, namely Nono, Alu, and Mohd, surrounded by their farmland, for farming

and rearing of their animals; as their main occupation. Each of the compound head settled at different areas but at close proximity to one another as revealed by Denyer (1986), that make or produced the term “Rikuni Uku” (three parts or villages), later called “Unguwa Uku” around 1970, it has one Dagachi and (3) three ward heads.

v. Hotoro Ward:- Located in Tarauni local government and it is accessed through Maiduguri road and Sani Abacha bye-pass due South-East of Kano Metropolis. Established around 1950 initially under Ungogo District, it consists of three parts, Hotoro Kudu (South), Hotoro Arewa (North), and Hotoro Danmarke. L ater segregated into sub-units or wards headed by Dagachi and Mai Unguwani with respective ward head, now separated by a Maiduguri highway due South East of Kano Metropolis. Consists of samples HTR 076-115.

The name Hotoro is derived from Fulani, the word of “Hoto”, meaning “Rest”. The area used to be a resting place for “Caravan and hunters” (fatake and mafarauta) used as transit camp (Zango) under one famous well called “Rijiyar Hagama”. The inhabitants are mainly farmers, craftmen, (metal worker, carpenter, masons) petty businessmen and few employed workers.

It consists of 15x15m, 15x22.50m and 30x30, plot sizes with moderate access roads, and commercial shops to generate revenue, has clear open spaces and organized setting.

95% of the Hotoro Kudu buildings are Contemporary houses 80% non-storey houses 20% storey houses with almost 60% houses in mud walls and zinc sheet, with fairly interconnected roads, but poor drainage system, at the center of the street, there is no dump or refuse point, interestingly it is the only ward with over 95% Contemporary toilet rather than traditional pit latrines despite the fact that they are experience a serious water shortage, sample HTR 076-115.

vi. Yakasai:- This name is also mentioned in Wakar Bagauda, as one of the three leaders of pre-Islamic Hausa, together with Sheshe and Gwale who came from the ancient kingdom of

Gaya, East of Kano. If this is correct, then the present ward must have been a relocation of an older ward, since the area became part of the city only after the 15th century expansion of the city wall. At one time Yakasai was the largest ward in the city, in terms of area and population, and later it was sub-divided into A and B wards. In 1961, another ward called Yakasai Sabuwar Unguwa was carved out for the sake of ease in administration, during the colonial times its location, its association with the mallam class, and its ability to absorb immigrants made it an area favored by the mid-level Native Authority Civil Servants.

According to M. Dahiru a resident of sample, YKS 995. House Popularly known as the residence of Sarkin Magina with his traditional builders and craftmen. Revealed that85% of the sample house are storey building in mud and cement bricks due to increase in population and lack of spaces for expansion its houses are sub-divided due to inheritance, and renovated by new owners to suit their needs in Contemporary Archetype, it has sufficient vehicular access roads, but linked inter-connecting alleys (Hanya) with waste drainage at middle of the street, sample YKS 357-377.

vii. Ungogo:- Located in Ungogo local government area accessed through Katsina road North-East of Kano Metropolitan area. Established over 200 years ago as Fulani cattle rearers settlement and around 1970 the then government sub-divided the farmland into residential layouts consisting of 15.5x15.5, 15.5x22.5, and 30.0x30.0mm plot sizes with access roads between 5-10 widths. The settlement is moderately populated due to limitation in plot size for a specific family size, which makes it static, in physical development. 89% of the houses are built in traditional mud with Azara, plastered with cement in walls and floors with poor waste drainage system. Lacks of economic activity and access roads limits its general development. Samples UGG 831-860.

viii. Bachirawa:- located in Fagge local government accessed through Katsina road due Northern part of Kano Metropolitan. Established around 1985, it consist of 60%

Contemporary Hausa Residential Building and 40% modern building with spacious access roads of about 5-15.0m width, 90% of the building, are constructed in cement brick covered with zinc roof, in modern design concepts and construction. The Plot layouts consists of 15.5mx15.5m, 15.5x22.5m and 30x30mm sizes in grid pattern planning system, with sufficient open spaces for lighting and ventilation. A typical Contemporary Building/archetype settlement, sample BRR, 861-878.

ix. Kumbotso:- Consists of samples of Traditional Hausa and Fulani settlements consists of plot, 750x225mm and 30x30mm with sufficient wider road network in grid patterns mostly contains one entrance zaure in □ square forms – with 90% buildings in mud plastered with cement 80% zinc roof and 20% mud, 95% cement screed floor finishing. A modern settlement purpose established for irrigation farmers for Kumbotso River from **(1979-82).** During Rimis administration, sample **KBT 961-991.**

x. Challawa:- Initially, a Fulani settlement it was also due to its proximity to river Challawa, and a fertile soil suitable for cultivation and rearing of animals. The town started developing in early 1970s due to the establishment of Kano Water Works (WRECCA), and manufacturing industries, it consists of various tribes from all parts of the country. As craftsmen and technicians from industries most of the houses are rented to workers, houses are located in a water log area with undulating gentle terrain in gentle slopes from 1000mm-3000mm up to a distance of 3-5mm, and other small-scale commercial activities in shops attached to houses, located in a water log area with undulating terrains, poor sanitation, and drainage system. A typical squatter slum with 70% dilapidated buildings, sample **CLW**.

Located at Kumbotso local government due western part of Kano Metropolitan Areas at Panshekara Generally, 80% of the houses are designed for commercial purposes (renting) in non-storey building with rows of single rooms on both sides of a central courtyard, accessed through I or □ shape entrance Zaure, 2-3 toilets with shower spaces are provided, cooking

takes place in courtyard the external wall faces a major access way/road, for shops mostly built in mud and covered with zinc roof with metal openings;

xi. Sheka:- Located in Tarauni local government as a resettlement ward accessed through Zoo road. Established in early 80s in Shagari Quarters, plot size 90% 10x10m, 15x15 (double) – 60% non-storey building with 2-8 rooms per house, The layout has been converted to traditional layout called Awon-Igiya a typical Contemporary archetype settlement, sample SHK 941-960.

xii. Naibawa:- it is a ward where 90% of the houses are of the Contemporary type with mostly a single I or L shape entrance Zaure without giving due considerations to privacy as expected in a Hausa/Fulani Houses. Sample **NBW 992-1010.**

xiii. Badawa:- Sample BDW 711-725 established in late 70^{s} (1978). It is a typical Ghetto settlement with 100% Contemporary typologies and a 70% of single plots sizes 30x30 and double 50x50mm plot sizes.

90% of the houses are non storey buildings with 100% characteristics features of Contemporary typologies. The area has smaller access roads with poor waste drainage uncovered from various individual houses at the centre of the road, 70% of the house are built with cement brick and covered with zinc sheet, the ward is dominated by low income earners such as traders craftsmen and workers. It is considered as one of the sub-standard settlement in Kano Metropolitan. Samples **UKU 01-016**.

xiv. Fagge:- Located in Fagge local government accessed through Ibrahim Taiwo road almost at the centre of Kano Metropolitan Area. One of the initial layout by the colonial masters in later 1950s over 90% storey building with simple I or L shape entrance Zaures on plots 10x10m, 15x15m or 15x22.5m, 30x30m, as one of the new layouts by the colonial masters in the early 50s. 80% of the houses have commercial shop at the exterior for tailoring, provision shops etc The ward has good access road network in grid patterns, sample

FGG 250-278.

xv. Jabba:- is a ward located in Fagge local government accessed through Airport road due North-East of Kano Metropolitan Area, founded around 1960, as a resettlement scheme to residents or villagers in the present Aminu Kano International Airport. With a good plot layouts of 15x22.50 and 30x30mm in grid layout pattern but the roads are not motorable due to persistent soil erosion with no drainage, 90% of the houses are in mud and non-storey buildings. The settlements show remarkably 90% of typical Contemporary typologies in almost all the domestic houses such as one entrance Zaure in □, I or L shapes regularly geometric forms, average, rather than thicker mud walls, zinc roofs, metal doors and window cement floor/wall finishes rather than mud or Makuba. Mostly, single-family compounds with plot of 900sqm for extended families later sub-divided due to marriages of elder son or brothers or any other circumstances.

xvi. Kurna asabe/Tudunbojuwa:- Located partly in Fagge and partly in Ungogo local governments, established around early 20th century by one Islamic scholar credited to be spiritual or leader Mallam Ibrahim Muazam, who used to sit under the tree called Kurna. It consists of merchants, traders, craftmen and intermediate workers transformed into Contemporary layout in 1980s. Good layout – 90% Contemporary buildings, with good access roads widely spaced that entrances in I or □ shape, has proper/sufficient, lighting and ventilation. 80% storey buildings on plot of between 100sqm – 250sqm in modern cement brick and zinc roof metal doors etc. The concentration of 80% Contemporary samples signifies the degree of transformation in Hausa Traditional Residential Architecture. Most of the plots are government layout of 15.0x15.0m (225sqm) rather however, sub-divided by individuals into plots of 25x50 (113sqm to contain 2-6 room in storey or non-storey forms), sample **KRN/TJB 276-301, KRN 319-335.**

xvii. Kawaji/Dakata:- Located in Nassarawa local government accessed through

Yankaba/Hadejia road due North-Eastern part of Kano Metropolitan Area, established around early 1950s. most houses are built in mud and cement blocks with metal doors and windows 60% of the house are in one storey form. A typical Contemporary ward, it has good planning layout by government with both major and minor roads, about 5m width even though they have acute water shortage, 60% of the toilet are pit latrine toilets others have Contemporary toilets of water system. It consists of plot mostly 15.0x15.0, 15.0x22.5 and 30x30.05sqm. With sufficient spaces for lighting and ventilation, sample KWJ 781-805, DKT 797-805.

xviii. Tudun Wada:- Located in Nassarawa local government accessed through Bompai road bordered by Dakata and Yankaba. Established around 1945 as war refugee settlement, it has good road network of about 20m width, a good and 40m width layout in grid iron pattern with sufficient open spaces for lighting/ventilation. It consists of Contemporary Hausa Residential Building with between 60-70% storey buildings with single I or L and □ shape zaure of about 2.0sqm-9.0ssqn in areas with 70% mud houses renovated and improved to the standards, of Contemporary archetype sample **TWD 759-779.**

xix. Sharada:- located in the Municipal Local Government accessed through B.U.K. road due south of Kano Metropolitan Area, it was established around the 1950s by Malam Aminu Kano a leading politician in Kano Politics. It has two sections; Sharadar Malam and Sharada Fegi Mayu, occupied by craftsmen and low-income earners. It consists of 90% Contemporary buildings, non storey and 20% storey buildings both in mud and cement brick with zinc sheet roof, plastered in cement with metal doors and windows, houses.

Generally, it consists of traditional 15x15 plots layout of 10x10mm, 60% of 30x30 10m plot 2-6 room per house 20% for renting to low income earners, with unmotorable roads, poor drainages, a typical Contemporary Hausa Residential Building settlement, sample **SRD 335-350.**

xx. Hausawa/Gandu:- Hausawa quarters was established 150 years the ago, and the owners

of farmland from Hausawa quarters in the old city called Hausawa decided to have (new layouts) and migrate outside due to the problem in 1972 of congestion in the city – 1972. It consists of samples 036-075, GDAA 386-400.

xxi. Kofar Mazugal:- Located in Dala local government accessed through Gwamaja/Mayanka road due south of Kano Metropolitan Area originated in the 19th century when the area was predominantly dominated by blacksmith who operate their trade. The name made by a fire blowing investment which was used by the smiths. Blowing of fire constantly emit the sound Zugal-Zugal that is why the area is called Mazugal. When Kano was surrounded by the famous wall, a gate was opened at Mazugal and it was named Kofar Mazugal gate. The sample houses of Contemporary houses that are sub-divided due to inheritance and transformed with single I, L or □ shapes a zures, 95% storey building in mud and brick, a typical traditional settlement with poor drainages, population congestion and other environmental hazards it consist of samples KMZ 601-610

5.12 Spatial Morphology of Some Sample Houses

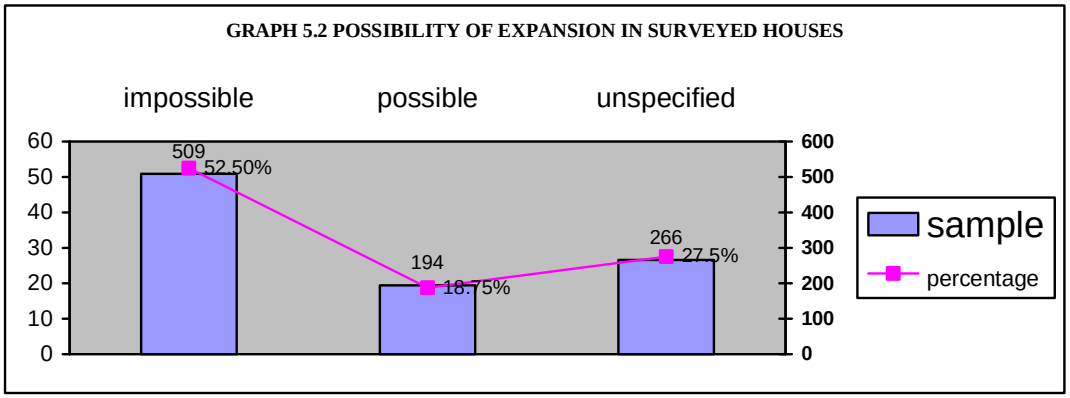
In an effort to relate the people to their housing environments, the study has shown that, one will need to accept the view that the physical environment we constructed is an expression of our social and economic values. Indeed Moughtin (1985) has also observed that; "The buildings that we produce and their layouts are direct product of the subtle balance between a culture and its environment".

Similarly, the study reveals that, Contemporary residential houses in Kano reflect the current cultural values and economic status in the spatial organization of the house. Thus, the physical environment should not be considered in isolation, since the social, cultural and economic factors are normally reflected in the physical environment. It is therefore, insufficient to define housing by only physical terms, housing is not only the question of its size, shape, appearance, or position of buildings, but it is much more concerned with relating

the physical setting to functions; providing for the main activities of the day to day domestic satisfaction of the users.

The traditional residential houses in Kano therefore, go through a sort of evolutionary trend or developmental cycle that is analogous to the ecological succession of a baby boy becoming a boy, or a middle-aged man and an old man. The gida (house) may also die a natural death to later allow for the formation of new spatial organization. A housing environment that grows and decays in response to users' needs and values can therefore be said to be organic in nature and user-responsive. As earlier reported by **Popoola (1984),** this assertion has no doubt been observed in sample houses of category (E) of the study.

However, it is noted that; the Contemporary buildings seem to be static housing environment designed to satisfy the immediate needs of the occupants. But because it is static, it cannot meet the changing socio-cultural needs of the occupants. This is exemplified in figure (Graph 5:1) showing the percentile distribution of the possibility of expansions where 53% indicate impossible



SOURCE: Field work 2005

The above graph indicates greater percentage have no possibility of expansion which can be attributed to the inadequacy of land

Popoola (1984) states that the inhabitants will later become trapped in a static product of the past if they can no longer satisfy their changing needs, Occupants of a misfit house can

readily change house by offering the misfit one for sale and buy one that will meet the new needs. But in Nigeria, where buying and selling of housing units are uncommon, the occupants will become stocked in a housing unit that can no longer satisfy their needs. The assertion is still valid in that situation if the occupants will require a new house that can meet and reflect changes in their needs.

Popoola (1984) has also observed that, a user-responsive housing therefore, implies that the inhabitant becomes the stimulus to which the environment responds. He adds that, a building cannot be organic or alive unless it requires repairs constantly during its life-time, perhaps transformation. Responsiveness can largely be achieved where the inhabitants are allowed to shape and reshape their housing environment to satisfy changes in needs.

Generally, the organization and presentation of data has been on using appropriate titles that corresponds to research questions, raised and each hypothesis to be tested. Similarly, the presentation of result, means putting the results in factual and original row form, without any attempt to interpret and draw inferences, Zanzan (2005).

The most common way in which data are organized, summarized and presented in this dissertation includes; the use of architectural drawings and photographs, tables maps etc. These illustrations usually accompany other techniques; such as measure of central tendency variability and correlation. However, illustrations (drawings and sketches) of sample houses (plan in Appendix) are used for quick reference and simplification of data in visual term in order to simplify and emphasize a point.

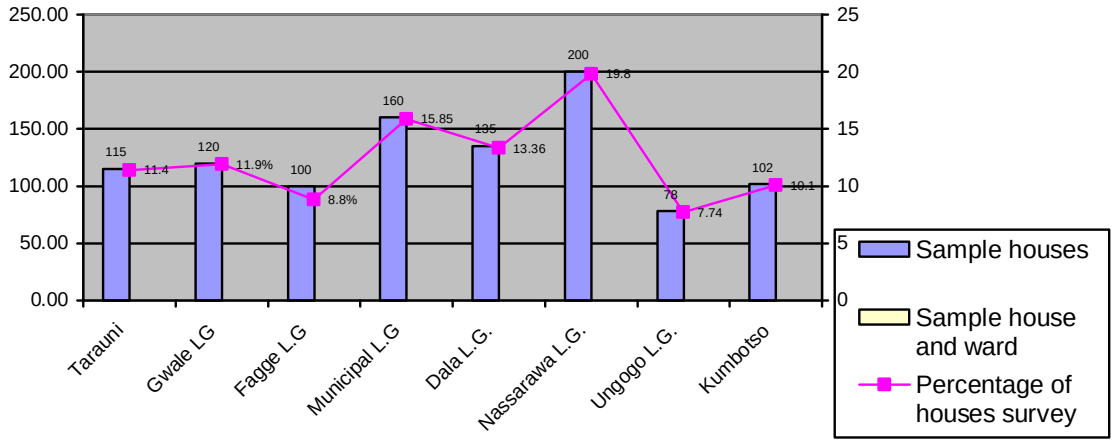
In addition, as stated earlier, in the methodology chapter two, sample houses are purposely selected to achieve the stated objectives; the houses ranges from the very small accommodation of a single family to the extremely large multi-family dwellings (i.e. samples UKU 002, BBG 042, RZK 880, HTR 096 respectively) it also consists of both nuclear, composite, and collateral agnate family units with mostly unrelated persons, socially

from the humble dwelling to the house of the noble rich, and from the very old to the most recently constructed houses.

Given the nature of urban disposition of Kano metropolitan, several and logical ways are used in the selection, sorting, and ordering of the houses. The simplest and the most obvious will be the geographical boundaries hence, (8) eight metropolitan local government boundaries and their 53 wards are sample (rather than the respective (4) four city sectors and the wards; Umar (1997 p91). This however, has dual advantages; first it incorporates settlements or (wards) that are not in existence or part of the (four) Kano sector wards (Fuskoki) such as Dorayi, Sharada, Yankaba, Naibawa etc. Secondly, the number of houses surveyed from each ward ranges from 16-40 houses. This makes it sufficient to be statistically significant as sample of representation.

Moreover, as noted in the course or the process of the fieldwork, the division of into four sectors (Fuskoki) is purely on traditional administrative purpose and has no social or economic significance. However, these traditional administrative powers have been transferred to the district head of each local government hence, the geographical ordering is discarded and local government ordering preferred. See the graph below indicating local government, wards samples percentages.

Graph 5.3 METRO POLITAN LOCAL GOVERNMENT, WARDS SAMPLES AND PERCENTAGES



Source: Field work 2005

The sample of the houses surveyed are classified in ascending order of their plot sizes categorized as A, B, C, D, & E, However, using social status of the occupants the number and size of sleeping rooms Umar (1997), and the number of other rooms, are the most common means of classifying houses samples, Schwerdtferger (1982). The basic premise of the study rules out the former, i.e., social status; as it is principally concerned with the ordinary house, rather than those of the rich and noble Hence, architecture, in term of concept, geometric form, building materials and construction, are the most important aspect of this study. The investigation of transformation in Hausa traditional architecture in terms of concept forms and size, (geometry) building materials are the most important aspect of this study.

5.13 Spatial Organization in contemporary Hausa House

A study in Contemporary Residential housing practices reveals that the house is a direct fulfillment of the inhabitant's immediate needs, of shelter, considering the economic status and social circumstances. The gida (house) is simply the construction of physical elements but also the creation of a shelter conforming to living environment for the users. The inhabitants did not have to adjust to fit fixed the physical structures, since the elements of the house are adjusted to relate to the changes in family structure and physical structure itself.

In order to establish the basic characteristic of the present “contemporary” building in Hausa traditional residential architecture, there is need to examine these aspects or variables (geometry size and form, planning and building materials) These aspects are obviously measurable and easily perceptible.

In the Contemporary housing areas of Kano, the study reveals that the majority of the houses have no building plans. The design of the houses is seen by the owners and mason as a continuous activity of shaping and reshaping the housing units in design, production and the use of the houses.

Changes (transformation) in the social structure of the family units leads to changes in the

physical spatial organization of their housing environments. The study reveals that when a domestic unit changes from a nuclear family to a composite family, the spatial formation of the gida (house) is changed from the youthful stage to the middle-stage.

The major reasons for the change or transformation are wealth, inheritance and marriage, constituting over 75% of the dependent variables as shown in the Table 5:1 table below:

TABLE 5.1 REASON FOR CHANGE/TRANSFORMATION

S/No.	Items	Number	Percentage
1	Marriage	170	17.5%
2	Inheritance	290	30.0%
3	Wealth	363	37.5%
4	Rain damage	102	10.00%
5	Road construction	44	5%
	Total	**969**	**100%**

Source: Field: survey 2005

The house spatial formation changes to a mature-stage when the composite family unit changes into a collateral agnates unit, (which hardly exists presently due to death of such relatives and subsequent inheritance by descendants), and the weakness of family social relationship probably as a result of individual responsibility and economic hardships.

There is a growth process in the spatial organization and transformation of the house reflecting the changes in the family structure. These were therefore, a close relationship between the social structure and the spatial organization of the houses.

5.14 Categorization of Samples

However, the samples of Contemporary Hausa houses surveyed are classified in ascending order of their plot sizes, categorized as (A, B, C, D and E). However, the number of rooms, number of occupants, building materials is considered as a secondary issue.

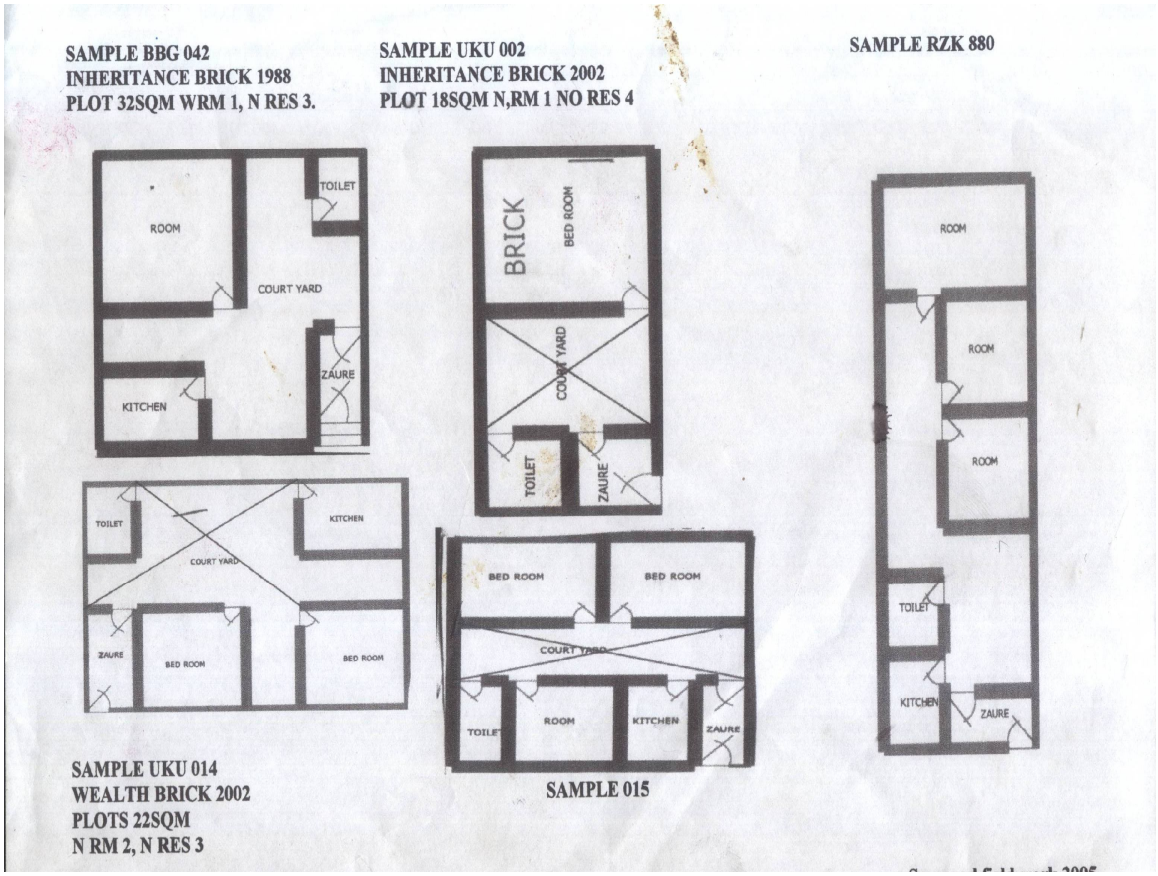
i. **Category A – plot size ≤ 100sqm**
ii. **Category B – plot size ≥ 225sqm**
iii. **Category C – plot size ≤ 480sqm**
iv. **Category D – plot size ≥ 900sqm**
v. **Category E – plot size ≥ 900sqm**

The study reveals that the size and the number of rooms depend largely on the plot size (i.e. number of rooms has correlation with plot size).The number of occupant does not necessarily relate to the number of rooms, rather to the socio-economic status of the owner or occupant; to this regard the following are presented:

Category (A) plots sizes ≥ 100sqm

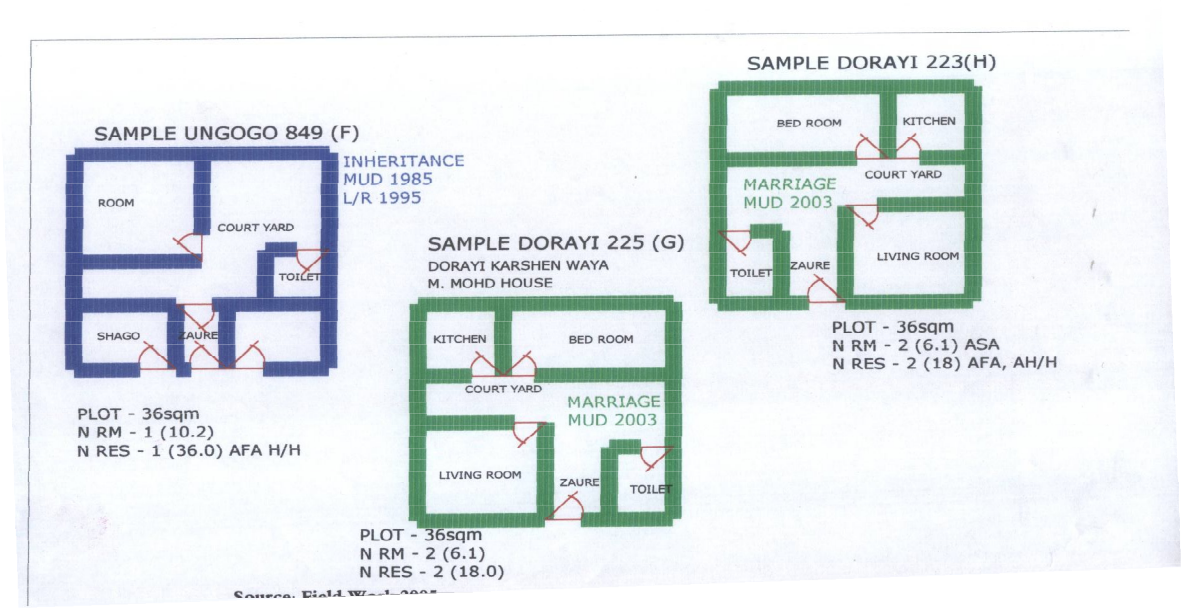
Contains 2-3 (room and parlour) a toilet, a small courtyard (cooking space) I or L shape entrance lobby equally accommodating about 2-6 family size with 2.0sqm average sleeping area per person and 3.5sqm average floor area/household. See figure 5.1 A, B, C.

FIGURE 5.1 A,B,C,D,E CATEGORY A SAMPLE ON PLOT SIZES<100SQM



Source: Field work 2005 **Scale Proportional**

Figure 5.1 F, G, H, CATEGORY (A) SAMPLE PLOT SIZES <100SQM

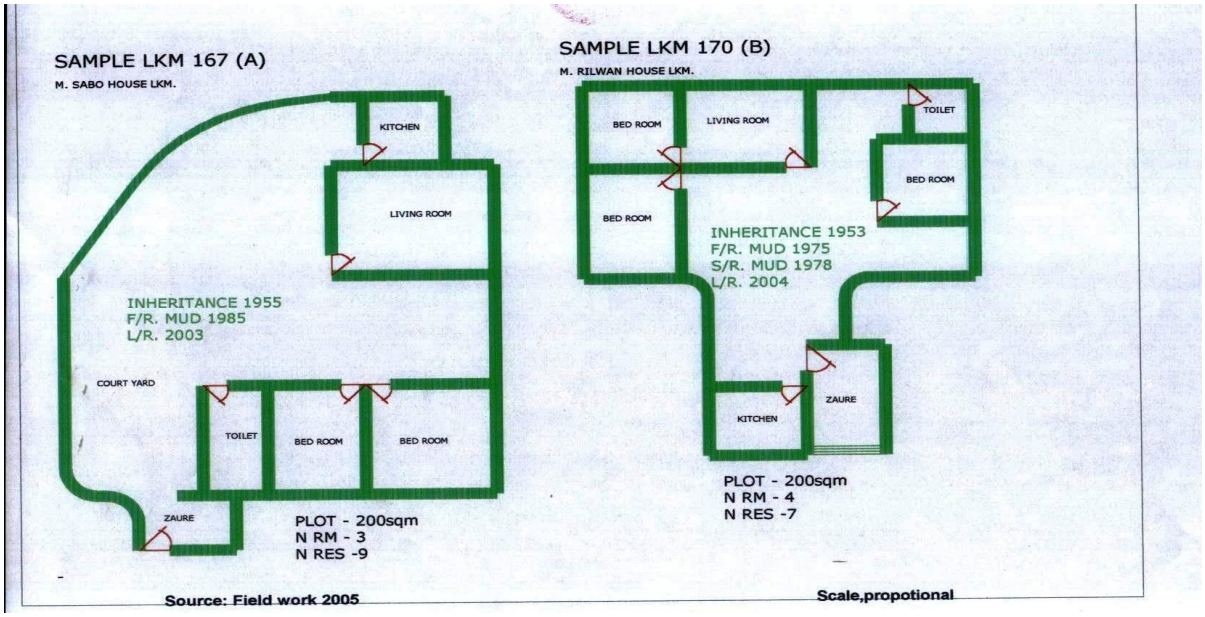


Scale Proportional **source: Field work 2005**

Category (B) plot sizes ≤ 225sqm

The figure above shows that the plot Contains 3-5 (room and parlour) depending on the room spaces requirement, a toilet, a kitchen, a small guest room and toilet a courtyard with a I or O shape entrance lobby, accommodating about 3-8 family size, with 2.0sqm average sleeping area/person and 3.0sqm average floor area/household, a few may contain garages for parking.

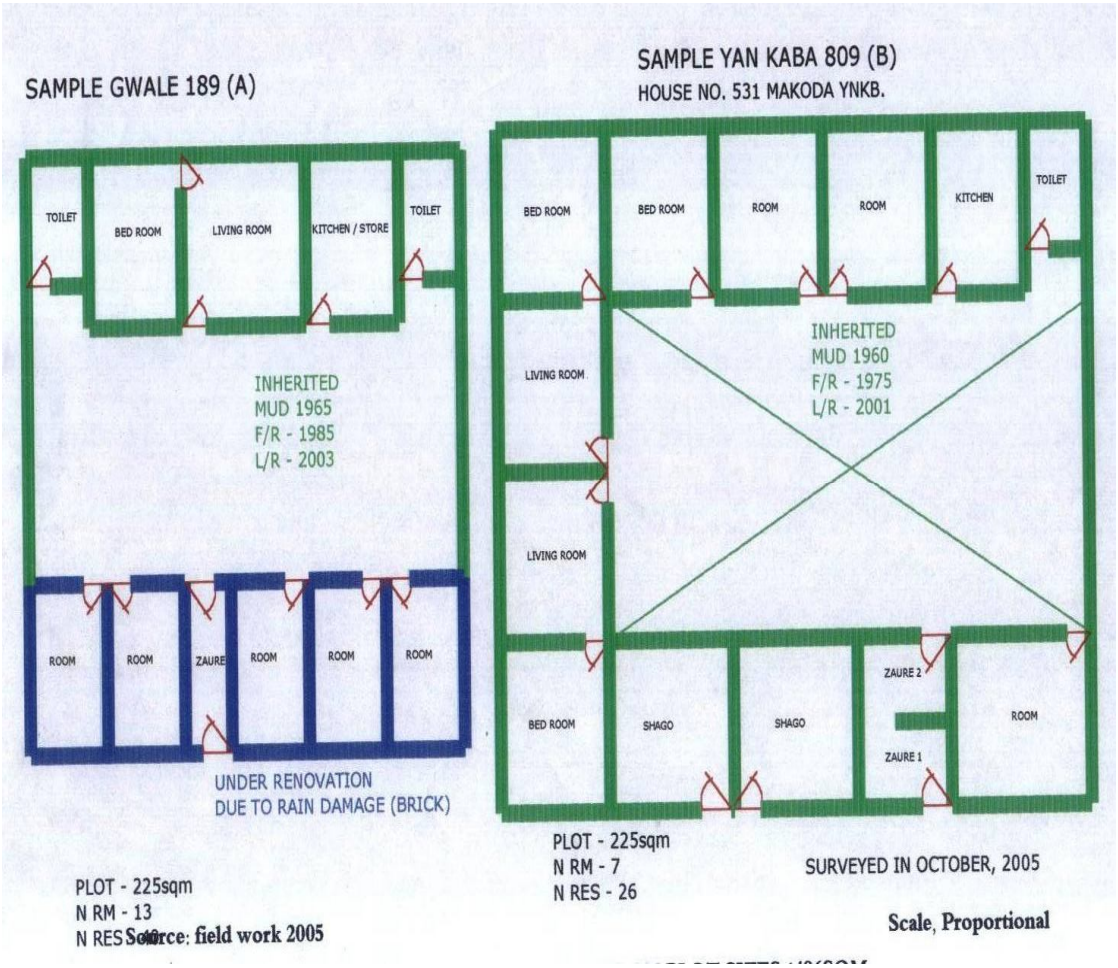
FIGURE 5.2 A, B, CATEGORY (B) SAMPLE HOUSES ON PLOT SIZES <225SQM



Category (c) plot size ≤ 486sqm

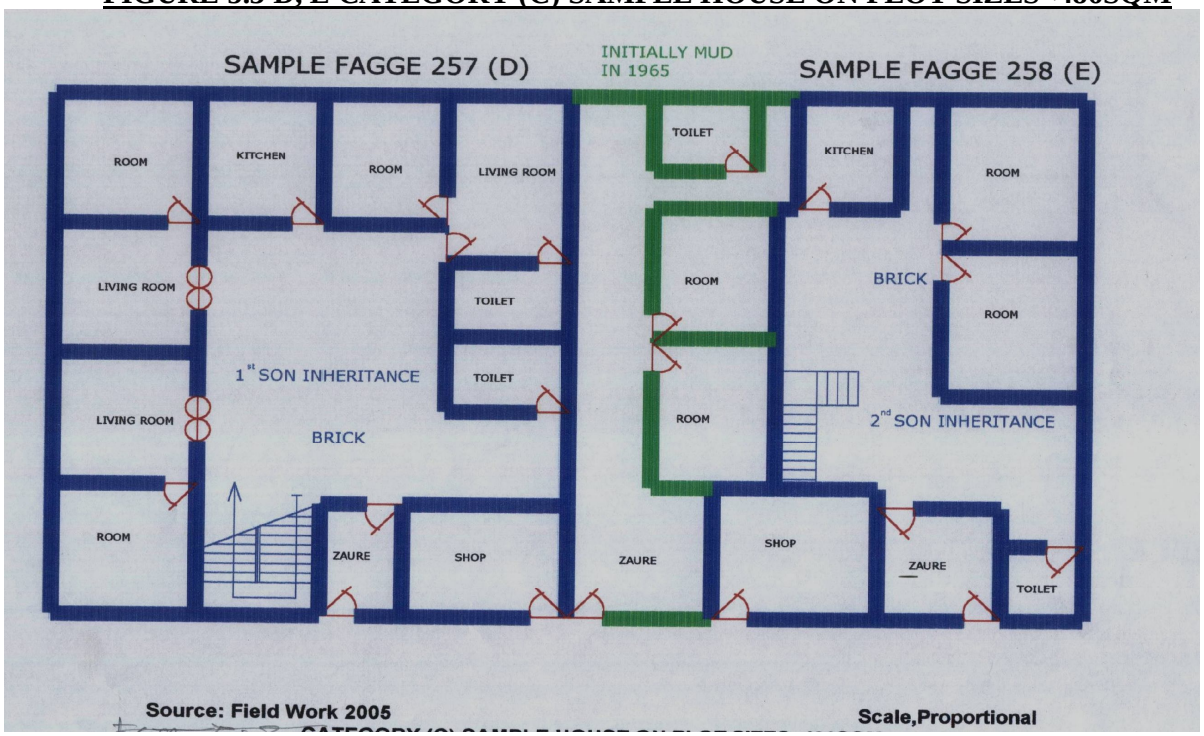
The figure above shows that the plot Contains 4-7 (rooms and 3 parlours) depending on the room spaces and requirements, 2 toilets and a shower, a kitchen, a guest room and toilet, a moderate size courtyard accessed through a linear or bigger I or O entrance lobby, accommodating a family size of about 4-10 persons with 2.2sqm average floor area per household, a few are in storey form sleeping area/person and 3.5sqm average floor area in storey form with a staircase leading to the upper floor with room spaces at the ground floor.

FIGURE 5.3 A, B, CATEGORY (C) SAMPLE HOUSESS ON PLOT SIZES <486SQM



Source: field work 2005

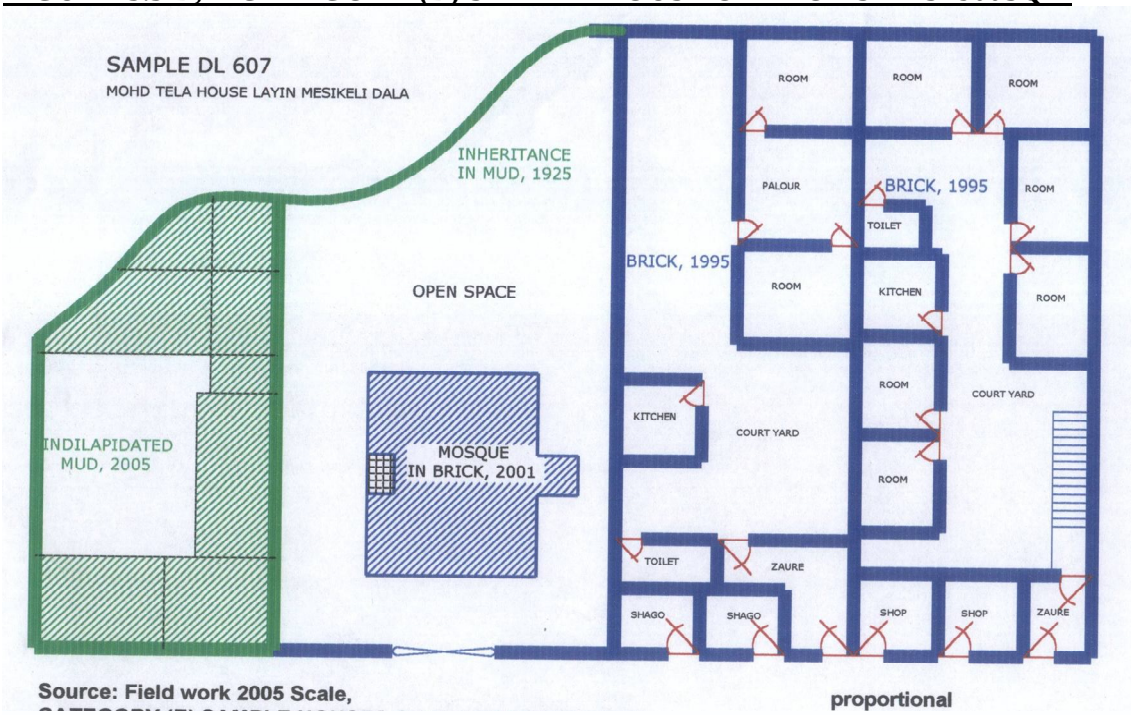
FIGURE 5.3 D, E CATEGORY (C) SAMPLE HOUSE ON PLOT SIZES<486SQM



Category (D) plot size ≤ 900sqm

The figure 5.3 above shows that the plot Contains 5-10 (rooms and 3-4 parlours) with bigger room sizes; a kitchen/store, 2/3 self contained and visitors toilet, a bigger courtyard, a masters area with bedroom/toilet, a guest living and toilet. In some cases the master is at upper floor with guest area at the ground floor accessed through a linear I or O shape I or 2 entrance lobbies, (foyers), it accommodates a family size of about 6-12 persons with 2.5sqm average sleeping area/person and 4.0-4-5sqm. In the average floor area/household, the frontal size may contain an upper floor with similar room space, with ground floor, but with little variation to the entrance lobbies, few may contain garages. This type of houses may be classified as big houses (Babban Gida), in Contemporary buildings.

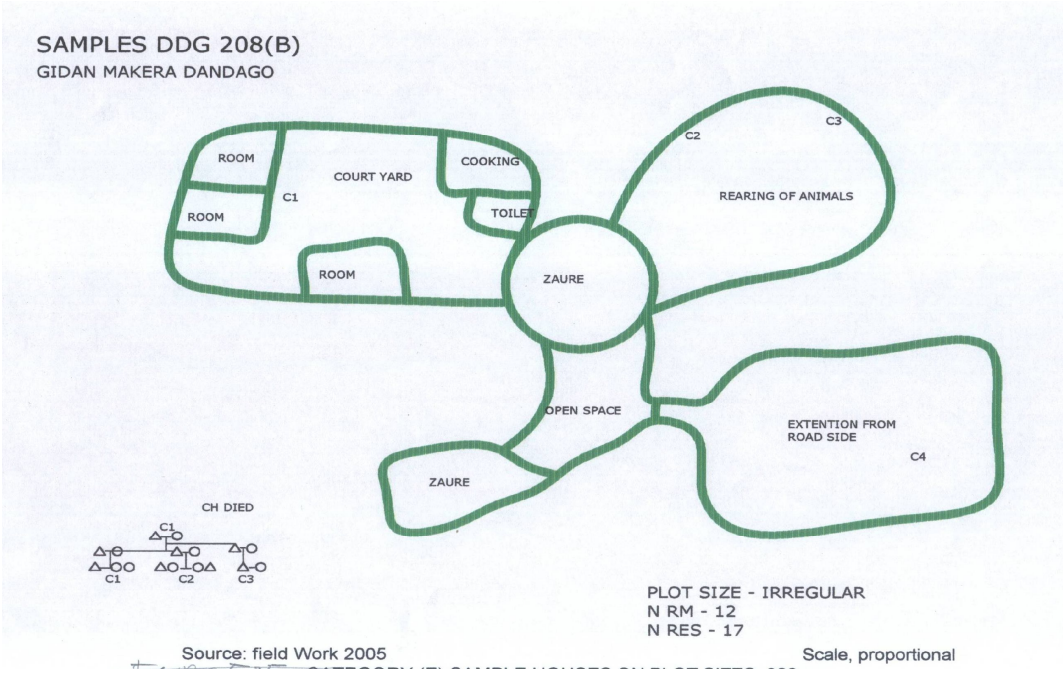
FIGURE 5.5 D, E CATEGORY (D) SAMPLE HOUSE ON PLOT SIZES<900SQM

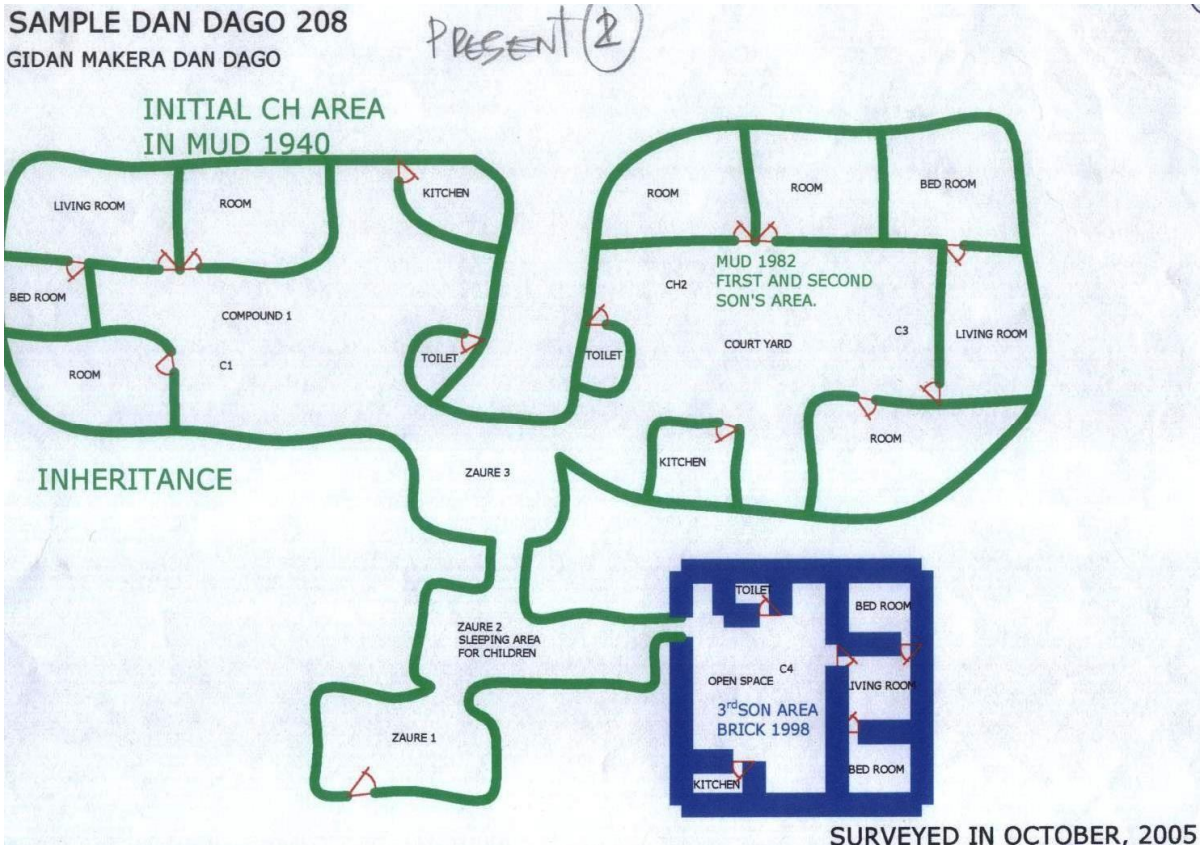


Category (E) plot sizes ≥ 900sqm

The owners belong to a large traditional collateral/agnate families, it consist of several individual family housing units of about 4-8 Contemporary houses with separate entrances from outside.

FIGURE 5.5 B CATEGORY (E) SAMPLE HOUSE ON PLOT SIZES<900SQM





As it has been noted above, the bulk of houses surveyed falls into categories A,B, and C, where 80% of the houses, without exception, are single storey buildings and not unexpectedly belonging to the family of low income group. In form and shape, some are in regular square or rectangular geometric forms. Few are irregular, attesting to their mode of construction. The houses in such groups or categories exhibit similar or physical characteristics with the following functional spaces in Contemporary houses as follows;

a) **Daki** (room) the inner room primarily that is meant for sleeping

b) **Falo** (parlour) the outer room meant for sitting and relaxation for wife, master or guest.

c) **Tsakar gida** (courtyard) it is a central side open space for lighting/ventilation and other household activities.

d) **Kicin** (kitchen) it is a room meant for cooking and storage.

e) **Shago** (room/shop). It is located outside for guests of any commercial activities, mostly for tailoring and provision materials.

f) **Zo ka wuce** (entrance lobby) it is a circulation spaces that is linking the exterior to interior parts of a house

g) **Bandaki** (toilet/bath) it is a service space meant as latrine and for bathing.

The houses contain similar functional spaces with A, B, C in unit houses that are sub-divided due to inheritance factor. They were big houses in the contemporary Hausa residential architecture.

In summary, majority of the samples Surveyed generally contain a nuclear family unit, and is classified as being in the youthful stage of family growth cycle and at the matured stage of its spatial transformation. For the fact that there is no physical space for expansion, from the floor plan, it can be observed that the entrance Zaure in L shape has only one entrance from the access road, which opens directly to the courtyard, see table 5.2 for functional space areas in sqm.

TABLE 5.2: FUNCTIONAL SPACE AREA (M2)

S/No	Plot size area	Ave. Built up area	Ave. Opens space	Daki sleeping areas	Approximate living area	Services area
1	100sqm	92sqm	8 sqm	46	40	14 sqm
2	120-225	180 sqm	12 sqm	120	60	28
3	225-330	284	18	160	120 sqm	40
4	>330		>20 sqm	-	-	-
	Total	**Average**	**14,40**	**108.6**	**73.3**	**27.3**

SOURCR: Field work 2005

Notes: - Sleeping areas (bedroom) - Living Areas (sitting room or parlour) - Services area (kitchen, toilet, Zaure Garage)-Built up areas (build in blocks).

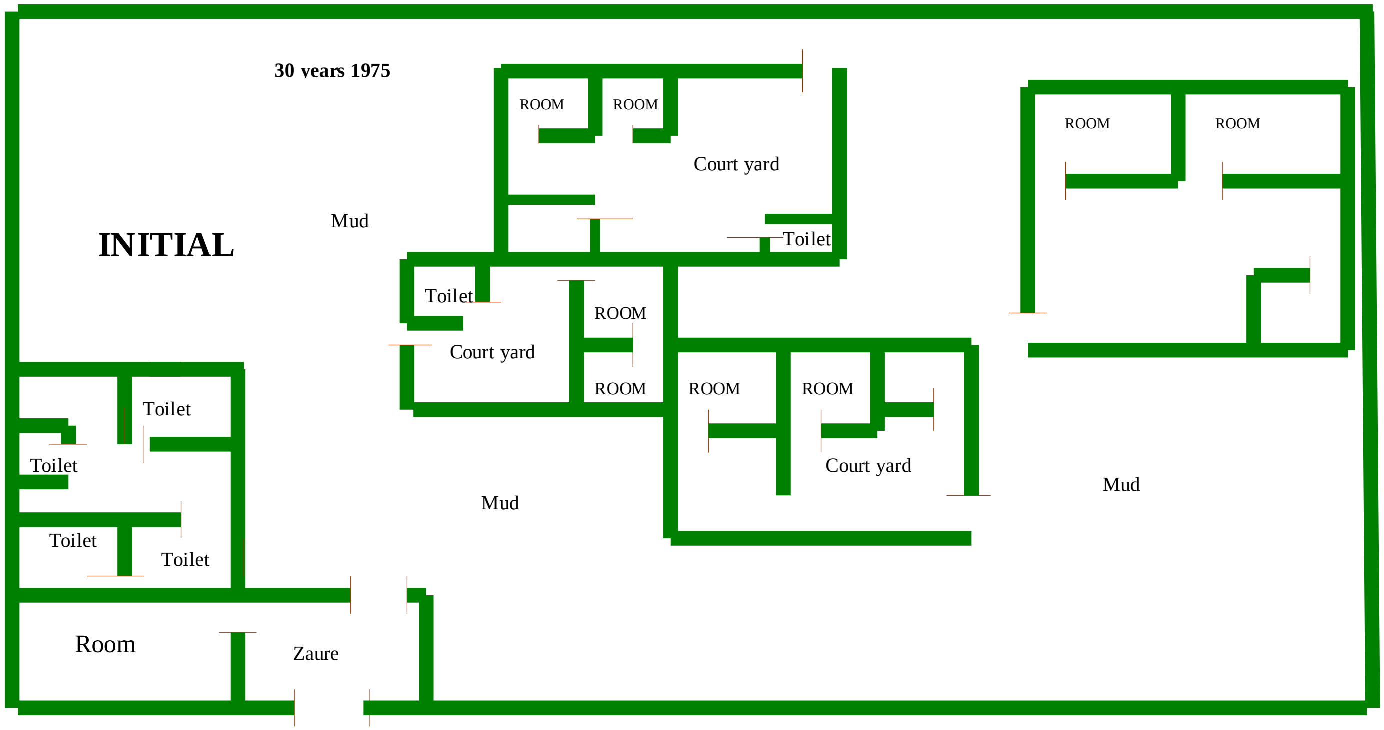
5.15 Spatial Morphology of Some Sample Houses

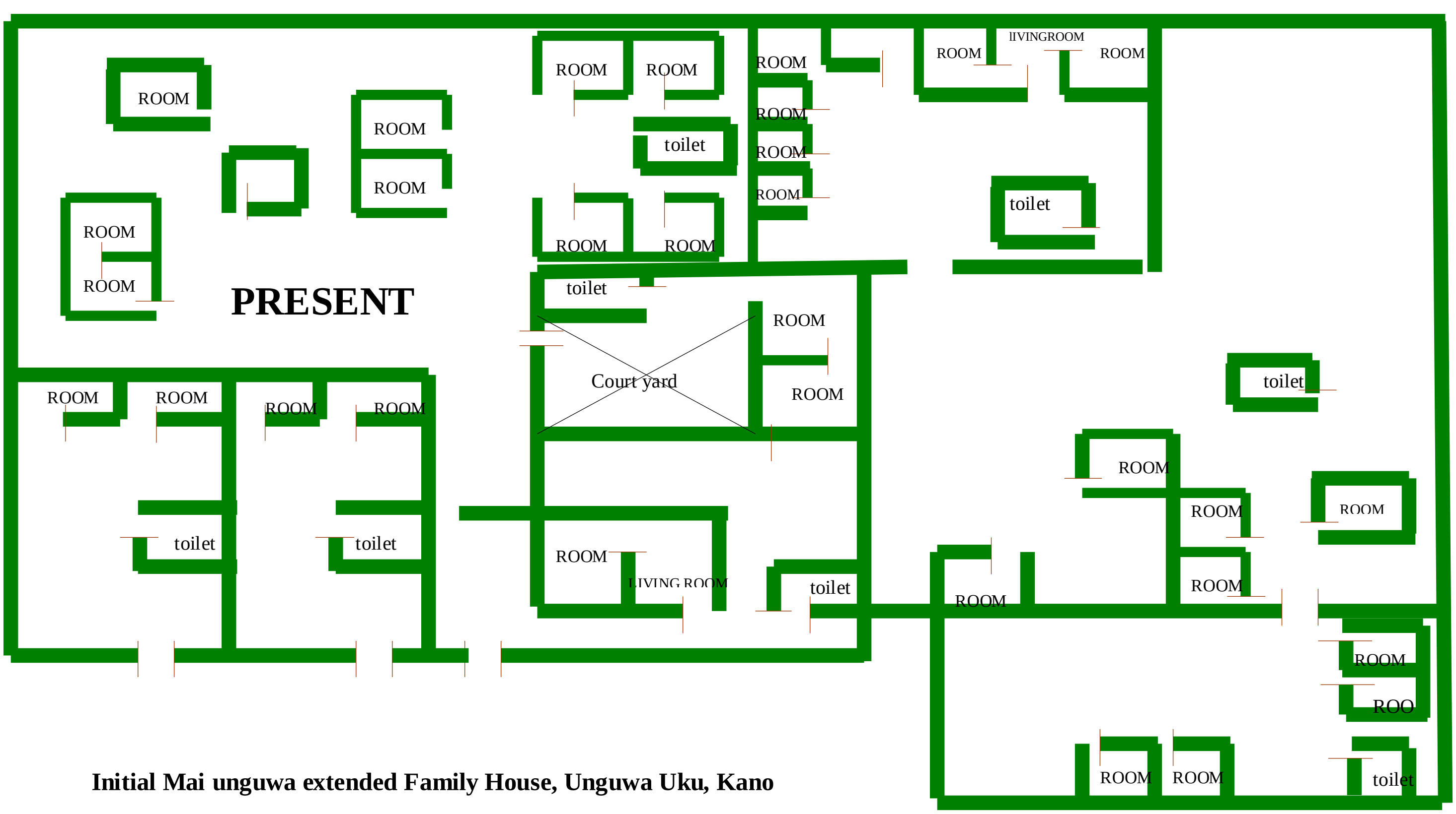
This section describes the different physical characteristics of some selected surveyed houses, in term of spatial changes or (transformation), in geometric forms and number of room spaces. Family structure and change in the type of building materials are used in initial construction, sub-sequent (periodic) and last renovations are effected, and also reveal the fundamental reasons for the transformation.

a. Sample UKU 014 Gidan Mai unguwa, (Unguwa Uku)

The social structure of this house is almost in the matured stage of the growth cycle, The family structure is a composite unit with a household head, initially built in 1975 on a farmland that this was surrounded by a compound fence made of mud and thatch, and accessed through two Zaure directly to a courtyard, that contains 3 (three unit) family houses for the Head of the family, two brothers each with two rooms, toilest, an inner courtyard that was surrounded by fence, and mud wall. In 1980, 3 rooms, house with a courtyard was built for the first son of the C,H, near the entrance Zaure.

In 1983, a two room house was built for the second son at the opposite extreme end, all in mud and azara, progressively in 1985-1990, and 1995 (4), four of the eldest sons of the two compound head brothers got married and new rooms and section were constructed for them in cement brick and zinc sheets, The main entrance Zaure in square form became centralized leading to inner houses Two additional unit houses have their entrances directly from outside. These exhibits the typical Contemporary Hausa Residential Building see figure 5 on category E.





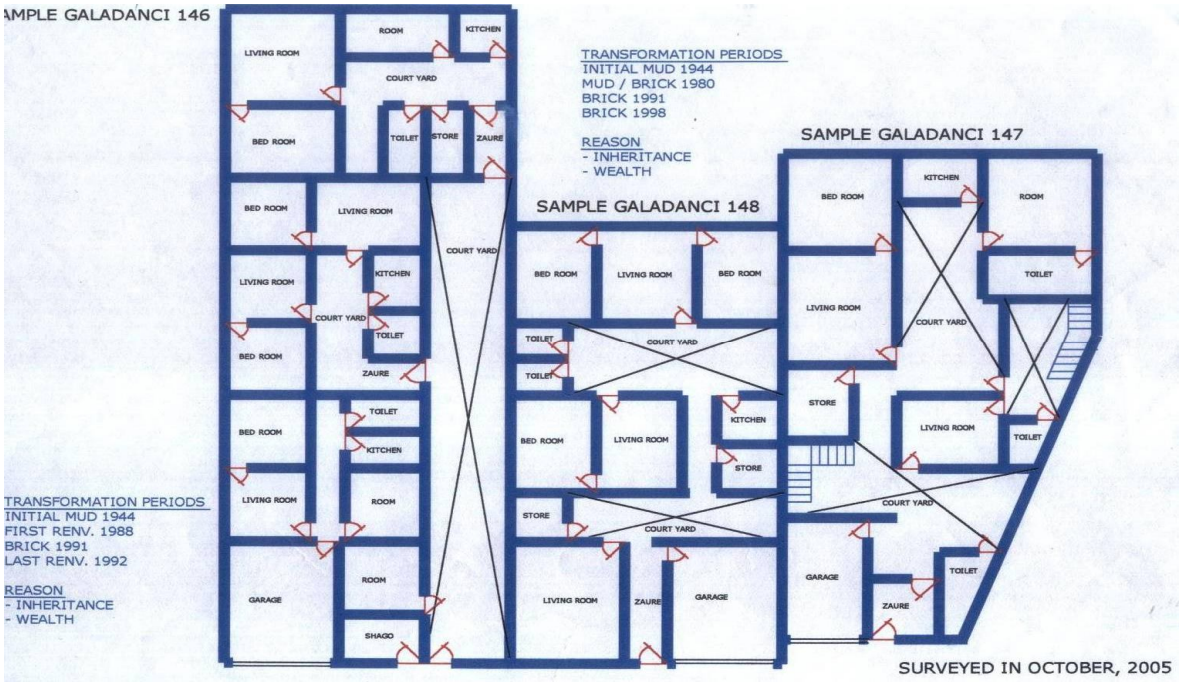
Initial Mai unguwa extended Family House, Unguwa Uku, Kano

Source: Field work 2005

b. Samples GLD 146,147,148, of the sample group in Galadanchi quarters contained sets of nuclear family unit and is classified as being in the matured stage of growth circle of spatial transformation stage.

The building was initially built in mud brick in 1944, due to the death of the compound head, when it was later sub-divided for inheritance to his descendants in **1980** as such some rooms were modified and renovated in mud. Similarly, **1991, 1992** and **1998** (last renovation) houses were renovated into cement brick, zinc sheet structures as a result of increase of the owner's income (wealth).

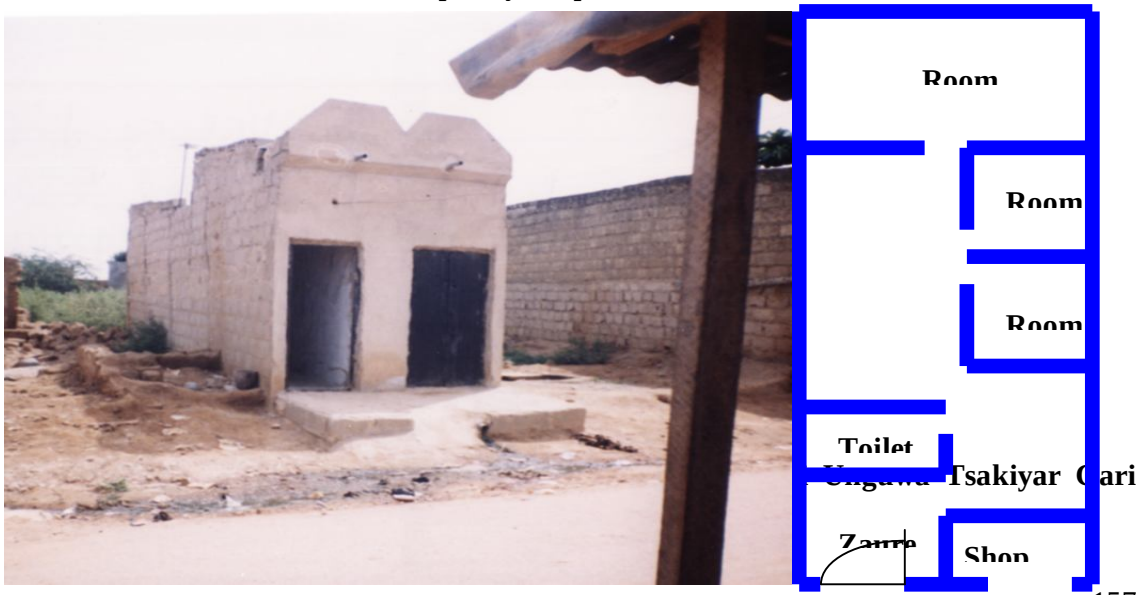
It can be observed that floor plans in fig.2 that first Zaure is in square, rectangular (I or L shapes) with one entrance door from the road that opens directly into courtyard (tsakar gida), The room contains regular geometric shapes that are open into courtyard with internal links uniform wall thickness of cement bricks, and average sizes of toilets and kitchens, Garages are provided along the road sides, on the left side, the houses are non-storey buildings while on the right hand side there is one storey building covered with zinc sheet roofs, plastered in cement with glass/metal openings. The social spaces for household activities (courtyard system) have diminished thereby affecting the socio-cultural relationship of the Hausa society, see figure on category D.



C. Sample R2K 880

The study reveals that sample **R2K 880**, located in Rijiyar Zaki, Babanlayi, is the smallest sample house investigated that that was on a plot of just 80sqm consisting 3 rooms, a small toilet, a kitchen in a courtyard accessed through a square lobby from outside. The owner inherited the house in 1988, when it was in mud after sub-division of 21.00mx10.00m plots for the three brothers, the owner got the house that was damage by rain, repaired/ renovated. renovated it to brick and zinc in 2000 and rented it out to the present occupant.

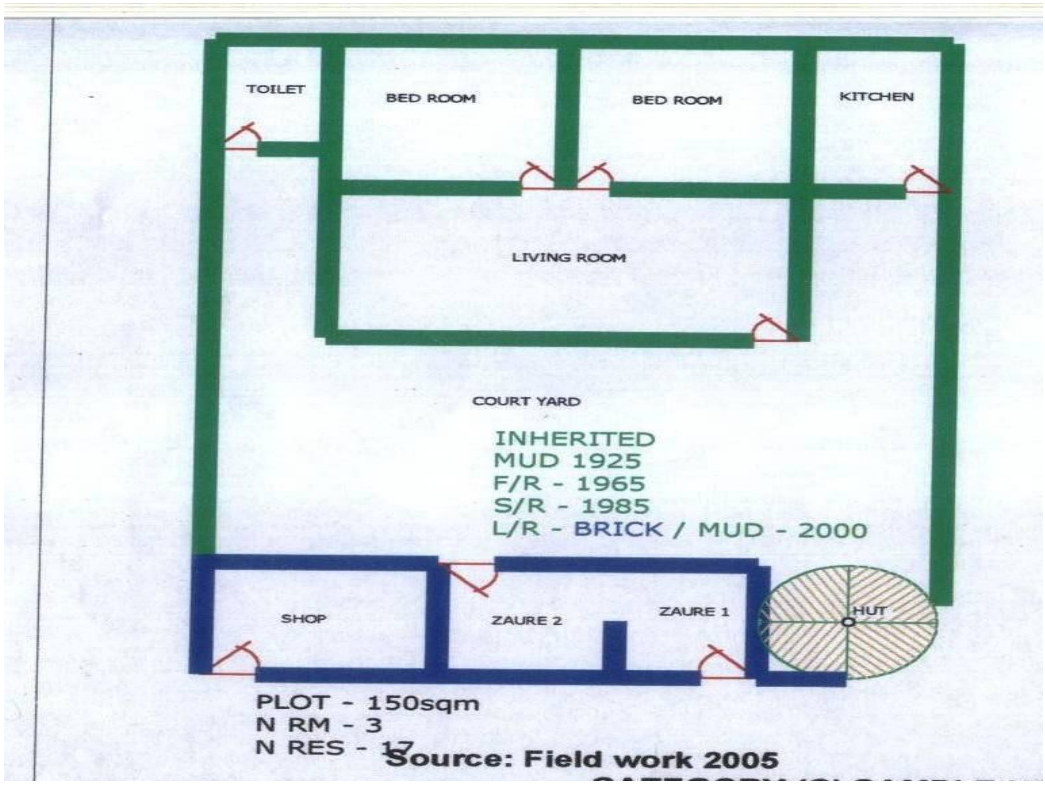
Plate 5.5: one of the smallest Contemporary samples



Source: Field work 2005

Ungogo

A close look at the spatial transformation of the house reveals that, initially the owner inherited the farmland in 1940, and built 2 rooms and a parlour having a detached kitchen and toilets, he roof them with thatch, and it passing through a courtyard, to the entrance zaure leading to the exterior of the house. A food storage "rumbo" is at the opposite side of the zaure, in 1965, presently, there are two additional separate units within the 'gida' for his two brothers built in mud in 1975, for the first brother and the second brother in 1985 using cement brick with zinc roof, A shop is provided adjacent to the zaure for commercial activity, the last renovation was carried out in 2000, see figure below.



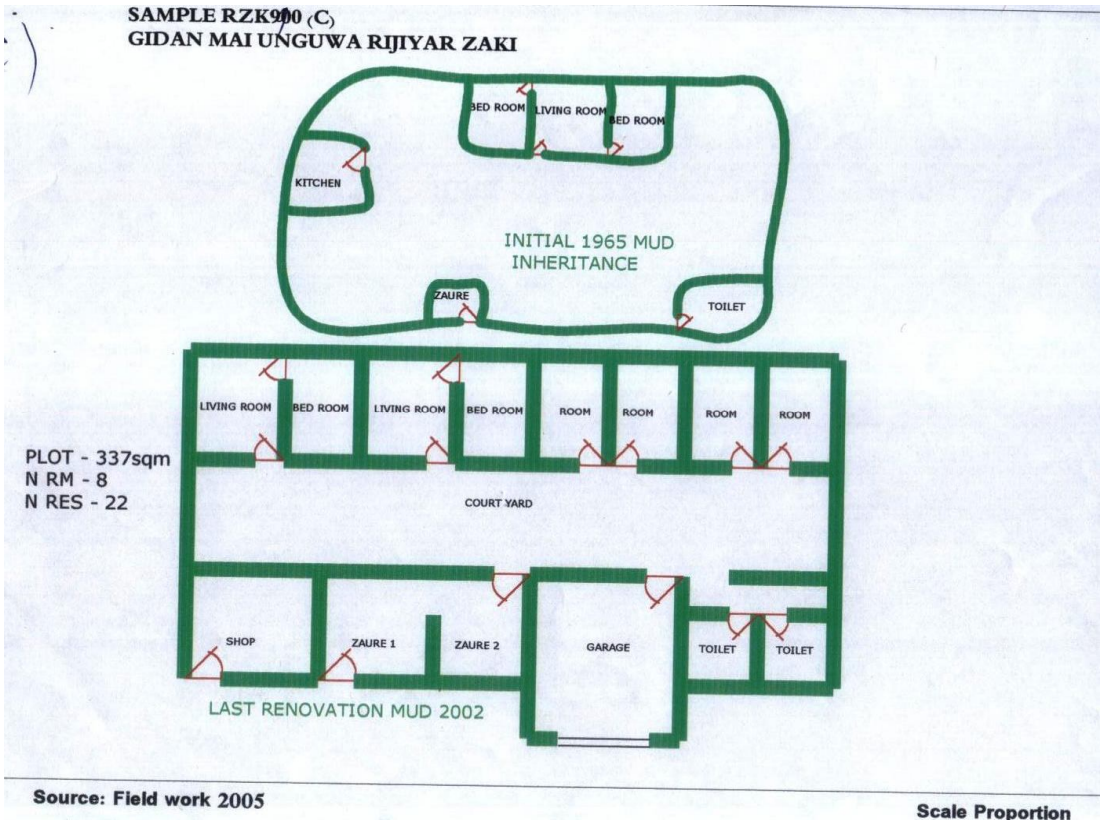
e. Sample RZK (990) Gidan Maiunguwa Rijiyar Zaki

This is located at Rijiyar Zaki cikin gari, initially built in 1965 in mud and azara, consisting only of (3) three rooms, detached kitchen and pit latrine it was surrounded by a compound wall accessed through two entrance zaure from outside, four additional rooms were added for additional wives and children, and female relatives of the compound head.

It was renovated in 1980, in mud with cement plaster and floors with roofed with zinc, the last renovation took place in 2002 with modification to provide (3) shago; with toilets outside for guest and visitors. As for a traditional ruling family, a garage is also provided, however, the compound head of the family died recently in mid 2005 and his eldest son has ascended the throne and recently married and occupying some rooms inside, see figure below.

In process, the physical aspect of the House in planning and elevational presentation, certain things are common to the sampled houses whereas other variables depend upon family size, and plot size etc. This will be discussed under the following six broad bases, namely – planning concept, foundation, walls, roof, elevations, finishes, floor areas, and toilets.

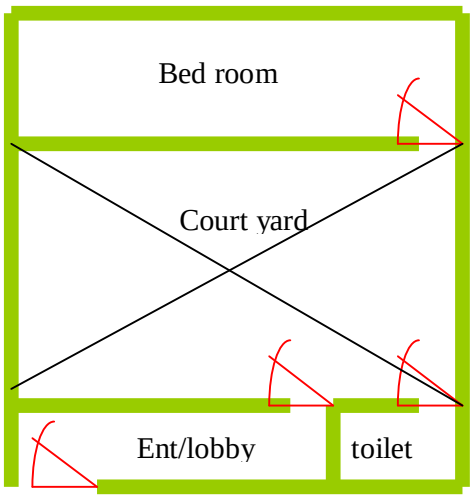
However, it is observed that about 20% of the 'Contemporary Hausa Residential Building have few sheet, of sketches, (building drawing) used by mason or supervisors during construction. This may be attributed to the level of education of the indigenes from technical schools and the polytechnic. See figures on category E.



f. Sample UKU 002

Smallest sample (UKU) has been occupied and rented by a humble young man of about 30years age, with his wife, and two children since year 2002, he has been a petty trader with Qur'anic and Islamic education. The house or chalet is a typical Contemporary Hausa Residential Building on traditional layout (Awon Igiya) and sub-divided due to inheritance by the landlord it contains one room, a courtyard, a toilet and entrance (Í) lobby, on a lot of 18.00sqm (see figure) built with 150mm cement bricks with zinc roof, plastered with cement in wall and floor, painted in white and green in openings. Family and simple bed furniture are stacked in one room,, of 9sqm, cooking with stove taking place in entrance lobby and other activities such as washing or preparation of food; or other house activities are conducted in the courtyard. It is observed that no sufficient space for lighting and ventilation, as the occupant seems to be like stacked in a tunnel with no alternative, but hope and pray to move to a bigger house of their own in future.

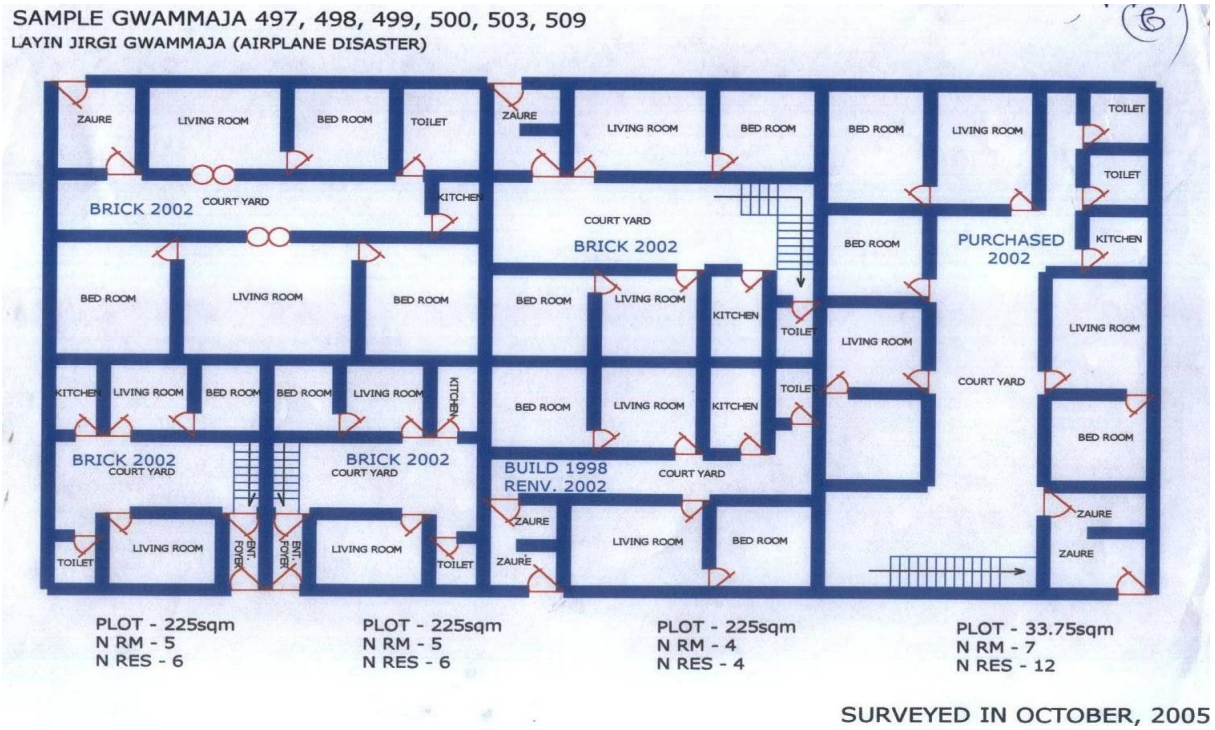
Similarly, sample DRY 223, DRY 225 and UGG 849, of Dorayi, Karshen Waya, (M. Mohd. house) and Ungogo Sabon Fegi, respectively, contain one room, a small courtyard, a kitchen, a shop or guest room, a toilet and I shape entrance lobby, on a lot of 36.00sqm (6x6), but in cement brick with zinc sheets in 2003 for marriage of elder sons. The former was due to inheritance 9 mud 1985) and renovated in 1995, and the occupant seems to be at youthful stage of family development, but sadly with no space for spatial expansion, see figure 1, category A.



Source: Field work 2005

g. Sample GMJ 497-509 (Gwammaja Layin Jirgi)

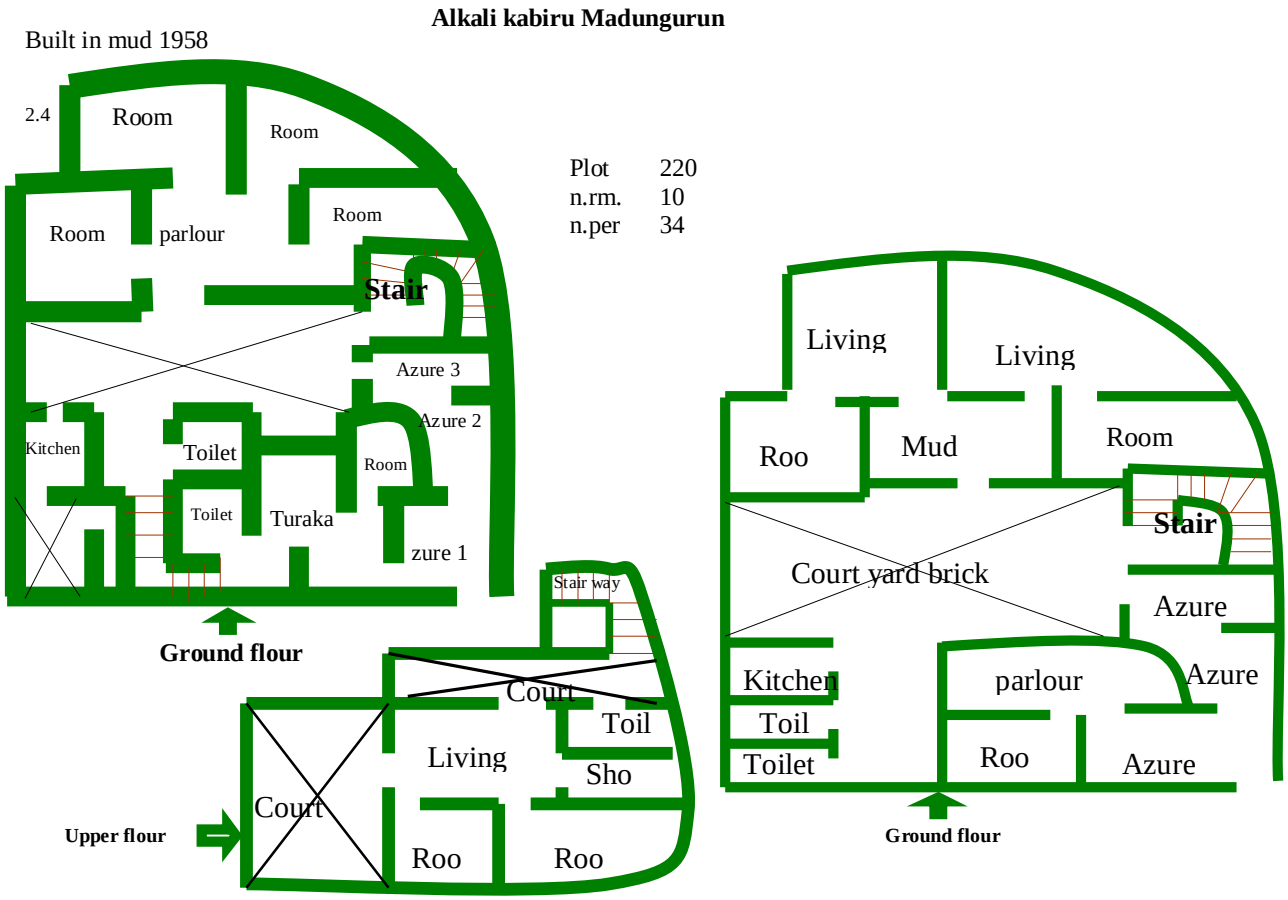
The houses are located at Gwammaja currently known as Layin Jirgi. They contain the families of the ill fated Gwammaja airplane disaster in 2002, reconstructed and compensated by the government, they exhibits the typical Contemporary typologies or archetype, build in a traditional concept with modern materials, The social structures of each house seems to be a and nuclear family unit, containing about 6-12 occupants with one or two wives the master and their children are occupying a plot area of about 225sqm, 330sqm. They contain two rooms and a parlor, a guest room, a toilet, and an I shape entrance lobby with regular rectangular courtyard, build in cement brick, colored zinc, modern roofs, uniquely painted and presented. However, the occupant could not explain the initial date of construction and materials, due to the reverberation of the ill fated airplane disaster, which their parents and relatives happens to be the victims. The house enjoys constant electricity supply, but experience acute shortage of water supply, however, patronizes a near bore hole, see figure 2 categories B.



h. DDG 201 (Gidan Alkali Kabiru Madungurum)

The house is located at Madungurum (a sub ward) residential area; the social structure of the household is in the matured stage or declining stage, as well as its optimal stage in its spatial formation it belongs to an Islamic scholar and an area court judge, initially built in mud and azara plastered with cement around 1958, with central courtyard, three open spaces at upper floor, accessed through a traditional stair case, it contains four rooms and a parlor with each room for one wife, (2) two pit latrine toilets, a kitchen and an open well. The Maigida has his own turaka at front of the house, with guest reception hall accessed through first azure. The second and third zaures leads to the inner core of the house, the traditional mud roofs at upper floor were covered with zinc roofings, and the timber windows were replaced with crystal hope window (metal and glass) around 1975, however, the household head use to maintain and paint the house almost every year especially during the Sallah festivities periods.

After the death of the head of the household, the house was first renovated in 1992 as a result of rain and waste water damage to the walls in a mud and cement plaster, it was the same reason in 2003 it has to be demolished but rebuild in cement bricks and zinc roofs, and the masters staircase, was demolished and his open space up stairs was covered with zinc roof to avoid rain penetration into other parts. However, the study observes that it is only the household head unmarried sons and daughters with his widows are living in the house, while matured and married ones are living at their marital houses, see figure below.



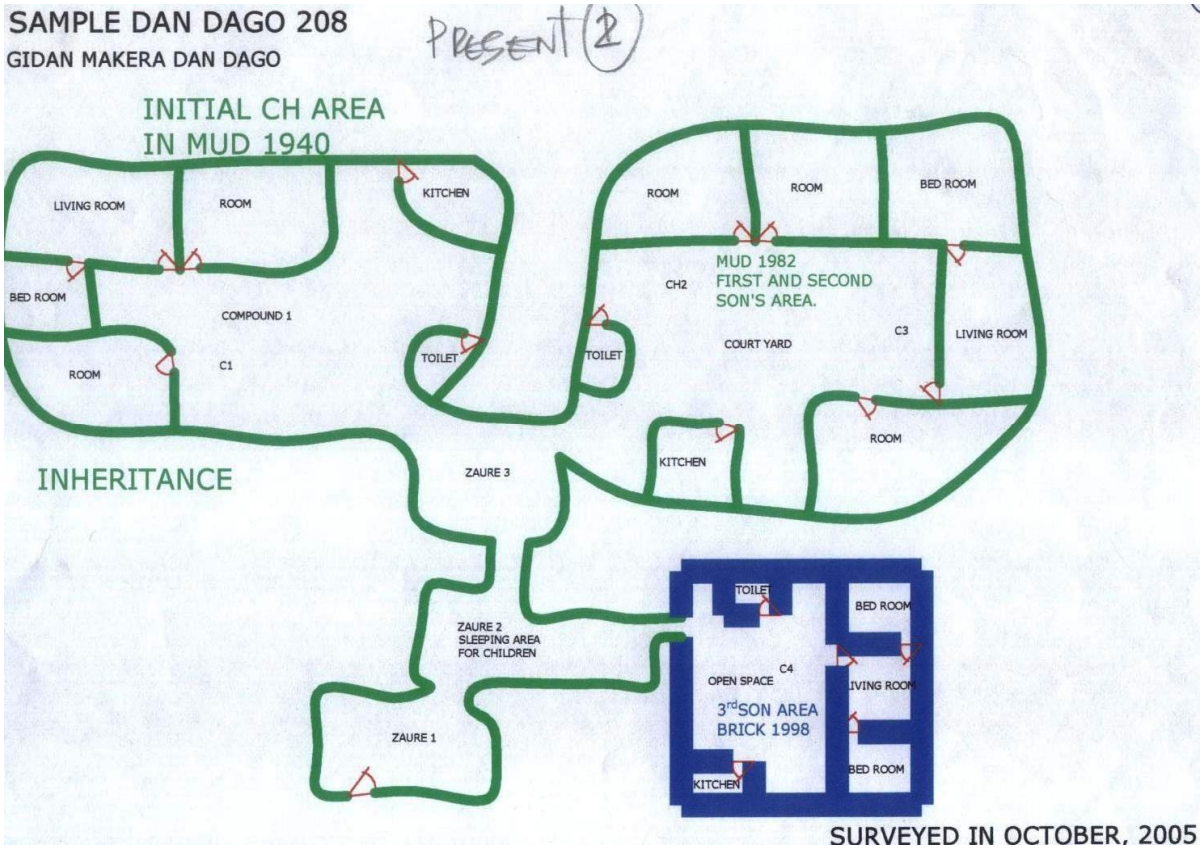
Source: Field survey 2005

i. Sample DDG 208 Gidan Makera Dandago

The social structure and spatial morphology has reached matured stage and development, it was initially built in 1940 in mud and azara for noble compound head who happened to be 'iron smelters'. Area C_1, it contains two rooms for his wife, his room, a cooking space, with open toilet all situated in spacious open courtyard, accessed through second zaure, open spaces to first zaure it is also used as a workshop for blacksmithing land iron smelting, area C_2 and C_3 a place for rearing of animals and C_4 happens to be extension from outside. Presently it contains four nuclear family units that of the father, and that of his three eldest sons. The space for rearing of animals was built in mud and azara in 1980, and thereafter for

his first and second sons, accessed through the second zaure, the central open space for children between the age of 6-14 years, It is observed that the family grows from nuclear unit and to composite unit, the third son area was carved out from extension from outside, to contain two rooms, a living room with toilet and a kitchen accessed through second zaure.

The first zaure was renovated and roofed with zinc after a rain damage to the mud roof in late 90s, the field work reveals that, after the death of the head of the house, it was still being occupied by his children and grand children but (sadly) the deceased's descendants have abandoned the inherited iron smelting craft to modern trades and crafts, see figure below:

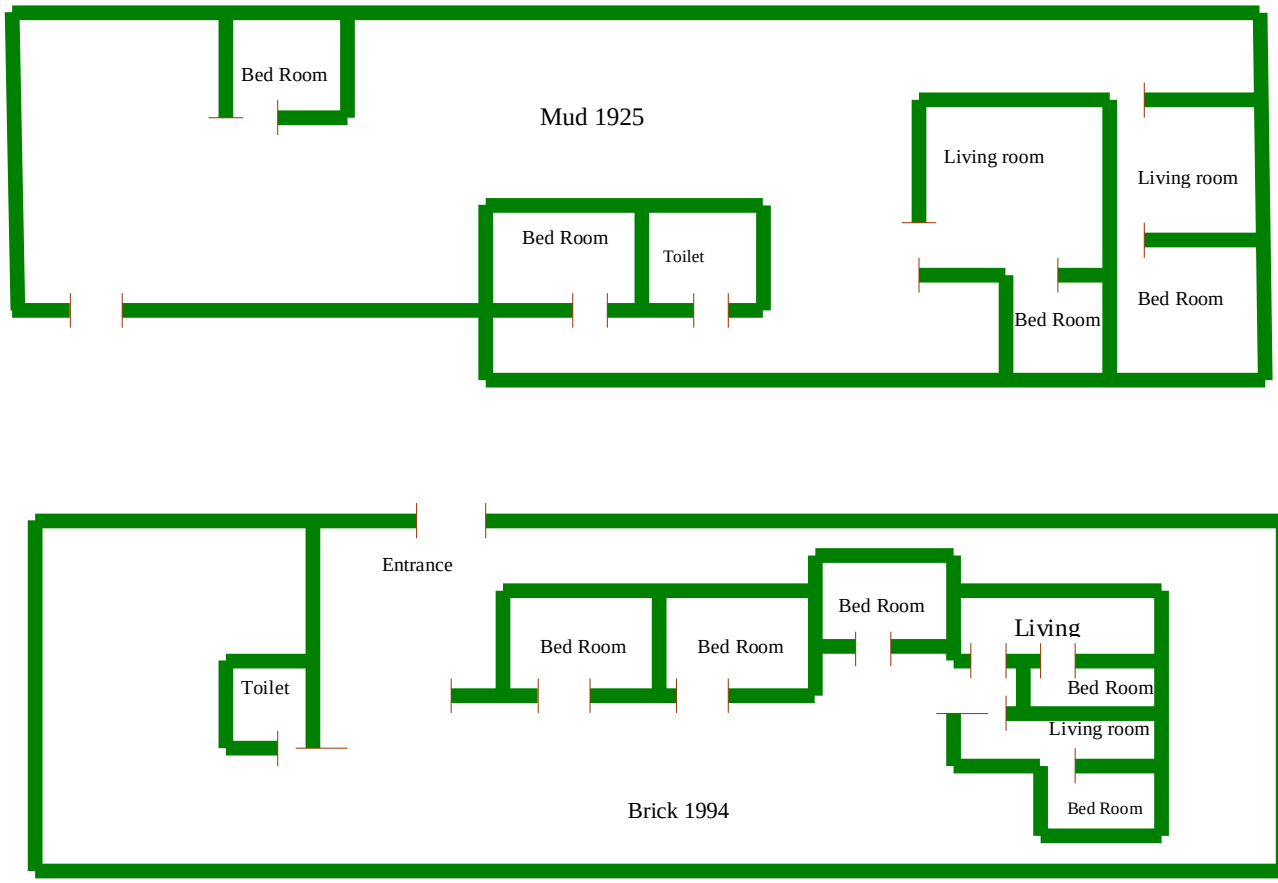


j. Sample BDW 050 Gidan Mai Unguwa Idi Jawa

Head of the family who is said to be 85 years old built it in mud with thatch compound fence on a family farmland in 1925 with two rooms and parlor, semi detached, a traditional open pit latrine (toilet) and open space for cooking, rearing of animals and other social family activities and household.

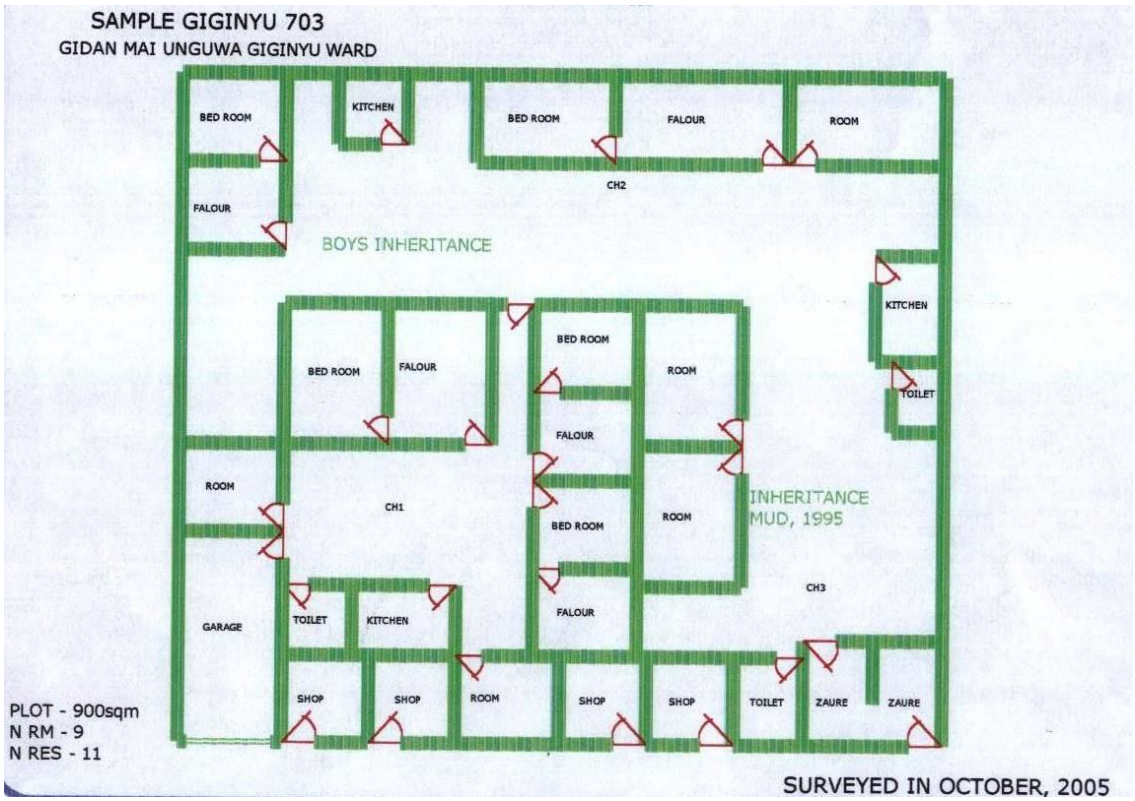
In 1994 the house transformed into consisting of (5) five rooms, (2) two parlors occupied by (9) nine occupants, and thereafter additional 3 rooms were constructed for his elderly sons and daughters with relocation of toilets and provision of a square shape entrance lobby. The fence was reconstructed in cement bricks enclosing the compound rooms all in cement bricks, zinc roof, and metal openings making it look a typical Contemporary Hausa Residential Building with open space for a satisfactory lighting and ventilation, see figure below

BDW 050
Mai Unguwa idi jawa badawa 50A



k. Sample GGY 703 Gidan Mai Unguwa Giginyu

Gidan Maiunguwa is one of the biggest compounds in the area, It seems to be at its completion stage of development, because it is occupied by (3) three compound heads, brothers each as a unit with family accessed through a ,residents 11rooms and 9consisting of ĺ shape entrance zaure, and a garage at opposite ends with 4 shops for commerce, and guest room facing outside, ironically there was no any information on its initial construction. However, renovated and additional room constructed in 1995 in both mud and brick covered in zinc roof, The compound looks like a collateral agnate family with relatives, brothers occupying some rooms inside, it contains 4 different courtyards, separated by a dwarf fence, see figure 4 categories D.



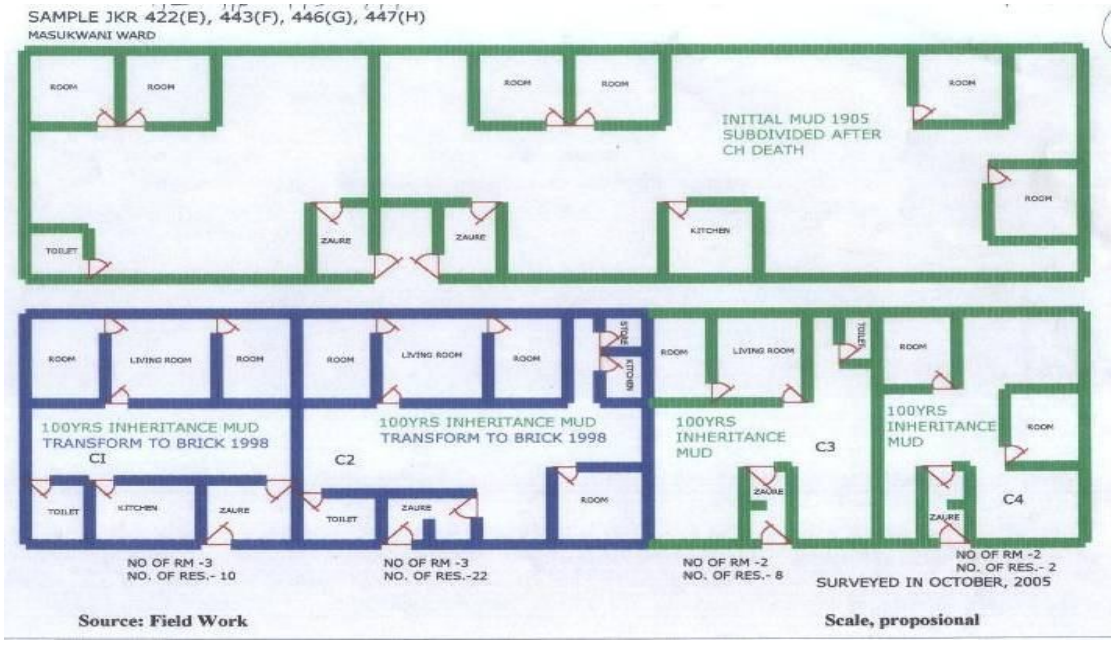
l. Sample KRW 493-495 Rimin Kira Quarters

The social structure of these three households seems to be in the middle stage of the growth cycle, however, at its optimal stage in its physical space (no room for expansion), initially built in mud and azara, in 1960, with two rooms and parlor, a kitchen, an open toilet, and two entrance azures, six years later a room and a toilet were added within the spacious courtyards. The central unit is still occupied by the widow of the household and her 3 younger children. The eldest son occupies the right wing with his wife and eight (8) children, renovated in 1980, with mud and cement plaster, second unit on the left side is occupied by his younger brother, and his family having a total eleven (11) residents renovated in mud after inheritance in the late 80s, see figure below



m. Sample JKR 442, 446 AND 447 Masukwani Ward

The house is located in Masukwani area of Jakara quarters which presently contains (4) four units of nuclear family houses and which is sub-divided after the death of their father, in the sharing of his estate for inheritance in accordance with Islamic laws. It was in mud and azara roof in 1905, with room and parlor for the children and his wife, open air toilet, a kitchen and three interconnected azures linking to spacious courtyard, with additional wife, Another room and parlor was built for the second wife (amarya) in 1955. Two additional rooms detached were built for the children, sister being a composite family unit after the death of the children's sister, his eldest son got married and occupied the unit, It is noted that; three daughters of compound head are living in their marital houses. A close look at the spatial arrangement of the house, revealed that there are four separate houses, directly accessed from outside, each consists of a nuclear family units, with the first unit containing 2-4 rooms with a kitchen, a small toilet, courtyard I or L shape lobbies, built and renovated between 1990-1995, 1998 and 2002 in cement brick and zinc roofing sheets. The house signifies the growth cycle from youth stages to matured and declining growth cycles finally to individual nuclear family units, see figures below.



n. Sample DL 584 & 585, Alfandas House

Alfanda's house is a popular merchants houses in the old city of Kano in Dala quarters it was initially built around 1945 in a traditional mud and azara and is a typical Hausa man's house with a room and parlor (daka da rumfa) it has an open toilet, and a big kitchen for cooking and storage, a big zaure with two shops facing outside but accessed through a smaller second zaure to a spacious courtyard. The frontal fence or wall contains bigger ware house for storage and caravan traders. However, the compound presently contains three units being occupied by his son after the death of the compound head it was renovated in 1987, some of the warehouses at the front were converted to rooms and separate entrance lobbies from outside the units are separated by internal compound walls to separate the units. The study reveals that, some of the compound head's sons are leaving at nearby houses allocated to them after inheritance, The social structure of the house seem to be at its matured stage, see figure below.

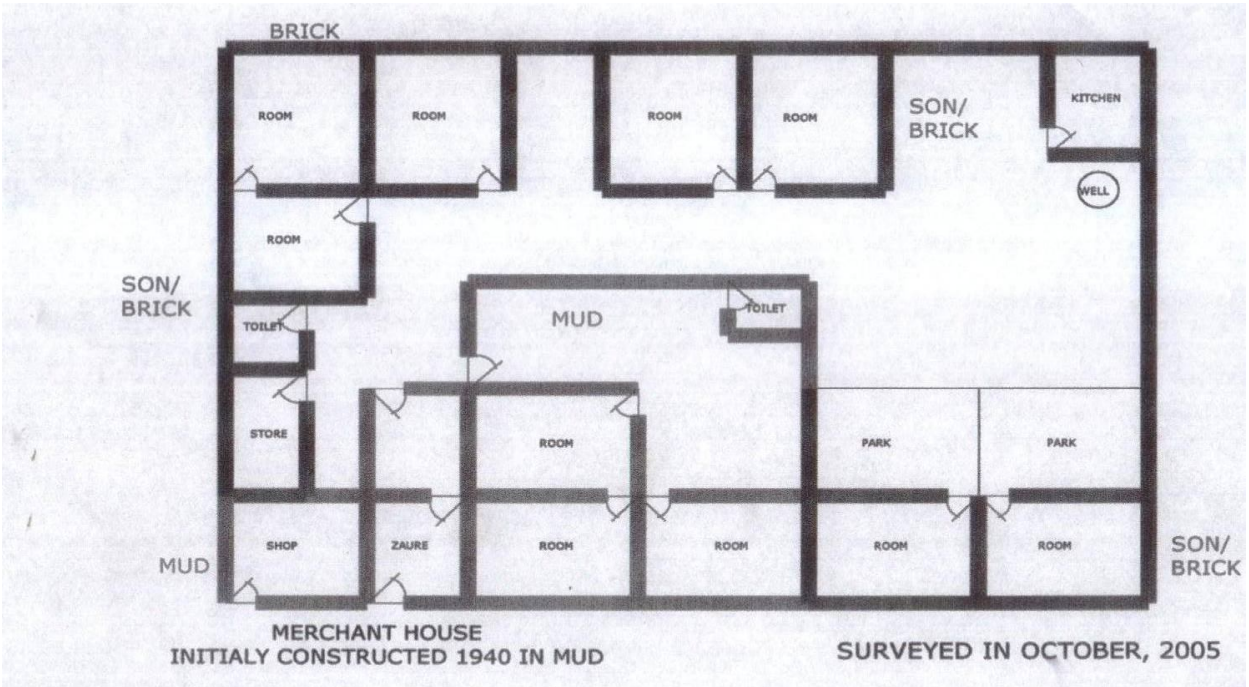
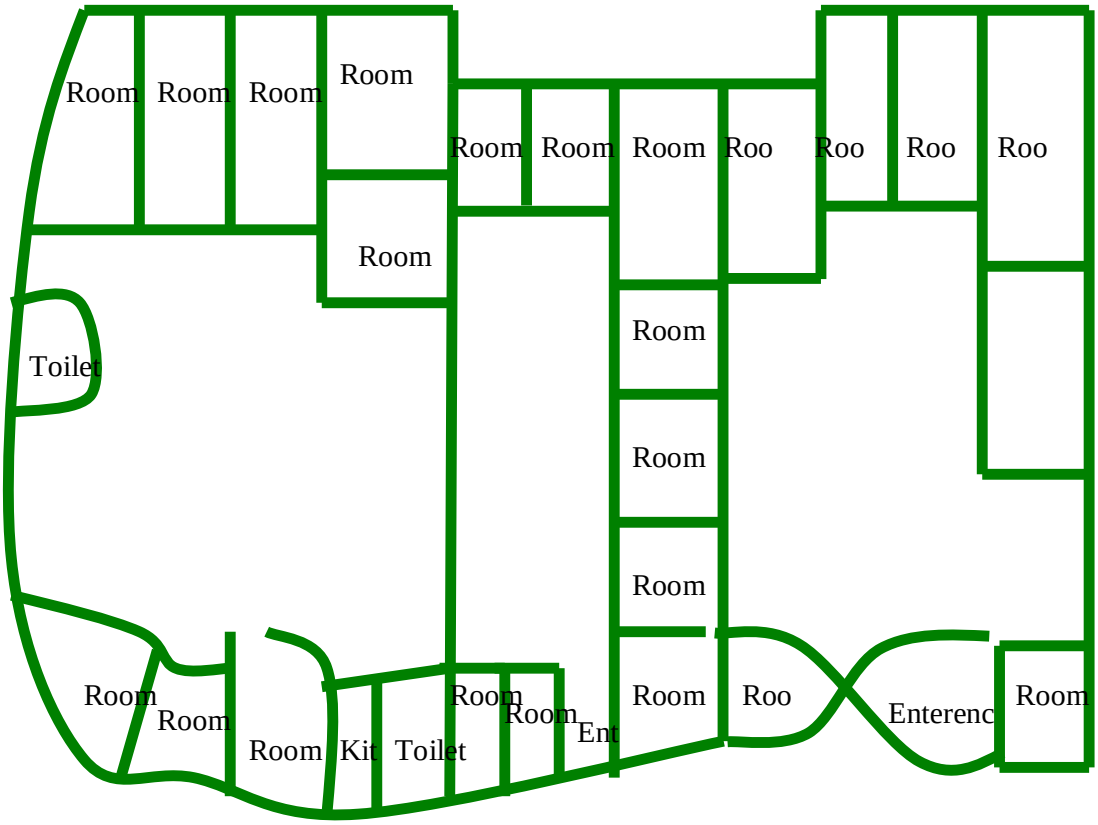


FIGURE 3

CATEGORY (C) SAMPLE HOUSES ON PLOT SIZES ≤ 486SQM

o. Sample DL 557-559

The house is located in Dala ward built initially in a traditional mud and azara in 1945 with four rooms, store and kitchen closed big pit latrine, two entrance zaures. However, at the middle stage of the growth cycle of the house, two additional rooms and parlor were added for the children and additional wife around 1965. After the death of the head of the compound, the house was splited to contain (3) independent compound units with the first house containing nine rooms with (32) occupants, (3) wives, the master and their children, one toilet, a kitchen and a square shape entrance azure. The second unit consists of (4) four rooms (2) two parlors "daki da rumfa" for two wives and their twelve children, while the master or the household head occupies two rooms and a parlor, it has a toilet, at the upper floor, while cooking takes place beneath the staircase, renovated in mud with cement plaster in 1985, with a tunnel shape courtyard and square shape entrance lobby. The third house contains 4 rooms, 2 parlors linked in a series, a store, while the cooking takes place outside close to a well and pit latrine toilet attached to an irregular shape azure. The shop in mud was demolished and rebuilt in brick in 1979, with electricity and pipe water supply. Despite the persistent scarcity of supply of light, when asked about the future perception, they felt that the house is inadequate and with increasing congestion of the city, they wish to move to the outskirts of the city, see figure below:



Source: Field work 2005

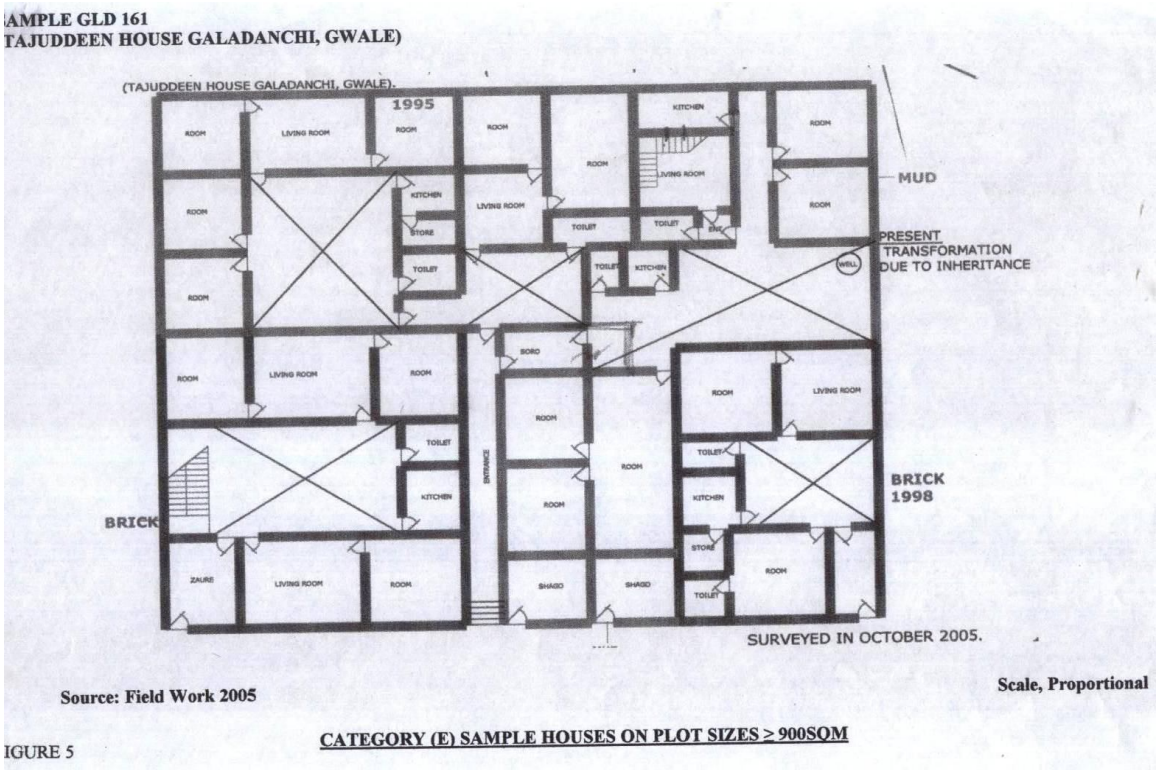
p. Sample GLD 161 (Tajudeen's House)

This is a popular rich merchant house. The social structure of the house is in its peak and was tithing towards a declining stages because of the unit houses are occupied by widowed or divorced daughters of the compound head. While the eldest son's shares are occupied by the relatives of the families; it was initially constructed in 1940 with (4) rooms and a parlor, kitchen and storage, two servants rooms, store or shop for goods at the exterior, it was linked to two entrance zaures leading to the interior open spaces, (2) wells are provided at centre and extreme end of the centralized courtyard, for social and other household activities. Due to certain reasons and business, the compound head settled in neighbouring country and the house become partially abandoned.

After his return and he eventually died, the house now consist of almost 6 units most built in

brick and zinc roof of a storey form, few in mud and azara, the house is no accessed through an I shape entrance lobby to a small courtyard linking to other units. Unit one was renovated in 1995, occupied by the eldest son of the family who now take it, contains (3) rooms and a parlor, built in a storey form with a toilet, kitchen, and a small courtyard it was built in brick or concrete, roofed with zinc sheet. The second unit which is by the exterior of the compound is occupied by another child and it was renovated in 1985 it contains 4 rooms, a living room, kitchen, toilet, a staircase with children's rooms accessed through the lobby. The third unit was equally renovated in 1998 it contains two rooms, an entrance lobby, toilet, kitchen and a courtyard with upper floor that is built in brick or concrete and zinc roof for the owner who causally lives in. The fourth unit contains one room, upper floor with a kitchen, toilet and staircase at ground floor for household head sisters. Other two rooms still in mud and azara is at the opposite side meant for another sister.

The last unit contains three dilapidated rooms for another son, it is yet to be renovated and still being occupied. However, it is observed that there is still a limited social household activity relation taking place in the centralized courtyard, containing the a common well and toilets with common entrance, see figure below.



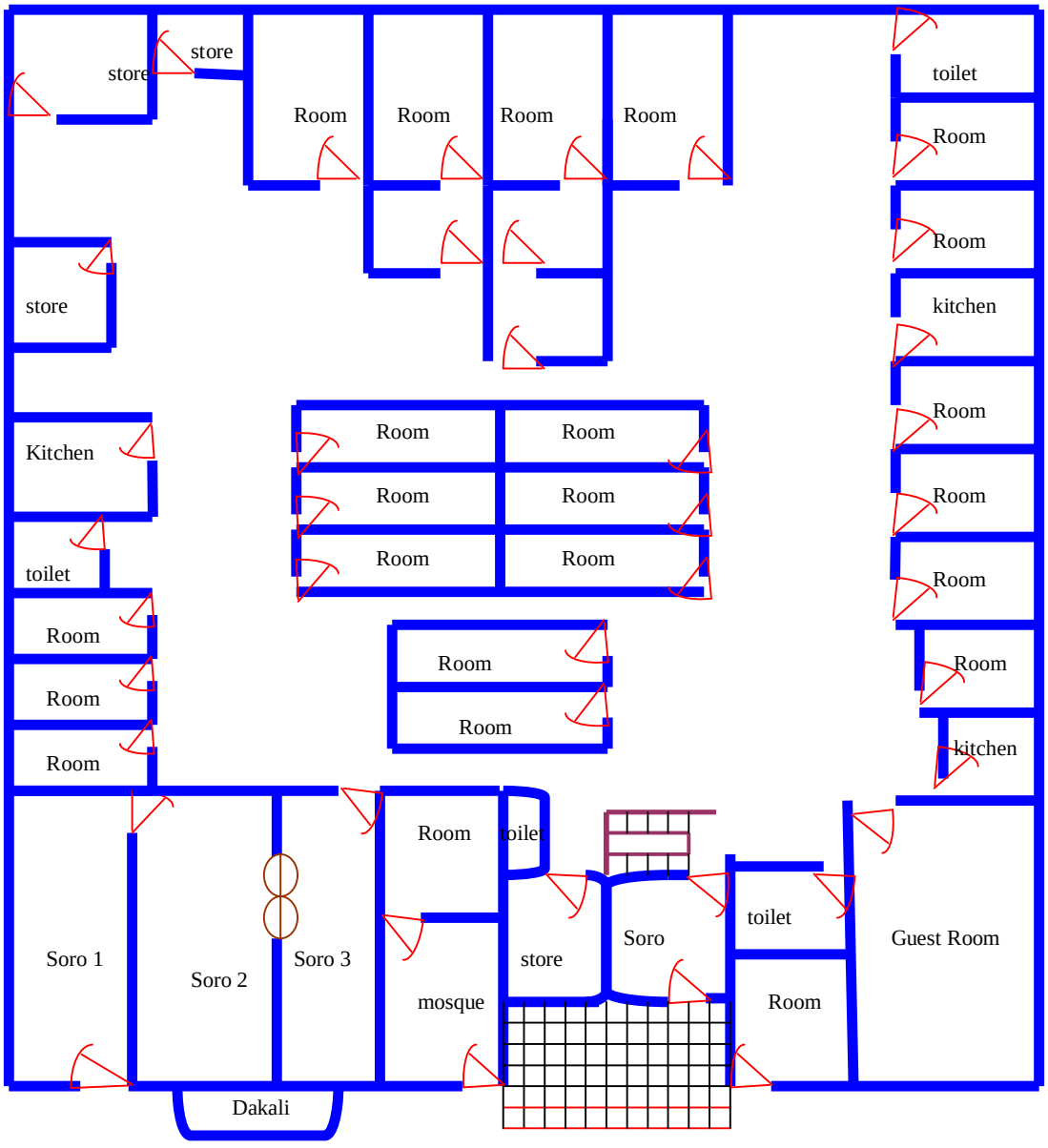
q. Sample GGY 035 (Gidan Dagachi Gyadi-Gyadi)

it is a traditional ruler's house called Dagachi, initially built in 1945 with (4) four rooms, a toilet, kitchen, a well and three entrance zaures enclosed in a bigger open space by a compound fence wall constructed of mud, two additional rooms and parlor were built for two subsequent wives.

In 1975, his eldest son got married. A room and a parlor, a toilet with staircase to upper floor was built for him in cement bricks African decking, and zinc roof plastered in cement with crystal hope window separately as his unit. Similarly, in the late 70s an upper floor was with (3) three rooms and staircase was built and occupied by the compound head, Some additional rooms were also built at the extreme left for his teenage sons, and the other relatives or guest as traditional rulers is concerned. A mosque close to the zaure was built and surrounded by a dakali with rumfa (shied) for local administration. By 1985, his (2) two sons got married and a separate house unit for each of them containing (2) two rooms and parlor with toilet, a kitchen were built in bricks and zinc roof were built for them. Additional rooms were also

carved out from the bigger rooms and spaces for the compound head relatives sisters and grand sons staying with them, there is a well by their side.

The house is a typical collateral agnate family unit; However, some of the compound head brothers who are ward head of Hausawa 1 and 2 are staying outside the compound, see figure below:

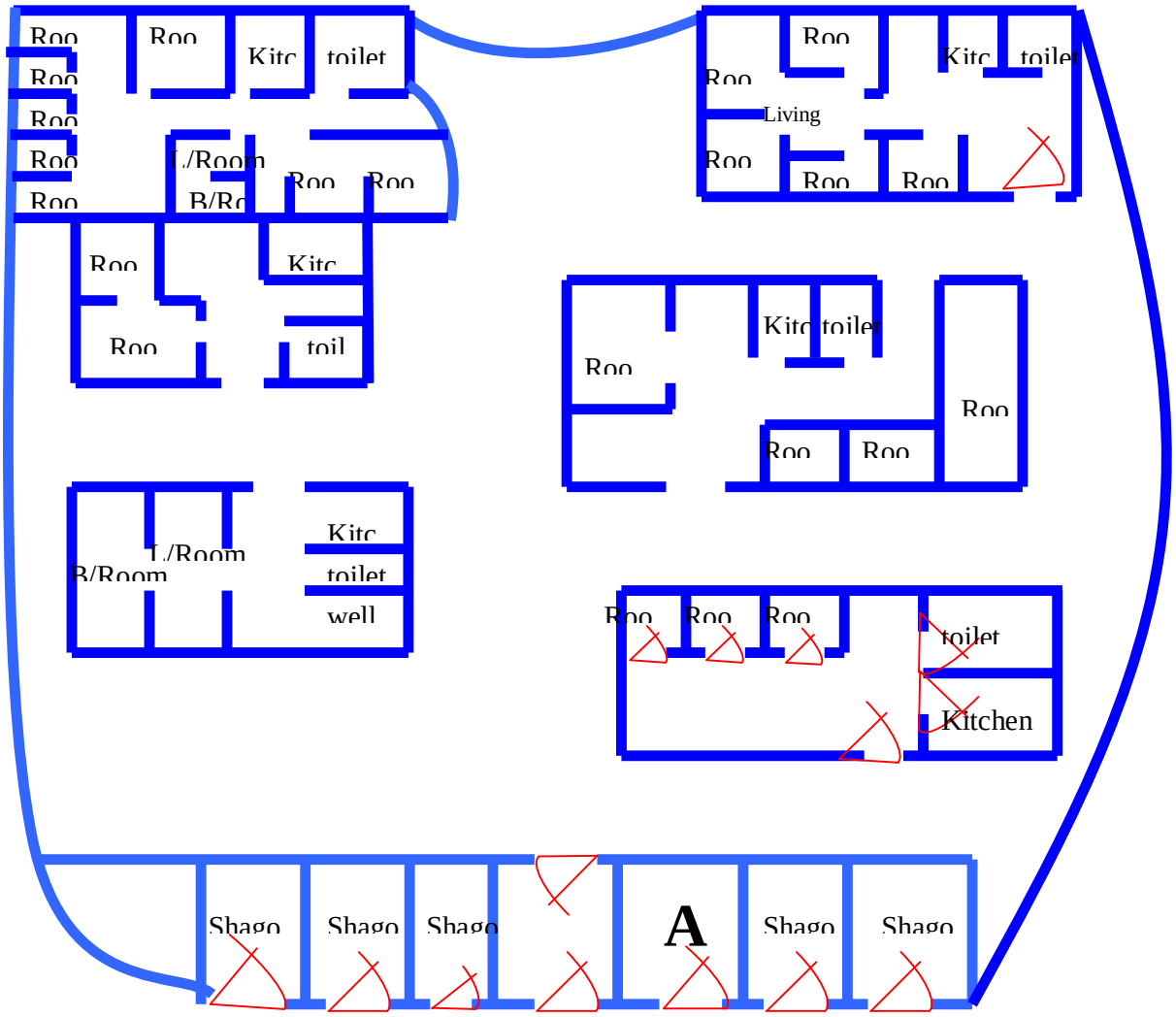


Source: Field work 2005

r. Sample HTR 096, Gidan Dagachi, Hotoro

It is a traditional rulers house (layin kankare, Hotoro). Established over 100 years ago, the social structure of this compound household is in its optimal stage, it is a typical collateral agnate family unit, consisting of (6) six step brothers and each occupying a separate unit of its own with his family as follows: compound one, is occupied by one of the eldest son of the deceased, Dagachi consists of (7) rooms and parlor a for his two wives and children. The master occupies a separate room and a parlor, it has a toilet, kitchen within L shape narrow courtyard built and renovated in mud. The second compound belongs to one of the younger brother with only a room and parlor, a toilet and a kitchen built in brick and zinc around year 2000, The third compound for another brother and his wife and children also contains a simple room and a parlor, a small kitchen, toilet and open well with internal courtyard. The fourth compound belongs to an intermediate brother with (2) two wives and (10) ten children living in five rooms, a living room, a toilet, kitchen, and a well in a small courtyard accessed from rear side, while the fifth compound is occupied by another step brother with (3) rooms, a parlor, toilet, and a kitchen in a L shape courtyard built in bricks and zinc roof. The last compound belongs to another son, with three rooms, a toilet, kitchen and a small courtyard accommodating the brother his wife and their (9) nine children, it was built in brick and zinc roof in the late 1990s.

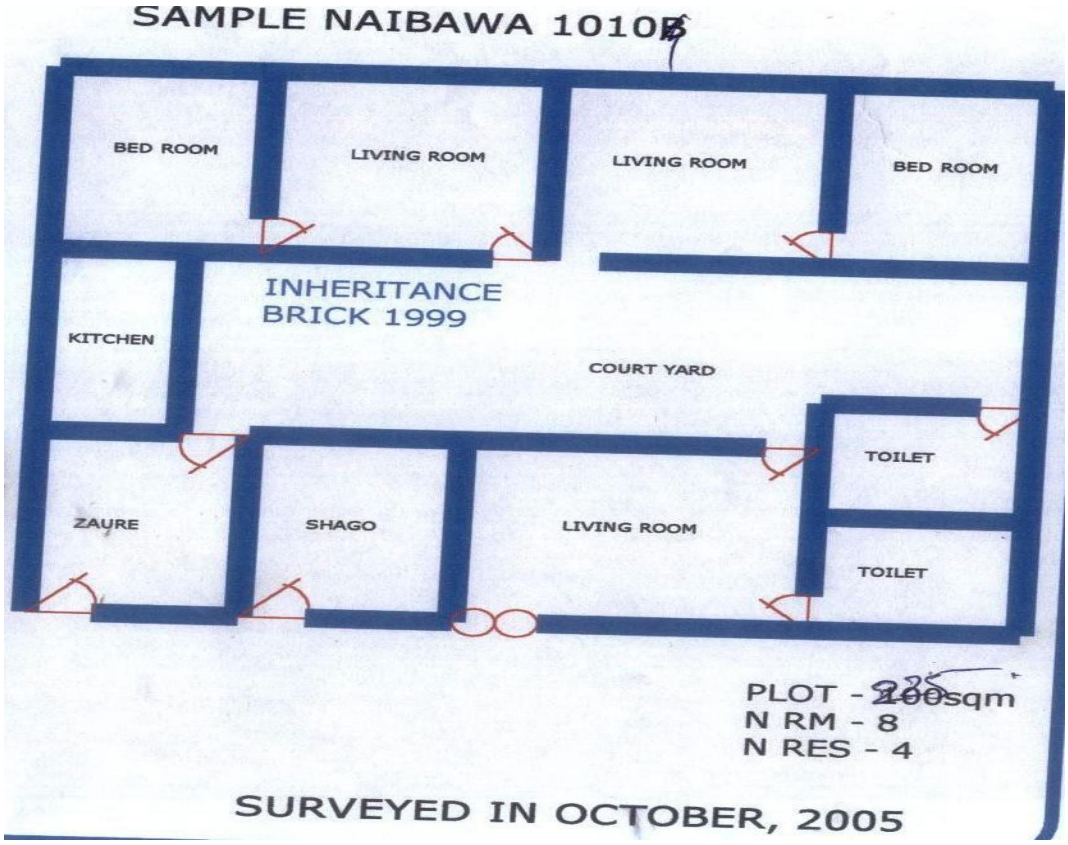
Similarly, it is noted that, the main entrance has lasted for ten years (around 1995) it has acenter with three commercial shops or garage at the opposite ends. The compound is still surrounded with a traditional dwarf having a mud, compound fence, with series of internal spaces for the grazing of animals, and other household activities. It was also gathered that some eldest sons were living outside the compound house; they are now ward heads of Hotoro Kudu and Hotoro Arewa. Ironically, most of the respondents could not recall the years of constructions and renovations, see figure below.



Source: field work 2005

s. Sample NBW 1010

The last sample to be surveyed in the process of the field work on (13th October 2005) is occupied by a humble Yoruba man with his wife and 6 children, he is a businessman, occupying a plot of 225sqm with (4) four rooms, having a kitchen and a toilet at opposite sides of a courtyard, it has a shop or “shago” for commerce by the wife and a guest room with toilet from outside, is accessed through A □ shape entrance lobby, initially constructed in 1999 in cement brick, zinc roof, metal doors and windows with regular and average room sizes it was plastered and finished in "Contemporary materials" see the figure below:



Source: field work 2005

5.15 Measure of Central Tendency

The techniques of measures of the central tendency are predicted on the premise that no matter how much buildings or houses differ from one another, both in physical attributes and functions, these differences eventually may show a limit. For instance, it may be difficult to find residential buildings up to or between 3-9 heights that are non storey buildings, houses, Chase (1967). Report that The height of buildings mostly ranges around a point located at the centre of these two extreme; The point is naturally considered to represent a typical height known as average height, i.e. total building height 4.0-4.5 non storey, 7.0-7.5m storey buildings.

The average provides the basis for comparing a condition in one group with the same condition in the second group i.e. four categories of sampled plot sizes The averages permit the estimation of (i.e. floor area per household, or sleeping area per person) thus to be able to

estimate a comfortable space in sleeping areas, living area, and service area etc, Also if one wishes to make a good estimate of cost of a set of elements or part or materials of a building according to **Zanzan (2005)** there are three indicators of typical or average status that are used widely; these are the mode, median and mean, see table in appendix.

1. **The Mode:** is the value in a distribution of scores that appears most frequently; it is the central point in a distribution of scores around which the bulk of the data seems to congregate, Sometimes it is an unstable average; because it depends upon only a fraction of total cases whereas its primary value lies in its case of computation and used a quick indicator of central valve of a distribution.

2. **The median:** is the value located at the position that leaves exactly 50% of the cases either side of the observations, the range of scores does not change the point that divides the distribution into magnitude than the median can be found from the relationships N+I in a sample scores.

$$\frac{N + I}{2}$$

3. **The Mean:** on the other hand, is simply the arithmetic average given as:

$$x = \frac{EX}{N} - 4.8 - 8.8 \quad S$$

Where X is the mean, X the row scores of samples (individuals) and N number of samples (individuals), on which EX = X1+X2+X3….X, Out of the three average measures, the mean is the most stable from sample because of its sensitivity to the individual scores obtained in the distribution.

Item	Mean	Median	Mode
Sleeping areas	1.8sqm	4.8	14.0sqm
Floor areas	2.5sqm	5.6	11.5sqm

For this study, the mode, median and mean for selected sampled houses has been obtained from the tested or measured variables as follows:

- NRM - Number of rooms – per house
- N RES - number of residents – per house
- A P - Area or plot size

Moreover, average sleeping area (ASA) per person and average floor area (AFA) per person have been calculated and obtained from the following formulae:

1. ASA = $\frac{NRM}{}$ where N, RM means no. of sleeping rooms per house

N, RES means of residents per house.

Average sleeping area per/person

2. Average floor area per household $\frac{AFA}{T\ N\ RES} = \frac{TPA}{TNR}$

Where TPA total plot area/size of a house sample

TNR total number of residents of occupants in a house sample.

1. Example 1: sample BBG 042

Plot size 56.25sqm

No. of rooms Irm and area (1x9)

No. of Res. 5per

Where ASA = $\frac{1(9sqm)}{5\ per}$ = 1.8sqm

Where AFA = 56.25 = 11.25sqm

Sample UKU 002, BBG 042, RZK 880, have the least ASA person obtained.

2. Sample HSW 044

Plot area – 162sqm 11.5, AFA, FLR area

No. of rooms – (7x9)

No. of residents – 17 AFA 4.5sqm ASA sleeping area

3. Sample HTR 112

Plot area 110sqm – 18.3sqm

No. or rooms 3x9

No. of residents 6 4.5sqm ASA

4. Sample GWL 189

Plot area 225sqm

No. or rooms 13x9 17.3sqm AFA

No. of residents 40 5.5sqm ASA

5. Sample CRC 142

Plot area 300sqm 11.1sqm ASA

No. of rooms 3x9

No. of residents 12 25.0sqm AFA

6. Sample LKM 172

Plot area 120sqm 4.4sqm ASA

No. of rooms 3x9

No. of residents 4 30.0sqm AFA

It can now be concluded that, average sleeping area per person in Kano metropolitan city is 4.80sqm (2005).And the average floor area per household in Kano metropolitan city is 5.6sqm (2005) in all the eight (8) metropolitan Local Governments

5.05 Space Analysis in Sample Houses

Two aspects of space provision or utilization were examined, and they are the Total Floor Area (TFA) or Total Plot Area (TPA) in a house, a total number of rooms in a house, and the number of house residents or inhabitants, the magnitude of the total floor area or plot size (see table), shows a wide range across four categories of plot sizes of the entire samples of 1010 surveyed.

It does not seem to show any uniformity, regularity or correlation between plot size and number of rooms, this is evident from an examination which has been extracted

For instance, the minimum and maximum average sleeping area recorded is (ASA) 1.8sqm and (5.6sqm) respectively, and minimum and maximum average floor area (AFA) is 2.5m^2 and 5m^2respectively. However, the mean ASA is 1.6m^2 and the mean AFA is 5.6m m^2 with a standard deviation value of 0.150 and corresponding 0.15%.

Similarly, it is observed that the space distribution in both ground floor and upper floor areas is relative to the ward 80-90% of the houses are storey buildings, such as Gwale, Gyadi-Gyadi, Dala, T/Wada etc.

Three different colors (red, blue, yellow/black) were used to identify various stages or years of transformation and materials used.

For the purpose of presentation 1010 are arranged in ascending order first by plot size they occupy and secondly, by number of room and family size, into five categories, and 200 samples were selected for presentation based on their qualities or sufficiency of information required to justify trends and reasons of transformation.

1. <100sqm family house sample

These houses on plot size <100sqm measures 7.5x10mx10mx10m length and breadth consist of two-three rooms, parlor as presented in (table…) consist of 2-5 family members.

Typical house sample 003 of U/UKU quarters being the smallest sample consist of a husband

and a wife and two children renting with one room, courtyard a toilet and entrance lobby on a plot of 2mx7m = 16sqm

The other sample… in Rijiyar Zaki consists of 4-5 family – renting plot 2x10-20sqm one room/parlor, courtyard, toilet kit, entrance lobby and shop.

5.06 Data Coding

Coding – the purpose of coding in survey, according to Moser and kalton (1974), is to classify answers to a question or data into meaningful categories so as to bring out their essential patterns. Content analysis may also be considered as a specialized form of coding in order to abbreviate data and assign identification tags to categories of variables for ease of identification, Zanzan (2005) For the purpose of this research surveyed, sample ward were coded and abbreviated under the eight metropolitan local governments as follows:

Table 5.3 Coded Wards.

S/N	WARD	CODE	S/N	WARD	CODE
1	Unguwa Uku	UKU	18	Fagge	FGG
2	Gyadi-Gyadi	GYD	19	Kurna	KRN
3	Tarauni	TRN	20	Gwagwarwa	GWG
4	Hotoro	HTR	21	Jaba	JBB
5	Baban Giji	BBG	22	Sharada	SRD
6	Hausawa	HSW	23	K/Mazugal	KMZ
7	Gwale	GWL	24	Jakara	JKR
8	Dandago	DDG	25	Naibawa	NBW
9	Chiranchi	CRC	26	Giginyu	GGY
10	Galadanchi	GLD	27	Dala	DL
11	Dorayi	DRY	28	Ungogo	UGG
12	Rijiyar Zaki	RZK	29	Kumbotso	KBT
13	Kabara	KBR	30	Yankaba	YKB
14	Yakasai	YKS	31	Badawa	BDW
15	Dakata	DKT	32	Kawaji	KWJ
16	Kurawa	KRW	33	Sheka	SHK
17	Gwammaja	GMJ			

But however, some sub wards are included within some major wards code. Other places where coding or abbreviations have been used are in Zaures, level of education and room spaces as follows:

Table 5.4 Coded Spaces.

Zaures		**Education**		**Room space**	
Square	أ	Primary	P	Bed rooms	BR
Rectangular	أ	Secondary	S	Living rooms	LR
L, shape	L	Tertiary	T	Courtyards	C/Y
I shape	I	Qur'anic/Islamic	Q/T	Kitchen	K
				Entrance lobby	

Source: Field work 2005

The coding takes place in the course of preparation and testing of questionnaire and the beginning of the survey itself, (pre-coding) and finalized in the course of data analysis, the coding process has played its role successfully in characterization, abbreviation, summarization, and ordering.

5.07 Planning Concept, Materials and Construction

a. Planning Concept (Form and Changes)

Previous research has revealed that Hausa traditional houses consist of series of Zaure, of rectangular or square shape depending upon the status of the owner with an average of 9-16 Sqm, used to receive visitors and relaxation known as (Birkin Bako) Sa'ad (1986) Umar (1997), presently is in for L shape of 2-6sqm which has no relationship with number of house occupants the entrance lobby is called "Zo ka Wuce".

Similarly, in Contemporary houses now have a guest room with a toilet is which is usually provided at the front of the house of about 9sqm –12sqm, which supplement the function of Zaure for guests.

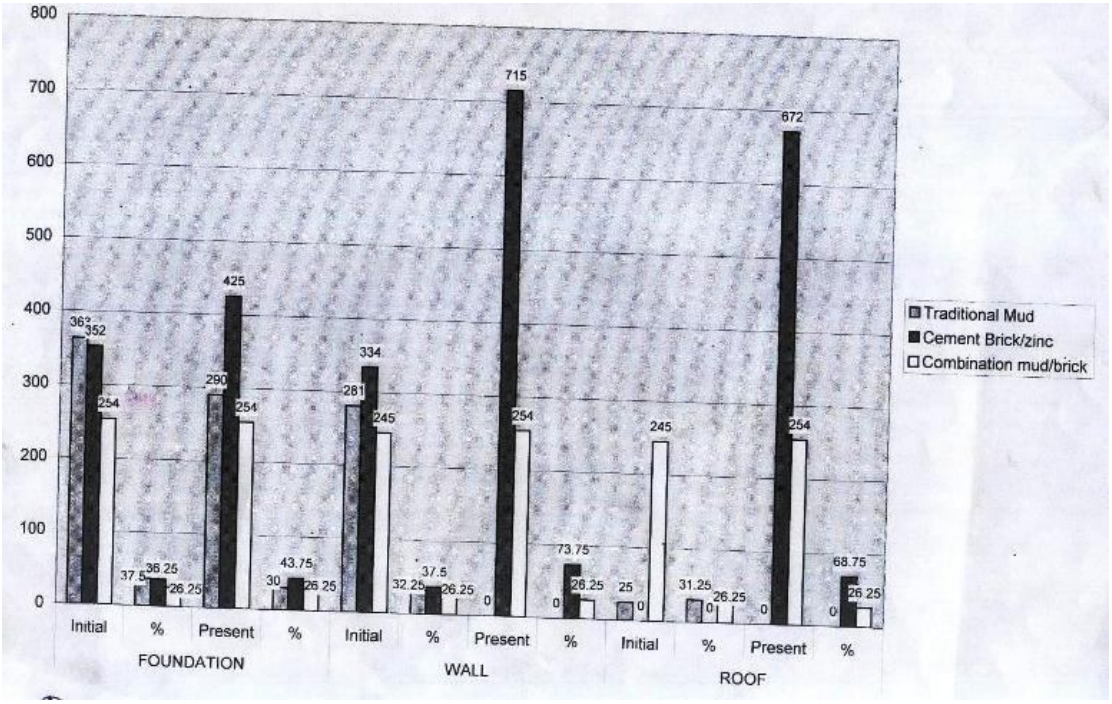
The concept of central Rumfa or parlour where family and guests congregate for discussions and relaxation in now diminishing to individual wife's parlour of about 9-12sqm, bedroom and living room furniture have to bear no relations to room sizes and forms, but depend on

the status of Amarya (wife) or Maigida which generally look congested with no circulation space.

However, 65% of the sample houses reveals that each wife now has a room and parlour sharing a central toilet and kitchen of 2-4sqm and 6-9sqm respectively accessed through a central courtyard of 9-16sqm, depending upon the plot size in Contemporary houses. See a sample in appendix.

Geometry of form, 80% of the sample house reveals that room shapes and sizes are regular and uniform in rectangular or squares of shapes, except plot at extreme edges, or irregular plots appears trapezoidal in shape and over 65% uses Contemporary Hausa Residential Building materials in foundation, walls and roof as shown in the graph below .

GRAPH 5.4 DISTRIBUTION OF BUILDING MATERIALS PER SAMLE HOUSES



SOURCE: FIELD WORK 2005

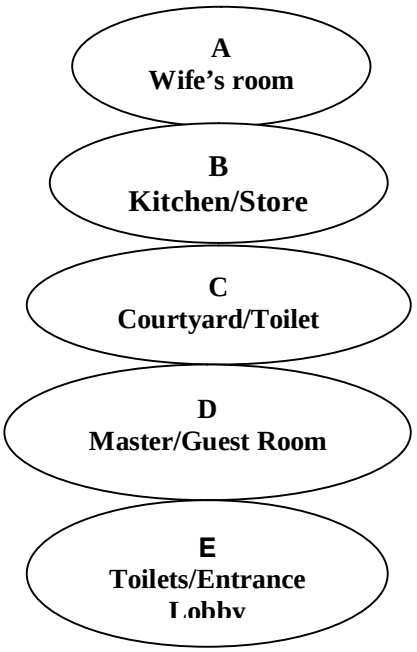
The graph above indicates that greater percentages of samples are built in cement brick rather than mud this can be attributed to increase the in the wealth as established earlier by

researcher Umar (1997), schwerdtferzer (1982) etc, which is still valid.

Additionally, previous research reveals that, - Zaure has less to do with utilitarian considerations, but more to do with wealth power and social status Umar (1997 p. 185). Interestingly, it was discovered that the Zaure now it serves as a utility, entrance lobby for circulation only.

The study reveals that of the L shape, or I shape entrance lobby over 60% of sample houses now takes this shape popularly called, "Zo ka Wuce", rather than **"Birkin Bako".**

PLATE 5.6 CONTEMPORARY CONCEPT



Key

A - Wife room

B – Kitchen/store

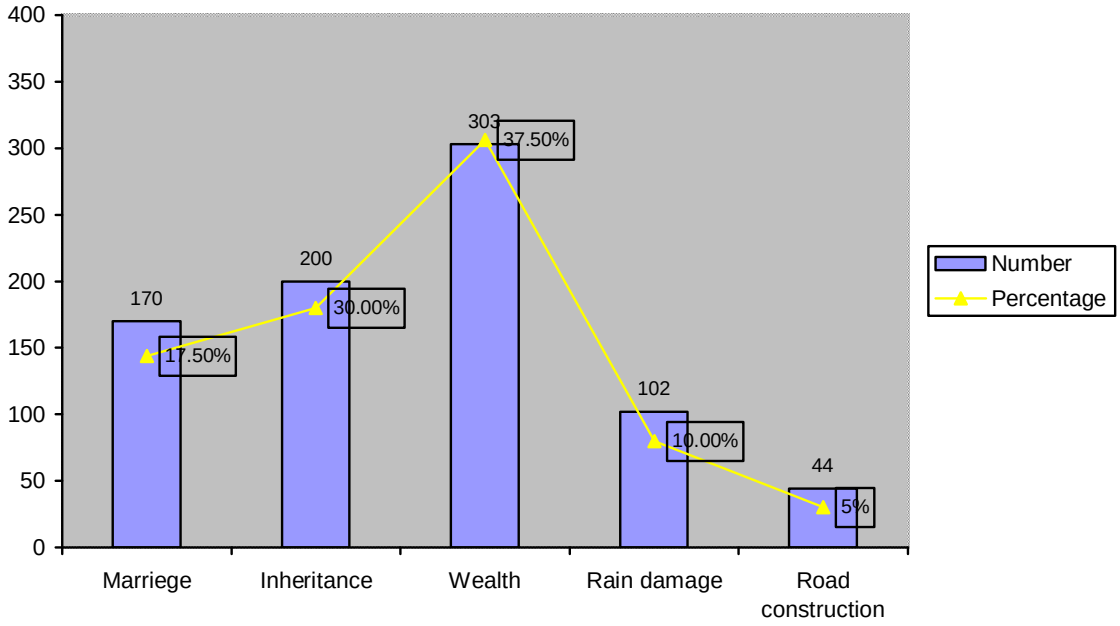
C – Courtyard/toilet

D – master/guest room

E – toilet/entrance lobby

The number of families or person per house varies from a single family to a maximum 3-4 families as observed in large family components, big houses such as sample UKU 001, GLD 146, GLD 147 & 148, LKM 175 & 184, TRN 009, DRY 232 etc., see Appendixes. This is result of sub-divided into units due to the increase in wealth or death of the compound head etc. according to inheritance the laws of Shari 'a, as shown in the Graph 5:5 thereby becoming individual unit with several entrances externally against the traditional common entrance through one Zaure or common compound.

GRAPH 5.5 REASON FOR CHANGE/TRANSFORMATION IN SAMPLE HOUSES



Source: Field work 2005

The graph above shows that greater percentage in wealth 37.5% causes changes/transformation of these houses which may be attributed to economic status. Source: field work 2005.

The number of persons and houses range from the anomalous two persons – **22** persons as shown from the samples. Perhaps these Contemporary houses as spatial system exhibit certain syntactic peculiarities mentioned above; One thing common that comes across clearly is that despite many syntactic similarities several houses are the same in shapes and sizes on plots of (100sqm of cattery A) attesting their similarity (rather than individuality, Umar (1997, 152).

The next chapter (6) presents and articulates the philosophy of designing residential spaces, the factors that influence the design of such spaces in the relevant study areas, and the attempt to establish the design data for Contemporary archetype with relevance to

Contemporary spatial pattern and morphology and its simple building traditional bye laws and standards were considered.

However, the main thrust of this study has been to synthesis and identify the transformational patterns and look at the aspects possible which have direct impact on house form material, and construction at the end of the study it has been found that house have been transformed from large traditional compound houses to single nuclear family houses in both planning concept of geometric form building material and construction techniques as presented in chapters 6, 7 and 8 respectively.

The study reveals that as a result of inheritance, economic status etc result in disintegrating the traditional architectural heritage.

As a result of introduction of the new/modern building materials during western education, innovation, diffusion and association with other societies from different parts of Nigeria, the average house owner or developers saw no need to continue the use of a traditional mud building material this has come to be considered as interior time costing in preparation and construction is substandard the development point to the fact that this research as unbiased aimed to producing the hypothesis that state the factors which identified the variables that were solely responsible for the transformation in Hausa Traditional architecture.

This is therefore a pioneer type, Hence the problems associated with such schemes In summary, it has been noted that the traditional family compound houses or structures have changed and have been assimilated or adopted to a new contemporary house form and condition. There can be no doubt that the principal factors of change or transformation are as a result of indirect influences in status.

On the basis of the evidences discovered the researchers present in this dissertation, that the transformation being experienced in the present Contemporary Hausa Residential Building or archetype notwithstanding.

5.08 Floor Area and Occupancy Ratio

This study reveals that there are little variations in the total floor area and occupancy ratio across the samples of Contemporary Buildings. These variations depend on the number of occupants and size of plot in relation to total number of rooms. Thus it depends largely on plot size ranging from 10.0x10.0m, (2-3rooms), 7.5mx15.5m (25ftx50ft), 15.5x15.15m, 50ftx50ft 4-6 and 50ftx75ft, 15.5x22.5m 8-12 room, with each, accommodating a family of (2,3,4,-6,8-12) respectively. The magnitude of the total floor area per house bears little relation to the number of people in the house.

As indicated sample BBG 042 1.8sqm AVFA/HTR/101 14.0sqm, is the lowest and the highest average sleeping areas per person.

Generally, the number of person in a house relate poorly to its size, and more and more to the number of families it contains. The entrance lobby, in I or L shape of, 2-6 square metres, has no relationship with the number of house occupants.

This indicates a significant decrease in (AVE FLR) area p/person and the consequent decrease in living standards.

5.09 Opacity Ratio in Sample Houses

In addition, the opacity ratio of 0.675 for houses in Zaria tends to support this argument. However, if one takes into account the fact that Kano city is larger and much more urban than Zaria city given a mean opacity of 0.24 and 0.20 it could be interpreted in many ways, and index of urbanity. Land use optimization increase physical compactness, and leads to possible decrease in climatic comfort and above all the lowering of socio-cultural ideals, as a result of social, economic and physical changes (transformation) Several of these premises could be valid for Kano social milieu.

However, about two third of the surveyed samples have room occupancy rate between 1-4 person/room. **Schwerdtferger (1982)** reveals that; an average sleeping area per person is

(4.4sqm) and an average sleeping area/per compound head is (4.8sqm) whereas average floor area is 9.8sqm for compound head is 12.8sqm decrease to 2.53sqm MSA per household and 16.6sqm AFA/per showing, a slight increase of 0.8sqm(1,8.734). **Umar (1997 p 185)** mean 2.67sqm per person has doubled from an average of 1.40sqm in 1963 indicating and increasing in population and consequent decrease in housing condition.

The mean number of person/house is approximately (5) but most houses have population of 4-12 persons with a single family (polygamous). The children make up the bulk of the population **Umar (1997 p193).**

Table 5.5: Functional Space Distribution (M2) in Person/Sleeping Areas/Rooms

	SLEEPING AREA	**%**	**NO OF AVERAGE PER PERSON**	**AREA PER PERSON**	**NO OF ROOM IN**	**AVERAGE NUMBER OF PERSON**
120	1.8sqm	1.35	1-3	4-0sqm	1-3	2
120-225	18-30	2.40	3-5	5.0sqm	2-4	3
225-330	30-45	375	6-9	5.6sqm	5-6	6
			9-12	6-0sqm	>8	9
>330	45-80	6.25	>12	-	-	20
Total average	Areas	37.5	6-9	-	-	20

Average mean = 1.8sqm per person Mode = 2.40sqm per person

Maximum = 5.6sqm per house ASA/per is 2.53

AFA/per is 10.60

5.10 Elevation of Contemporary Building

The elevation refer to above, portrays the overall character in effect symbol and function of a building; aesthetics and decoration are purely elaborated with pinnacles (zonkwaye) monumental entrances with engraving of traditional motifs Sa'ad (1986), but however, the

Contemporary Hausa Residential Building at the moment portray elements of modern architecture in concrete material with pure creative decorations the reflecting financial status of the owner. However, one may not hesitate to speculate that the traditional mason of mud craftsmanship is dying, that in the next 20 years or more there may be less than 5% traditional mud mason due to the death of the older ones. The younger ones are acquiring Contemporary skills, and the people and society prefer “Contemporary” typologies.

Elevational Characteristics of Some Selected wards

In the process of elevation, the physical aspect of the House in planning and elevational presentation, must be consider so also certain things are common to sample houses whereas other variables depend upon family size, and plot size etc. This will be discussed under the following six broad bases, namely – planning concept, foundation, walls, roof, elevations, finishes, floor areas, and toilets.

However for comparative purposes, Plate 5.07 display contemporary elevations of some residential houses and plate 5.08 displays traditional elevation of some selected houses

The contemporary residential elevation of some selected ward as shown below in Plate 5.07 ABC etc. shows a remarkable transformation in design and construction materials vis-vis to traditional residential elevation in plate 5.08 ABC etc with typical traditional design and mud material in construction.

Plate 5.07 Contemporary Elevations













Source: Field work 2005








Source: Field work 2005








Source: Field work 2005





Source: Field work 2005

Plate 5:8 Traditional Residential Elevetion








Source: field work 2005













Source: Field work 2005

























Source: Field work 2005









Source: Field work 2005

CHAPTER SIX

THEORY AND DESIGN DATA FOR CONTEMPORARY BUILDINGS

6.01 Philosophy of designing residential spaces

The study attempts to suggest or propose an average geometric size and form of the residential space of the Contemporary Hausa Residential Building as a reference material to design and construction of residential spaces synonymous to the current trends.

Human residence is a unit of societal existence that is been evident in one form or the other. Right from the inception of humanity, man has been deeply affected and consequently conditioned by his natural environment. He sheltered himself in trees, caves, huts, etc., as it was evident in the pre-historic times. The quality of a shelter or residence is relative, or a matter of opinion. Shelter or a residence is any place where a person resides, and gets a protection against weather element, a source of protection from enemies and enjoys personal privacy together with other elements.

Every man is deeply affected and consequently conditioned by his interior environment. He cannot escape the cumulative effect that it would eventually have on his life style and character. This places the architect or the designer in a sensitive position, which makes him to realize his societal responsibility both to the individual client and to the continual expression and projection of the evolution of life itself.

The design of a residential space in Contemporary Hausa residential building archetype must express the essence, character, culture, beauty and rhyme of contemporary living within its own context. The successful designer is the one who is able to adequately assimilate all the clients' requirement and limitation and logically come out with a design which represents the following primary consideration:

1. Firstly – the design must represents adequately, the essence of the interior from the exterior appearance of the building, (form follows function).

2. Secondly – the symbol must adequately captures adquetly, the essence of taste as it relates specifically to the client, such that the design of residential space appears fundamentally easy. Perhaps, the ability of the architect/designer to create an atmosphere, conducive to the inhabitants way of life depends largely on his ability to comprehend the clients needs realizing that taste is highly individualistic by his manipulation of space and form by his exploitation of light and shadow, by his dexterity in the use of materials texture and color to adequately apprehend his clients imagination and transform them into reality and to a logical conclusion. It is that man feels he has achieved the essence of taste. It is a conduct of thinking process which has been logically and intuitively developed to its maturity. The satisfying result requires no pre-conceived ideas aside from the essence of functionality, which he aims at.

6.02 Influence of Culture and Religion in Design of Residential Spaces

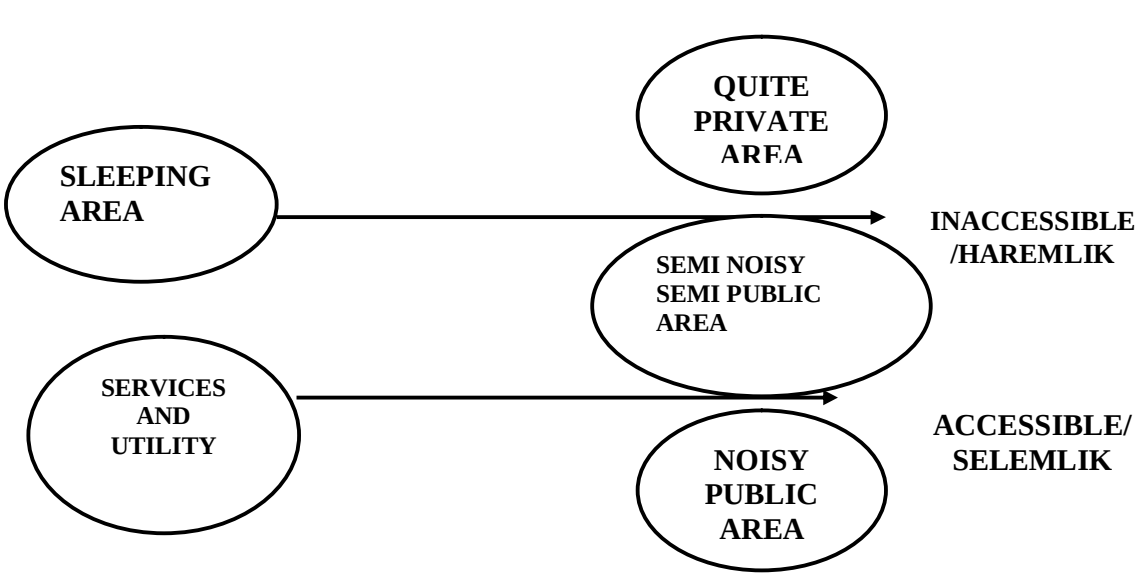
Culture and religion plays a prominent role in the design of residential houses This determines the adaptability of any design to the people (clients) needs. Any successful design must be accurately conceived within the context in which it exists. However, culture is an issue that affects people to various degrees depending on several factors. For instance, the family size will determine several issues, such as the space required, their sizes and the interrelationship between them, in some cases it requires complete separation of living space. Based on religious injunctions female (wives) areas are located behind the male (master) rooms called Haremlik spaces and Salemlik spaces i.e. prohibited and unprohibited spaces respectively.

Moreover, the influence of religion and tradition is also noticed in the zoning system for privacy such as areas for public, semi-public and private; that is restricted and unrestricted spaces for guests, where as boys and servants areas are referred to as semi-public, public for guests and private strictly for the family where the word **“Ba shiga”** is implied. These areas

are completely inaccessible. However, the guest's areas are accessible; the master's wing remains to be the quiet zone; where as the family is semi-noisy and the public (guest) is the noisy zone of the compound.

The Contemporary archetype currently produces only two forms and concept of zoning; the former has three concepts of zoning see figure 6.1.

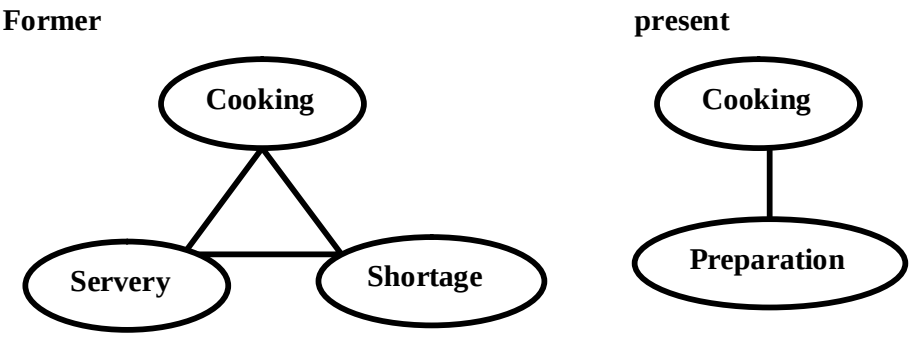
Figure 6.1 concept of zoning



6.03 Design Consideration in Space

Similarly, various room sizes are determined generally by the functional items or furniture to be used within the various rooms such as bedroom, kitchen, living room etc. and each and every space has its determinants i.e. in the room. You have the bed furniture, wardrobes, reading table (and seating) where applicable, and in the kitchen are the storage facility, preparation area and cooking area, which has a triangular working relationship, see figure 6.2 below:

Figure 6.2 working triangle or line



However, in the modern day some design central courtyards systems are introduced as against multi-courtyards for ventilation and household activities and straight or L shape foyers or Zaures are used nowadays, as in the case of bigger and series of Zauruka/Foyers used for guests as against the present guest room with toilets accessed through living rooms The modern day architect should design these spaces with due consideration to space economy, and related to available plot size.

6.04 Design Theory and Data for Contemporary Archetype

Design in the context of architecture, is simply the ability of generating proposals that may change something that already exists into something that is better. For a Hausa/Fulani family the residence is primordial, that is there exists a concept or a theory on what is termed Gidan Mallam Bahaushe and should satisfy the following, as theoritize by other researchers.

The house should accommodate a single family with agnatic relations. The house has to be conceptually sub-divided into 'inner core', central core, and outer core or private and semi-private (women and masters area) public area (wards and servants area). The house has to be flexible, enough to meet the spatial requirements of family whose size is traditionally never static. Other features include thicker walls, smaller openings with external finishing and decoration beautifully expressing the aesthetics of Hausa Architecture Sa'ad (1984).

However, for this concept or definition to be developed or improved to certain standards in order to achieve a possible design theory for a residence of the said family the design has to

be viewed in three parts or process consisting of an initial state, a method or process of transformation and an imagined future state. These components will identify the existing concepts process and reason for transformation and also the method for achieving and implementing solution, through compliance with building bye-law and regulations. Perhaps, it is noted that, people have been planning and building in Hausa/Fulani community for a long time in using local concept and materials by locally and inherited skilled craftsmen Sa'ad (1986), called traditional 'magina' this shows the origin of architectural design of Hausa traditional buildings which predate the first architect of Hausa traditional buildings.

6.05 Design of Contemporary archetype

Literature on design methods and theories began to appear in the 1950s and 1960s, initially it was a rare description of craft evolution of both literate and craftsmen of the ancient artistic times Sturt (1923)**,** a few quotations quickly give insight into reasons and process by which the works of craftsman are governed.

A common feature of both criticisms of traditional methods and the proposals for new ones is the attempt to isolate the essence of designing and to write down standard method that can be relied upon in all situations. Some recent philosophers define and describe design as funding the right physical component of a physical structure Alexander (1963)**,** a good direct problem solving activity Archer (1965) decision making in the face of uncertainty with penalties for error Assimowo (1962), the condition factor for those parts of the product which came into contact with people Farr (1966). However, Gugeloy (1963), wrote a practical and successful design methods and information stage, and model making stage; and virtually every stage displays typical characteristics and inter-relationship interestingly these should be the tentative steps to follow and they relates to the definition of theories in order to achieve a definite 'design theory' for a Hausa/Fulani residence.

6.06 Theory of Contemporary archetype

'Theories' are general statement dealing with, 'what Architecture is', what architecture should accomplish, and how best to design. Theories and history have always been essential to the study and understanding of Architecture.

The theories are concerned with the identification of key variables like space, structure or social process in terms of which building should be seen or evaluated – Bruno Zevi advocates a 'theory of architecture, in which a pace is the fundamental ingredient; to grasp a space to know how to see it is the key to the understanding of building.

6.07 Traditional Hausa/Fulani Residence

Traditional Hausa/Fulani buildings are constructed from all pervasive and readily local materials such as timber, grasses, stone or mud, built in mud walls covered with timber or thatch roof with small openings for good circulation and ventilation, with floor usually finished with traditional mud materials, rooms are in curvilinear or rectilinear shape, surrounded by a thatch or mud wall compound fence. The size of the compound depends largely on the family size or number of wives of the compound head, conceptually divided into family sleeping area, compound heads area cultivation and rearing of animals area, entrance and guests area related to the environment in a cluster of shelter. This is a character of a typical Hausa/Fulani residence **Umar (1997).**

6.08 Spatial Morphology

Spatial patterns reflect social processes and spatial relationships reflect social relations, Man's housing spaces are organized according to their context. There is therefore, a spatial organization which gives rise to a spatial order in man's housing environment.

It was noted that man's spatial order is not universal since according to **Rapoport (1976)** "one group's order may not be another's disorder". One way by which one can understand the spatial order of the house for dwelling is through the preparation of a behaviour which may

relates individual's behaviour or activity patterns within spaces in the housing environment.

In addition, one would require a probably sketch plan of the housing environment and collect data on such information as the spaces being utilized, the people involved, size or number of people involved and material being used in construction.

A house for dwelling is suppose to be. If there is no form of order in a house for dwelling, it becomes almost impossible to classify the components. By nature a house for dwelling is a composite issue and there is therefore the need to find out a system of classification that will include all the dimensions of the form and structure of the house for dwelling. Such form of classification is essential for a systematic study of house form structure of a house for dwelling, since house form is an expression of function, content and the structure of the house for dwelling. Thus, a classification on the basis of the functions, operations, content or elements, and order of the house will deal with the composite nature of the house and will be useful for the analysis of housing spatial morphology. Popoola (1984)

Similarly, the functional analysis of the traditional housing spatial order would have to start with the activity patterns of the inhabitants. One of the objectives of architectural design is to create spatial layouts which will provide for the activity patterns required by a set of building users in order to achieve their goals. Activity patterns alone will not be sufficient in classifying the functional spatial order, since the inhabitants goals are expressed in terms of their needs, values and attitudes. Thus the activity patterns would have to be related to the user's goals. This confirms the earlier observation that an activity within the housing environment is made up of four parts.

According to Rapoport (1976), it is the variability that leads to differences in form. Thus, while activity patterns are relatively easy to establish, it is important to understand the complex system of behavioural components which underpin them. Activity patterns must be related to the people who perform them – their goals, values, needs and attitude should be

considered. Some activities within a housing environment are: sleeping, relaxing, sitting, resting, cooking, eating, recreating, washing and producing.

Not withstanding, for a hypothetical, morphological and spatial analysis, one can see how the location of doors, for instance can affect and change the functions of spatial order. The functional activity pattern is the movement pattern within some spatial order. A hypothetical Hausa traditional house is used to prepare the chart defining the movement pattern within the spatial order and the use of the spaces. Another traditional house may be the same as the first except that the locations of some doors may have been changed. Similarly, the space allocation of entrances and doors is important in considering the inhabitants use of spaces and movement patterns.

6.09 Classification by Contents or Elements

This is the classification system that is most employed by the designers and planners of the housing environment. To classify in terms of elements only is to remove the influence and presence of the inhabitants. Spaces are seen in terms of objects with which they are made and which they contain. When the presence of the inhabitants is taken into account, as did **Hall (1970)** and **Rapoport (1976),** then one would have three main feature elements within the housing spatial order. The three feature elements are the fixed feature elements, the semi-fixed feature elements and the non-fixed feature elements. The nature and the arrangements of the feature elements or the contents of a house, influence the house form and structure.

6.10 Fixed Feature Elements

These elements are fixed, not in the sense that they are permanent but that once decided by human activity and design they **do not change too often. In relation to a** house for dwelling such fixed-feature elements would include floors, walls, ceilings, and roofs. The size, the shape, the arrangement, and the placing of such elements within housing spatial order is a reflection of the uses envisaged.

But some aspects of fixed-feature space are not visible until one observes human behaviour. One should therefore, not just concern oneself with the visual patterns of walls, floors, ceilings, roofs or the material components but also with how such fixed-feature elements relate to the human behaviour which they accommodate.

The spatial organization of the fixed-feature elements communicates certain meaning which would be interpreted differently from one culture to another.

6.11 Semi-Fixed Feature Elements:

This shows that even the less fixed feature elements in spaces, like furniture, affect and influence people's behaviour within the space. While one arrangement of the furniture, within a space, could bring classification by content or elements should take account of the three feature elements fixed, semi-fixed and non-fixed. Content should therefore, relate to the people, the non-fixed feature elements.

6.12 Classification by Spatial Structure and Order:

While the structure is the disposition of the various components of the form to form an order, spatial function and spatial content greatly influence spatial structure. Any reference to structure would also contain function and content. However, the structure of a house can be seen as the anatomy of the house, using medical term, while the function is the physiology. Such analogy should act as taking too far because of the dissimilarities between the house and the human body.

The structural classification system is a relationship approach, since it relates the parts to one another. The consideration of the relationship between parts can lead to useful conclusions about the formation of the parts and the importance of the elements in them. Using Doxiadis approach to human settlement; one can divide the housing environment into four parts – the central, the homogeneous, the circulatory and the special.

While the traditional house can be seen in terms of the four parts, each spatial unit in house

can also be seen in terms of the parts. Here also one would need to consider the problem of the scale of observation.

People relate to the parts based on their role within the whole unit. Man, for example, acts and behaves in a different way if in a homogenous area, a central area, a special area or a circulatory one. Each part of the structure has to be understood in terms of their functions and operations and each part has to be related to the other parts to be able to understand the functioning of the whole.

I. **Homogenous units:** these are areas which appear as the main parts. In a housing cluster the houses will form the homogenous parts, while in a house the bedrooms or sleeping areas will form the homogenous parts.
II. **Central units:** these areas are those serving other larger areas all around them with special functions. Central unit functions would include social, production, commerce, entertainment or recreational.
III. **Circulatory units:** these areas provide for the movement of people, goods and information within it, as well as between it and other.
IV. **Special units**: Doxiadis defines these areas as those which are neither homogenous nor central, nor part of the basic circulatory system. For a house the toilet and the kitchen would be considered as special areas.

Traditional housing spatial morphology can be studied through the use of one or more of the three classification systems described above. An ideal situation should however, take all the three systems into consideration.

Its development is either in form of linear or patrilinear expansion from a nuclear to extended family **Schwerdtferger (1982)**. In order to develop a design theory for a modern day Hausa/Fulani house certain factors have to be considered as alternative design theories.

6.13 Alternative Design Theory

Design theory is a collective denomination for all the previous knowledge that is intended to assist the design of modern day traditional houses. This includes the normative standards (case studies), building materials, and traditional regulations.

Design space for Hausa/Fulani house

1. Site location and its charaqcteristics
2. Women's yard for domestic activities
3. Men's yard for social activities
4. Service yard, kitchen and storage
5. Garden yard for cultivation and rearing of animals
6. Pit latrine and other services
7. Entrance lobby and guest area
8. External factors and relations

These elements have been traditional design elements for Hausa/Fulani family residence.

To develop a new design method or theory of Hausa/Fulani family residence the procedures employed will (include, history of existing settlement, standard typologies, construction materials socio-cultural factors as well as the environmental factors, these factors have different ramifications in building forms and character).

6.14 Normative Standards

These are traditional customary ways of designing and building Hausa/Fulani house usually influenced by many factors such as the family size socio-religious factors building materials and construction method. The first term brought about variation in building type in relation to plot size, the second under the influence of Islamic tradition has disciplined the planning of residential building the law of segregation of sexes privacy etc., this has significantly influence the planning of houses.

The design theory may not be in a good position to achieve a good plan unless, it include revised version (case studies) of traditional Architecture, and a link should be created between the traditional and the contemporary typologies.

6.15 Design Concept

Design concept and tools to develop a theory for a Hausa/Fulani house designer should consider the family size, plot size vis-à-vis to increase in family by birth rate or addition of wife by the compound head. The functional subdivision of spaces by use of internal courtyards for house activities, ventilation and light requirements, average and regular room sizes and shapes.

To achieve a regular and proportional functional space the possibility of expansion either in horizontal or vertical forms (in form of storey building) which normally serves as master's wing with stair case at any suitable place usually is an open courtyard or enclosed space. Athropotnetrics shall be use in allocation of space such as in bedroom, living room, kitchen entrances etc., as well as building heights and circulation in the room spaces and traditional interrelationship should also be achieved.

6.16 Construction Material

Traditional Hausa/Fulani houses are sensitive to climatic reasons, usually maintained and reconstructed in any of the three distinct season rainy, hot and dry due to the pervious nature of local materials (mud and azara), However, the designer should consider the use of 'Contemporary' materials popularly used in most of the Hausa traditional building, these includes cement blocks, timber and zinc roofing sheet, cement wall, floor finishes metal door and windows and azara (African Decking in upper floor). The designer should also try as much as possible to relate his design to thermal and material properties of each materials to be used in the house and also initiate an architectural design alternative in the use of materials like building orientation, landscaping etc., to achieve a comfortable and convenient residence.

6.17 Traditional Building Regulation:

These are instruments through which administrative power promote and protect the right of neighborhood in terms of privacy, drainage an accessibility and height of building. These element restraint the construction of any building in traditional Hausa/Fulani settlement. this have been taking over Presently by established state government planning authority. The regulation includes planning approval and building approvals according to planning land uses; These should be critically examined and compiled by the designer.

However, this does not stop the development of sub-standard settlement (Slums) in the bid to improve design and use of materials in the outskirts of the Hausa/Fulani settlement in town and cities particularly Kano Metropolis.

6.18 Principle of Design Data

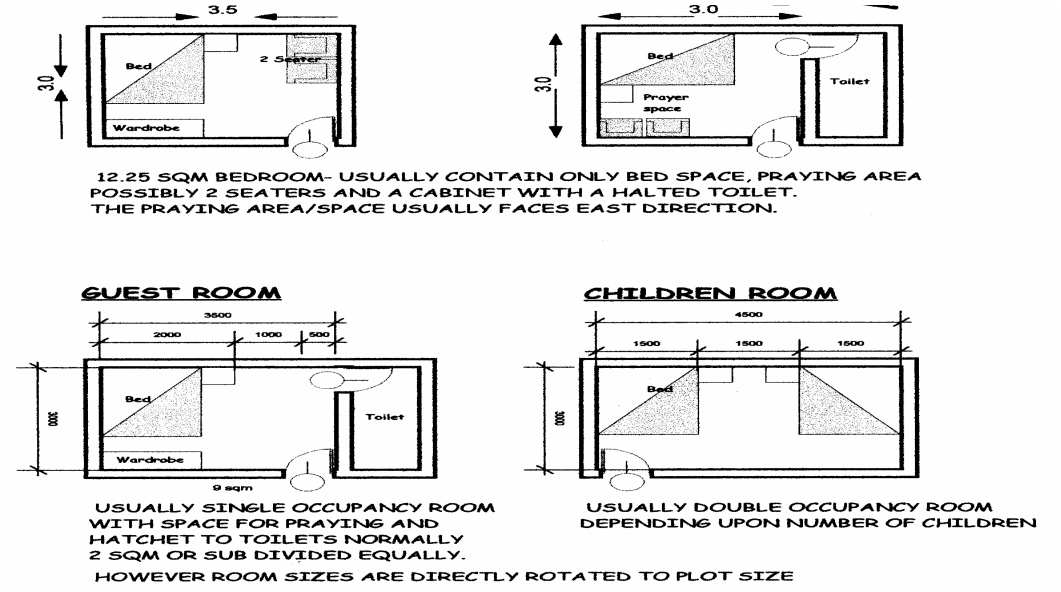
The prime objective in 'Contemporary building' design is to secure an attractive, habitable building of medium aesthetic value serving domestic purposes, hence the design is essentially concerned with providing a home that will satisfy the occupants' needs, and effectively meet the changing need of the occupants over a period of time invariably this serves as a basis for design data, for use in planning building, layouts and furnishing, with adequate clearances to allow comfortable accommodation and activity.

In summary, this may serve as tentative guide for the design of Hausa/Fulani traditional family residence in order to produce sketched drawing working specification of materials and other necessary documents for the construction housing or villages settlements in Hausa/Fulani community so as to improve the standard of living of the society and environment, as practically and successfully achieved in Malawi, Zanzibar, Liberia, India etc..

6.19 Master Bedroom

The master bedroom usually contains only a bed space, praying area, possibly two seats and a cabinet, with an attached toilet. The praying area/space usually faces. The direction of the east with one or two window for ventilation and light.

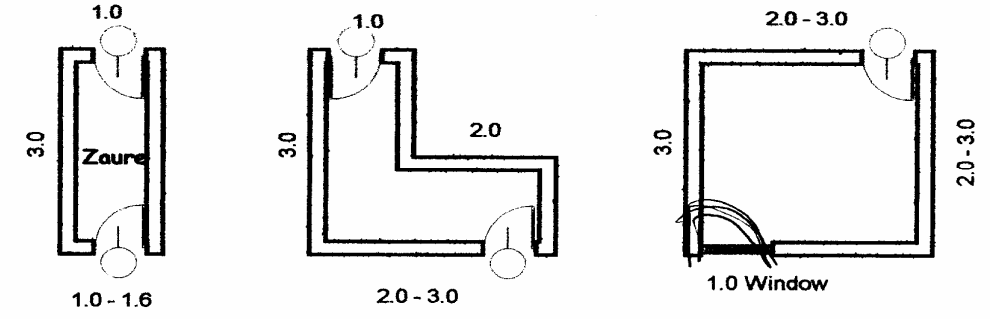
Figure 6.3 Master bedroom, guest and children's room.



6.19 Entrance Lobby/(Zo Ka Wuce)

Entrance lobby in Contemporary Hausa Residential Building serves as means of entrance and exit of the house, only circulation therefore should be kept to a minimum as presented below: Common types are I, L, and □ squares, with entrance door directly on opposite sides or on the extreme end of parallel walls. The entrance lobby should preparably be adjacent to the exterior room by the extreme end, directly accessed to the courtyard or any room space.

Figure 6.4 entrance lobbies



6.20 Bedrooms (Daki)

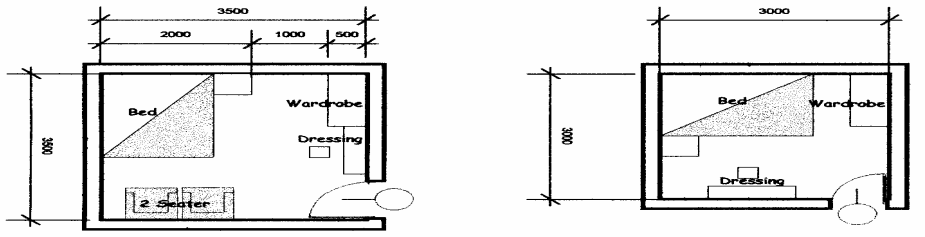
The activities that usually takes place in bedrooms include, sleeping, storage for clothing and dressing area, personal care, reading and writing, video and audio watchings.

Four (4) categories of bedrooms are identified, the master, the wife, children (male/female) and the guest where available. The two types of bedrooms have hardly any significant difference in size, design, furniture, accommodation as elaborated earlier in this chapter. The wife's bedroom and master bedroom.

However, from the average room sizes presented, the minimum requirements for furniture and space are prescribed, if occupants are to be able to comfortably and conveniently carryout their normal bedroom activities.

Cleanlinees should be provided in front of and around the furniture, all the time

Figure 6.5 female bedrooms

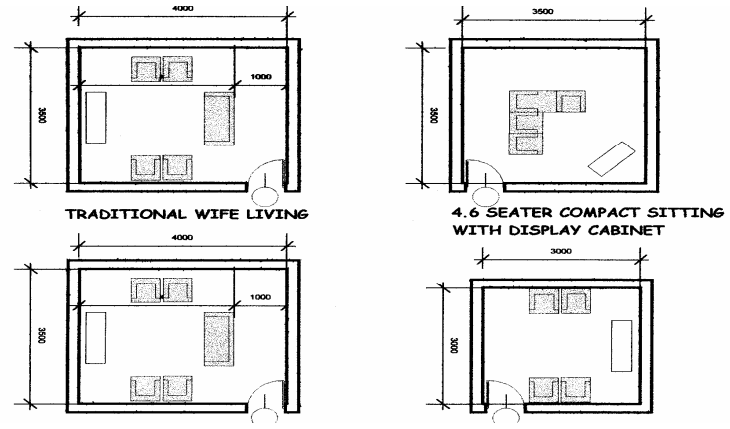


average sizes 12.25sqm grade a **average sizes 9sqm grade**

6.21 Living Rooms (Falo)

Basically, a living room is the most impressive and the largest of all rooms and should be conducive to general family life and group activities, as well as individual relaxation, entertaining, reading, writing, reception etc. Two common types are identified (i.e. the wife and master living room).

Figure 6.6 Living rooms (master and guest)



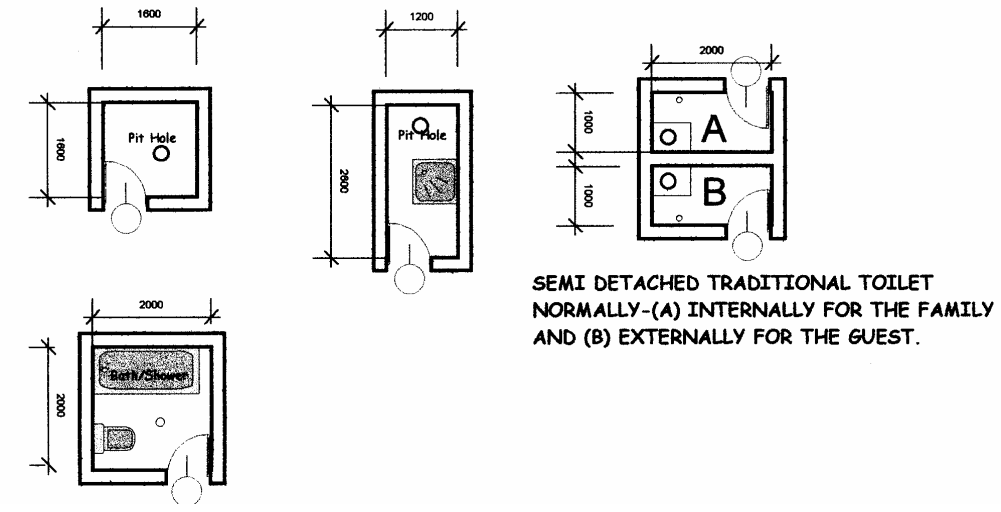
TRADITIONAL MASTER LIVING **TRADITIONAL GUEST LIVING**

Living rooms are expected to have efficient natural lighting and ventilation system especially in the Contemporary archetypes. Nominal sizes of window should be $^1/_3$ of room width and height related increase in length and should be sufficient enough to accommodate furniture arrangement and circulation space.

6.22 Toilets: (Wife, Master, Guest and General)

Toilets – place for bathing, easing or excreting for the health and comfort of human beings, it depends upon the size of the plot and number of rooms but hardly the number of occupants. Four (4) common types are identified, ranging from 1.0sqm-5.0sqm in square or rectangular forms, some sharing one pit with two squatting points separated partly by a wall as shown in figure 6:5. Finished and smoothed with special cement mortar, with a floor waste provided to drain waste water.

Figure 6.7 contemporary toilet samples

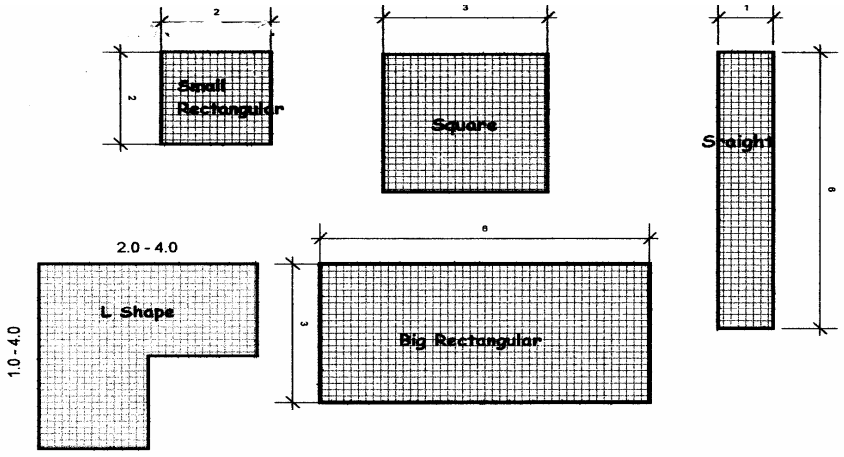


6.23 Courtyards

Courtyards are functionally designed to serve dual purposes; lighting and ventilation, likewise circulation, and other household activities, and partial landscaping for thermal comfort. Functional Contemporary courtyards should not be less than 10.00sqm to achieve the proper flow of air/wind into the buildings.

They vary according to plot sizes and the number of rooms required. The common types are straight, rectangular, L shape, or square shape, the sizes ranges from 4sqm-16sqm, finished with ordinary floor cement screed with opening to rooms' spaces, accessed from the courtyard.

Figure 6.8 Contemporary courtyards



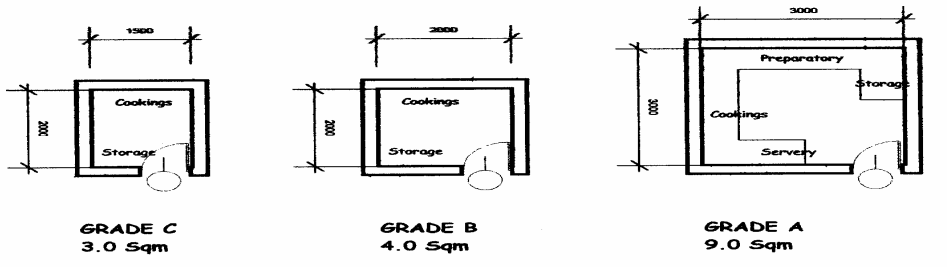
It is appropriate to have courtyard surfaces with light finishing materials to avoid surface solar radiation, and to provide a sufficient roof eave of 400mm-600mm in order to control unnecessary wind and rain influx to the building.

6.25 Kitchens (Kicin)

One of the primary functions of the Contemporary kitchen has been to provide a space for cooking using kerosene stove, fire wood, coal stove, and gas cooker, etc., and partially a storage space for food stuffs, utensils etc. Three common types have been identified from the

four categories of samples and averages sizes computed as grades: **A, B, AND C.**

Figure 6.9 Contemporary kitchens



The kitchen design should be functional in the sense of minimizing, reaching and stooping a cabinet that serves as storage facilities, should not be higher than a person can reach from the floor, working areas should be kept compact, likewise the kitchen arrangement, storage, working space, should permit a comfortable working posture.

It is noted that most Contemporary kitchens are horizontal or L shape types, with average sizes ranging from 3-9sqm, with a few cabinets in local setting floor to ceiling heights which is 3.0mm with smaller or no window opening, ventilation sometimes is achieved through the entrance door, opening. It should have at least a high level; window if not normal window of (1.00sqm) which is almost desirable,

6.20 Lighting and Ventilation

Good lighting helps to prevent fatigue, as well as promote safety and a pleasant atmosphere the recommended window size is $^1/_3$ of wall area centralized; an operable window, provided over a sink for a good view while working for a smoke from stove, or firewood to escape.

In summary this functional space and dimensional data may serve as a tentative guide for the design of Hausa/Fulani traditional family residence in order to produce sketched drawing working specification of materials and other necessary documents for the construction of housing or villages settlements in Hausa/Fulani community so as to improve the standard of

living of the people in the society and environment, as practically and successfully achieved in Malawi, Zanzibar, Liberia, India, and perhaps Nigeria.

Chapters 7 and 8, will discuss the various Contemporary Hausa Residential Building materials in terms of their properties and applications, and highlight the fundamental elements or parts of Contemporary archetypes as well explain construction process and techniques of such material and elements respectively.

CHAPTER SEVEN

CONTEMPORARY HAUSA RESIDENTIAL BUILDING MATERIALS

7.00 Introduction

This section describes and illustrates the materials and components used in erecting a simple Contemporary building. Its primary aim is to highlight the basic building elements of a Contemporary Hausa Residential Building from the sub-structure to super structure, in order to understand and appreciate the processes, and materials. All specifications are in metric terms and reference is made to to the standard of local situation standards, for the fact that most of the local and modern building materials are of such standards.

Dmowchowsky (1990)**,** notes the fact that, despite the simplicity of building materials and tools, Hausa traditional architecture reached its final maturity of excellence due to decisive human factor. The quality of Hausa builders, as well as their behaviour is purposefully, economical of all effort and competent. Obviously it is the result of long training in accordance with firmly established standards. He added that, traditional building materials fall into three groups namely; rocks and products of natural decay, disintegrated, alluvial deposits of earth, laterite etc; Secondly, paints, trees, shrubs, and their leaves, and bye products as extracts or ashes, and lastly metal and its accessories. The builders 'know' the various building materials available in their areas, especially properties of different trees, both wild and cultivated. They are also well acquainted with the properties of building earth.

Further studies reveal that, as it is common with the rest of the countries, five basic building materials used in Hausa traditional buildings are earth, azara, wood, mortar and paint. The earth is for making the sun dried mud brick, making mortar, and plaster called "Tubali", "Kwabi", "makuba" katsi laso etc**.** The wood is used in making doors and windows for the opening – the azara and thatch for the upper floors and roof surfaces, mortar for floor finishing made from specialized materials, called "dabe", and wall surfaces painted with

white ash called “farar kasa”, aesthetically, decorated with traditional motifs and other elements (Makuba, Laso, Katsi etc), Dmowchowsky (1997), Sa'ad (1986), respectively.

However, the present Contemporary Hausa Residential Building materials consist of cements bricks used in block works, azara and concrete in African Decking, upper floors, timber and zinc sheet (ceiling board) in roofs, portland cement issued for wall plaster and floor finishes, metal in doors and windows, paints, emulsion and glose paints used both internally and externally, concrete/cement for engraving designs, decorations and aesthetics.

7.01 Building Materials

Building materials vary considerably in quality from not only town to town, or from pit to pit, the local builders always know the right or suitable materials, Daldy (1945). But however, for ‘Contemporary materials’, it varies from market to market, manufacturer-to-manufacturer accordingly.

The Materials include sand, cement, mud bricks, timber roof, aluminium ceiling boards, roofing sheets, metal doors and windows, cement floor, screeds floor, tiles, electrical materials, and plumbing materials.. Others includes external works, sanitary materials etc. this will be presented in summary.

7.02 Building Bricks and Block

Stone is not often used for buildings **Dmowchowsky (1990),** but however, Hausa builders occasionally, use rough stone for the foundation of their structures. In Kano, the stone was queried at the bottom of Dala/Goron Dutse hills, used mostly in external walls and compound fence walls filled with earth plaster to form dry stone walls.

But however, for Contemporary buildings, brick and block are bonded to give maximum strength and adequate distribution of loads over the wall, so that no continuous vertical joint occurs with accompanying risk of failure, bond walls are expected to provide lateral stability, and resistance to thrust, as well as attractive appearance to wall face, while the four common

types of bonds namely, stretcher, header, Flemish and English bond, **Seeley (1994).** Though, for Contemporary buildings, only two types are commonly used, namely stretcher bond and header bond.

Brick – mud brick and cement bricks are the most popular form of walling unit for domestic Contemporary construction. Their limited size and color (brown and ash), make them an attractive proposition, varying in materials, methods of manufacture (hand mould, manual or machine made). The usual mud brick size is **L300mmxW105x60mm-80mm**), allowing for **10-15mm** mortar joint.

Joint bricks are made form traditional mud clay composed mainly of gravel sand, lime and other added mixture, today, for Contemporary building, the hollow sand cement brick/block is used and made in various sizes 150x225x450, and 225x225x450mm respectively.

Plate 7.1 Contemporary bricks





Source: Field work 2005

7.03 Timber

Dmowchowsky (1990)**,** notes that the best timber used is obtained from the trunk of palm tree called “Deleb” or Giginya”, commonly called “Azara” or “Kyemi” they are heavy, rigid and unpalatable to termites and resistant to decay and excellent for mud Traditional roofs.

Similarly, standard timber designed and used for Contemporary roof trusses which are strong and effective, and dispense with the need for the support of internal load bearing and allowing greater flexibility in internal planning – Contemporary roof trusses consist of both

soft wood and hard wood types of various thickness, ranging from noggins (50x75mm), purlins (75x100mm), for wall plates (100x150mm) and rafters, fascia board 125x225mm with particle board for ceiling pattern of 5mm-10mm respectively. Joints between truss members are mainly formed with connectors, which consist of sheradized or galvanized nails of 3”4”5 or 1mm-6mm thick, used for various joints in various trusses. The timber is usually preserved by using few gallons of chemicals or toxic oil which are suitable for interior and exterior use. Sometimes 'azara' is used in place of timber rafters, when it is unaffordable.

Plate 7.2 Contemporary timber materials





Source: Field work 2005

7.04 Mortar

Traditional mortar is made by wetting and trampling the earth, covered with adds mixtures, (grass, stalks, horse manure etc). It is allowed to be mixed and mature for three days with the addition of water daily. The process is repeated continuously for about two-three weeks then the material is ready for use, wetted, and rolled on short pieces, before each handful is thrown to the builder for application into the wall surface.

However, for ‘Contemporary’, a specialized material made of sand/mixture of cement used in bedding and jointing bricks and blocks, a good mortar spreads readily, remains plastic, while achieving good bonding between bricks and mortar resisting frost and acquiring early strength – consist of two common types.

i **Lime and mortar –** composed of one part lime to three part of sand/gravel

mix chemicals, additives and water, prepared for 3 days as the traditional mud mortar.

ii. **Cement mortar –** a modern cement mortar – a mix of 1:3 or 1:6 ratio cement/sand depending upon strength required but more importantly depending upon the number of bags of cement available or purchased by the owner – (in Contemporary building) the process of pointing and joining in mortar finishing is hardly observed in wall construction.

7.05 Plastering

Internal plastering is applied in two coats, first in ordinary mud mortar and second coat of red earth and sand, trowelled to provide for good surface for white wash, for external plastering. The final coat is finished with Makuba and special plaster to cover Azara internally (under ceiling). But however, for the present Contemporary archetype, plastering is achieved both internally and externally, using cement and sand mortar (ratio 1:6) mixed with water, applied immediately after mix to avoid drying by evaporation or dehydration.

7.06 Flooring

Daldy (1945), notes that there are three kinds of floors, the native “Dabe”, the “European concrete, and the combination of the two while the former is made by spreading laterite gravel about one inch deep on the floor and then beating the surface continuously with sticks and at the same time sprinkling water on it interestingly. The second type (European concrete), is the present floor cement screed finishing in Contemporary Hausa Residential Building made by spreading, remaining and leveling the laterite, then finished with cement sand, mortar (ratio of 1:6) smoothed and trowelled to obtain good surfaces,it is still practiced in Contemporary but in an improved quality and standard of workmanship.

7.07 Iron Mongery

The term iron mongery or hardware, in Contemporary Hausa Residential Building includes lock (key) hinges bolts, handles etc., requirements for materials, types and dimensions, are presented in plate 7:3 below keys are mostly mortice lock, rim lock, jam lock, cylinder night etc.

Traditional double doors hung to swing and horizontal sliding, although much less popular are still available. Door frames are mainly used in both internal and external doors including all sorts of windows made of metal or steel are often **100x75mm, 50x75mm, 50/65mm** etc., consist of two upright, the jamb and the head see figure.

Plate 7.3 Contemporary accessories





Source: field work 2005

7.08 Doors and Windows/Burglars

Metal doors and windows are used for three principal purposes in Contemporary domestic construction. For circulation, lighting and ventilation etc, these elements are purely made of metal or steel materials in various types of design, quality of material and fabrication, painted in dark ash, brown, red, white, green, yellow, blue etc., or any color in harmony or contrast to the color of paint on the internal and external walls. However, the consideration of general design principles is based on the examination of the various types of doors and windows, their uses and the construction techniques employed together with the main characteristics of frames and iron mongery.

The doors provide a measure of security for the contents of the rooms and a barrier against weather. They may be hung to swing or fold, for simple and effective means of operation. Variety of matters are considered in selecting metal doors and windows in Contemporary Hausa Residential Building such includes cost, quality, durability and design/finishing, associated with the size of the opening.

Average sizes include 750x2100, for a single opening and 1200x2100, 1400x2100mm for a double opening. The former is generally for bedrooms, toilets and kitchen stores etc., while the latter is for living rooms, the master bedroom, and or the guest (shago) while 2100x3000mm and for garages of specialized living rooms usually in three or four collapsible patterns. See figures.., quite few doors and windows are covered with glass at the top of about ½-¼ size of the door for lighting and aesthetics.

Plate 7.5 Contemporary metal doors and windows





Source: field work 2005

7.09 Cement

Substances which bind together the particle of aggregates, (usually sand and gravel) to form a mass of high compressive strength, the most commonly used cement in Hausa Contemporary Hausa Residential Building is Portland cement, which may be of ordinary or rapid hardening, which can also be modified by the addition of admixtures. The cement combines with water to form hydrated calcium silicate or aluminates. The initial set takes place in about 45minutes and the final set within 10hours; and develops strength sufficiently and rapidly for most

concrete works.

Plate 7.5 Aggregates (building materials)



Source: Field work 2005

7.10 Aggregates

The aggregates are gravels, crushed stones and sand which are mixed together with cement and water to make concrete. The two most essential characteristics for aggregates are quality and cleanliness, and it should includes being free from organic impurities. Fine aggregate – consists of natural sand or crushed stone or crushed gravel and sand, with a good proportion of larger particles.

Coarse Aggregate- This is primarily natural gravel/crushed gravel or stone. The size of aggregate is determined by the class of work and type of reinforcements required. Such types of work include foundation footing, over site concrete, column and lintel, floor slabs etc, the size ranges from 10mm-40mm aggregate sizes.

However, there is a considerable variation in the quality of materials between different quarries and excavation site, (i.e. machine quarries, Rimin Gado and Dantata site, road side manual quarries, similarly Rano, Sharada sample sands), and therefore, requires a careful assessment in quality and cost.

7.11 Concrete

Concrete which consists of ‘cast insitu concrete’ and ‘pre-cast concrete’, is expected to be strong enough to resist the various stress to which it would be subjected and often to withstand weathering action. When it hardens, and when freshly mixed it must be of such consistency that can be readily handled and easily compacted in the form work, concrete mixes can be specified by volume or weight of the constituents materials or by the minimum strength of the concrete desired; 1:3:6 for plain concrete, foundations 1:2:4, for reinforced concrete 1:1:5:3 and 1:4:8 sometimes for light weight surfaces. Nevertheless, the strength of concrete produced under site conditions varies widely, a more realistic approach is to specify the minimum strength, proportions of cement, sand and aggregate, and water selected to achieve designed mix 7,10,15,25, is used for plain and reinforced concrete accordingly.

Plate 7.6 Concrete



Source: Field work 2005

7.12 Water/Cement Ratio

Water should be free from impurities or excess amount of oil, acid, chemicals etc., and therefore, should be portable. The ratio should be low so as to obtain, and achieve high strength, durability, hardness and resistance in concrete mix or mortar.

As $\frac{\text{weight of } H_2{}^0}{\text{Weight of cement}} = H_2{}^0/\text{cement ratio}$

That is 5-10 litres per 50kg of Portland cement materials added into the mix should be for the purpose of controlling, modifying, or imparting some particular property to the material with proportioning (1:2:4 and 1:3:6) cement, sand, aggregate, respectively to obtain a workable paste. More water can be added to it when necessary to satisfy the required chemical changes, while the paste settle and hardened; where as by excess water, paste is diluted and subsequently, strength and durability are reduced.

7.13 Thermal Conditions in Contemporary Houses

A few studies have been conducted on thermal conditions in traditional residential houses, Peel (1958), reveals that contrary to the general opinion about the "legendry coolness" of the traditional mud roofed houses of the Hausa, the actual experience was a more transitory sensation associated with changing environment. This "coolness", he argues relates more to the differential temperature between the outside and the inside than the real thermal condition inside the room Sa'ad (1986).

Schwerdtferger (1984)**,** also works on the thermal performance of traditional Hausa houses in Zaria, and seems to the concludes that all the three different forms of traditional structures were climatically far from being satisfactory with respect to thermal comfort zones. His study yielded the same result as that of Peel (1961), Sa'ad (1986).

Thermal comfort in Contemporary Hausa Residential Building is still far beyond satisfactory in all the three distinct different climatic season, because of the use of modern construction

materials such as cement bricks, and zinc roofs which have low thermal performance in relation to climatic situation in Kano Metropolis, where as, the survey reveals that 65% of samples surveyed have to resort to artificial or traditional means of cooling and heating to achieve thermal comfort in rooms, with the use of electrical fan, room heaters, charcoal for heating or traditional "**Mafichi"** (cooler) for thermal comforts in respective seasons.

Sa'ad (1986), asserted that the majority of dwellings in northern Nigeria today, are what may be called **Vernacular architecture,** rather than traditional architecture, since quite a number of modern elements have been incorporated into their design and construction. These new introductions have definite effects on thermal comfort levels achieved in dwellings that have found their way into the traditional architectural vocabulary of the 1980s; certainly this defines the evolution of Contemporary archetypes, though during our fieldwork we were not able to determine the level of consciousness of "thermal comfort" among the occupants, perhaps retrieved answers through the use of questionnaires and discussions.

CHAPTER EIGHT

CONTEMPORARY HAUSA RESIDENTIAL BUILDING CONSTRUCTION

8.00 Introduction

Contemporary Building is a skilled acquisition craft. The craftsmen or tradesmen such as Mason, Carpenters, Iron Benders, Painters, Electricians, Plumbers etc., acquires their technical know-how from informal training from chief craftsmen they are attached to him as apprentice to learn the basic skills of any related craft, with few years of experience in the field, or through formal training from skill acquisition centers in government vocational/technical school spread out in the metropolitan city. However, it is noted that the skill of a Contemporary craftsman is acquired on a personal effort to obtain the necessary technical dexterity. They are found in almost every ward and nooks and crannies of the city, particularly where Contemporary typologies are predominant (the outskirts of a city wall, Dorayi, Kurna, Yankaba, Naibawa, etc.,) popular craftsmen, especially mason and carpenters are known for their special expertise in job, which displays an excellent quality on their workmanship on previous job. These expert craftsmen have in one-way or the other become direct labour contractors.

Similarly, it is gathered that the majority of the craftsmen live on daily payment ranging from ₦300-500 (Naira) labourers, ₦700-1000(Naira) mason, depending upon the trade. Even the labourers undergo 2-5years apprenticeship to qualify them as expert in the field, and subsequently become masters in the field (mason or carpenter). They are interested and satisfied with their craft job and willing to try and improve on new methods in order to go along with the modern trends in traditional approaches/systems or harmonize traditional trends with modern trends (materials and constructions as well as form).

"Contemporary residential Building" is referred to as Hausa Residential Building in improved Traditional concept built with modern building materials.

"Hausa domestic residential building", in an improved traditional concept and modern building materials such as bricks, cement, zinc, roof and metal components.

It is also noted that **completion and occupation** of Contemporary Hausa Residential Building can be done in **2-3-6** months averagely depending upon the plot size and number of rooms and the financial capability of the owner (client) Materials can be easily purchased, such as sand, cements brick (hand mould ready in 4 days-one week), timber, cement bricks may be obtained gradually and packed on site or on purchase at once from the nearest local brick moulding site or factory.

Moreover, the traditional way of building Contemporary typologies is to employ the services of a chief mason who always has several labourers and allied craftsmen (carpenters, iron benders, electricians, plumbers etc) who normally work as a construction team depending upon their personal interest and understanding or record of their past work and relationship.

In some projects, certain levels of works, are executed by labour contract rather than daily payment, i.e. excavation, (block work to and above D.P.C. level:- block work to lintel and roof, based on counting number of blocks laid by a mason i.e. (₦10-₦20 per block) or casting concrete at pillars and lintels or rafter works. These approach fasten the work rather than daily pay that retard workers output. There is also a tendency among the chief builder to control two or more house construction at a period, or run them concurrently hiring more workers to execute the works. This becomes his source of pride as boasting to exemplars of his works and clients.

8.01 Structural Type

There are three main types of Contemporary Hausa Residential Building archetype;

2. The pure cement brick type
3. Mud brick type
4. The combination of brick and mud

In rectangular or square geometric form with a courtyard, roofed with zinc sheet or Azara as the case may be, some are elaborate non-storey structure and few are storey buildings still called “Bene”.

8.02 Contemporary Hausa Residential Building Constructions

The element of Hausa material culture used to develop from the natural products in the local environment; until quite recently, supplemented in a limited way, only by imported goods. But under the growing influence of industrialized nations, the number of variety of materials and techniques for construction processes has increased dramatically.

The changes in traditional building technology caused by several factors, such as new materials and techniques as mentioned previously and by external contacts are most apparent in the Contemporary Hausa Residential Building within and outside the walled city of Kano, by the growing low income or middle class earners, who can now afford to build with cement blocks and zinc roofs rather than thick mud and Azara roof. However, despite these rapidly accelerating changes, which will certainly bring about the demise of once great Hausa architectural tradition, Hausa builders (skilled mason) are still only marginally affected by the new technology hence, most of their disciples have acquired basic skills in the construction of contemporary buildings, and most construction works are still within the scope of present formal building industry Contemporary is still a material found in the local environment.

Perhaps, the uncompromising nature of the architectural pattern derived from constantly repeated structural forms expresses the spatial and social needs of the Hausas through the symbolic use of forms and spaces they create. It is because of this unity of form and purpose, and the meaning or transformation attached to it that Contemporary Hausa Residential Building will be classified, studied and revealed from sub-structure to super structures, including finishing differences between load bearing walls and non load bearing walls, see table 7.1 in the appendix.

8.03 Contemporary Foundation

Foundation is a part of sub-structure designed to provide logical, structural, solid base and support to the building structure itself. However, there are a number of different foundation types available for use in domestic building. The site selection is influenced by the types of building nature or loading, and site conditions, for modern construction notably consists of strip, pad, raft and pile foundations designed to safely, sustain and transmit load to ground and avoid undue settlements, usually made in two parts, of similar materials with walls (150 x 300 x 200 with mud) or cement brick with cement brick 6" (150mm), 9" 250mm (150 x 225 x450mm) or combination of cement brick at depth of 300mm-650mm max, at about 800mm-1000mm thickness and block work with mud brick, to roof level.

Contemporary foundation depths are of two types, commonly used strip, wide strip, and raft foundations. They might depend on soil nature, if the area (soil) is found to be strong (Goron Dutse) the depth is usually (300mm) or averagely 400mm in an area (soil) where it is weak: sand or clay, it is dug up to 500-700mm (3 course layer to DPC) the trench width is 600mm no matter the soil type or the thickness of the block work.

Setting Out: is the process of establishing a building structure on the ground surface, the first step in erecting Contemporary Hausa Residential Building is partial clearance of the surface soil, then the building is set out using measuring tapes, pegs, metal or wooden ropes etc. The plan is drawn on the ground by the Chief Mason Builder or any technical supervisor using tread and digger the trench of 600mm (2ft) wide is marked. The plan marked is called "Fasali". Then labour is negotiated depending upon the depth of the trench required which ranges between 400-600mm ($1^{1/2}$ ft – $2^{1/2}$ ft) few buildings have concrete foundation footing of 100m-200mm thickness, this relates to financial status of the owner and urgency required to erect the building.

The block work is completely done in stretcher bonding rarely in header bonding up to three or six courses, about **10m-1.2m** to receive over site concrete.

Plate 8.1 Setting out Foundation Trench



Source: field work 2005

8.04 Concrete Over Site

Where its applicable is mostly 100mm thick, the mix ratio is **(1:3:6 or 1:2:4)**, incorporating coarse aggregate size of 20mm-40mm, as these aggregates are mostly hand crushed, and batched or measured rather than the approved weight in tons/m^2.

In terms of differentiation between fine, or coarse aggregates, their application or performance is hardly understood much less of compliance. Rather it depends on mason, knowledge and experience, absence of water proof material is evident in most of the concrete over site floors in Contemporary building.

Hard core filling may be required to fill hollow, and raise the finished level of an over site concrete slab, after the removal of turf and other vegetation, hard core filling in regard is mostly sandy, gravel soil readily available or excavated on site or a laterite soil imported to the site to required quantities – depending upon soil type. The best filling materials are those with particles that are hard, durable and chemically inert and commonly suggest materials brick or tile rubble stone rubble, gravel 40mm well graded and consolidated.

8.05 Contemporary Wall Construction

The persistent use of mud brick is indicative of its viability as a construction material, and also its assesability and this is from an economic point of view, Umar (1997). It is discovered, that cement bricks replaces mud brick despite it cost little higher and faster to mould, dry, build quicker and neater than mud. Moreover, 46.5% of the samples are built in cement brick of a single family house and 33.75% of the samples made in mud brick. The decision to resolve to use brick is taken individually by the owner, rather than collectively by the family members.

However, this change has significantly affected the thermal comfort of the occupants in the room, when compared with mud brick which has 65% thermal comfort satisfaction, despite the seasonal variation of summer and winter periods; whereas cement bricks have less than 50% thermal comfort satisfaction in both the two different season, hence, the occupant has to supplement or complement with artificial system or cooling or heating system.

Plate 8.2 (150mm block/room layout).





Source: field work 2005

In addition to these – the construction process of Contemporary Hausa Residential Building is similar to modern concrete/cement blocks or building construction technology with little or no differences on construction techniques, on a particular element of building such as foundation, wall, roof and finishing etc., which will be treated appropriately.

The Preparation of material (cement block or mud blocks) is generally instant purchase from or market manufacturer incase of machine made, or standard products from the market (popular building materials market are Kofar Ruwa, Sharada, Naibawa, Yankaba, and a lot more on the road side,) while brick/block producers are scattered almost at every nook and cranny of the town where new construction takes place, brick or block is required, its general gradual mixing, forming, and drying last for a maximum period of three-seven days on site or off site. The period of construction of Contemporary Hausa Residential Building depends on the availability, of fund released from the building owner.

Hence, Contemporary building means traditional house in modern form and materials in improved geometric form, materials or traditional house in modern concept and material. Furthermore, the walls are described as a vertical element that carries floor and roof loads archieve, thermal requirements and accommodates opening components. The traditional tendency is to make walls thicker than it's structurally necessary. This is done partly to be on the safe side, partly because thick walls make the room cooler and partly because slave labour is cheap. A buttress (Dogari) is added to a wall when all begins to crack but is never included in the original design, Daldy (1945)**.** Moreover, failures in wall such as cracks collapse or wearing are rarely identified talk much of taking preventive measures during the construction works.

Similarly, Hausa builders have learned, through accumulated experience of many generations that the stability of mud wall is increased by decreasing its thickness towards the top. They achieve structural stability by mass of the walls which vary in thickness from 0.15m-1.20m for low partition walls, bigger rooms up to two storey building Dmowchowsky (1990).

However, wall construction in Contemporary buildings is usually up to eight courses of block (6”, 9” 150mm-225mm) from foundation to D.P.C up to lintel level, and two or three courses to roof level. The concrete floor (German floor), is hardly cast in Contemporary structures,

block work continues directly to door and window and to lintel level.

The lintels are of two kinds, I complete reinforced lintel and partial reinforced lintel with additional two or three more courses of block to roof levels, (few building employs concrete beams) roof members wood rafter and wall plates of **150x100mm** thickness are tied together with 6" nail, 10mm corbel called **(Langa Langa)** or 8mm steel bar for strength to the roof structure.

It is note worthy that, hardly any roof load or any load is considered in the construction of walls particularly thickness and the spacing of wall elements to cater for such structural considerations.

Walls to building in "Contemporary Archetype", and rarely in header bonding are constructed in various ways using a variety of materials (mud-cement brick) employing various constructional techniques and their relative methods, Contemporary walls are doubtfully constructed to perform the desired function of walls (strength durability resistance insulation appearance). Rather than simply expected to enclose the space of building are sub-divided into required number of room or spaces.

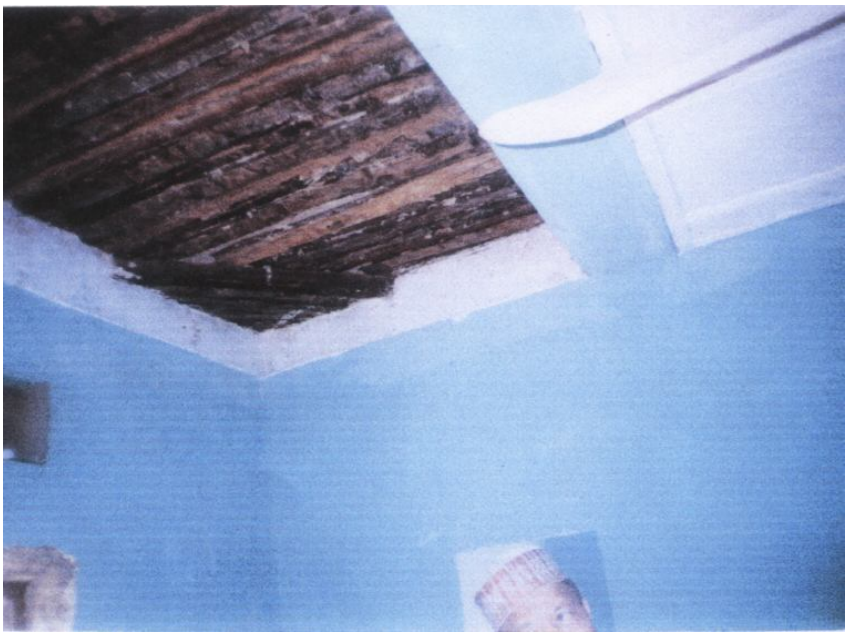
Common brick used for walls are solid mud brick and hollow sand cement block made in various sizes (150x225x540 and 225x225x450mm) respectively.

8.06 Upper Floor

(African Decking), traditional upper floor are purely made in mud and Azara material imbedded together plastered and smoothed with cement, both top and bottom. Peharps Sometimes decorated at the bottom, however, for Contemporary building, the upper floor consists of Azara beam of about 3.0-5.0m length laid horizontally in conformity with room shape concrete filling (1:2:4)(1:3:6) with smaller chips or aggregates to fill smaller pours. Poured from the top. The thickness of the floor, quantity and size of Azara reinforcement with the span and super imposed loads are but hardly considered by Contemporary mason.

The Azara beam sizes ranges from **50x100m, 75x100mm and 100x150mm** for beam to control room span that extends the full depth of the floor, the top surface is finished with cement screed or ceramic tiles or any desired suitable materials, while the bottom is covered with modern ceiling materials or left exposed. See plate 8.3 below

Plate 8.3 upper floor (African decking)





Source: Field work 2005

8.07 Roof Construction:

The conical thatch, the flat muds are the cheapest and the most common traditional roofing, until very recently the most expensive and most prestigious, the domed mud roof supported on mud arches. However, at he moment these domed shaped roofs are being constructed in reinforced concrete materials supported on concrete pillar(column) and arches mostly found in royal houses, and rich merchant houses.

Two basic roof types are identified:

(1). Exposed single pitch roof (2) covered pitched roof with parapet wall and concrete gutter of 600mm made of timber rafter etc., covered with corrugated iron sheets with ceiling in place of traditional roof of (Azara) covered with mud in dome or flat form (Umar 1997). The study reveals that 68% of the samples uses corrugated iron-roofing sheets or Azara covered with cement concrete in upper floor popularly known as **"African Decking".**

Plate 8.4 roof structure



Source: Field work 2005

The wasted aluminium, or Corroded iron zinc sheet is now becoming the most popular roofing material and most prestigious roof coloring material – it is readily available in 10-50mm. The material is used as an alternative material to control or eliminate periodic maintenance in mud roofs (even some mud-roofs are latter covered with zinc sheet to reduce rainfall leakages).

The sheet are light in weight and reasonably ductile, normally about **2500x1000mm** and a thickness of 0.80mm placed or fixed to a wood rafter of **100x150mm at 900-1200** centre to centre with zinc capping covering the turn up of the sheets on either side of the roll, by zinc clips at 750mm spacing

8.08 Parapet Wall and Gutters

Basically, consists of two types internal or external form cast in city after form works, reinforcement works etc, generally provided to achieve the desired aesthetics of the elevation. The width ranges from **400mm-800mm** internally with a bottom beam of **100-150mm** and a 100mm parapet wall thickness at a height of **1000-1200mm** height, the floor surface is finished with ordinary cement screed, but special mix ratio of **1:4 or 1:6** mix few with bitumen felting.

An understanding of the key process of structural construction of a sample roof form is imperative in analyzing and interpreting the form of Contemporary roof structure from the simplest flat roof, to the complex single or double pitched roof structures i.e. samples of reconstructed Gwamaja Aero plane disaster in 2001.

The most common roof types in Contemporary buildings are single pitch and double pitched roofs as presented below:

8.09 Single Pitched Roofs

This is the type where rafters are supported at the end only. The simplest form is the lean or pent roof, where one wall is carried to the higher level than the other and the rafters bridged

the space between, the rafters are normally supported by a ridge board plugged to the wall or a plate resting on corbel brackets, span ranges from 2.0mm-5.0mm, the roof water falls mostly into the courtyard internally, or outwards externally covered with parapet walls or gutters as discussed.

8.10 Double-Pitched Roofs

When the span exceeds 50mm, or where single roofs are no longer suitable, as it would entail excessively large and uneconomical timbers. A typical double or purlin roof are used at 3.0m centre to achieve intermediate support to rafters 100x150mm, supported by struts 100x150mm which bears the load bearing partition or ceiling beams, purlins 75x100mm king post 150x100mm beam/wall plate 100x150mm ceiling noggin 600x600mm at 1200mm spacing covered with ceiling board made up of particles or gypsum sum board, Fascia board 125x225mm at exterior of the roof eave.

8.11 Arches in Door Way/Verandah

Traditionally, arches are normally constructed in the following manner; each layer of reinforcement **"Kafi"** is tied back to the preceding one, beginning from both walls and working upwards and outwards the centre of the room space. When the gap between the two halves of the arch is small enough horizontal Azara called **"Bako"** are used to complete the arch. Each corbel is allowed to dry overnight before the next one is constructed; in this way the arch can be built without centering or scaffolding. In rectangular room where the span is less than 45m it is usually divided into 2.1m and the simple arches span across the room parallel to the shortest side, Dmowchowsky (1990).

However, the present day Contemporary arches are more common found only in entrance doorways and internal verandahs but rarely in interior spaces, completely constructed in semi-reinforced cast in site concrete, with the timber form work giving the type of design and construction required which largely depends on the intellect or creativity of the chief

carpenter, normally spans from 1.0m-2.5m width and 2.0m-2.5m height in a wider span of about 3- up to 8.0mm length. The spaces are equally divided to carry 2-4 number arch ways, with interesting circular, semi-circular designs popularly called Arabian or Arabesque styles, common in the ancient Islamic Architecture.

8.12 Wall Finishes:

Wall finishes are made of cement plaster on cement brick previous research indicate that wall/floor finishes are either of cob or cement screed on Adobe wall and floor Umar (1997 p.184). Accordingly, floor finishes are still made in a similar way with an instant mixed ratio of 1:6 or 1:8, regardless of their expected requirement; whereas previous researches reveals that wall/floor finishes are simple mud internally at two layers, then smoothed and externally with Makuba floor are made with specialized mud for floor called Dabe Sa'ad (1996) Dmowchowsky (1990).

Prior to the introduction of cement on wall and floor finished in early 1990s specialized purpose made material for smooth surface wall finishes, floors as well as decorations was used. Around 1950, cement was introduced to plaster mud walls and floor, as well as Artistic decoration, painted in white ash (Farar kasa) Dmowchowsky (1990) and Sa’ad (1986).

However, currently decorations are made with specialized cement mortar (Mix ratio 1:4, 1:6) designed and engraved in walls painting, in form of multi colour of choice (white, blue, orange etc). see plate 8.5

PLATE 8.5 Decoration in Contemporary Buidings








Source: Field work 2005

8.13 Floor Finishing

Several factors required to be considered when selecting a floor finishes. Requirement vary in different parts of the building i.e. bed room, living room, toilets, and kitchen, it is observed that 95% of the sample, have ordinary cement screed floor finishing mat mix ratio of 1:6-1:8. Few wealthy individuals have their toilet floors and walls finished in ceramic tiles, and P.V.C. or ceramic tiles in rooms and living rooms in various colors but hardly differentiating where most appropriate to use textured or smooth tiles, in the building surfaces.

Floor screeds should be provided to serve a number of functions such as smooth surfaces, thermal insulation accommodate services etc, cement and sand ratio of **1:3/1:4** or 1:6 by weight up to 10mm thickness, coarse aggregates or any other suitable aggregates.

8.14 Stairway in Contemporary Hausa Residential Building

This section completes the study by examining the types, design of stair cases associated with constructional works, stairs consist of a succession of steps and landing that make it possible to pass on foot to other levels, whereas the term is often applied to the complete system of tread, risers, strings, landings, balustrades and other component parts in one or more successive flight of stairs Seeley (1994).

The simplest and commonest form of stairs in Contemporary buildings are three (3), namely; straight flight, (U) shape and (L) shape stairs, consist of straight continuous flight, run of opposite parallel steps, a flight with landing and a right angle turn to left or right respectively.

Stairway is designed and constructed to provide a safe, comfortable, serviceable and commodious means of access from one floor to another of a building. Ironically, staircases in Contemporary Hausa Residential Buildings are designed and constructed according to the intellect and technical know-how of the mason or carpenter within the limited and available space of the house generally, made in form of **"cast insitu"** formwork reinforcement works of 10-11mm steel bars. Concrete materials of a clever ratio by the chief mason of **(1:3:6 or**

1:2:6 mix) average width of tread ranges from **200mm-300mm**, risers from **200-500mm** total of steps ranges from 10-14 steps.

The width of step **500-800mm** is very narrow smaller than the arm width of a person, Similarly the risers height are very irregular, (not uniform as it should be) very steep and uncomfortable, hardly any minimum headroom clearance is considered in all cases, fall within **1000-1600mm** height, depending upon design and location.

Common materials for handrails and balustrades are mainly solid cement bricks, concrete pin of designed elements. Few are made of metal rails of **50-100mm** sizes. The steps surfaces are finished with ordinary cement screed materials.

8.15 Toilets

Daldy (1945), reveals that Hausa traditional toilet initially were water flush on floor system called 'Ture' later a 'bucket' system followed by pit latrine system of 4-6m depth covered with Azara slab later concrete slab now it is soak 'away pit' at the interior wall of the toilet with the squatting point internally joined by a PV.C pipe of 1-0 – 1-5m length slanted at a convenient angle slope of 5-10 to the combined pit of soak away and septic tank outside, popularly called "sokawe" in Hausa see plate 8.06.

Plate 8.06 Contemporary Toilets





8.16 Septic Tank and Soak Away Pit "Contemporary Sokawey"

The absence of public sever for individual domestic houses, necessitates the provision of individual **"Sokawey",** no matter how small it should be, depending upon available area outside a suitable for its location. The Contemporary **Sokawey** serves dual purposes, the breaking down and settlement of solid matter in the foul water from the building – heavier solids settle at the bottom as sludge and lighter solid rise and form a scum which acts as a surface and permits bacterial decomposition. Furthermore, the generation of gases requires efficient ventilation (vent pipe) for satisfactory dispersal.

A simple Contemporary sokawey is illustrated in plate 8.06

8.17 Two Tanks System

The first chamber has a capacity of $^{2}/_{3}$ of the total of the chamber with a separation wall of 150mm or 225mm with P.V.C. pipe at $^{2}/_{3}$ of the wall height to enable passage to scum and foul water to soil percolation pit. Normal/common sizes L, I 200xW3000xH2600mm. The one way tank system, is a combination of traditional pit latrine with the squatting point inside linked to the **'soakawey'** pit outside by a 100mm-150mm P.V.C. pipe starts at suitable gradient angle, to enable droppage to the tank normally 1200x1200x2500-35000 depth, covered with a concrete slab with a vent pipe.

The final part of the dissertation in chapter nine discusses the summary and implication of some findings as well as recommendation on the subject matter after the focus and objectives of the study is achieved or arrived at (really there is a transformational changes in Hausa traditional residential architecture to the present Hausa Contemporary Residential Buildings in Kano metropolis).

CHAPTER NINE

SUMMARY AND CONCLUSION

9.01 Summary of Findings

The study reveals that certain salient features become evident first of all is the geometric form of the entrance lobby, **(I, L or □) I, L,** or square shapes with average sizes of 2sqm, Certain spaces are found in every house regardless of its size, location or economic status of the group it belong to. These spaces are the courtyard **(tsakar gida),** the room (**daki**) living room (**rumfa**) and a toilet (**bandaki**), are found in every house in the sample. They may constitute what may spatially be termed "Universals". In a sample term, no house is fully constituted, if any of these spaces is missing. Other spaces found in the majority samples include guest rooms and guest toilets of about "9sqm and 1sqm average sizes) each respectively. And a commercial shop outside are common and it is usually for renting out in order to generate income as is the practice in Yoruba society there is also existence external soak away and metal rail fenced verandah.

Generally, however, the number of these spaces in a house varies according to the category of plot sizes (**A-D**) it also has a closer relation to the number of families in a house, whereas forms and sizes relate directly to income groups they belong. On the other hand workmanship relates to construction components, methods and the skill of the artisans.

There are three other basic types or concepts in the house namely; the (family room) "**daki**", the service and utility (kitchen or courtyard), the master/guest rooms/toilets usually linked to the entrance lobby.

The spatial organization of the "Contemporary house" in Kano is thus a concrete expression of the present social structure as well as the cultural values and economic status of the inhabitants. The users control the housing process, such that, the owner rather, designs and build his own house or adjust an inherited unit to meet his needs in both cases, the decision

making power rests in the hands of each family or owners, who are also users of the housing environment so created. The owners are therefore, the principal actors in the transformation process, and are in full control of the shaping and reshaping process.

As Popoola (1994) in a similar vein notes that; traditional builders and craftsmen aid in the construction of the housing units, (the present Contemporary). Their role is however, limited to constructing the structures to meet the expressed needs and values of the users. The ease with which the gida (house) is shaped and reshaped (transformed) to reflect economic status and cultural values can be attributed to both the nature of the building material and the type of the development procedure of the house.

The study reveals that, the housing process in the form of progressive development process (transformation) did not try to meet all the anticipated users' demands at once, instead the people were constantly building and rebuilding, maintaining, modifying, changing and building again in an attempt to reflect the constantly changing social structure, in terms of family size and composition. The process encourages the development of the spatial organization and transformation of the house, based on the immediate circumstances and needs of the inhabitants and owners Such as degenerating to a squatter settlement i.e. Dorayi, Sharada, Kabuga, Naibawa, Tarauni, Kurna etc.

Family increases or changes, maintenance is not considered to be a nuisance but is taken as part of the process of reshaping the environment, either in terms of finishes or in terms of the addition of units, which are presently neglected in both the houses and its environment.

Thus, the dynamic process in which both context and form change together, will stay mutually well adjusted, because of the progressive development procedure of shaping the environment.

Popoola (1984) similarly reports that, the non-permanent nature of the building material, coupled with the progressive development procedure of the spatial formation of the Hausa

house, is greatly responsible for the building form that could expand and contract as required. Is still a valid statement**.** Since the Hausa housing form is the expression of content, function and structure, all of which are much more important than the form itself, one may conclude that the Contemporary house in Kano, reflects the present, social family structure, some cultural values and satisfies some psychological needs and it is also based on the available resources and the traditional building skills of the people.

Having noted that the current state of affairs is the decline in Hausa indigenous architecture, Umar (1997:244), particularly in these two broad aspects of Hausa architecture; spatial concept, and art of building itself, Most of the building owners have been strongly influenced by Contemporary Hausa Residential Building materials and construction components and method available, while some have tried to adopt their indigenous taste to the new architectural dispensation. We may speculate that certain Hausa Urban lifestyle factor may override mainly individual distinctions for instance; ethnic historical or religious influence i.e. (form of domestic house that is uniquely Hausa).

The study reveals that the major reason behind changes, modification, reconstruction (transformation) indicates the wealth 37.5%, rain damage 10%, marriage 17.5%, inheritance 30%, etc., as shown in the appendix furthermore the current high maintenance cost of traditional building. The cost does not necessarily mean in monetary terms, but in terms of time and labour), significantly affects the present dispensation.

However, from the data gathered, it was possible to make a categorical statement that compound family houses undergo a minimal of 2-3 stages of transformation at any eventual death of compound head and subsequent sub-division of spaces or other factors associated with the transformation. Additionally, there is no denying the fact that while most of the houses that were constructed between 1980 and 2005 were constructed in cement bricks quite a considerable number were made of mud bricks; hence, that transformation in spatial

pattern started around 1970 due to new layout outside the wall city by the government, and in building around 1980s due to economic prosperity, increase in population and education which led to a new Contemporary Hausa Residential Building in the outskirts of the walled city boundaries.

Similarly, the study explores the physical and historical characteristics of surveyed wards in brief; the aim is to build a data base which can be statistically and theoretically analyzed in order to address the set out objectives to which the establishment of new Hausa traditional domestic house, and domestic environment (neighborhood) of the Kano spatial patterns. Perhaps, as in every research, only the long process of numerous practical tests, improvements and corrections can assure positive final results.

The findings from this study evidently indicate that the cost of Contemporary traditional houses is apparently much lower than that of mud house buildings, due to faster acquisition of preparation of material and quick, expedient labour out put and periodic maintenance cost.

Additionally, the other economic problem, which cannot be omitted especially, now in times of severe economic hardship is the cost and availability of building materials. Even local products as earth, mud Makuba thatch, Azara are scarce and extremely difficult to get. Of course, the prices are very high even if they are available.

The time Saving for the preparation, high cost of transportation, lack of skilled traditional builders make it difficult for traditional mud houses to be built, undoubtedly the desire and easier to purchase faster to build, availability of labour of various trades, as well as the satisfactory. Durability of Contemporary materials, give the archetype a significant advantage.

The second factor of labour availability is connected with the character of housing destined for traditional low-income groups. It has already been mentioned that private investors are popularly involved in Contemporary low-cost housing production owing to the simple fact

that they are easier in acquisition and subdivision of land (informal) called **"Awon Igiya".** They expect immediate considerable return from the rent, in the outskirts of the Kano walled city such as Dorayi, Kurna, Yankaba, Naibawa, Sharada, Kabuga etc.

The author's proposals stem from the observation of traditional building methods where extended families and part of the community are often involved in the construction process. This is no longer feasible, due to the partial disintegration of the families and the economic hardship in the society.

Not withstanding, the importance is the acquiring of new skills by the members of the community, which can later bring them attractive employment in the building industry and also help to learn how to maintain their own houses.

The prospects of this research provide the basic framework for future research on documentation on Hausa Traditional Residential Architecture and also highlight how modern architecture and materials have influenced the concepts of geometric forms, materials and construction methods, as well as the entirely changing patterns of lifestyles in our traditional compounds and settlements resulting in several alteration or modification of buildings due to certain variable factors as enumerated. Similarly, it reveals the degree of individual perceptions and acceptance of Contemporary Hausa Residential Building from owner/occupants in terms of comfort, durability, functionality and economy. It also highlight the basis and stages for the significant transformation that occurred within the period of **1950-2005** in Hausa traditional residential architecture, which has been due to economic and educational awareness, interaction with other socio-cultural groups from other parts of Nigeria, and the neighboring countries, and also with the introduction of modern materials and design as a result of British colonial administration.

Similarly, the physical aspects of the Kano Metropolitan City typically grew up around the walled precinct of the city walls and gates, where houses were arranged in an organic manner

forming irregular mass of broken intervals by open spaces internally and in front of the residential houses or buildings. Streets are narrow, unpaved and often lacking adequate drainage. There is no clear evidence of refuse management, (collection and disposal.) At the moment, on the outskirt of Kano Metropolis such as Tarauni, Sharada, Kurna, the situation is different, i.e. there is an evidence of continuous rising of street level, due to refuse dumping, and refilling of site, which necessitates stepping of some house entrances to peach level with the ever rising street level. The peripheral wards of the city portray the houses of the poor section of the society. A striking feature of this city is the existence, within or near the periphery, of a large number of agricultural and cropping plots which are subsequently used into residential plots due to urbanization processes signifying a resemblance with the later Iron Age cities.

9.02 Implications of the Research Findings

Judging from the sample of houses surveyed, there is a growing the tendency to prefer modern building materials most especially in wall, roof, openings, cement bricks, zinc sheet, and metal. Because of their durability and instant preparation, though with a higher cost of compared to traditional mud and azara, the study shows that over 50% of respondents built their own houses. The Graph in 5.3 indicates that greater percentages of samples are built in cement brick rather than mud. This can be attributed to an increase in wealth as established earlier by schwerdtferzer (1982) which is still valid

The aspect of building decoration has seriously suffered from this development that the art of arched roof and interior calligraphy and engraving in (Daurin Guga), and exterior decoration as elaborated by **Sa'ad (1986),** is giving way to zinc sheet and ceiling board decorations.

The spatial quality of the house (i.e. the arrangement) location and expression of the principal functional space within houses is not satisfactory, for most house inhabitant, to those areas particularly at urban periphery or squatter settlements such as Dorayi, Sharada, Badawa, Kurna etc.

The consequential decrease or lost open spaces of courtyard systems in the present Contemporary residential houses have a significant negative effect, in the socio-cultural (household) family activities in the Hausa traditional community.

There is a strong indication of environmental pollution, liquid waste filtering the **street** from various houses, with poor drainage, and accessibility for vehicles coupled with lack of public and commercial spaces.

In addition the cooking space or **"Dakin Girki"** where it exists is minimally connected and segregated where there is no kitchen cooking is carryout in Zaure or entrance lobby or an area appropriated from the courtyard. The study also reveals that 70% of sample houses use kerosene stove for cooking (unless in case of scarcity or cost) they use firewood. These

phenomena suggest the redesign in allocation of spaces for such function.

It is also noted that, most of the houses have common toilet and shower, few have self-contained toilets for the master or guests and wives depending upon the size of the family and wealth known as 'VIP' toilet rather than pit latrine, see appendix.

Similarly, the physical characteristic (i.e. geometry and appearance) are recorded in an attempt to appreciate the modern trend in **"Contemporary building"** of Hausa traditional, domestic architecture at the local level of the environment.

1. The sample of houses surveyed are classified, using social status, number of occupant, size of room, but the basic premise of the study rules out the former. The number of rooms are the most common means of classifying house samples Schwerdtferger (1982). This tool is still valid and the most suitable and efficient means of classifying houses accommodating various numbers of occupants.

2. According to Sa'ad (1986) colonialism has been the major cause directly or indirectly of the major changes (transformation) in the architecture of Kano. However, these changes are reflected more in appearance rather than in configuration, of spaces is still valid. But, on the other side the agreement seem to be invalid, because the configuration of space size and form has significantly changed to regular geometric configuration and as noted and presented in the previous chapters – traditional residential concepts and materials are diminishing.

It can also be assumed that the level of education may be another factor that has precipitated these transformation.

In relating the people to their housing environments the study shows that one would need to accept the view that the physical environment we construct is an expression of our social and economic values. Indeed Moughtin (1985) also observed that;

"The buildings that we produce and their layout… are a direct product of the subtle

balance between a culture and its environment". Indeed, Popoola (1984) has also observes that; The traditional (Contemporary residential houses in Kano) therefore go through a sort of evolutionary trend or developmental cycle, analogous to the ecological succession of a baby boy becoming a boy, a middle-aged man and an old man. The (house) may also die a natural death to later allow for the formation of new spatial organization. A housing environment which grows and decays in response to users' needs and values can therefore be said to be organic in nature and user-responsive.

The Contemporary buildings implies a static housing environment designed to satisfy the immediate needs of the occupants, but because it is static, it cannot meet the changing socio-cultural needs of the occupants. Popoola (1984), the inhabitants will later become trapped in a static product once they observed that (20% of samples) they have no room for expansion and that would no longer satisfy their changing needs. In countries with active housing market, especially in the developed world, the occupants of a misfit house can readily change house by offering the misfit one for sale and buying one that would meet their new needs. But in Nigeria, where buying and selling of housing units are uncommon, the occupants will become stocked in a housing unit that can no longer satisfy their needs. The assertion is still valid in that situation. The occupants would require a new house that can meet and reflect changes in their needs.

In other words, a building cannot be organic or alive unless, gradually developed and repaired constantly during its lifetime, perhaps transformation. and responsiveness can largely be achieved where the inhabitants are allowed to shape and reshape their housing environment to satisfy changes in needs. However, it may be pertinent to say that; the study has finally explored the reasons for transformation (see appendix) has correlation with construction materials etc thereby establishing a new form and concept of Hausa traditional

architecture **(the Contemporary concept)**, or Kano archetype.

Notwithstanding, the importance of the acquiring of new skills by the members of the community, which can later bring for them attractive employment in the building industry and also help to learn how to maintain their own houses.

The other factor – living inhabits, gives preference to the **Contemporary** forms of housing settlements. The family organization with its close link between members of the extended family is deeply rooted in African tradition and is hardly reflected in the design of Contemporary compound.

The employment habits of the part of the low-income population earners always favour the Contemporary traditional settlement patterns of living. It is easier; cheaper to perform various small scale commercial or building activities where a small shop or workshop in front of the house opens to the public, while internal courtyard remains to keep the intimacy of a single-family household activity.

However, from present study of Contemporary buildings one may speculate the adequate precautions taken by the planning authorities to prescribe minimum plot size, room's sizes and maximum number of space and ensure strict compliance with building regulations. Failure to comply with that; may result in the tendency of losing the designs construction standards, in the very near future, consequently, affecting health, socio-economic and environmental standard.

9.03 Recommendations

Finally, the prospect of this research may provide a basic framework for future research on Hausa traditional residential architecture and also highlight how modern architecture and materials have influenced the concepts of geometric forms, materials and construction methods as well as how it has entirely changed the patterns of lifestyles in our traditional compounds and settlements, due to certain variable factors as enumerated in the study. Similarly, it reveals the degree of individual perceptions and acceptance of Contemporary Hausa Residential Building from owner/occupants in terms of comfort, durability, functionality and economy. It has also highlighted the basis and stages for the significant transformation that occurred within the period **1950-2005** in Hausa traditional residential architecture, which has been specifically due to economic, educational awareness, interaction with other socio-cultural groups from other parts of Nigeria, neighbouring countries, and also the introduction of modern materials and design as a result of British colonial administration in Nigeria.

In this regard the study strongly recommends that

1. The physical and cultural wealth of Hausa traditional building architecture needs to be preserved and documented for the education and appreciation of the future generation. And further research
2. The Contemporary, construction method and techniques should be develop and improved by agencies and institutions concern
3. The talent of the craftsmen involved, and building materials used should be protected and improved to suit modern trends, so that it may be possible to design and build modern village settlements in Contemporary concepts.
4. The relevant agencies should adopt and design data or average requirement for the contemporary Hausa residential buildings with strict compliance to the building

byelaws and regulation. Thereby, achieving and saving local talents and materials assimilation by foreign talent (in design) and imported materials for the nation as successfully practiced and executed in other parts of the world. Example: "Gorna Housing Estate in Egypt".

Quotation – Tradition – (**culture and buildings**) may not necessarily be old fashioned, it should be improved and maintained, local materials, local craftsmen, local concepts and techniques, according to **Hassan Fathy of Egypt (1984)**.

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APPENDICES

APPENDIX I -XI

APPENDIX I METROPOLITAN LOCAL GOVERNMENT, SURVEYED SAMPLES AND PERCENTAGE SAMPLE:

S/NO	**Local Govt.**	**Sample housing**	**Number of some selected houses**	**Percentage Houses surveyd**	**Remark**
1.	Tarauni L.G.	001-115	115	11.40%	
2.	Gwale L.G	116-235	120	11.85%	
3.	Fagge L.G.	236-335	100	9.90%	
4.	Municipal	336-495	160	15.85%	
5.	Dala	496-630	135	13.36%	
6.	Nassarawa	631-830	200	19.80%	
7.	Ungogo	831-908	78	7.74%	
8.	Kumbotso	909-1010	102	10.10%	
	Total	-	**1010**	**100%**	

Source Field work 2008

APPENDIX 11 LEVEL OF EDUCATION OF RESPONDENTS

S/No	Item	Number	Percentage
1	Primary	76	7.5%
2	Secondary	289	28.75%
3	Tertiary	234	22.5%
4	Questionnaire/Islamic	206	23.75%
5	Unspecified	164	17.5%
	Total	969	100%

SOURCE: FIELD WORK 2005

Table two shows that over 50% have primary and tertiary education and over 80% level of literacy changes could be attribute to educational dynamism.

APPENDIX III DISTRIBUTION OF BUIDING MATERIAL PER HOUSE SAMPLES

ITEMS	FOUNDATION				WALL				ROOF			
	Initial	%	present	%	Initial	%	Present	%	Initial	%	Present	%
1. Traditional mud	363	37.50	290	30	281	32.25	-	-	25	31.25	-	-
2.Cement block, brick/zinc	352	36.25	426	43.25	334	37.5	715	73.75	-	-	672	68.75
3. combination mud/brick	254	26.25	254	26.35	254	26.24	254	26.25	254	26.25	254	26.25
Total	969	100%	969	100%	969	100%	969	100%	969	100%	969	100%

SOURCE: FIELD WORK 2005

Table three indicates that greater percentages of samples are built in cement bricks rather than mud; this can be attributed to increase in wealth as established earlier by researcher i.e. Umar (1997) Schwerdtferger(1982) etc., still valid.

APPENDIX IV: SKILLED LABOUR OF BUILDERS OF SAMPLE HOUSES

ITEMS	SAMPLE	PERCENTAGE
Skilled	508	62.50%
Unskilled	242	12.50%
Unspecified	219	35.00%
Total	969	100%

Table indicates greater percentage of skilled labour could attribute to level of education

APPENDIX V: TOILET FACILITY IN SAMPLE HOUSES

Item	Sample	Percentage
Traditional	399	41.25%
VIP toilets	570	58.75%
Total	969	**100%**

Table shows that over 58% used VIP toilets (ventilated improved pit) contemporary toilet pit latrine at interior and the soak away pit at that exterior of the house. As shown in plate 6.00

APPENDIX VI SOURCE OF OWNERSHIP OF RESPONDENTS

S/No.	**ITEMS**	**NUMBER**	**PERCENTAGE**
1	Inheritance	254	26.5%
2	Purchased	219	25%
3	Built	463	47%
4	Renting	33	2.5%
	Total	**969**	**100%**

SOURCE: FIELD WORK 2005

APPENDIX VII: REASON FOR CHANGE/TRANSFORMATION IN SAMPLE HOUSE

S/No	**Items**	**Number**	**Percentage**
1.	Marriage	170	26.5%
2.	Inheritance	290	30.0%
3.	Wealth	363	37.5%
4.	Rain Drainage	102	10.00%
5.	Road construction	44	5%
	Total	**969**	**100%**

SOURCE: FIELD WORK 2005

Table shows that greater percentage in wealth causes changes/transformation of these houses may be attributed to economic status:

APPENDIX VIII: GENERAL SERVICE FACILITIES IN SURVEYED WARDS

S/No	**Items**	**Sample**	**Percentage**
1.	Portable water	728	80%
2.	Electricity	758	82.5%
3.	Drainage	758	82.5%
4.	Waste Disposal	690	65%
		969	**100%**

SOURCE: FIELD WORK 2005

Table shows availability of public amenities in item (1) the remaining 20% patronizes well water. (2) The remaining 7.5 experiences disconnection.

APPENDIX IX: POSSIBLITY OF EXPANSION IN SURVEYED HOUSES.

Item	Sample	Percentage
Impossible	509	52.5%
Possible	194	18.75%
Unspecified	266	27.50%
Total	**969**	**100%**

Table indicates greater percentage have no possibility of expansion this can be attributed to inadequacy of land.

APPENDIX X: POPULATION DENSITY IN SURVEYED SAMPLES

S/No.	**Item**	**Sample**	**Percentage**
1.	Densely populated	460	47.5%
2.	Moderate populated	254	26.25%
3.	Scarcely populated	96	10%
4.	Unspecified	158	16.26%
	Total	**969**	**100%**

APPENDIX XI: CONSTRUCTION MATERIALS USED IN SURVEYED HOUSES

Items	**Sample**	**Percentage**
Trade mud	254	31.2%
Cement brick	96	41.10%
Mud/Brick	158	27.70%
Total	**80**	**100**%

SOURCE: FIELD WORK 2005

Table eleven indicates that greater percentages of samples are built in cement bricks rather than mud; this can be attributed to increase in wealth as established earlier by **shwerdtferger (1982)** still valid.

APPENDIX XII

SAMPLE QUESTIONNAIRE

TRANSFORMATION IN HAUSA TRADITIONAL RESIDENTIAL

ARCHITECTURE (1950-2000)

CASE STUDY OF KANO METROPOLITAN (1950-2005)

Survey of Traditional Family Compound

Part A: Ward Descriptions

1. Location Kano Metropolitan _____ Sheet No._____

2. Local Govt. _____

3. Ward _____

Street_____

4. General Historical Information (Ward).

_____

_____

5. Particular characteristics (Traditional, Modern Contemporary)

_____

_____

_____

_____

6. Public Service/amenities

Water_____ Electricity_____

Drainage_____ Garbage Disposal_____

Economic Activity _____

7. Population_____ Ethnic composition_____

1. APPROPRIATE AREA OF THE WARD _____

1. Plot Layout - Traditional _____Government_____

2. Service/Facilities in the settlement

Schools_____ Hospitals _____ Market _____

Security _____ Roads_____ Drainage _____

Water _____ Electricity _____ Other_____

PART B COMPOUND HOUSE

1. Approximate Area of the Plot or House_____

2. Total number of Rooms _____Total number of residents _____

Average sizes of rooms _____Bedroom_____

Living Room _____ kitchen_____

Courtyard _____ Toilets_____ Entrance Zaure_____

3. Geometric shape of house and rooms

Rectangular _____ Square _____ others _____

4. General Observation

Lighting _____

Ventilation _____

Concept _____

Others _____

Remarks _____

PART C COMPOUND HOUSE

Please tick where appropriate

New construction _____ 100%_____ 50%(year)_____

Material brick _____ MOD _____ both _____

Please state its developments from earliest part, and ending with present part in room part material, and satisfaction or otherwise give detail briefly.

B House from when it was initially constructed _____

i. Initial construction (year) _____

ii. First renovation (year) _____

iii. Second renovation (year) _____

iv. Last renovation (year)_____

REASONS FOR CHANGES OR RECONSTRUCTION (TRANSFORMATION)

Inheritance	
Rain Drainage	
Marriage	
Wealth/Income	
Change of Ownership	
Road Construction	

3. Preparations of materials (Gradual_____ Instant _____

4. Labour _____ Personal _____ Hired_____

Further comments _____

5. Season _____ Days of the Week _____ Time _____

Duration _____ Period of Maintenance_____

6. Source of Finance _____ Approximate Cost _____

7. Expected years of durability_____

8. Assumed period maintenance (3years)_____ 5 years_____ above_____

9. Total No. of residents _____ Male _____ Female_____

10. Level of education (CH) _____ Western _____

11. Religious/informal _____

12. General Occupation _____

13. Perceived Future of the Compound _____

14. Possibilities of Expansion _____

PART D CONSTRUCTION/MATERIAL

Fill and tick ( ) or write concrete, cement, zinc, Azara, where appropriate

Item	Initial		Present	
	Mud	Bricks	Mud	Bricks
Foundation				
Wall				
Linter				
Door/window				
Floors types				
Roof types				
Plastering				
Decoration				
Amenities/services				
Column/beans				
WATER	WELL	BOREHOLE		PUBLIC

Electricity				
Water Disposal				
Heating				
Kitchen facilities				
Sanitary facilities				

SKETCH/PLAN/ELEVATION OF THE HOUSE INITIAL

SKETCH/PLAN/ELEVATION OF THE HOUSE INITIAL

REMARKS/OBSERVATION

_____

_____

_____

_____

_____

HOUSE/SAMPLE_____

RESEARCH ASS._____ DATE_____

DATA/INFORM Collected is strictly for Ph.D research program.

APPENDIX XIII

DEPARTMENT OF ARCHITECTURE
AHMADU BELLO UNIVERSITY, ZARIA
VICE CHANCELLOR: Professor Shehu U. Abdullahi, DVM, Ph.D (min) FCVSN, FIMC, mni

REF: PG/A/4.1/Vol.1

Date: 16th May, 2005.

TO WHOM IT MAY CONCERN

Dear Sir,

LETTER OF INTRODUCTION

This is to certify that the bearer KABIR, GALI UMAR is a Postgraduate student of this Department. He is conducting Ph.D Architecture Research Programme and at the moment collecting data relevant to the subject to be used for purely Academic Purpose.

I will be very grateful if you could assist him in this regard.

Thank you very much.

Yours faithfully,

HEAD, DEPT. OF ARCHITECTURE
Faculty of Environmental Design
A. B. U. Zaria, Nigeria.

Arc. Mas'ud Abdulkarim.
HEAD OF DEPARTMENT.

FACULTY OF ENVIRONMENTAL DESIGN
DEPARTMENT OF ARCHITECTURE
Head: Arc. Mas'ud Abdulkarim, mnia

Telephone

APPENDIX XIV

P.HD ARCHITECTURE RESEARCH PROGRbAMME

FIELD WORK TIME TABLE KANO METROPOLITAN 2005

S/N	LOCAL GOVERNMENT	WARDS	DATE
1.	Dala	Gwammaja, Dala, Koki, Madabo, K/Mazugal etc.	Mon-Thur 26-29 September
2.	Fagge	Fagge, Brigade Gwagwarwa Jabba etc.	Mon-Thur 12-15 September
3.	Gwale	Hausawa, Dorayi, Galadanchi, Diso, Chiranchi Dandago, Sani Mai magge.	Mon-Thur 29-1 August-September
4.	Kumbotso	Kumbotso, Naibawa, Sheka Jaen etc.	Mon-Thur 3-6 October
5.	Municipal	Yakasai, Jakara, Kabara, Kurawa, Sharada Estate, K/Mata, Zango, Wudilawa, Kofar Naisa.	Mon-Thur 19-22 September
6.	Nassarawa	Yankaba, Badawa, dakata, Kawaji etc.	Mon-Thur 5-8 September
7.	Tarauni	Naibawa, Tarauni, Gyadi-Gyadi, Hausawa, Hotoro, Giginyu, Unguwa Uku.	Mon-Thur 22-25 August
8.	Ungogo	Kurna, Rijiya Lemo, Rijiya Zaki, Ungogo.	15th and 16th October or 18th and 19th October 2005
9.	Royal Houses	Gidan Waziri, Madaki, Ciroma, Galadima, and two others.	15th and 16th October or 18th and 19th October 2005.

APPENDIX XV

FIELD WORK ASSISTANTS SEPTEMBER/OCTOBER 2006

TARAUNI LOCAL GOVERNMENT

1. Sunusi Ado
2. Hauwa Garba
3. Hauwa Ahmed Bello
4. Hadiza Abdullahi
5. Hauwa Adamu

GWALE LOCAL GOVERNMENT

6. Farida Ahmad
7. Madyan M. Inuwa
8. Marwa Hamza
9. Wada Aminu
10. Bashir Abba (HOD Works)

FAGGE LOCAL GOVERNMENT

11. Talatu Umar Fagge
12. Sadiya Ibrahim
13. Aishatu Musa
14. Abida Umar
15. Sunusi Ali Fagge

MUNICIPAL

16. Sa'adatu Hussani Waziri
17. Asmau Akilu
18. Hadiza Yushau
19. Rukayya Mohd. K
20. Saidu Magaji

DALA LOCAL GOVERNMENT

21. Rabiat Mohd.
22. Ramtah Saleh Yusuf
23. Fatima Maina
24. Hadiza Nalele K.
25. Umar J. Sule

NASSARAWA LOCAL GOVERNMENT

26. Aisha Suwaib
27. Zolai Aliyu
28. Jummai Sulaiman
29. Zulai Hassan
30. Iliyasu Mohd.

UNGOGO LOCAL GOVERNMENT

31. Hauwa U. Auwal
32. Nasibah Abdullahi
33. Hauwa Bashir
34. Sunusi Dahiru
35. Mohd Shafi Ali

KUMBOTSO LOCAL GOVERNMENT

36. Binta Abdulkarim
37. Halima S. Ismail
38. Mardiya Y. Inusa
39. Bilkisu R. Rabiu
40. Umar Inuwa

APPENDIX XVI

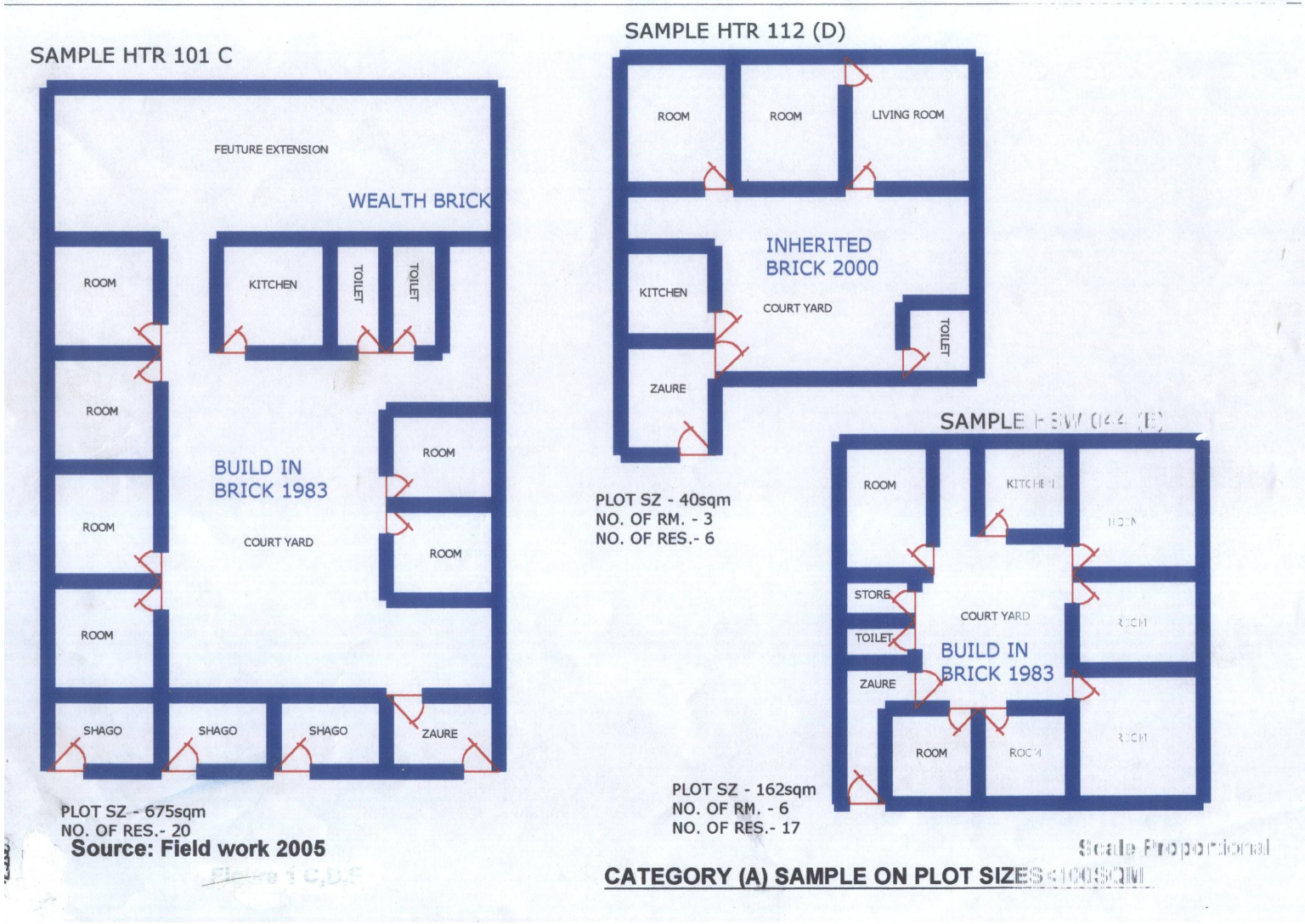
PLOT - 56.25
N RM - 3-2.7sqm
N RES - 10,5.6sqm

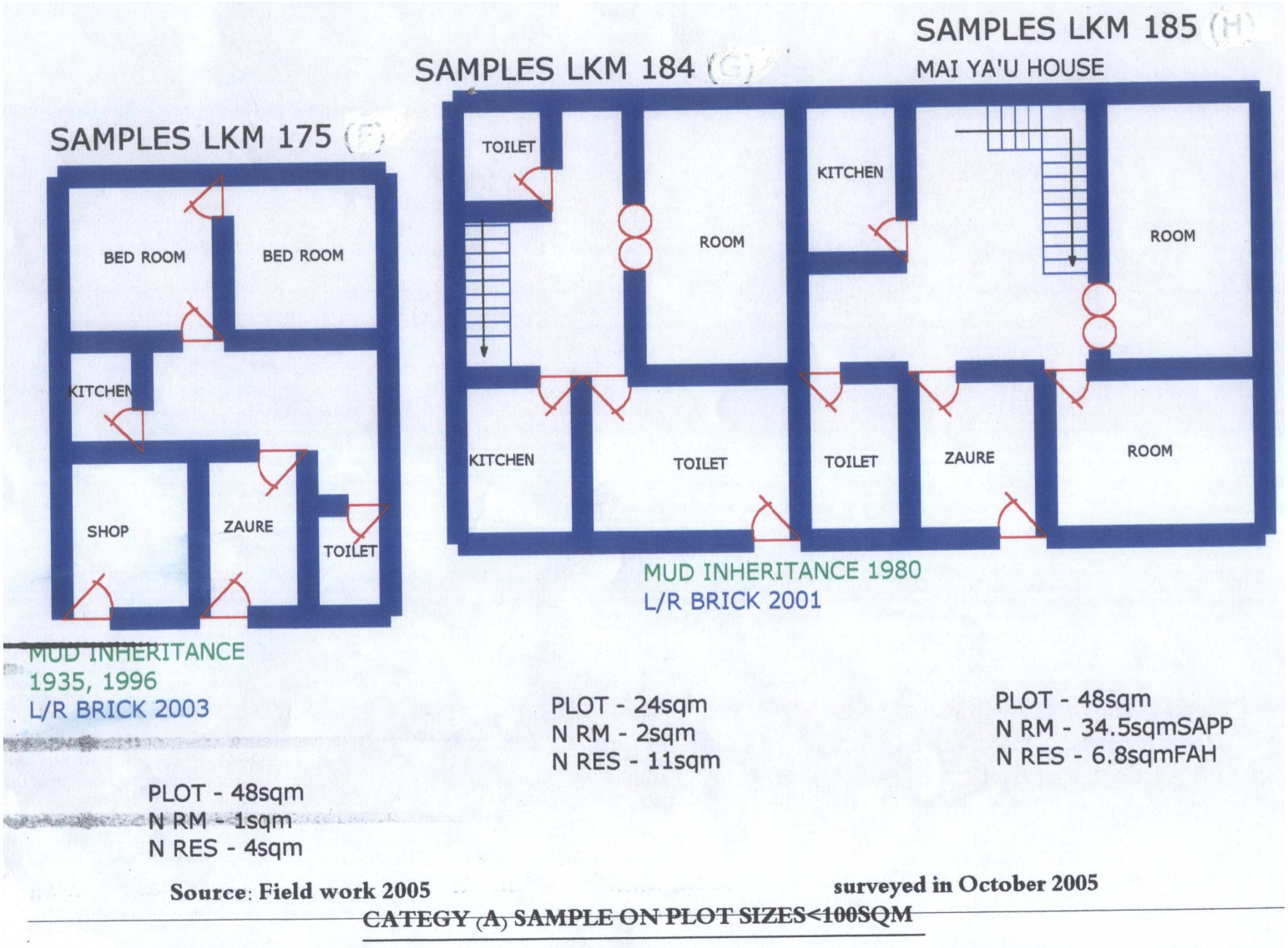
PLOT - 225.0sqm
N RM - 5-15sqm
N RES - 3.75sqm

PLOT - 56.25
N RM - 3sqm
N RES - sqm

Source: Field work 2005 **surveyed in October 2005**

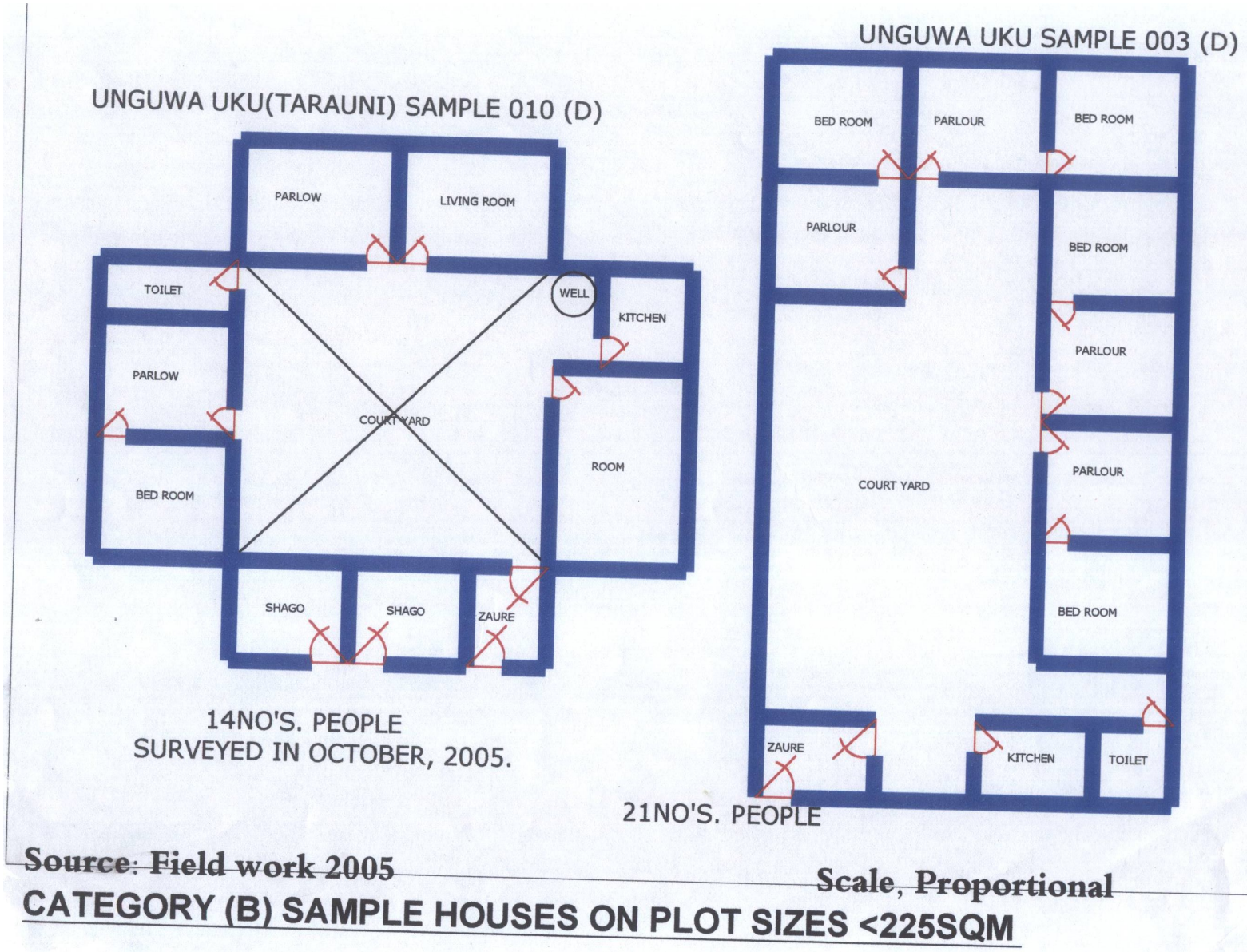
CATEGORY (A) SAMPLE ON PLOT SIZES <100SQM


SAMPLE HTR 101 C
FEUTURE EXTENSION
WEALTH BRICK
ROOM
KITCHEN
TOILET
TOILET
ROOM
ROOM
BUILD IN
BRICK 1983
ROOM
ROOM
COURT YARD
ROOM
ROOM
SHAGO
SHAGO
SHAGO
ZAURE
PLOT SZ - 675sqm
NO. OF RES.- 20
Source: Field work 2005
SAMPLE HTR 112 (D)
ROOM
ROOM
LIVING ROOM
INHERITED
BRICK 2000
KITCHEN
COURT YARD
TOILET
ZAURE
PLOT SZ - 40sqm
NO. OF RM. - 3
NO. OF RES.- 6
ROOM
KITCHEN
STORE
COURT YARD
TOILET
BUILD IN
BRICK 1983
ZAURE
ROOM
ROOM
PLOT SZ - 162sqm
NO. OF RM. - 6
NO. OF RES.- 17
CATEGORY (A) SAMPLE ON PLOT SIZES



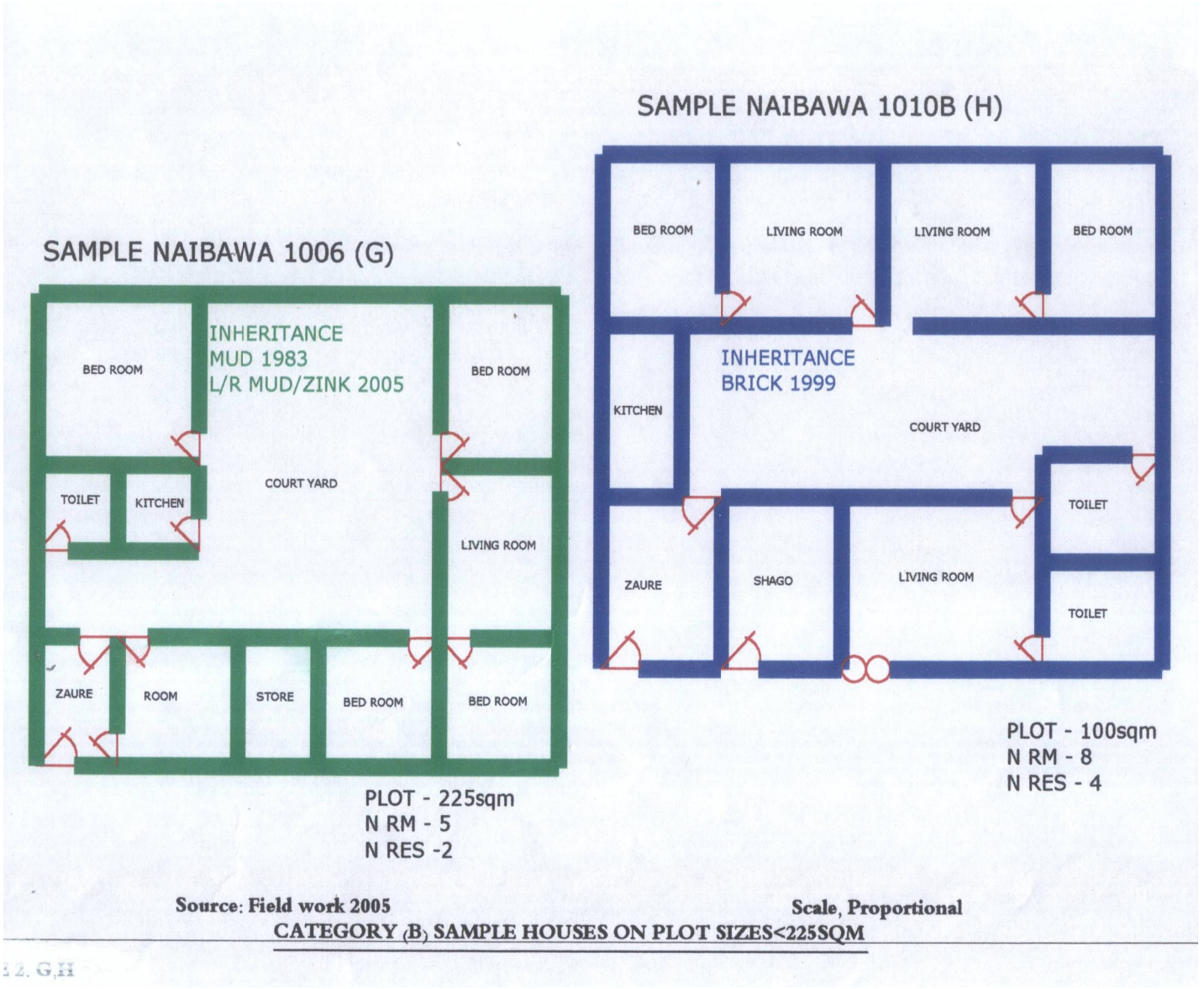
Source: Field work 2005 **surveyed in October 2005**

~~CATEGY (A) SAMPLE ON PLOT SIZES<100SQM~~

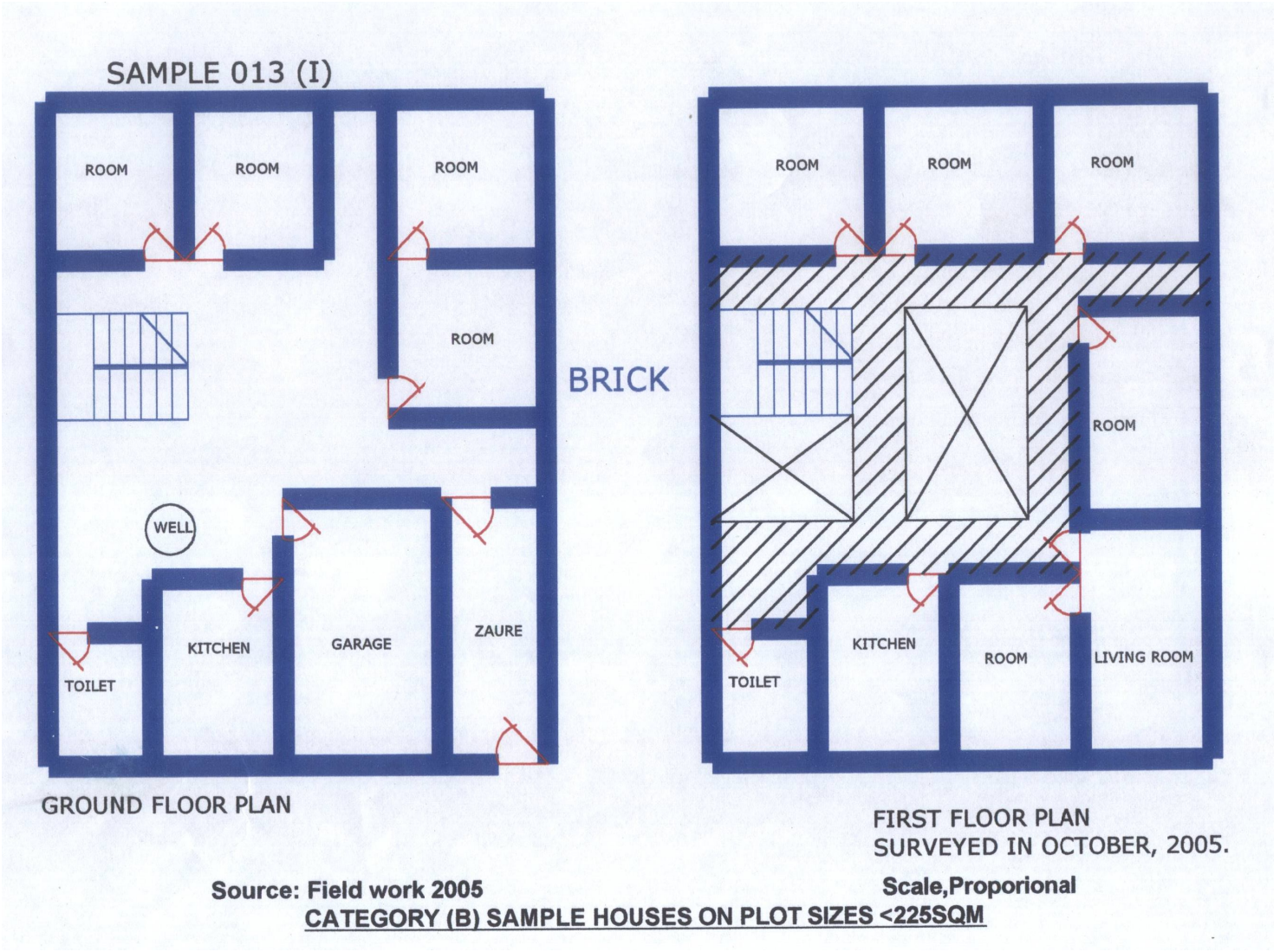


Source: Field work 2005 **Scale, Proportional**

CATEGORY (B) SAMPLE HOUSES ON PLOT SIZES <225SQM

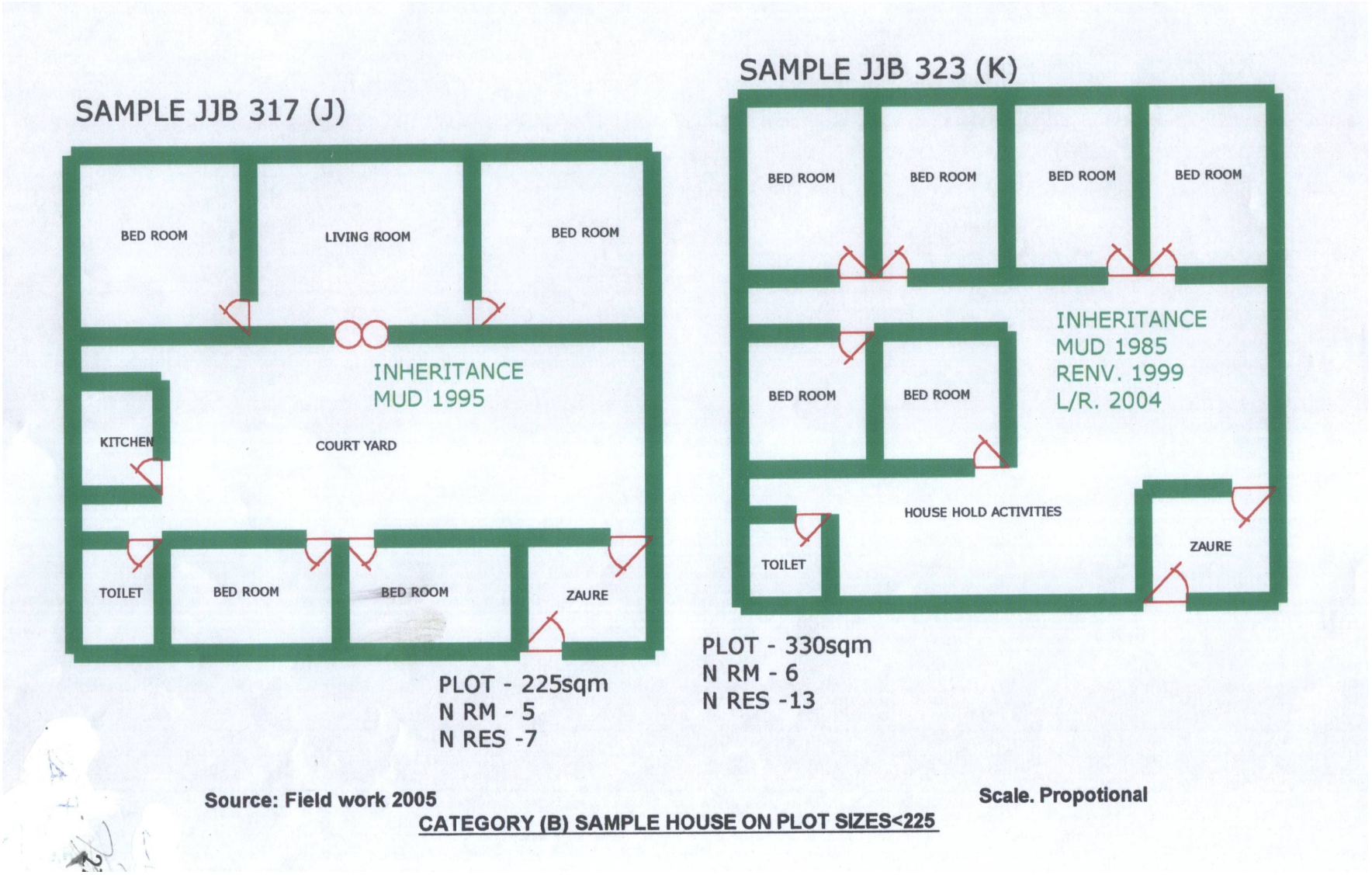

SAMPLE NAIBAWA 1010B (H)
BED ROOM
LIVING ROOM
LIVING ROOM
BED ROOM
INHERITANCE
BRICK 1999
KITCHEN
COURT YARD
TOILET
ZAURE
SHAGO
LIVING ROOM
TOILET
PLOT - 100sqm
N RM - 8
N RES - 4
SAMPLE NAIBAWA 1006 (G)
INHERITANCE
MUD 1983
L/R MUD/ZINK 2005
BED ROOM
BED ROOM
TOILET
KITCHEN
COURT YARD
LIVING ROOM
ZAURE
ROOM
STORE
BED ROOM
BED ROOM
PLOT - 225sqm
N RM - 5
N RES -2
Source: Field work 2005
Scale, Proportional
CATEGORY (B) SAMPLE HOUSES ON PLOT SIZES<225SQM

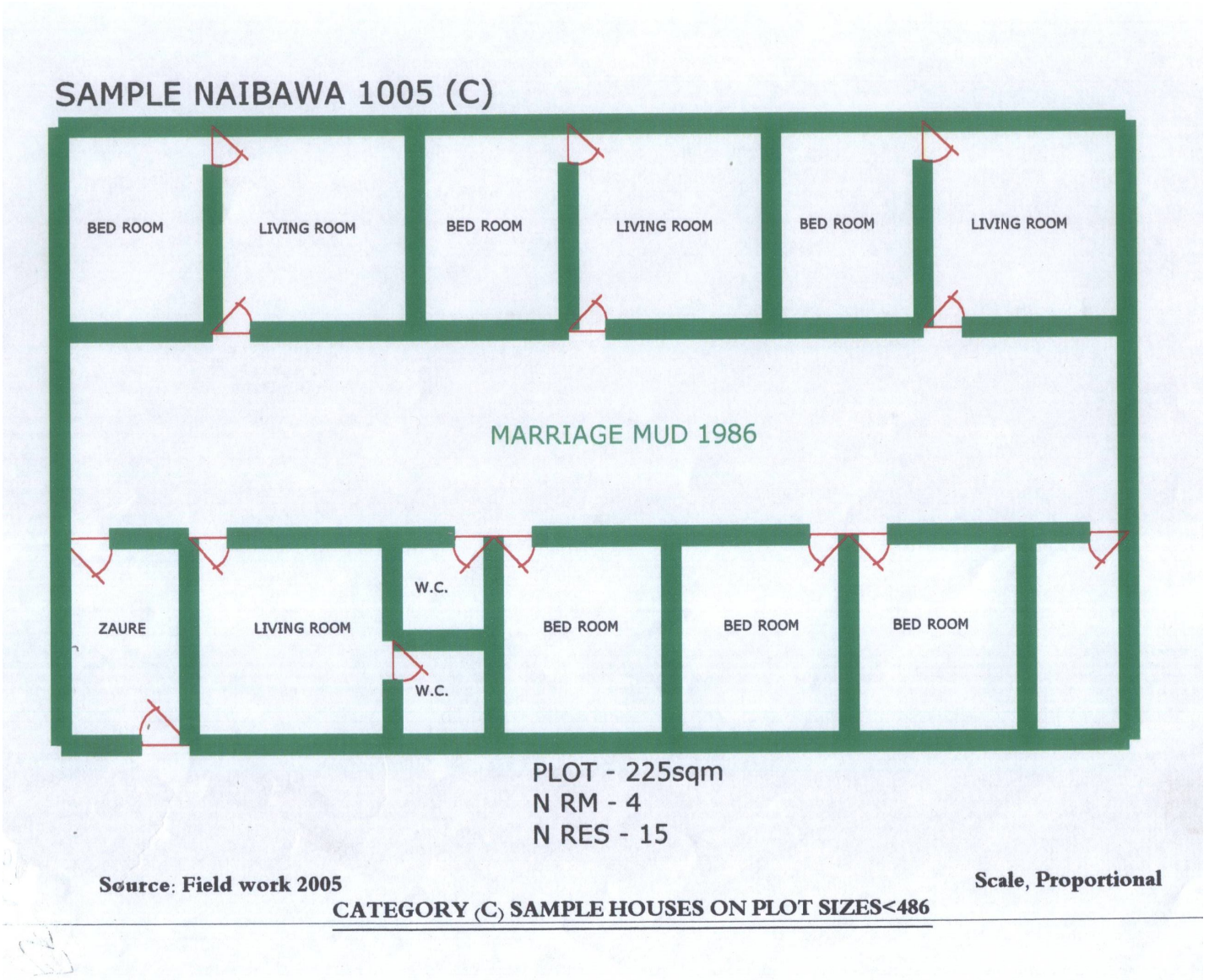
12. G,H

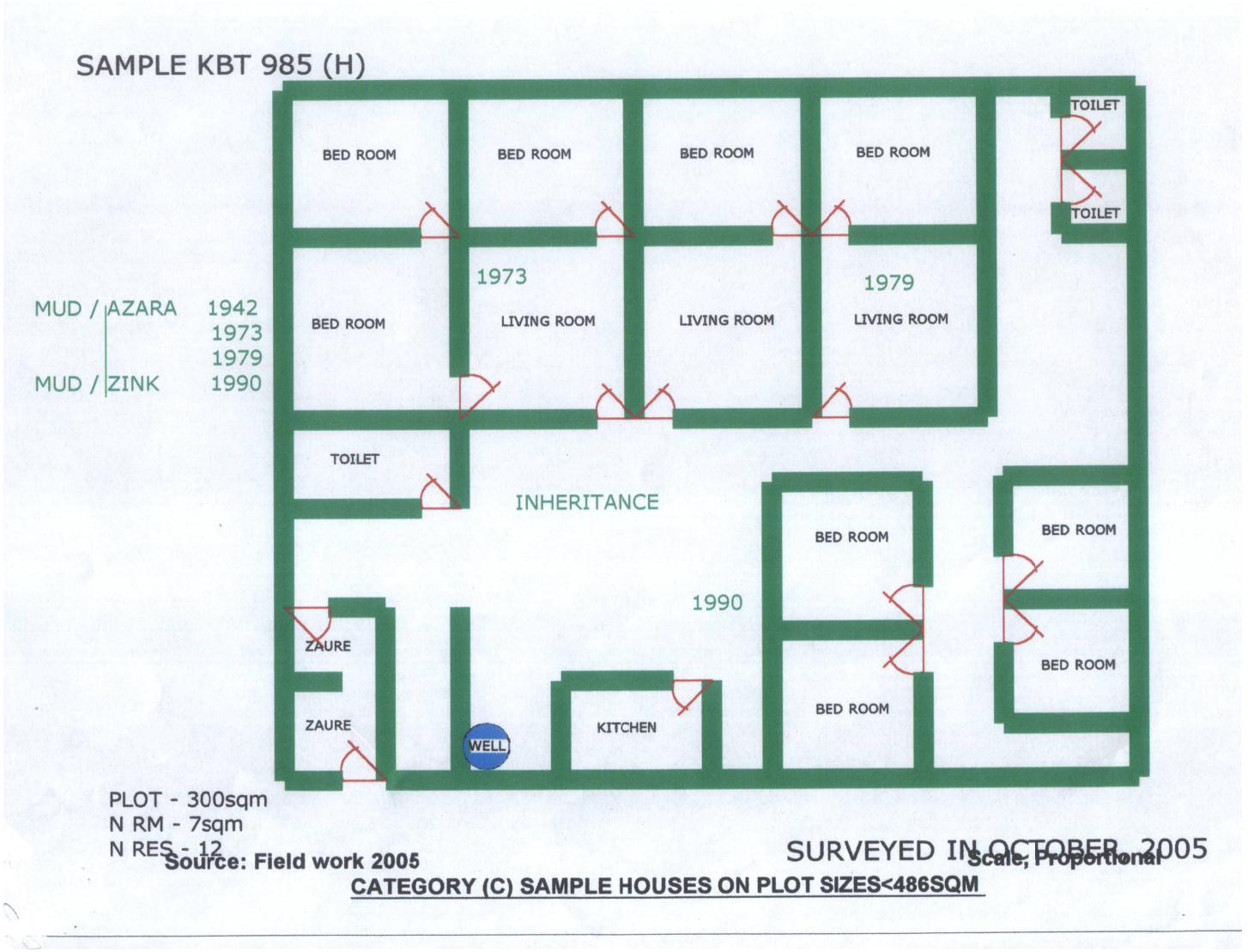


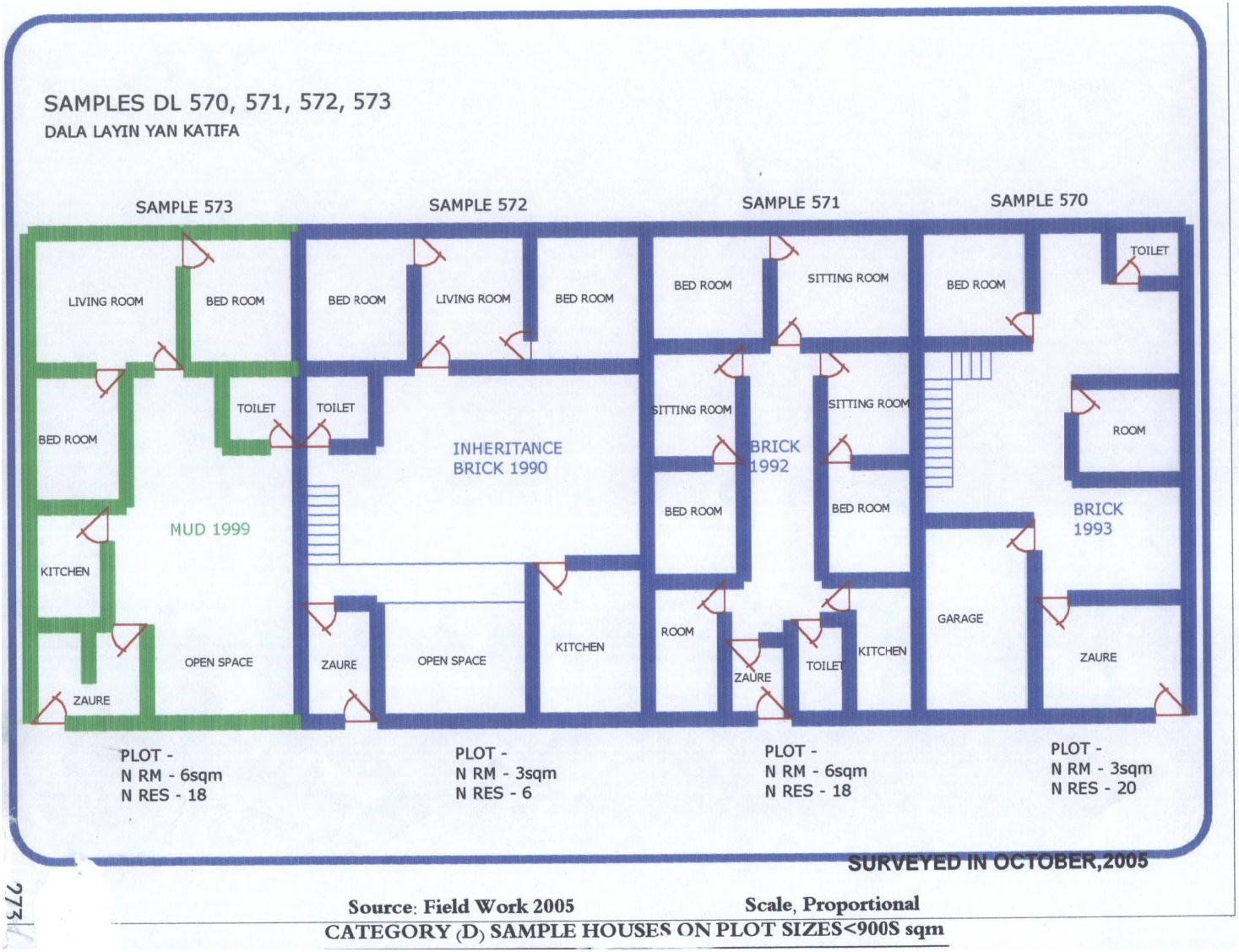
Source: Field work 2005 **Scale,Proporional**

CATEGORY (B) SAMPLE HOUSES ON PLOT SIZES <225SQM


SAMPLE JJB 317 (J)
BED ROOM
LIVING ROOM
BED ROOM
INHERITANCE
MUD 1995
KITCHEN
COURT YARD
TOILET
BED ROOM
BED ROOM
ZAURE
PLOT - 225sqm
N RM - 5
N RES -7
SAMPLE JJB 323 (K)
BED ROOM
BED ROOM
BED ROOM
BED ROOM
INHERITANCE
MUD 1985
RENV. 1999
L/R. 2004
BED ROOM
BED ROOM
HOUSE HOLD ACTIVITIES
TOILET
ZAURE
PLOT - 330sqm
N RM - 6
N RES -13
Source: Field work 2005
Scale. Propotional
CATEGORY (B) SAMPLE HOUSE ON PLOT SIZES<225

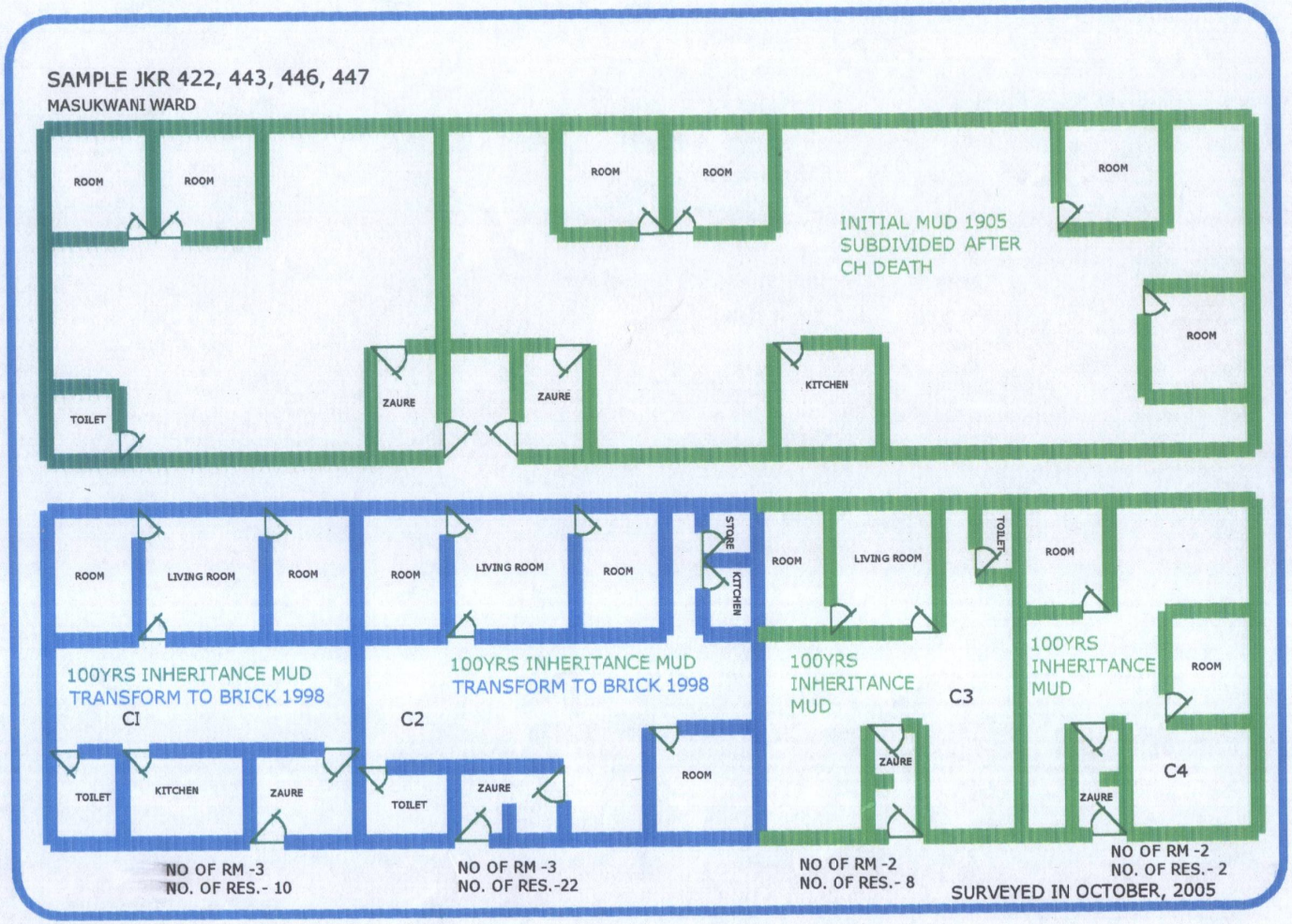

SAMPLE NAIBAWA 1005 (C)
BED ROOM
LIVING ROOM
BED ROOM
LIVING ROOM
BED ROOM
LIVING ROOM
MARRIAGE MUD 1986
ZAURE
LIVING ROOM
W.C.
W.C.
BED ROOM
BED ROOM
BED ROOM
PLOT - 225sqm
N RM - 4
N RES - 15
Source: Field work 2005
Scale, Proportional
CATEGORY (C) SAMPLE HOUSES ON PLOT SIZES<486


SAMPLE KBT 985 (H)
MUD / AZARA 1942
1973
1979
MUD / ZINK 1990
BED ROOM
BED ROOM
BED ROOM
BED ROOM
TOILET
TOILET
BED ROOM
1973
LIVING ROOM
LIVING ROOM
1979
LIVING ROOM
TOILET
INHERITANCE
BED ROOM
BED ROOM
1990
ZAURE
ZAURE
WELL
KITCHEN
BED ROOM
BED ROOM
PLOT - 300sqm
N RM - 7sqm
N RES - 12
Source: Field work 2005
SURVEYED IN OCTOBER, 2005
Scale, Proportional
CATEGORY (C) SAMPLE HOUSES ON PLOT SIZES<486SQM



Source: Field Work 2005 Scale, Proportional

CATEGORY (D) SAMPLE HOUSES ON PLOT SIZES<900S sqm

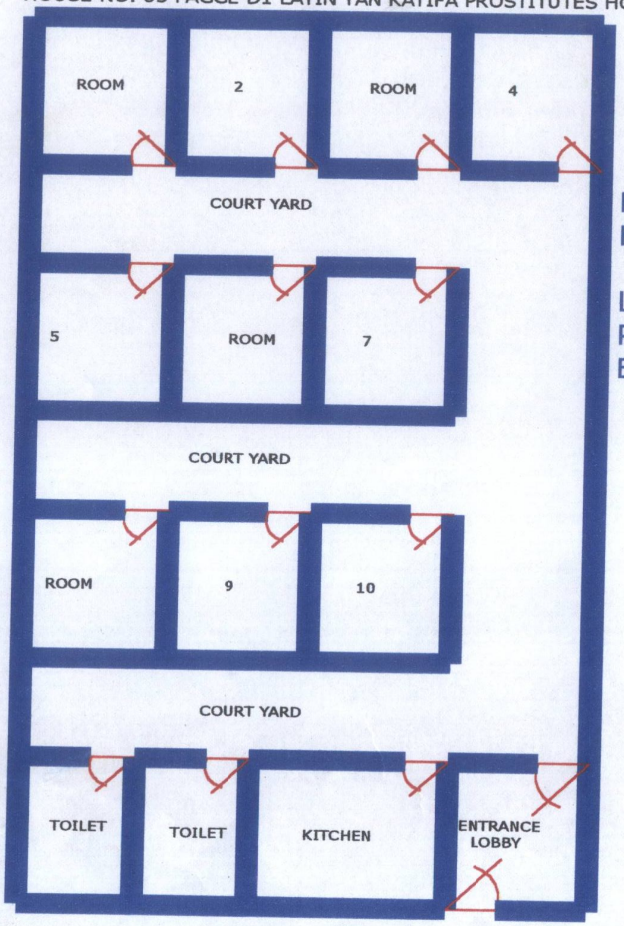


CATEGORY (D) SAMPLES ON PLOT SIZE< 900SQM

Scale, proposional

SAMPLE FGE 246 (I)

HOUSE NO. 65 FAGGE D1 LAYIN YAN KATIFA PROSTITUTES HOUSE FMR



MUD - 1965
FIRST RENOVATION 2001

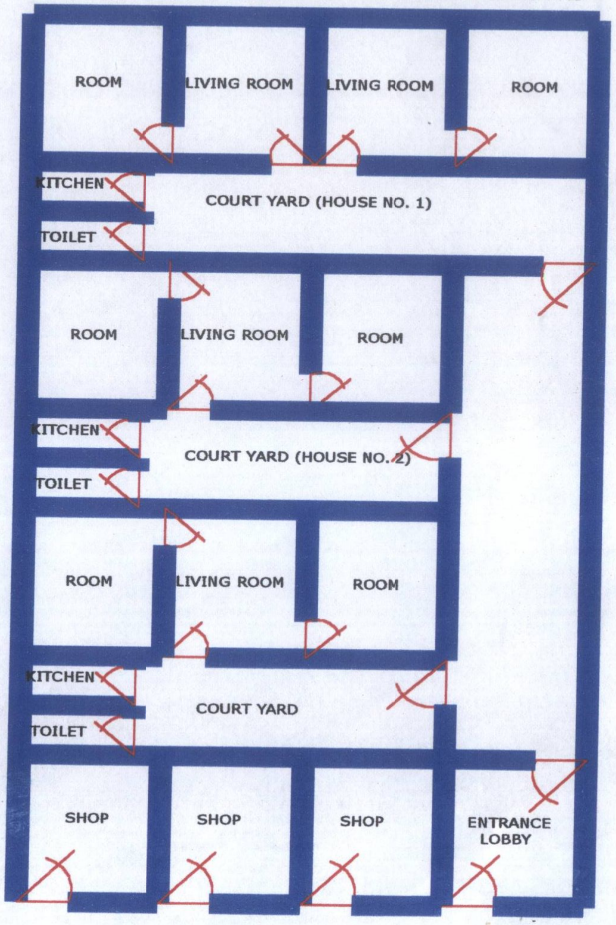
LAST RENUVATION 2004
PRESENTLY OCCUPIED
BY 3 COMPOUND FAMILIES

PLOT SIZE: 112.5
NO. OF ROOMS 10
SURVEYDE OCTOBER 2005

Source: Field work 2005

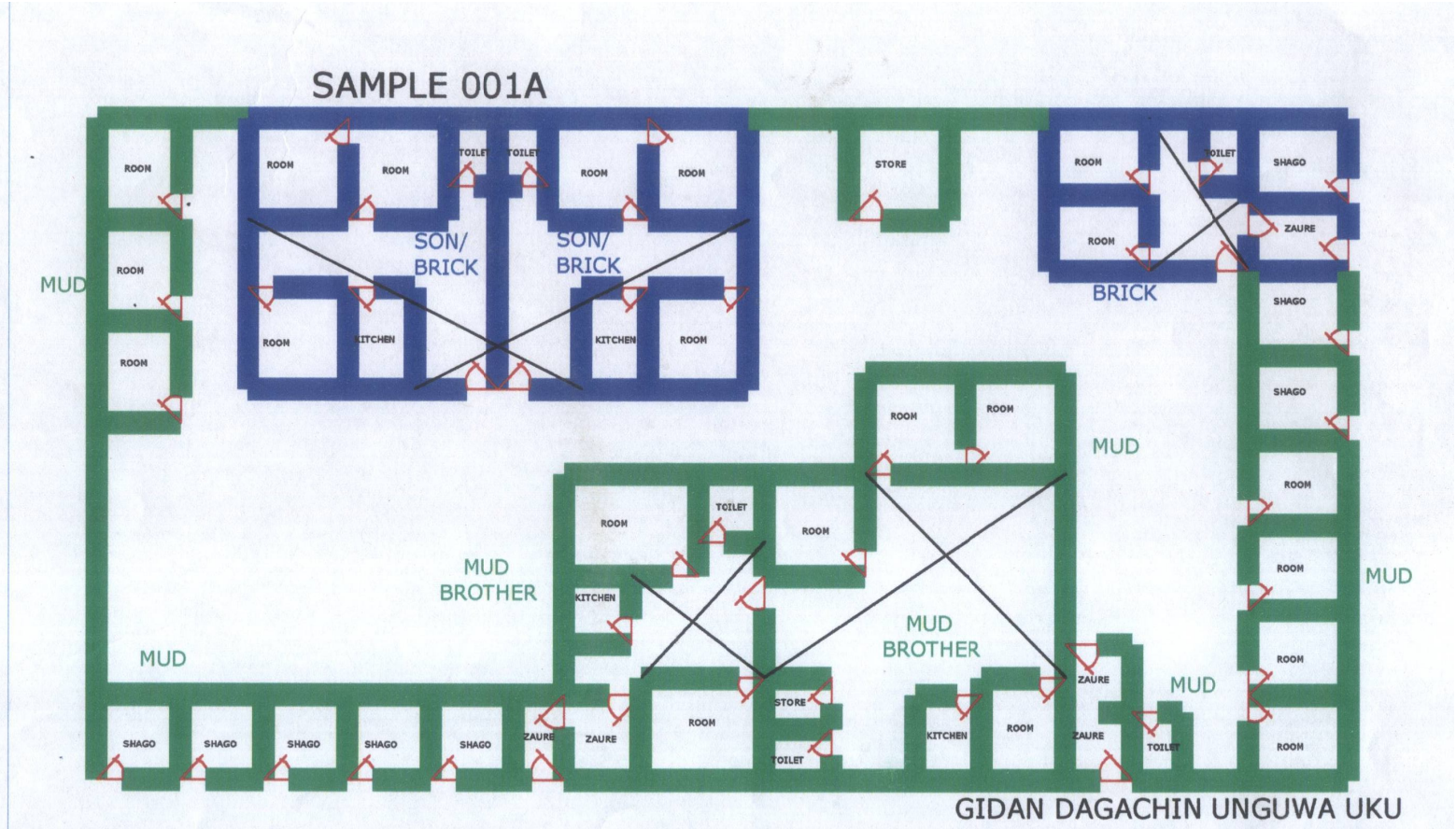
SAMPLE FGE 246 (J)

HOUSE NO. 65 FAGGE D1 LAYIN YAN KATIFA FMR PRT. HS



Scale, Proportional

CATEGORY D SAMPLE HOUSES ON PLOT SIZES<486



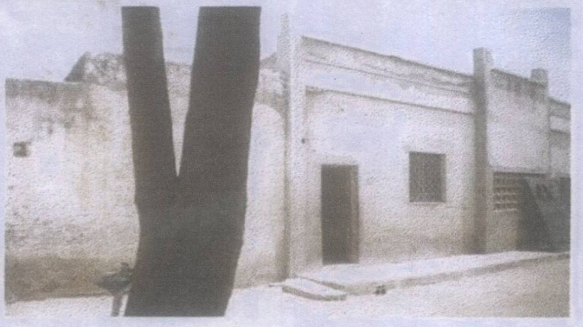
Source: Field work 2005 **Scale, Proportional**

CATEGORY (C) SAMPLE HOUSES ON PLOT SIZES<486SQM

APPENDIX XVII







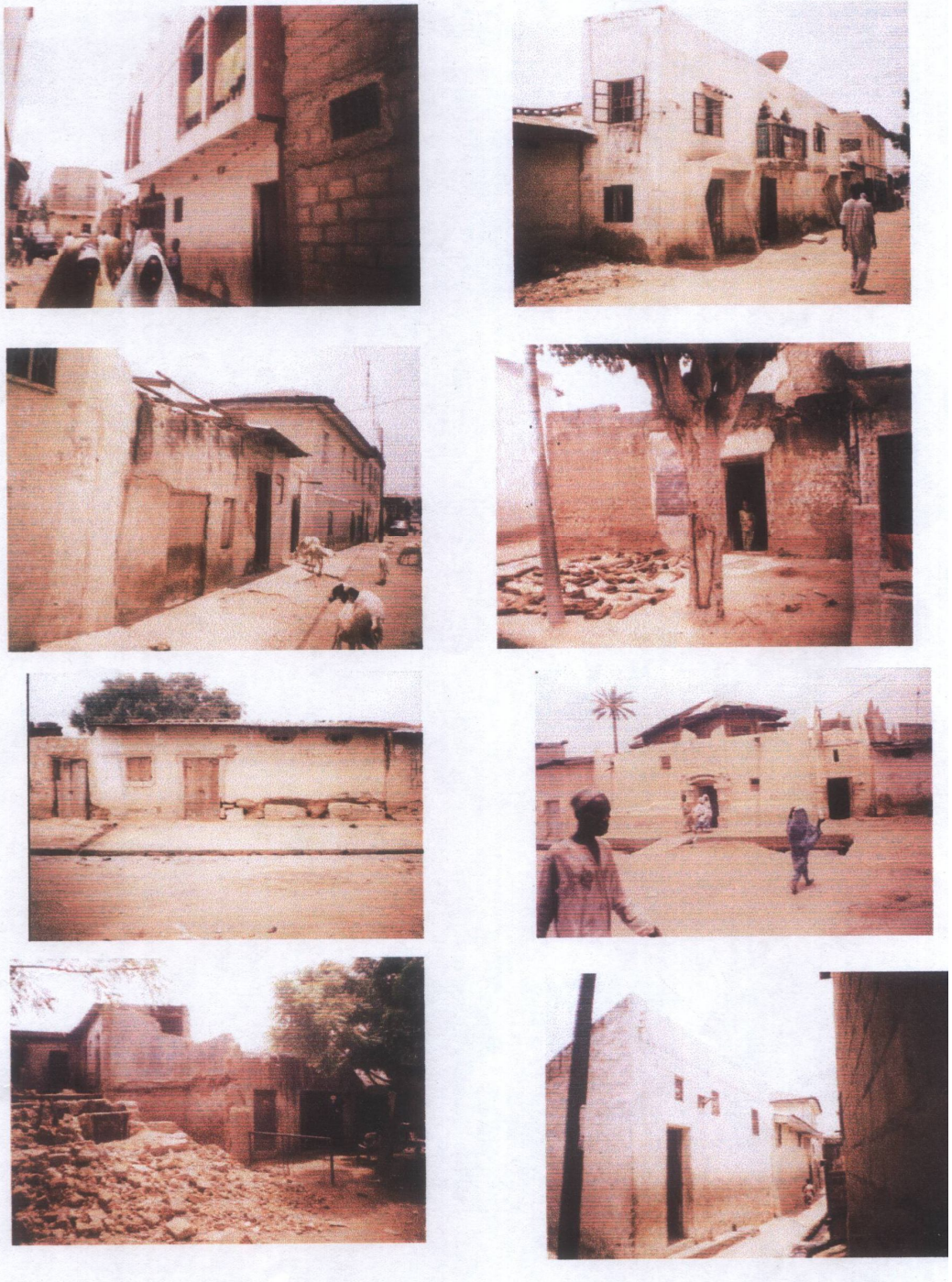






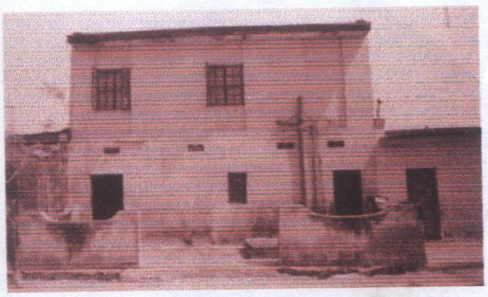


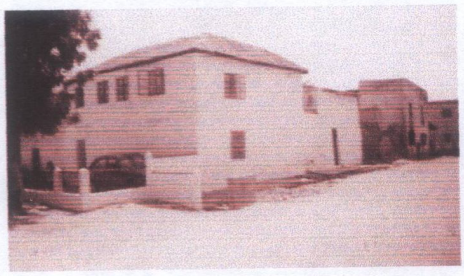


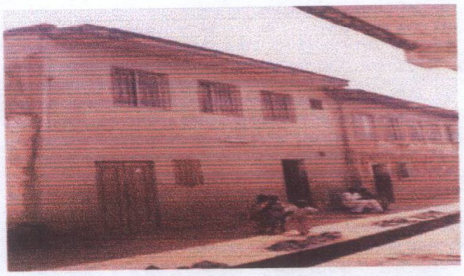


Contemporary Buildings in mixed construction









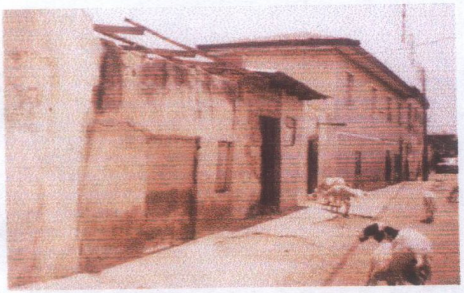
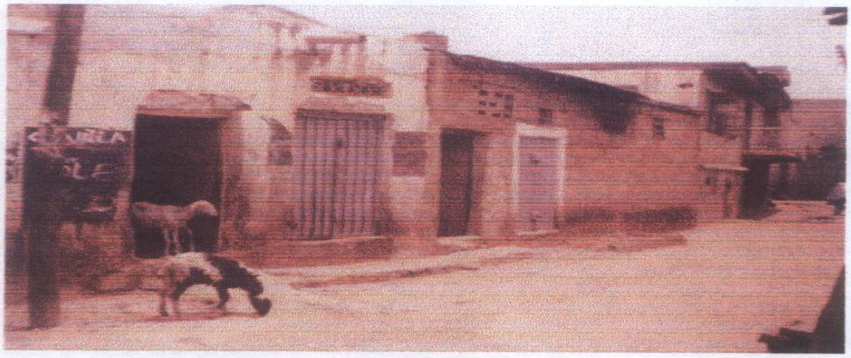
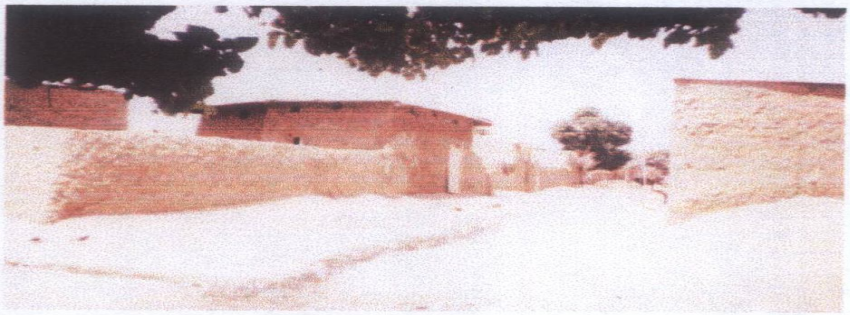




Plate 5.27 **Contemporary in Storey Forms**

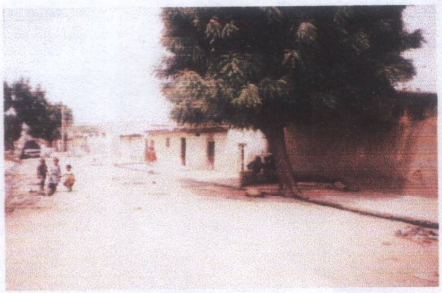
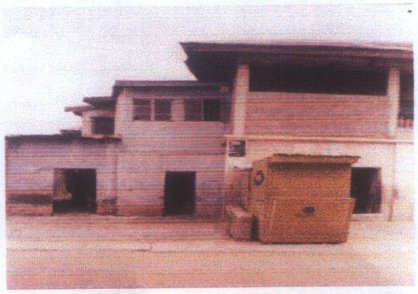


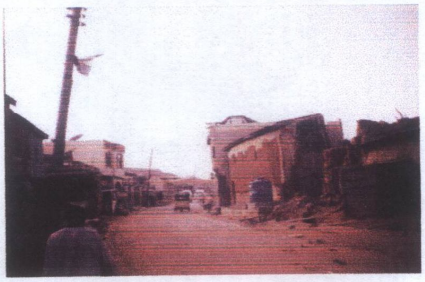
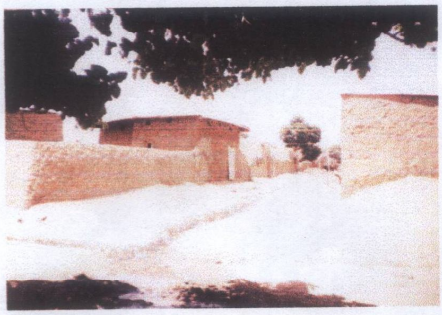


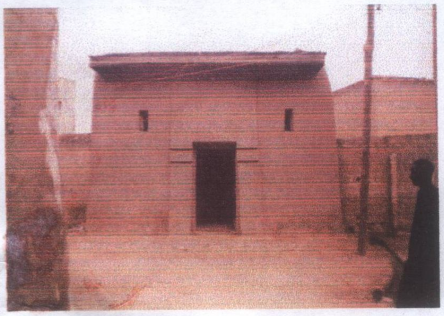
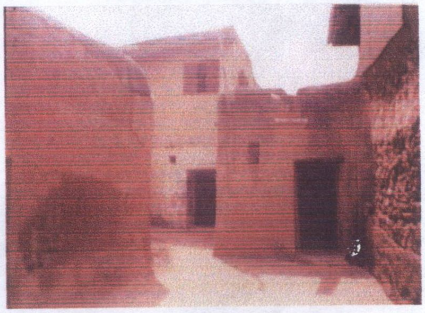




Contemporary Elevations in Exposed Ro

Contemporary Elevations in mixed construction