

# Analysing The Impact Of Culture On The Spatial Layout Of Residential Buildings. An Evaluation Of Selected Houses In Yelwa, Bauchi State

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**Abstract:** *The layout of residential buildings exhibits a community's cultural values, beliefs, and customs. Architecture and cultural beliefs have long been known to be closely related. However, a knowledge gap exists on how culture and spatial organisation interact in domestic buildings. The paper examines how culture has influenced the layout of residential buildings in Yelwa, Bauchi State. The study will concentrate on the comparative study of selected residences in the area, looking at how cultural practices and beliefs have an impact on the architecture and layout of these structures. To find socio-spatial designs within the cultures of the study area, it was intended to investigate the socio-cultural effects of privacy on spatial hierarchy and organisation. The study uses qualitative and quantitative research methodology that includes field observations, homeowner interviews, architectural plan analysis, surveys, and activity mapping. The research shows how cultural elements, including social structure, way of life, and religious beliefs, have an impact on how spaces are organized, how rooms are assigned, and how a house is built overall. The study offers insights for architects, urban planners, and politicians involved in the design and development of residential spaces in Bauchi and similar parts of Nigeria, as well as knowledge of how culture impacts the built environment.*

**Keywords:** Comparative Analysis, Culture, Residential Buildings Spatial Layout, Yelwa

## 1. Introduction

The arrangement of spaces and the design of homes are just two examples of how culture profoundly influences many facets of human existence. Several researches have shown that cultural norms, beliefs, and traditions have an impact on how residential structures are arranged spatially, which reflects the distinctive identity and way of life of a given community. Studies have shown that culture is a complicated and multidimensional phenomenon that has a significant influence on how we conduct our lives; (Jacoby et al., 2022; Ege & Budke, 2022). This still holds when it comes to how our homes are laid up spatially. One's living arrangements are a reflection of our cultural values, precepts, and customs. Makinde (2015) and Adebara (2022), in their research, agreed that the spatial arrangement and design of residential buildings are deeply

influenced by the cultural background of the inhabitants. According to the study, culture comprises many different elements, such as social structure, values, beliefs, and traditions, all of which have an impact on how people interact with their living environments. Also, Alhusban *et al.* (2018) studied the influence of cultural ideas on the creation and design of spatial organisations, space hierarchy, and privacy of detached homes and apartments. The research discovered that cultural values significantly influence residential building design. The study also discovered that the social structure of the society in which residential structures are located has an impact on their design.

In her essay, Jadhav (2022) noted that works on architecture typically claim that the spatial organisation of a structured environment is a crucial reflection of social and cultural values and traditions. According to the research, different cultures consequently express themselves through

different spatial conceptions. The research further posited that cultural information and knowledge of

the physical environment has an impact on how cities are laid out as a whole as well as on particular building designs or clusters

of buildings. This is because architecture possesses the quality of being a culture-maker, an indication of the civilisation it represents since it develops per the needs of the socio-cultural structure and technological achievements of the era it belongs to. Furthermore, it seeks to depict a particular era's culture through spatial arrangements made with objects and technical advancements from that era. In other words, a community's history, defining traits, the outcomes of numerous social processes, and the theory of an individual or a community are just a few fundamental ideas that can explain culture.

This comparative study focuses on examining how culture has influenced the spatial arrangement of residential structures in Yelwa, a town in Bauchi State, Nigeria. The study hopes to learn more about how cultural influences impact the architectural design and spatial distribution of residential structures by looking at a few of the homes in this area. As a contribution to the larger area of architectural and cultural studies, this research aims to offer insight into the interaction between culture and spatial arrangement. This study intends to gain important insights into the dynamic interaction between cultural values and architectural design by examining the influence of culture on the spatial organisation of residential buildings in Yelwa.

According to Chowdhury (2009), a family's and an individual's life are lived inside of a house. Following up on this, the study by Alhusban et al. (2018) on the link between cultural identity and the epistemology of architecture found a clear and significant correlation between culture and spatial organisation. The spatial organisation of residential buildings is influenced by various factors such as culture, social norms, and religious beliefs. Culture plays a significant role in shaping the way people use space and interact with each other. However, there is a lack of research on how cultural aspects affect the spatial organisation of residential buildings in Yelwa, Bauchi State. There have not been many studies on how culture affects the spatial organisation of residential buildings in Nigeria. This study aims to fill this gap by conducting a comparative analysis of selected houses to identify how cultural aspects such as gender roles

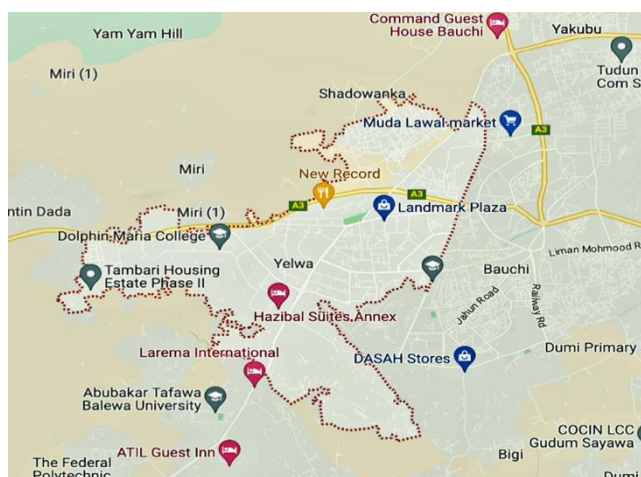
and social norms affect the spatial organisation of residential buildings. This study aims to fill this gap by conducting a comparative analysis of a few selected residences in Yelwa, Bauchi State.

This study aims to examine the impact of cultural factors on the spatial organisation of residential buildings in Yelwa, Bauchi State. The specific Objectives of the study are: To investigate the cultural and social factors influencing the spatial organisation of residential buildings in Yelwa. To compare and contrast the spatial layouts and organisation of selected houses in Yelwa based on cultural influences. To examine the relationship between cultural factors and the functionality and design of residential spaces. To identify the challenges and opportunities of integrating cultural considerations in the spatial organisation of residential buildings. To propose recommendations for enhancing the cultural sustainability of residential buildings in Yelwa.

This study focuses on the impact of culture on the spatial organisation of residential buildings in Yelwa, Bauchi State, Nigeria. By conducting a comparative analysis of selected houses, this research aims to explore the relationship between culture and the design of residential spaces. This study is significant for a variety of reasons. It will primarily help to better understand the cultural aspects that affect how residential buildings are arranged in Yelwa. It will advance knowledge of how culture affects the spatial layout of residential structures, particularly in the context of Yelwa, Bauchi State. The research findings can help architects, urban planners, and policymakers create housing solutions that respect regional cultural norms and values. By including cultural considerations in the design and planning of residential structures, it can encourage the preservation of cultural identities and develop a sense of community. The study can serve as a springboard for additional research and add to the body of knowledge on how culture and architecture interact, particularly in Nigerian and African contexts. These suggestions will aid in ensuring that upcoming structures better meet the needs of the community and exhibit the distinct cultures that subsist within the study area.

The Study Area: Yelwa is a town in Bauchi City, Bauchi State, in the North of Nigeria. Its coordinates are 10° 11'70" North and 9° 44'70" East. It is located about 15 kilometres (9.3 mi) from the state capital, Bauchi. Yelwa is a predominantly Muslim town. The major ethnic groups in the town are the Hausa, Fulani, and Seyawas. There are, however, smaller groups like Tangales, Idomas, Yorubas, and Igbos. Each of these ethnic groups has a unique culture,

which is reflected in how their residential structures are arranged spatially. The town is known for its traditional Hausa architecture, including its use of mud bricks in residential houses and mosques. Yelwa is a major commercial centre in the area. The town has a fairly large market where a variety of goods are sold, including food, clothing, and household items. Yelwa is also home to several educational institutions, including ATBU, the School of Agriculture, primary schools, secondary schools, and a technical college as shown in Figure 1.



**Figure 1:** Map of Yelwa, Bauchi State.  
Source: Google Maps (2023)

### 1.1 Theoretical Framework.

In understanding the independent variable, which is culture and its effect on the dependent variable identified as the spatial organisation of residential buildings, the theory of cultural determinism by Muchemwa et al. (2014), contends that culture is the main predictor of human behaviour, serves as the theoretical foundation for this study. This implies that our cultural views and values influence how we conduct our lives, including how we arrange our homes. One of the earlier studies that investigated the impact of culture on the spatial organisation of residential buildings was conducted by Dursun and Saglamer (2003). This study examined the spatial organisation of traditional Turkish homes. The researchers found that these homes were organized in a way that reflected the cultural values of Turkish society, such as the importance of family and the concept of privacy.

The study by Alhassan et al. (2018) also clearly demonstrates how Jordan's cultural values, such as the value of privacy and the extended family, have had an impact on the spatial organisation of dwellings in Jordan. Similarly, a study by Haraty et al. (2019) found that the spatial organisation of houses in Iraq is influenced by the country's cultural values, such as the importance of hospitality and the role of women in society. Cultural determinism theory suggests that culture plays a significant role in shaping various aspects of society, including the spatial organisation of residential buildings. The design, architecture, and placement of these buildings are influenced by cultural variables, which can be better understood using the cultural determinism theory. Nigeria is used as a case study in the study by Ikudayisi & Odeyale (2021) to examine how culture impacts architecture in Africa. The study looked at diverse traditional architectural achievements throughout Africa and revealed the loss of cultural identity as well as the tenuous relationship between traditional and contemporary architecture. Another study by Kazeem et al. (2021), "Cultural Influences on Traditional and Modern Architecture in Ijebu-Ode," explores how technology, available materials, economy, culture, and other factors affect how people live and have a big impact on the kinds of buildings they inhabit and spaces they create. These studies suggest that culture can have a significant impact on the spatial organisation of residential buildings. However, more research is needed to understand the specific ways in which culture influences the spatial organisation of buildings in Nigeria and different parts of the world.

Various research has established the pattern of Nigerian architecture. It is well documented that it is influenced by a variety of cultural beliefs, including religion, family structure, and social hierarchy (Agboola & Zango, 2014; Lodson et al., 2018; Koko, 2019; Umar et al., 2019). Religion is one of the most important influences on Nigerian architecture. The Hausa people of northern Nigeria, for example, are predominantly Muslim, and their mosques are characterized by their use of mudbrick, geometric patterns, and Islamic calligraphy. The Yoruba people of southwestern Nigeria, on the other hand, are predominantly Christian, and their churches often feature European-style architecture with traditional Yoruba elements (Agboola, 2021). Family structure is another important influence on Nigerian architecture. The Igbo people of south-eastern Nigeria, for example, traditionally live in extended family compounds. These compounds are typically made up of several round houses, each of which is



home to a single family. The houses are arranged around a central courtyard, which is used for cooking, eating, and socializing (Bert-okonkwor et al., 2017). Social hierarchy is also an important influence on Nigerian architecture.

**1.2 Implications For Policy And Urban Planning**

Numerous policy implications can be drawn from studying how culture affects how residential buildings are laid out in space ( West, 2007; Tricco et al., 2018). For instance, it can assist policymakers in comprehending how cultural elements affect the style and layout of residential structures in various locales. Using this knowledge, regulations may be created that support the preservation of cultural heritage while simultaneously ensuring that residential structures are made to adhere to contemporary safety and comfort standards. Other implications are listed in the sub-chapters below. The analysis and conclusions can influence housing and urban planning strategies in Yelwa, Bauchi State, as well as perhaps in other places with comparable cultural backgrounds. Policymakers can design housing better in line with the cultural tastes and demands of the local community by understanding how culture affects the spatial layout of residential buildings. It might entail taking into account things like family dynamics, social standards, religious beliefs, and conventional building designs (Odoyi & Riekkinen, 2022). Promoting social cohesion and community development may depend on how well we understand how culture affects the layout of the building. The research findings can be used by policymakers to develop communities that foster social connections, community interaction, and a sense of belonging. This can entail creating public areas, communal spaces, and shared utilities that respect cultural preferences and promote social contact among locals ( Esenaliev et al., 2018; Monroy et al., 2020). The analysis of how culture affects spatial arrangement can also help to design liveable and healthy residential spaces. The research findings can guide policies that attempt to improve the quality of housing, such as minimum requirements for living areas, access to natural light and ventilation, privacy considerations, and the incorporation of cultural elements that enhance psychological and emotional well-being (Song et al., 2021).

The literature has established the fact that the independent variable of culture significantly affects the spatial organisation of residential buildings. There is, however, a gap in the literature on how culture affects the spatial organisation of

residential buildings in Nigeria. By performing a comparative analysis of a few chosen residences in Yelwa, Bauchi State, this study seeks to close this gap. This research seeks to discover a greater understanding of the changes in spatial arrangement caused by cultural influences, which can be gained by conducting a comparative examination of a few chosen dwellings in Yelwa. The study seeks to add to the body of knowledge by comparing various housing types and looking into the variables that influence these variations. The research hopes to gain insight into how the occupants within the study area of Yelwa perceive and interact with the spatial layout of their homes. It might be more beneficial to comprehend how cultural elements affect people's preferences, levels of happiness, and usage patterns while looking at residential buildings.

**2. Materials And Methods**

The study employed a mixed-method research design to collect and analyse data. The sampling strategy involved a combination of purposive and random sampling techniques. Initially, a purposive sampling approach was used to identify and select houses in Yelwa that represent different cultural backgrounds and architectural styles for the qualitative aspect. The selection criteria considered factors such as ethnicity, socio-economic status, and religion as they affect spatial arrangements in architectural design. Subsequently, a random sampling technique was employed to select a representative sample of houses within each cultural category for the quantitative aspect.

**2.1 Sample Size**

The sample size was determined both by the saturation point as suggested by Hennink & Kaiser (2022), ensuring that a sufficient number of houses are included to capture the diversity of cultural influences on spatial organisation, and the Yamane (1967) method for sample size calculation, which was used to determine the percentage of questionnaires that were distributed within the study area of Yelwa (Orewere et al., 2019). The equation used for this is as follows,  $SS = \frac{N}{1+N(e)^2}$

Where SS = Sample Size  
e = Acceptable error size, typically 0.05,  
where N is the whole population being studied.

$$\frac{70}{1+70 \times (0.05)^2} = 59.57$$





**Figure 2:** New Muazu Layout, Anguwan Kusu, Yelwa, Bauchi State

Source: Google Earth (2023)

The study found that out of the 105 houses evaluated, those with relatively homogeneous study populations and with carefully specified objectives attained saturation within a constrained range of interviews which was 70. After using the formula, the sample size was calculated to be 59.57, which was rounded up to 60. Figure 2 shows the study area selected and marked. From the Anguwan Kusu line through Muazu's new layout, the triangulation shows the selected houses for these areas.

## 2.2 Research Instruments

The following research instruments were utilised to collect relevant data to show the influence of culture on the internal allocations of spaces and user satisfaction with these created spaces:

**Questionnaires:** Based on the sample size calculated, 60 structured questionnaires were developed to gather information from residents of selected houses in Yelwa. The questionnaires had questions that related to cultural practices, preferences, and beliefs that influenced the spatial layout and design of respondents' homes. Questions covered aspects such as room allocation, room preferences, spatial boundaries, overall zoning, and the significance of specific spaces within the house. Open-ended questions were also included, which allowed respondents to provide detailed explanations. Kobo collect application was used to prepare and administer the questionnaire.

**Interviews:** Interviews were conducted with architects, builders, homeowners, and community leaders who possess expertise in residential architecture and cultural practices in Yelwa. These

interviews provided valuable insights into the historical, social, and cultural factors that influence the spatial organisation of residential buildings.

**Observations:** Detailed observations of two selected houses (based on cultural differences) in Yelwa were conducted to document the physical aspects of spatial organisation. This included documenting room layouts, spatial boundaries, and the presence of culturally significant symbols or artefacts. The observations were systematic, noting both similarities and differences between the houses.

**Architectural Drawings:** Architectural drawings of the two selected houses, capturing floor plans to show the spatial allocations for the two very different identified cultures within Yelwa, were detailed. These drawings accurately represented the spatial organisation and design elements of the residential buildings.

**Photographic Documentation:** High-quality photographs of the selected houses were captured to represent the spatial organisation and design features visually.

## 2.3 Research Instrument Validity and Reliability

The study's research instruments' validity and reliability were demonstrated and documented using the following techniques:

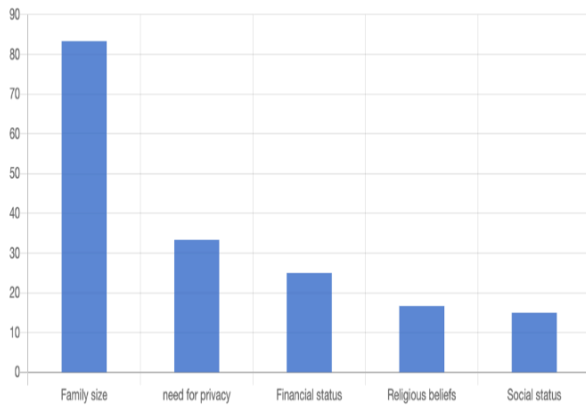
1. **Test-Retest dependability:** To determine the stability and dependability of the instruments over time, observations were conducted at two separate time points to assess the consistency of the data gathered.

2. **Validity of Content:** The research tools accurately measured the contents designated to be measured.

## 3. Presentation and Discussion of Results

The identified cultural and social factors based on the questionnaire distribution are family size, need for privacy, financial status, religious beliefs, and social status, in that order as seen in the bar chart in Figure 4. The questionnaire responses identified the percentages and frequencies as tabulated in Table 1. This demonstrates that in Yelwa, the size of the family and the need for privacy are the utmost determinants of architecturally designed spaces; this is consistent with the study by Muhammad-Oumar (2015), which posited that Hausa culture had been intricately blended with the Islamic religion.

there is a general bathroom and toilet located at the back.



**Figure 4:** Bar Chart showing social and cultural influences

Source: Author's Fieldwork (2023)

**Table 1:** Socio-cultural determinants.

Value.	Freq.
Perc.	
Family size	50
83.33	
Need for privacy	20.
33.33	
Financial Status	15
25	
Social Influence	15
25	
Social Status	15
9	

Source: Author's Fieldwork (2023)

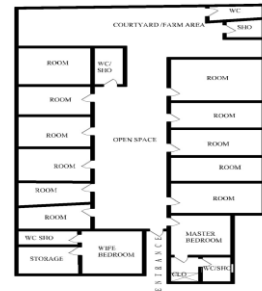
**Objective 1;** To compare and contrast the spatial layouts and organisation of selected houses in Yelwa based on cultural influences, photographs of the three typologies were taken, and sketches were drawn of the plans showing architecturally designed spaces, as seen in figures 5, and 6 and 7

The compound layout of the first type shows the allocated designed spaces. This respondent represents the Christian house layout for the traditional setting. Spaces are for the man, his wife, eight children, and room for three grandchildren staying within the same family compound. Farm space has been carved out behind the rooms, and

DESCRIPTION

IMAGE

The compound layout of the first type shows the allocated designed spaces. This respondent represents the Christian house layout for the traditional setting. Spaces are for the man, his wife, eight children, and room for three grandchildren staying within the same family compound. Farm space has been carved out behind the rooms, and there is a general bathroom and toilet located at the back.



The main entrance to the compound



**Figure 5:** A typical layout for the typologies selected. Type A.

Source: Author's Fieldwork (2023)

DESCRIPTION	IMAGE
<p>The compound layout of the second typology. This is a typical Muslim home found in the study area. The spaces provided include the mosque (masjid), the zaure, the conveniences at the back of the compound, the kitchen area, the wives' room (3 wives), the male and the female children's rooms, and space for two courtyards.</p>	
<p>The main entrance shows the mosque and entrances to the female and male sections.</p>	

**Figure 6:** A typical layout for the typologies selected, Type B.  
Source: Author's Fieldwork (2023).

DESCRIPTION	IMAGE
<p>The floor plan for the third typology is that of the only duplex located within the study area. The Igbo businessman who built this is married to a Hausa Christian woman. The cross-cultural house design blended contemporary house design with cultural inclusion. The separation of the living rooms is a cultural attribute making sure that the working-class wife has the privacy to be with friends while the man also has his privacy while meeting with friends. The kitchen is a contemporary one where the family eats within the kitchen area. The guest bedroom is downstairs.</p>	

On the upper floor, the provision of a study and walk-in closet ensures that the building is classified as a contemporary one.



The main entrance to the man's living room.



**Figure 7:** Layout for the typologies selected, Type c.  
Source: Authors Fieldwork (2023).

**Objective 2.** To examine the relationship between cultural factors and the functionality and design of residential spaces, the spaces provided by respondents based on questionnaire responses are shown in Table 2.



**Table 2:** Determinant of architecturally designed spaces.

DESIGNED SPACES	FREQ.	PERC.
Bedroom	50	83.33
Indoor Kitchen	32	53.33
Courtyard	32	53.33
Living Room	31	51.67
Master Bedroom	24	40
Visitors Toilet	22	36.67
Dining	21	35
Outdoor Kitchen	18	30
Guest Bedroom	18	30
Madams Living Room	14	23.33
Bedroom	8	13.33
Pre-Sit	8	13.33

Source: Authors Fieldwork (2023)

Using the Excel worksheet as shown in Table 2 and assuming the critical value for  $\alpha = 0.05$  and degree of freedom, using the formula  $n-2$ , is  $12-2= 11$ . From Table 3, the Pearson Correlation is 0.99999999. An exceptionally strong positive linear association between cultural variables and the functionality of the spaces offered is indicated by the value for the correlation coefficient. This shows that there is a strong positive correlation between the two variables. This implies that while one variable rises, the other variable rises as well, almost perfectly linearly.

Hypotheses Testing.

**Objective 3.** To ascertain the level of similarity of opinions of respondents across Yelwa, a hypothesis  $H_0$  and  $H_1$  were postulated to guide the study.  $H_0$  states that culture has no significant impact on the spatial organisation of residential buildings in Yelwa. Alternatively,  $H_1$  postulates that culture has a significant impact on the spatial organisation of residential buildings in Yelwa.

From Table 2 using the formula;

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where;  
 $\chi^2$  = Chi-squared  
 $O_i$  = Observed Value  
 $E_i$  = Expected Value

For the first row (Bedroom):

$$(O - E)^2 / E = (50 - 8.33)^2 / 8.33 \approx 10.048$$

The chi-square value is 337.84. The degree of freedom is 11, so the critical value at a significance level of 0.05 is 19.675. Since the chi-square value is greater than the critical value, we can reject the null hypothesis and conclude that Culture has a significant impact on the spatial organisation of residential buildings in Yelwa. To determine the difficulties and potential benefits of incorporating cultural factors into the spatial planning of residential buildings. Table 3's analysis of the questionnaire responses from 43 people reveals that the biggest barrier to incorporating cultural considerations into the spatial design of residential buildings in Yelwa is the perception of culture as outmoded and unconnected from modern trends. Similarly, 17 of the 60 respondents believe that globalization is hastening the disappearance of culturally inclusive designs.

**Table 3:** Challenges of culturally inclusive designs.

DESCRIPTION	FREQUENCY	PERCENTAGE
Perception	43	72
Globalisation	17	28

Source: Authors Fieldwork (2023)

In fulfilling objective 4, the most frequently cited benefit of incorporating culture into residential building design, according to responses sorted from the questionnaire, was the preservation of the local area's distinct cultural identity.

#### 4. Recommendations

1. Proper advocacy- respondents explained that an advocacy drive would ensure that intending homeowners will be aware of the benefits of cultural inclusivity, and the sensitisation process would ensure proper education to change negative perceptions.



2. Proper Education- Architects and engineers should be properly educated from school on the advantages of designing for cultural identity and cultural sustainability. Research should emphasise the need to develop a more sustainable measure of creating culturally inclusive spaces.
3. Government Policies – The government at all levels must ensure policies are put in place to ensure that development control ensures a certain percentage of identified cultural attributes as a condition for plan approval. This will ensure the proper inclusion of culturally designed spaces and buildings moving forward.
4. Enforcement – The government at all levels must ensure compliance with these policies to ensure sustainability and ensure that the cultural identity identified in each locality is preserved.

## 5. Conclusion

In conclusion, culture has a big impact on how residential buildings are arranged in Yelwa, Bauchi State. The design of the homes, which are often grouped in compounds, reflects the traditional Hausa culture, which places a strong emphasis on the value of family and community. The courtyard, which acts as the family's main gathering space, is highlighted in the interior designs of the homes, which are also inwardly facing. The Hausa values of hospitality and communal living are reflected in this spatial organisation. This study's comparative investigation of the three houses produced some intriguing findings regarding the influence of culture on spatial organisation. When compared to the other two residences, the room of the head of the family in the Muslim home, for instance, is larger and more elaborate, representing his superior role within the household. The affluent businessman's home is a more open-plan and bigger than the other two homes in terms of room sizes, reflecting his more Westernized lifestyle. The smallest of the three houses, the typical farmer's home is still functional and well-organized.

This study has demonstrated that culture significantly influences how residential buildings are laid up in terms of space. However, it is crucial to understand that culture is a dynamic force that changes throughout time, as demography, technology, and socioeconomic circumstances change in Yelwa and other towns, the impact on residential spatial patterns could be deep and complicated. The way that residential buildings are laid up may alter as societies adjust to new

influences and changes. Taking into account these factors, architects and urban planners must find a balance between maintaining cultural identity and meeting modern demands and expectations. The results of this study could be applied to new housing developments in Bauchi State, Yelwa, and other regions of Nigeria. Housing that is both practical and aesthetically beautiful can be made by considering the cultural values of the community.

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