

ARCHITECTURAL EXPRESSIONS OF CULTURAL IDENTITY THROUGH VERNACULAR BUILDING METHODS, IDEOLOGIES AND MATERIALS IN GHANA.

Faculty of Architecture & the Built Environment, Delft University of Technology
Julianalaan 134, 2628BL Delft

TITLE

The title of the research as mentioned above seeks to address various key vernacular and cultural aspects of building which reflects the cultural identity of Ghana.

ABSTRACT

This paper gives an overview of the research approach established to address specific subject matters relating to expressing the cultural identity of Ghana through explorative architectural design means. Ghana today is experiencing a gradual loss in the reflection of its rich cultural identity through modern-day architectural compositions. The urbanized centers are characterized by buildings that do not fully reflect the historic vernacular building materials, character and techniques exhibited by local craftsmen and builders in Ghana. As a way of appreciating Ghana's rich cultural traditions through architecture, research was conducted into some key aspects of vernacular building techniques and principles. By so doing results from the research can be translated into the design in order to create an authentic architectural language particular to the climate and culture of Ghana. With respect to the subject of study qualitative methods of data collection were used. The research procedure serves as a starting point towards the entire graduation trajectory. This process should result in developing the desired epistemes of morphology and the environment. It entails demonstrating how various vernacular building forms, methods and materials can be composed to reflect and respond to the culture and tropical climate of Ghana.

KEYWORDS: *Cultural identity, vernacular building, local materials, climate, culture.*

1. INTRODUCTION

Ghana is enriched with diverse cultural values and traditions especially with respect to traditional architecture. These vernacular building methods are exhibited amongst various tribes and ethnic groups in respective climatic regions in Ghana. Again, the inspirations regarding the exploration of Ghanaian vernacular building methods emanates from personal living experiences within that particular context. The cultural dispositions of various vernacular building structures in Ghana gives a first impression of the diverse nature of how culture is expressed amongst different tribes and ethnic groups. Bearing in mind the tropical nature of Ghana's climate, this research is a step to understand how different vernacular building methods have been expressed not only to portray identity but to respond to the warm climatic conditions.

1.1. Problem statement

With regards to this thematic paper, the problem statement will be focused on addressing the cultural aspects of my entire graduation research trajectory. Ghana is seen to be endowed with a rich cultural heritage and this is evident in the vernacular architectural disposition especially within the rural areas. Over the years, the cultural identity of Ghana has been expressed through an indigenous architectural

ensemble of local materials and building principles by local craftsmen and builders. Unfortunately, the cultural identity seems to be gradually fading away due to how contemporary architecture is composed by architects in the major cities of Ghana. This is because most of the architecture exhibited are highly influenced by westernized ideas and building technologies. Indigenous Ghanaian materials, building techniques and ideologies such as bamboo and earth construction seem to be fading away and replaced with contemporary materials like glass and concrete. The vernacular building approach in Ghana seems to engage more of unskilled labour force which includes local craftsmen and artisans. However, the modernized approach to building mega-structures and buildings within the cities tends to create an avenue for a greater percentage of skilled labour force only especially during construction, hence, causing instances of unemployment of unskilled workforce within the local communities. For this reason, local builders are not given the chance to showcase their indigenous craftsmanship during the construction of buildings in the major cities like Accra, Ghana's capital.

1.2. Thematic Research Questions

- What are the different climatic zones in Ghana, which landscape typologies do they consist of and which building materials do they supply to local communities?
- What are some examples and physical properties of available local building materials within the Ghanaian context?
- What vernacular cultural ideologies have been explored by local artisans in Ghana?
- What vernacular building methods and materials are used by local craftsmen with respect to their culture and climatic position in Ghana?
- How are specific building components and elements like walls, roofs, floors constructed by these local artisans in Ghana?

2. METHOD

For the purpose of this thematic research, the limitation focuses on addressing the vernacular aspects of building, materialization and construction in Ghana. In spite of this, qualitative methods of data collection were used. These include case studies, literature reviews, group discussions and desktop studies. These methods were conducted on specific vernacular buildings in order to have in-depth knowledge about their architectural characteristics as well as the building techniques and materiality used by local craftsmen and artisans in Ghana. The vernacular cases investigated and analyzed were based on specific housing structures, building materials and techniques identified in the three climatic zones of Ghana namely, the Savannah climatic zone, tropical rainforest and Accra plains. The various methodologies used helped shape my ideas to have a set limitation of scope for my graduation trajectory in order to produce maximum results within the stipulated graduation time frame.

3. RESEARCH RESULTS

The thematic research questions stated above are answered in this section. These results address the various aspects of vernacular building, climatic zones, indigenous construction and local material use by the local craftsmen or artisans in Ghana. Thematic research questions and their respective results are as follows;

3.1. What are the different climatic zones in Ghana, which landscape typologies do they consist of and which building materials do they supply to local communities?

The vernacular architectural disposition within the three climatic regions of Ghana are expressed in various unique ways through the available resources and climatic influences. These three climatic zones in Ghana are the Savannah climatic zone, tropical rainforest and Accra plains or coastal savannah (appendix.1). First and foremost, the savannah climatic zone, located in northern Ghana, experiences extremely hot and dry temperatures (35-37 degrees celsius) with a single rainfall season from end of May to September (Hellum, 2013). Harsh climatic conditions of this region has served as an influential factor towards the composition and processes in developing vernacular architecture. The arid and flat landscape of the savannah climatic zone is characterized by materials such as thatch, earth, clay and

loam soil. Local builders within this climatic region aim at designing and building structures that will mitigate harsh harmattan winds, eliminate heat and thus, improve comfortable indoor temperatures. Secondly, the tropical rainforest climatic zone is located in the south-west of Ghana with temperatures between 25 and 35 degrees celsius. This zone is characterized by the southern maritime wind resulting in two rainy seasons from April to July and September to November annually (Hellum, 2013). The vernacular architecture is built to respond to the humid, wet and dry conditions governing this zone. The tropical rainforest climatic zone is characterized by sloppy lands, and thick dense rainforests. Primary available materials within this zone include timber, bamboo, palm fronds, stone, clay, earth / laterite. These materials are harnessed by local builders in the community in constructing their houses. Finally, the Accra plains climatic zone in the south of Ghana is characterized by variable precipitation and vegetation similar to the savannah zone with relatively low annual rainfall and high humidity levels (Hellum, 2013). Readily available materials within this zone are similar to that of the savannah region in the north of Ghana.

3.2. What are some examples and physical properties of available local building materials within the Ghanaian context?

Some available local building materials within the Ghanaian context include wood/timber, bamboo, clay bricks, stone and thatch. Clay bricks have good fire resistance, great aesthetic appeal, high thermal performance and good acoustic properties. Timber reduces carbon dioxide emission, durable, and is aesthetically pleasing. Thatch is composed of rye straw/reed. It is hand-threshed; 1.2 to 1.4 meters long on battens, 300mm apart from each other. It is usually built up to a thickness of 180-200mm and thus acts as a natural insulator. It has a life span of 60-70 years (tropical climate). Bamboo has high tensile strength. Its outer layers are highly elastic and fibres run axial. Bamboo shrinks more than wood when it loses water. The canes can tear apart at the nodes. It shrinks in its cross section. The fire resistance of bamboo is very good because of the high content of silicate acid. Filled up with water, it can withstand a temperature of 400°C while the water cooks inside. The enormous elasticity of bamboo makes it a very good building material for earth-quake prone areas. Finally, stone is durable and has great aesthetic character. It is dense and its structure is stratified.

3.3. What vernacular cultural ideologies have been explored by local artisans in Ghana?

Factors such as form, family structure, religion, function, art and symbolism are examples of design principles and ideologies used by local artisans to express their cultural identity in a vernacular way. With respect to art and symbolism, local builders in the north of Ghana decorate buildings by painting indigenous calligraphic abstract patterns (appendix.2) on the walls, while in the tropical rainforest climatic zone, abstract “adinkra” symbols are used as decoration elements on walls, columns, windows and other building elements (appendix.3). The meanings of these symbols could also be attributed to wise sayings or words of advice and encouragement. The indigenous architectural style of the Ashanti people of Ghana reflects their way of life, religious and spiritual beliefs. Buildings are usually constructed in a rectangular form with spaces evolving around a central courtyard where social as well as spiritual activities take place. Again, the vernacular architectural disposition in the savannah region is highly influenced by Islamic religion due to the trans-Saharan trade in the early days. This brought about a unique architectural style known as the “ancient Sudanese-Sahelian style” which exhibits buildings expressing a mass conical structure constructed from earth with wooden poles as a supporting structure (appendix.4). Also, buildings in the north of Ghana are constructed in an organic way responding to the growing trends of the family structure. The spaces are articulated around a central outdoor courtyard where social, domestic and recreational activities such as cooking, washing, music, dance, playing games and story-telling take place (appendix.5).

3.4. What vernacular building methods and materials are used by local craftsmen with respect to their culture and climatic position in Ghana?

One of the methods of heat retention exhibited by the local builders in the savannah climatic region is to reduce the number of openings in the thick earthen walls so as to reduce the amount of warm air circulating through the interior space (Prussin 1974, p.186). The builders avoid these openings so as to

maximize the thermal insulation capacity of the thick earthen walls. Local builders construct their structures and houses with available materials such as earth, straw, sticks and loam soil (Wolters,1982, p.8). Also, some buildings are constructed with sun-dried bricks in conjunction with a technique known as “banco”, which is a wet-mud process similar to the concept of coil pottery with earth-tone artistic impressions on the walls (Prussin 1974, 192). Within the tropical rainforest climatic zone, a passive design approach is used by local builders in designing their buildings, thus, louvered openings and bamboo screen walls are used to facilitate maximum air circulation within the interior space (appendix.6). Available local materials such as bamboo, earth bricks, timber, stone and palm fronds within the tropical rainforest influences the form and method of building. The Ashanti tribe within the tropical rainforest climatic zone are also known for a building method or construction system known as “wattle and daub”. This construction technique makes use of vertical timber poles or bamboo which are tied horizontally to hold the applied earth mixture in place (appendix.7). Finally, the three vernacular building methods employed by local builders in the Accra plains climatic zone include the use of sun-dried bricks, “wattle-and-daub” method and “atakpame” method (Essienyi, 2012). The “atakpame” method consists of rectangular mud walls laid out by the builder with a peg or string.

3.5. How are specific building components and elements like walls, roofs, floors constructed by these local artisans in Ghana?

In the north of Ghana, there is a division of labour amongst family members during the construction process (Prussin 1974, p.191). The chief builder is usually a man, known to be the head of the family (appendix.8). The men are responsible for the intense labour works such as digging the earth whiles women fetch water and prepare the earth into a workable consistency. The earth is kneaded and formed into a spherical, conical or cylindrical ball and handed to the chief builder to set it in place. Women are responsible for the aesthetic finishes of the building such as wall rendering and painting (appendix.9). The construction of roofs does not rest on the walls but rather on vertical forked wooden trunks since the walls are not strong enough to bear the load of the roof. Local builders within the tropical rainforest climatic zone build earthen walls with an armature to prevent the heavy rains from destroying them. Roofs are constructed with thatch or corrugated aluminium sheets which are sometimes steeply pitched to repel rainwater as much as possible due to heavy annual precipitation volumes. Walls and floors are also given a weather-proof material to reduce the rate of deterioration. Again, during the “atakpame” wall construction in the Accra plains climatic zone, local builders prepare wet mud balls of 200mm in diameter which are laid in courses. Each course is covered with palm leaves and allowed to dry before continuing the next course. Also, walls are mainly constructed using mud bricks usually 200mm by 90mm in dimension. In some cases, floors and flat roofs are also constructed with these bricks in conjunction with cement.

4. CONCLUSIONS

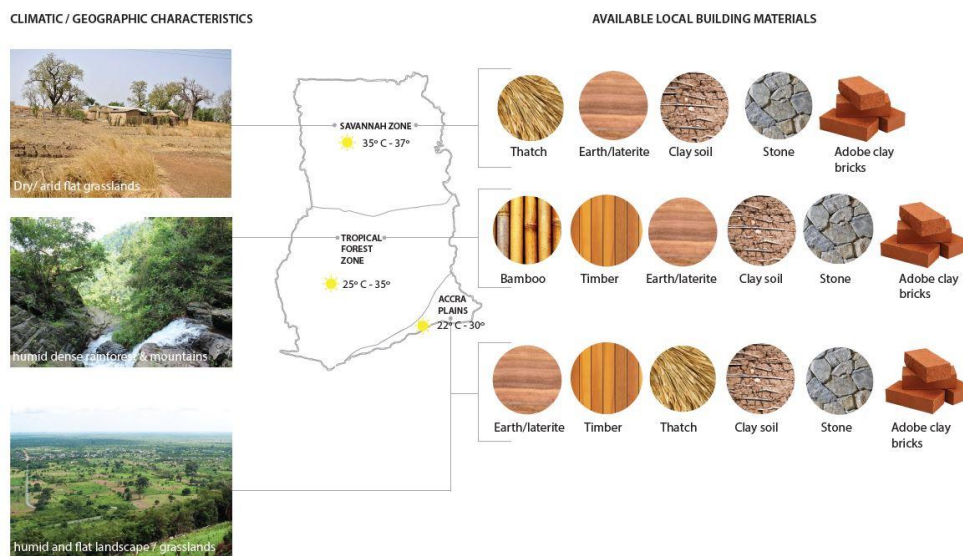
Conclusions from the study gives a clear demonstration of how most of the vernacular building materials and techniques portrayed in the different climatic zones are interrelated in one way or the other. For example, it is evident that all the construction methods and techniques used by local builders within the three climatic zones aim at mitigating heat within the interior spaces. Local builders within all these climatic zones in Ghana tend to use earth, sun-dried or mud bricks to construct walls due to the heat absorption capacity of the earth material. Again, a passive design approach is employed by these local builders to ensure heat reduction and indoor thermal comfort. This was achieved through the design of central courtyards, conscious orientation of buildings from direct solar impact, roof design and cross ventilation. It is important to note that these local builders do not focus only on the use of materials to express their vernacular architecture. Factors such as form, religion, function, art and symbolism are examples of design principles and ideologies used by these local artisans to express their cultural identity in a vernacular way. For example, in the savannah climatic region, buildings are decorated by women by painting indigenous calligraphic patterns on the walls whiles in the tropical rainforest climatic zone, abstract “adinkra” symbols are used as decoration elements on walls, columns, windows and other building elements.

This shows that although the vernacular architectural approaches by local builders differ in their respective climatic positions, similar building principles are shared in common.

REFERENCES

1. Essienyi, E., (2012). *Traditional Building Methods In Southern Ghana*. [online] Affordable Housing Institute - Global Blog. Available at: <<https://ahiglobal.wordpress.com/2012/03/14/traditional-building-methods-in-southern-ghana/>> [Accessed 8 December 2020].
2. Hellum, M.,(2013). *The Climate In Ghana Today And In The Future*. Kick Off Ghana. <https://kickoffghana.wordpress.com/2013/01/07/the-climate-in-ghana-today-and-in-the-future/>.
3. Prussin, L., (1974). *An Introduction To Indigenous African Architecture*. [online] Pdfs.semanticscholar.org. Available at: <<https://pdfs.semanticscholar.org/20b4/5f2140a9e2ee9bdf733f9101401d4533879d.pdf>> [Accessed 8 December 2020].
4. Wolters, A., (1982). *Bouwvormen In Ghana*. Eindhoven: Technische Hogeschool, p.8.

APPENDICES



Appendix 1. The three climatic zones in Ghana showing their landscape and associated available materials



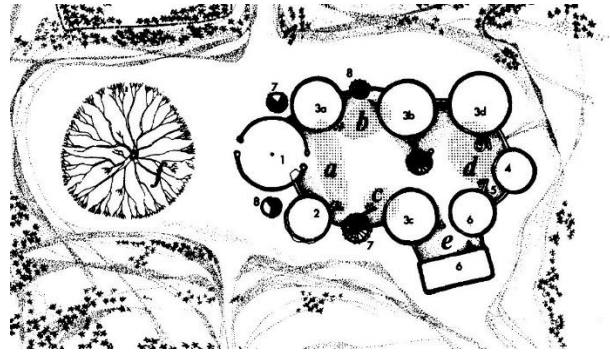
Appendix 2. Indigenous calligraphic abstract wall paintings in Northern Ghana



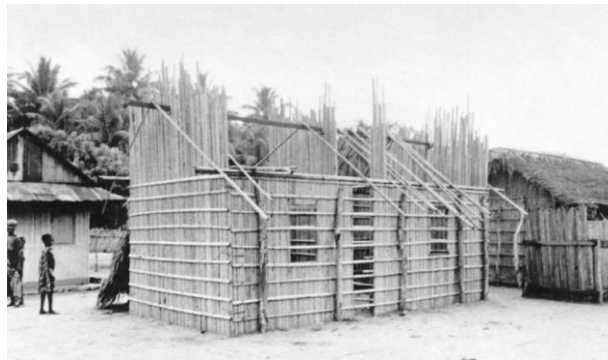
Appendix 3. Abstract “adinkra” symbols used as decoration elements on the building



Appendix 4. Larabanga mosque in Ghana depicting ancient Sudanese-sahelian architectural style



Appendix 5. Plan of a Konkomba compound house in northern Ghana showing the organic nature of the spaces around a courtyard also known as “compound”.



Appendix 6. House construction at Half Assini in Ghana with natural openings from bamboo



Appendix 7. Wattle-and-daub wall construction



Appendix 8. Division of labour during construction with head of the family being the master builder



Appendix 9. Women responsible for aesthetic finishes to the building