

Study on Rwandan Traditional Architecture

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Abstract—Rwanda has a unique climate, traditional culture and regional characteristic. This paper analyses the traditional architectural function layout, structure, form, construction materials of Rwanda, and its adaptable climate characteristics, and summarizes the traditional construction and local material using different technologies. It's expected that modern architectural design in Rwanda today draw the essence of traditional architecture.

Keywords—Rwandan traditional architecture; conservation; material; design

I. INTRODUCTION

Rwanda is officially known as the Republic of Rwanda, found in East Central Africa. It borders Democratic Republic of Congo in the West, Uganda in the North, Tanzania in the East, and Burundi in the South (as shown in “Fig. 1”). Kigali is the capital and the largest town. Rwanda, like most African states, did not escape the wave of colonization, and it gained independence from Belgium as an administered UN trusteeship on 1 July 1962. Rwanda is landlocked other than its western border of Lake Kivu. The government system is a Republic; the chief of state is the president, and the head of government is the prime minister. Although much of the economy relies on subsistence farming, Rwanda has a mixed economic system in which there is a variety of private freedom, combined with centralized economic planning and government regulation. Rwanda is a member of the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC).

A. Location

Located in the continent of Africa, Rwanda covers 24,668 square kilometers of land and 1,670 square kilometers of water, making it the 150th largest nation in the world with a total area of 26,338 square kilometers. (as shown in “Fig. 2”)

The population of Rwanda is 11,689,696 (2012) and the nation has a density of 474 people per square kilometer. The five provinces act as intermediaries between the national government and their constituent districts to ensure that national policies are implemented at the district level.



Fig. 1. Africa Map.

^a. (<https://msu.edu/~williss2/carpentier/part1/congolese.html>)



Fig. 2. Rwanda location on the Africa Maps.

^a. (<https://www.butterfield.com/blog/2015/10/26/in-deep-rwanda/>)

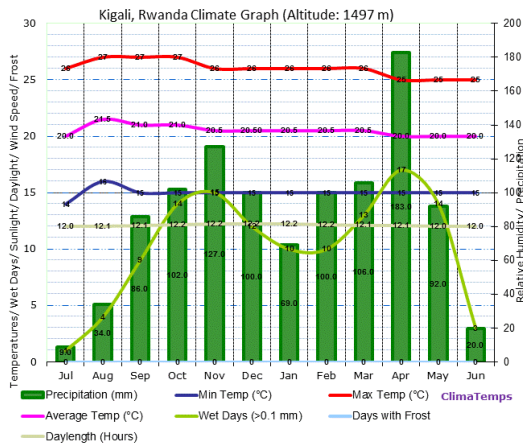


Fig. 3. Rwanda Climate Graph.

a. (<https://www.thinglink.com/scene/784065916609495042>)

B. Climate

The climate in Rwanda is cooled by the high altitude. It is warm throughout most of the year, but it can be cooler in the mountains. Precipitation ranges from 1,000 to 1,400 millimeter’s per year, depending on the area; there’s a dry season from June to August (and July is the driest month) and a rainy season from September to May. (as shown in “Fig. 3”). On closer view, there would be two rainy seasons, caused by the zenith passages of the sun, from March to May and September to November. However, from December to February the decrease in rainfall is small, and it’s just more pronounced in the north, where it drops below 100 mm per month, so we cannot properly speak of the dry season. Between the two rainy seasons, the more intense is the former, and the rainiest months are usually April and May, when precipitation reaches 150 mm per month, or even more. The capital, Kigali, is located at the center of the country, at 1,500 meters above sea level, and receives 950 mm of rain per year, with a maximum in April and a minimum from June to August, when it almost never rains. From December to February, the rains are still quite frequent.



Fig. 4. The King's Palace.

a. (<https://www.visitrwanda.com/tourism/interests/culture-heritage/>)



Fig. 5. Traditional building.

a. (<https://twitter.com/kwitaizina/status/348350711328821248>)

C. Culture

As all Rwandans formed the same nation and shared the same cults, rites, customs and traditions, myths, fables and legends, the same mental universe, one could say, then everyone was looking for the same positive values as the nobility, the generosity, love, tolerance, patriotism, trust, insight. Rwandans met in multiple concentric circles and in institutions that welded them (for example, the various army corps). They shared the same clans in which brotherhood, unity and helpfulness were cultivated. Several other circumstances could strengthen the values of solidarity, good neighborliness and conviviality. Friendship was cultivated through all kinds of gifts and counter-donations, including intermarriage between clans. We helped each other through the exchange of diversified services, such as, for example, field work, house building, and mutual help.

II. FORM OF TRADITIONAL HOUSE IN RWANDA

The traditional human habitat had the following characteristics: dwellings were not grouped into compact villages; they were rather scattered on the hills and inhabited by members of the same lineage, each dwelling was surrounded by fields planted mostly with banana, sorghum, beans and potatoes sweet (as shown in “Fig .4”). Among the rich people, there were several huts: chief hut, for the chief, a second hut, generally, the woman’s hut, and a third reserved for cooking, a fourth for teenage girls or for visitors. The entrance of the enclosure and that of the house were in the same axis. Inside the enclosure were constructions smaller like granaries and / or henhouses (as shown in “Fig .5”).

A. Plan of House

Every hut has only one entrance. A woven porch protects the entrance, making a building that is attractive and highly insulated, ideally adapted to the high temperature and humidity of the Rwandan highlands. (as shown in “Fig .6”). Cooking, latrines and stores are located in the courtyard. The Rwandan round house is an important survival of an ancient

dwelling type, reflected in our own archaeological record by hut circles and wheel houses (as shown in “Fig.7”).



Fig. 6. Floor plan of dome.

a. (<https://bterlinden.wordpress.com/author/bertrandterlindenarchitecture/page/5/>)

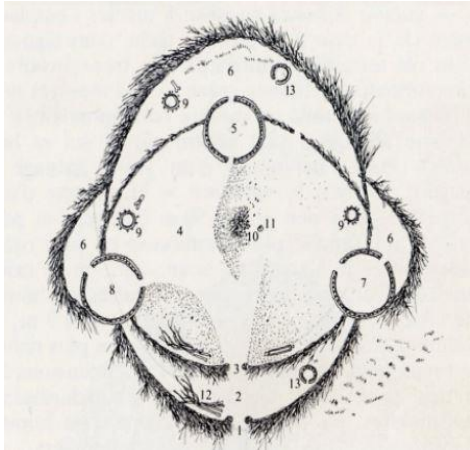


Fig. 7. Floor plan of dome.

a. (<https://bterlinden.wordpress.com/author/bertrandterlindenarchitecture/page/5/>)

B. Sections of House

The circular beehive-type dwelling or roundhouse was standard in pre-colonial Rwanda. Standing at the center of a courtyard surrounded by bamboo and thorn hedges, it is a dome-shaped building based on a circle of closely spaced cypress poles, with their tapering tops bent down to the center and tied in place with concentric rings of reed and bamboo (as shown in “Fig.8”). The exterior is thatched with overlapping bunches of grass tied to the frame rings with vegetable fibers.

III. STRUCTURE OF TRADITIONAL HOUSE IN RWANDA

Rwanda is distinguished by their original construction made by men. Their size is determined by the size of a person lying on the ground with the right arm extended. This dimension is made according to the social rank and the needs of the owner. The construction begins with the choice of land

that is cleared and felled. Then a circular perimeter is drawn to define the location of the house and, at equal distance, vertical poles often made of markhamia are attached to it. The poles are connected by horizontal ties made by an assembly, flexible stems of plants such as markhamia, phyllanthus and hyparrhenia. The transom is held by ropes made of bark of banana, Fichus or papyrus.

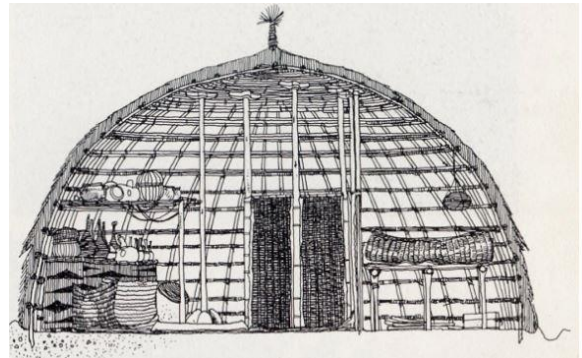


Fig. 8. Section of dome.

a. (<https://bterlinden.wordpress.com/author/bertrandterlindenarchitecture/page/5/>)

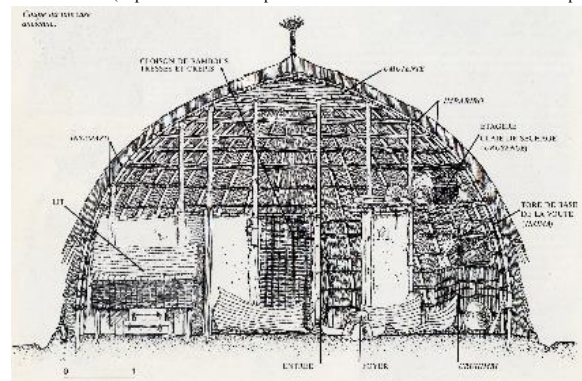


Fig. 9. Section of dome.

a. (<https://bterlinden.wordpress.com/author/bertrandterlindenarchitecture/page/5/>)



Fig. 10. The Reconstruction of place.

a. (<https://enclosuretakerefuge.com/tag/traditional-rwanda-building-techniques/>)



Fig. 11. The Ceiling.



Fig. 12. Grass Thatched House.

a. (<https://www.newtimes.co.rw/section/read/19181>)

A. Foundation

Traditional Rwandan houses do not have foundations. They have a load-bearing structure of wood or bamboo, planted directly in the soil. Without foundations, termites and moisture have direct access to organic materials. The house is also not well protected against heavy rains, wind and numerous earthquakes in the region. The circular beehive-type dwelling or roundhouse was standard in pre-colonial Rwanda. Standing at the center of a courtyard surrounded by bamboo and thorn hedges, it is a dome-shaped building based on a circle of closely spaced cypress poles, with their tapering tops bent down to the center and tied in place with concentric rings of reed and bamboo. The exterior is thatched with overlapping bunches of grass tied to the frame rings with vegetable fibers (as shown in “Fig. 9”).

B. Skeleton of the Hut

The skeleton of the hut is then covered with grass boots: marsh grass, Cyprus or stems of sorghum. The soil of the huts treated is covered with a layer of fine grass on which one spreads small mats. The ceiling, the central part of the dome and the most important architectural element, has been prepared independently. It is placed in the middle of the poles and maintained at the right height by about fifteen or twenty pillars. On this ceiling, we bend and fix the poles. An awning is also installed above the front door as well as the pillars that delimit it. (as shown in “Fig .10”).

IV. MATERIAL

Material used of reconstitution of plan the archaic hut, entirely vegetal, flexible frame, drying rack, 11 pillars, central hearth, bamboo partitions and same internal organization, but the walls of daub or bamboo are generalized the roof changes rigid framework of eucalyptus supported by two central pillars that the bamboo partitions are crepe or mud: the hearth is no longer central. (as shown in “Fig .11”).

A. Binder

For Rwanda such improvements are generally too expensive, even if the coating could be eliminated like this. Traditionally, for the stabilization of the blocks, we added the soil of termite mounds, the dung of cows or extracts of plants. Generally, these binders helped to increase the strength and durability of the constructions (as shown in “Fig. 12”).

Currently, commercial binders are most commonly used, such as lime or cement, and sometimes bitumen. (as shown in “Fig.13”).With binders, the blocks become much more resistant and durable and better protected against erosion. He becomes thus possible to use land that would not be suitable without binders (as shown in “Fig. 14”).



Fig. 13. Grass Thatched House.

a. (<http://www.bbc.co.uk/blogs/africahaveyoursay/2011/05/should-modernisation-be-forced.shtml>)



Fig. 14. Mud Thatched House.

a. (<https://maison-monde.com/maisons-traditionnelles-rwandaise>)



Fig. 15. Mud Thatched House.

a. (<https://maison-monde.com/maisons-traditionnelles-rwandaise>)

B. Mud

Mud construction is often associated with rural poverty and urban residents would rather build with imported materials such as cement, which is a relatively expensive material and does not provide thermal and acoustic insulation. (as shown in “Fig .15”).

V. CONCLUSION

All the paper shows the use of local materials and ways found on construction sites in Rwanda. It also gives some very useful recommendations for the improvement of construction: how to make a waterproof foundation, stable walls, beams and lintels, limited openings, and a good roof. It also explains the use of sustainable infrastructure: rainwater harvesting, the biogas digester and solar panels, and explains the use of the infrastructure sustainable: rainwater harvesting, biogas digester and solar panels. The earth construction is again allowed. It is possible to present a project with a modern vision, which explains and defends the interest of a sustainable architecture. There is a need to sensitize the ruling class about the use of traditional materials, explaining that they are not synonymous with poverty.

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