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Namibia's vernacular architecture: insights towards the sustainable development of local communities

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Abstract: Vernacular architecture is commonly recognized as the fundamental expression of the world's cultural diversity. Natural disasters, the lack of knowledge and awareness of local communities, the desire for modernization and the well-known globalization phenomenon are some of the most frequent evoked issues responsible for endangering the survival of vernacular heritage in Africa. Hence, this paper aims to address some of these issues by providing a detailed architectural and morphological characterization of the "Owambo" tribe, the largest cultural area of Namibia. With this case study, the authors aim to highlight the outstanding universal value of vernacular architectural heritage in Namibia and to raise awareness to the increasing need, not only the protection of these structures' integrity but also for the preservation of such ancient and sustainable building techniques as a living heritage.

Key words: African vernacular architecture, Namibia homesteads, Owambo tribe, multi-hazard risk mitigation, architectural and morphological characterization, sustainable development.

La arquitectura vernácula de Namibia: perspectivas para el desarrollo sostenible de las comunidades locales

Resumen: La arquitectura vernácula se reconoce comúnmente como la expresión fundamental de la diversidad cultural del mundo. Los desastres naturales, la falta de conocimiento y la sensibilización de las comunidades locales en general, el deseo de modernización y la globalización son algunos de los problemas más frecuentes responsables por amenazar la supervivencia del patrimonio vernáculo en África. Por lo tanto, este trabajo tiene como objetivo hacer frente a algunos de estos problemas relativos al patrimonio cultural vernáculo africano, proporcionando un detalle arquitectónico y la caracterización morfológica de la tribu "Owambo", en el norte de Namibia. Con este caso de estudio, los autores tienen como objetivo destacar el valor universal excepcional del patrimonio cultural vernáculo en Namibia, y sensibilizar a la necesidad inmediata de proteger no sólo la integridad de estas estructuras, sino también de preservar estas técnicas antiguas y sostenibles de construcción como tradiciones vivas.

Palabras clave: Arquitectura vernácula africana, granjas de Namibia, tribu de Owambo, mitigación de multi-riesgos, caracterización arquitectónica y morfológica, desarrollo sostenible.

Introduction

Vernacular architectural heritage plays a crucial role in safeguarding and expanding the cultural features of communities and their relationships with the land, contributing decisively to the expression of the world's cultural diversity. It is worth noting that vernacular heritage encompasses, not only the built environment but also intangible aspects, such as construction techniques, lifestyles, and territorial connections, which are intrinsically connected to communities (ICOMOS 1999). Furthermore, it is believed that approximately one-third of the world's population lives in vernacular structures, stressing the importance of vernacular architecture not only for its cultural outstanding universal value but also as a feasible housing strategy for the sustainable development of local communities worldwide, moving towards the concept of livable heritage. The preservation of vernacular architecture in a holistic approach is believed to revive people's faith in their own culture. Nevertheless, due to several globalization-related matters, vernacular heritage is becoming more and more vulnerable, facing serious problems of obsolescence, internal equilibrium, and integration. Therefore, the management and protection of vernacular architectural heritage depend highly on the capacity of identifying and interrelating all the variables at play.

Besides the richness and diversity of Southern African countries' natural heritage, this region of the globe also has a very rich and heterogeneous cultural heritage that lacks coverage from scholars and decision-makers, being, therefore, under-represented both in literature and on the internet. From the projects and initiatives lately conducted in this regard, it is worth referring the African Vernacular Architecture project, which aims to collect and store photographs of vernacular architecture in Africa in an open-source database that can be accessed by invited explorers who want to share their own photographs.

Furthermore, the occurrence of disasters in Africa is increasing in frequency and severity, compounding the challenges to sustainable development and undermining Africa's prospect of achieving the Millennium Development Goals. Climatic and hydrological hazards, in particular drought, floods, cyclones and landslides, dominate the disaster profile of the Africa region, affecting, on average, around 12.5 million people per year (African Union Commission and UNISDR 2015). Moreover, the extreme social vulnerability of some African nations has the potential itself to transform minor hazard events into major human disasters. In developing countries, disasters are known to disproportionately affect poor people the most and have the potential to trigger food supply crisis, human losses, constrain progress, and the destruction of infrastructure and natural environment. For this reason, the establishment of disaster risk management policies, focusing on disaster risk reduction within the broader context of sustainable development, are of vital importance. However, reducing disaster risk across Africa requires a radical shift in the current view of governments and an even more radical shift from rhetoric, centralized and top-down instructions to decentralization and respect for local knowledge and initiatives (López-Carresi et al 2014).

Bearing in mind the above, this paper aims at providing a clear insight on the main issues that are contributing to an accelerated degradation and potential extinction of vernacular architecture in rural areas of Namibia. This paper also aims to highlight the outstanding universal value of a particular vernacular typology, commonly observed within the "Owambo" tribe, in northern Namibia, and to raise awareness to the urgent need, not only that of protecting these structures' integrity, but also of preserving such ancient and sustainable construction techniques as a living heritage (Maio et al., in press (a).

Owambo tribe case study, in northen Namibia

The area traditionally known as Owamboland is placed in the far north of Namibia between the Etosha National Park and the Angolan border (as illustrated in Figure 1). This region is by far the most densely populated rural area of Namibia. Many of the villages and farmlands situated on the raised ground between water-courses are typically

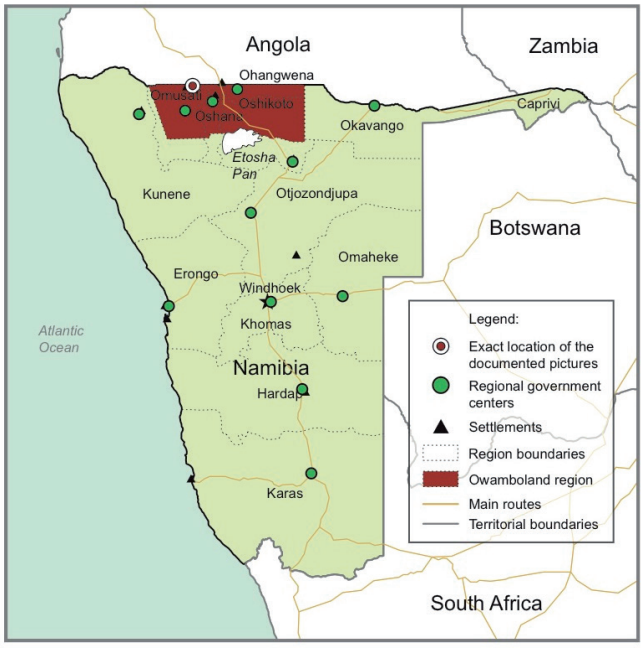
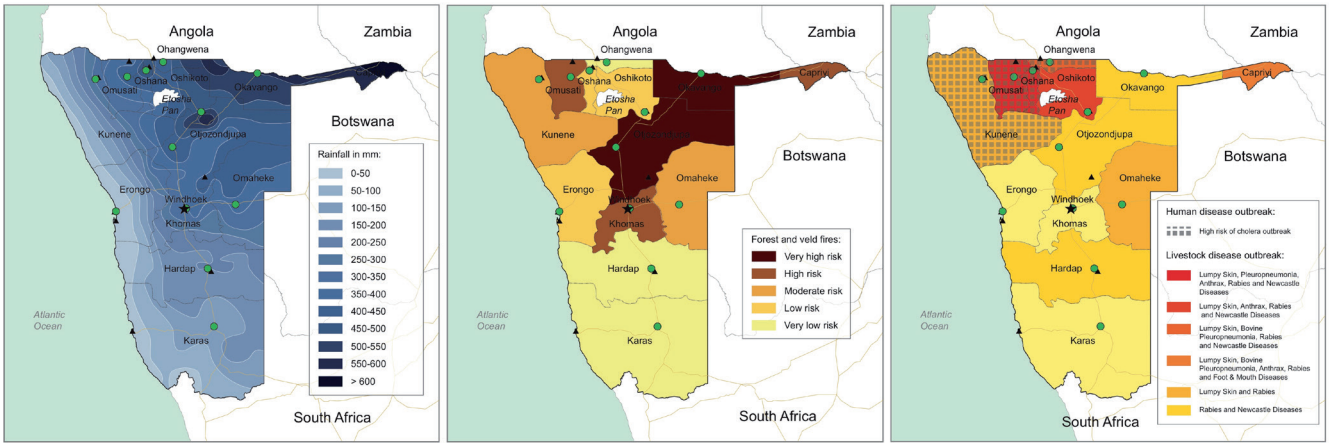


Figure 1.- Location of the Owamboland region and exact site of the documented homestead.

flooded after heavy rains, despite the average rainfall in this area varies between 400 and 550 mm (see Figure 2a). Actually, flooding is the most frequent and hazardous natural phenomenon in this region, which severely affects the livelihoods of these communities by triggering massive population displacement, loss of human life and livestock, and the destruction of vernacular homesteads, crops, and social infrastructure.

As a result of rapid population growth, scarcity of arable land near permanent water-supply points, socio-economic lifestyle changes and township development, many of the Owambo people no longer live in traditional homesteads. During the past two decades, large villages have sprung up in the proximity of the main routes. People stay in rectangular houses built with poles, corrugated iron, and other materials. Moreover, the felling of trees for the construction of huts, cattle enclosures and fences has resulted in extensive deforestation. Other socio-economic factors that are affecting deforestation in north Namibia have been identified: population growth, settlement patterns, land use practices, the structure of production, consumption patterns of wood, and valuations related to forests. In Owamboland's wilderness, settlers not only cut down large amounts of poles to construct huts, palisades, kraals, and fences but also destroy most of the tree and bush vegetation on their prospective farm plots. The fire was the settlers' most powerful tool when clearing land for farms and fields (Kreike 2010), and in Namibia, forest and veldt fires are responsible for burning 3.5 to 7 million hectares of forest and veldt land every year. IIn fact, in the span of just two years between 2001 and 2002, almost 10 million hectares of land have burned in Namibia (Republic of Namibia 2011). Albeit these figures fluctuate annually, they show the seriousness of this hazard in Namibia (see



a) b) c)

Figure 2.- a) Spatial distribution of the average annual rainfall, adapted from V2030 report (insert footnote number). b) Spatial distribution of the forest and veldt fire outbreak, adapted from the NDRMP 2011 (insert footnote number) (source: Directorate for Forestry). c) Spatial distribution of both human and livestock disease outbreak, adapted from the NDRMP 2011 (insert footnote number) (sources: Ministry of Health and Social Services and Directorate for Veterinary Services, respectively).

Figure 2b). With regards to disease outbreaks, as shown in Figure 2c, Namibia has experienced several outbreaks in the past that have demanded state intervention. In this respect, It is particularly worth noting the August 1970 cholera epidemic that had stricken more than 150,000 people, killing about 20,000 of them (Goodgame and Greenough 1975). Livestock disease outbreaks, such as Foot and Mouth Disease, as well as outbreaks of Anthrax, Rabies and lung diseases, also constitute a global threat in Namibia (Republic of Namibia 2011).

Considering each hazard individually has proven to be a good approach for looking at specific health issues that might be linked to each of them. However, it is also important to identify potential hotspots where the population might be exposed to multiple hazards at the same time. In the literature review carried out by Kappes et al. (2012), not only the main challenges associated with each step of a multi-hazard risk analysis were identified, but also the latest studies and approaches addressing these issues were presented and discussed. In order to get the spatial distribution of the intensity level of multi-hazard, El Morjani et al. (2007) assigned weights in a first stage to each of the addressed hazards, on the basis of the human and economic impact of each event reported in different databases. Consequently, for each hazard, the regional averages of these indicators have been computed, standardized, weighted and aggregated.

Despite the great value of this work, multi-hazard analyses should account not only for the features of single hazardous events but also their mutual interrelations, as for example, landslides caused by extreme rainfall or tsunamis triggered by offshore earthquakes. However, the way that multiple hazards with distinct reference units (nature, intensity, return period, etc.) and complex interrelations can be compared, remains a fundamental challenge.

As depicted in Figure 3, the multi-hazard risk approach presented in this study is based on a multi-hazard risk index, which results from the product of hazard and vulnerability (Maio et al., in press (b). As explained bellow, the exposure model is implicit in the formulation. The scale, magnitude, and probability of single hazards are defined within the hazard module. Moreover, in order to take into account climate changes, a range of possible climate scenarios are also considered. Concerning the exposure module, it results from the multiplication of a set of indicators related to the elements at potential risk. The analysis of such elements is used to create reference baselines of qualitative and quantitative features of residents and infrastructure, which are used to identify and define elements that are potentially more exposed. FFinally, the individual vulnerability of the elements exposed to different hazards is also assessed, taking into account their mutual dependencies (cascading effects).

The integration of the results into a Geographic Information System (GIS) tool represents the last but key step of this multi-hazard risk approach. Such tool allows the user to perform the spatial analysis of the study area (considering different scenarios) and to manage data regarding the features of the elements exposed. Based on this GIS-based analysis system, it is then possible to outline optimized pre-disaster planning, including risk communication campaigns, and post-disaster intervention, such as emergency planning and reconstruction (Maio et al., in press (b).

After Namibia's independence on 21 March 1990, the Owamboland was divided into the regions of Omusati, Oshana, Ohangwena and Oshikoto. Amongst the traditional Owambo tribe, family groups live in round, stockade homesteads (ongandjo) built on the raised ground between the oshanas, surrounded by a few

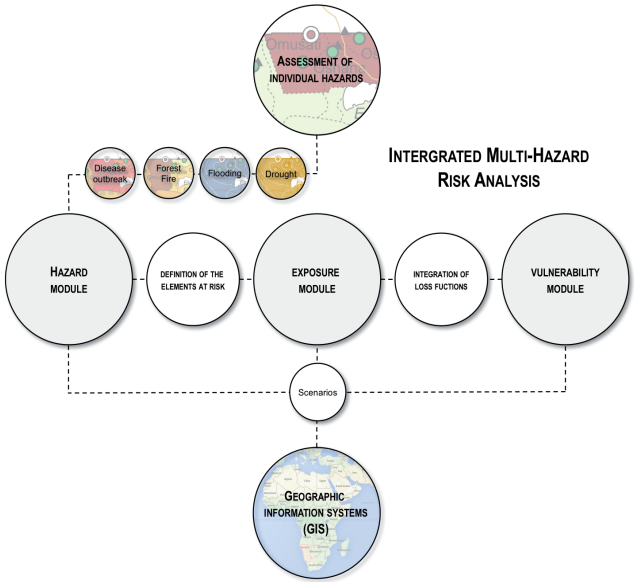


Figure 3.- Example of a diagram for the integrated multi-hazard mitigation approach.

hectares of cultivated land (Maio et al, in press (a). With the resulting scattered settlement pattern, the homesteads are able to constitute villages administered by selected headmen who report to local and traditional authorities. The homestead is enclosed by a wooden palisade or millet-stalk fence and is composed of several quarters of huts articulated with walkways and corridors for controlling the movement patterns in the household. In the past, this wooden palisade (made of tree trunks) distinguished the Owambo architecture from that of its neighbors (Malan 1995) and protected its occupants from wars and cattle raids. However, the lack of wood in this region due to extreme deforestation and several forest and veld fires, led local communities to search for innovative construction techniques and materials, which justifies the appearance of small adobe huts within this area, distinguishing again this tribe's vernacular architecture and building technique from the others, see Figure 4.

As can be seen in Figure 5a, the vertical structure of these huts is mainly composed by load bearing masonry walls, made of adobe blocks with a very poor mortar. These walls are erected resorting to manual adobe manufacture and an ancestral earthen constructive technique (still in use in several African countries) that consists on shaping or sculpting units of plastic earth manually, which are then sun-dried before used for the construction of the walls (Maio et al, in press (a). It is thought that this technique has been the primitive cuboid form of the adobe blocks existing today (Fernandes 2006). Figure 5b instead, captures the detail of the connection between the thatch roof and the vertical structure. Finally, Figure 5c reflects the dismal trend of abandoning and substituting vernacular architecture and ancient construction techniques for new building technologies and materials. For the set of reasons given in the following section, the authors believe that such trend might not help fostering the sustainable development of local communities.

Figure 4.- Sketch of some of the most common typologies of huts and their location in northern Namibia.

a) b) c)

Figure 5.- a) One example of an adobe hut within the case study homestead. b) Detail of the connection between adobe masonry walls and the thatch roofs. c) An example of a vernacular structure in an advanced state of degradation due to the increasing abandonment of vernacular constructive techniques to the detriment of imported building technologies and materials.

Sustainable development of local communities

According to Whitfield (2010), sustainability can be generally defined as economically viable development, socio-culturally acceptable and environmentally friendly. Therefore, the following recommendations are thought for the sustainable preservation vernacular architecture of the rural settlements in the Owamboland region:

—rational use of local materials and resources, instead of importing new technologies and materials at a higher cost with large carbon footprint.

—sustainable site planning and management to preserve vernacular cultural heritage from hazards, avoiding population displacement and local communities' growing backlog, just to cite a few.

—rational water management by introducing rainwater harvesting and water recycling policies.

—safe and healthy environment by improving the indoor air quality (optimizing the use of natural light and the solar exposure), acoustics, thermal comfort, health conditions, and energy efficiency.

—reduction of waste through recycling.

Moreover, another fundamental aspect concerning sustainable development policies is that they should be unavoidably centered on social equity, meaning that the transfer of knowledge and the need for involving the community on the preservation of the Namibian cultures should be established as the pillars of such policies. In this sense, not only local communities need to be sensitized about the cultural value of vernacular architecture, but also the urban myth of that living conditions provided by this type of constructions are not decent, has yet to be clarified. The authors instead, are strongly convinced that the sustainability of vernacular housing is irrefutable. It is however necessary to control the quality of materials and the subsequent construction phase to make sure that satisfactory performances are attained. Moreover, the particularities of the construction process itself and its details need to be taught by experts to younger generations in order to ensure the quality of these structures and the safety of their residents. Additionally, capacity building drivers need to be put in place to encourage the community involvement on the preservation of vernacular heritage. Finally, the authors also believe that it is fundamental to establish strategies to reduce the vulnerability of homesteads facing the most recurrent hazards (Maio et al, in press (a).

Conclusions

This paper intended to raise awareness to the preservation of vernacular architecture in Africa, particularly in northern Namibia, in order to safeguard these ancient structures to future generations. Acknowledging that the intrinsic features and environmental circumstances of vernacular architecture in Namibia vary considerably from site to site, this paper focus on the Owambo tribe's homesteads. Moreover, recognizing the Namibian Government's efforts in tackling disaster risk reduction, the authors aim to raise awareness for the importance of implementing multi-hazard risk mitigation policies, which benefits are widely recognized, particularly in the decision making process. Hence, it is fundamental that all actors and ministries can use a compatible language when assessing individual hazards. Additionally, the authors believe that using open-source GIS tools in the mapping and interpretation of outputs for decision making purposes is also fundamental to move towards more efficient and proactive strategies. Local communities need to be proactively sensitized about risks so that they can be prepared when

disasters strike. Moreover, capacity building programmes need to be put in place to facilitate the involvement and the participation of community. Finally, having all these sprocket wheels work together will definitely increase the preparedness of local communities and contribute to a more efficient approach for disaster risk mitigation of Namibian vernacular architectural heritage.

Future developments should focus the debate on how vernacular architecture can be adapted to current human needs and standards, including a desire for modernization, in a sustainable way, i.e., without limiting future generations from accessing heritage of the past. The full architectural characterization of homesteads within the Owambo tribe, as well as the materials' mechanical characterization, should be also conducted. As a final comment, the authors would like to refer that, despite the influence of the preservation of vernacular cultural heritage over tourism in the Owaboland region was not addressed in this study, it is naturally understood as a key aspect towards the development of local communities and a topic to be reflected in future studies.

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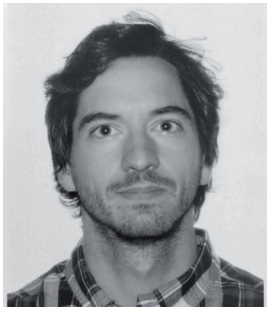

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