Geographic Information Tools in the Service of Heritage Conservation in a World Heritage Site

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Key words: Mapping, Heritage, Database, Enumeration,

SUMMARY

The Historic Town of Lamu on the Kenya coast was inscribed by UNESCO as a World Heritage Site (WHS) on the 14th December 2001. This was done in recognition of its outstanding universal value arising from its cultural diversity and harmony; its historic role in the Indian Ocean maritime trading activity over many centuries as expressed through architecture and urban structure. The WHS status guarantees international exposure and gives the tourist industry in Lamu a much needed boost.

The National Museums of Kenya, as the custodians of the WHS, has the mandate to approve or disapprove) all development/ construction works within Lamu's Heritage Site. Knowledge of the existing structures and their heritage value greatly influences the approval of additional works within the WHS. All these issues can only be analysed after relevant data is gathered and processed and analysed including the preparation of a comprehensive spatial database that will influence decision making processes and policies to meet the various socio-economic and sustainability challenges that may arise. In the research project forming the subject of this paper the gathered information was put in a Geographical Information Management System that integrates spatial information and property attributes. This system handles all kinds of spatially referenced land related data at all mapping scales in support of decision making and guiding policy directives. The administrators were trained on how to use these tools to ensure efficient updating of systems. Office and field hardware together with the necessary software were provided as part of the project to alleviate the shortage of technical equipment.

The system built, as well as the GIS technical knowledge will improve the effectiveness of the National Museums of Kenya conservation officers and can also act as a base for a detailed Heritage Management Plan for the Lamu World Heritage Site capable of meeting UNESCO standards for such sites.

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1. INTRODUCTION

The Historic Town of Lamu was inscribed by UNESCO as a World Heritage Site on the 14th December 2001. This was done in recognition of its outstanding universal value arising from its cultural diversity and harmony; and its historic part in the Indian Ocean maritime trading activity over many centuries as expressed through architecture and urban structure. Lamu is also a major tourist destination attracting local and international visitors from far and wide. Lamu was inscribed in the list due to criteria (ii), (iv) and (vi) (World Heritage Committee, 2001)
Criterion (ii): The architecture and urban structure of Lamu graphically demonstrate the cultural stewing pot from Europe, Arabia, and India, utilizing traditional Swahili techniques to produce a distinct culture.
Criterion (iv): The growth and decline of the seaports on the East African coast and interaction between the Bantu, Arabs, Persians, Indians, and Europeans represents a significant cultural and economic phase in the history of the region
Criterion (vi): The paramount trading role and its attraction for scholars and teachers gave and will continue to give Lamu an important religious and cultural function in the region.

The town is on an island forming part of the Lamu Archipelego off the north-east Kenya coast. Extensive remains of Swahili, Portuguese, Omani and British occupation in the form of public architecture and private buildings (see for instance Ghaidan 1976), including parks, gardens and cemeteries, are supplemented by a distinct style of marine architecture, furnishings, clothing, music and other aspects of tangible heritage. Economic survival and adaptation to progress are a challenge confronting residents and those charged with the responsibility of protecting the Island's heritage.
All these parameters that define Lamu Island need to be captured in order for a detailed analysis to be made of important issues relating to the above. The quality and maintenance of the built heritage, infrastructure needs (both present and future), and the interface between conservation, development and economic renewal need to be addressed. How the town's heritage should be managed and the availability of data resources for doing so receives special attention.

1.1 The purpose of the project

All these issues can only be analysed after information (relevant processed data) is gathered regarding different outstanding universal values of the cultural heritage assets of Lamu, thus the dire need for comprehensive spatial data that will influence decision making processes to meet these challenges.

The gathered information was put in a Geographical Information Management System that integrates spatial information and property attributes. This system will handle all kinds of spatially referenced land related data at all mapping scales in support of decision making. It shall enable the input, management, manipulation, analysis, modeling, output and dissemination of spatially referenced land-related data. Landmark buildings can then be turned into 'heritage' of cultural and social significance with a creative strategy of city marketing in order to promote city pride among the citizens as well as to the world (Arif and Pang, 2005).

2. PROBLEM STATEMENT

Can comprehensive spatial data be acquired and used in the development of a Heritage Management Plan?

3. RESEARCH OBJECTIVES

Objectives of this research include:

- To map out (by use of GIS and Remote Sensing) the World Heritage Site
- To map out the buffer zones of the World Heritage Site
- To map out important peripherals that heavily influence activities and standards of living within the World Heritage Site.
- To map out infrastructural services available within the World Heritage Site
- To design a comprehensive database that will capture all aspects necessary for heritage management and local administration
- To collect data relevant to the database that has been developed.

The last objective was to train end users in ways of using and updating the GIS and Database.

4. METHODOLOGY

The project was expected to be completed over twelve months, based on the rules and regulations of the sponsors, The Kenya National Council for Science and Technology (NCST). However, it was completed in a duration longer than that anticipated. This was due to several logistical, communication challenges that will be addressed in a separate section.
The methodology undertaken is best described by the flow chart below. Some of the work was performed within Lamu with the Lamu Fort Museum acting as a working office for the project whereas the rest was undertaken in Nairobi with the help of research Assistants.

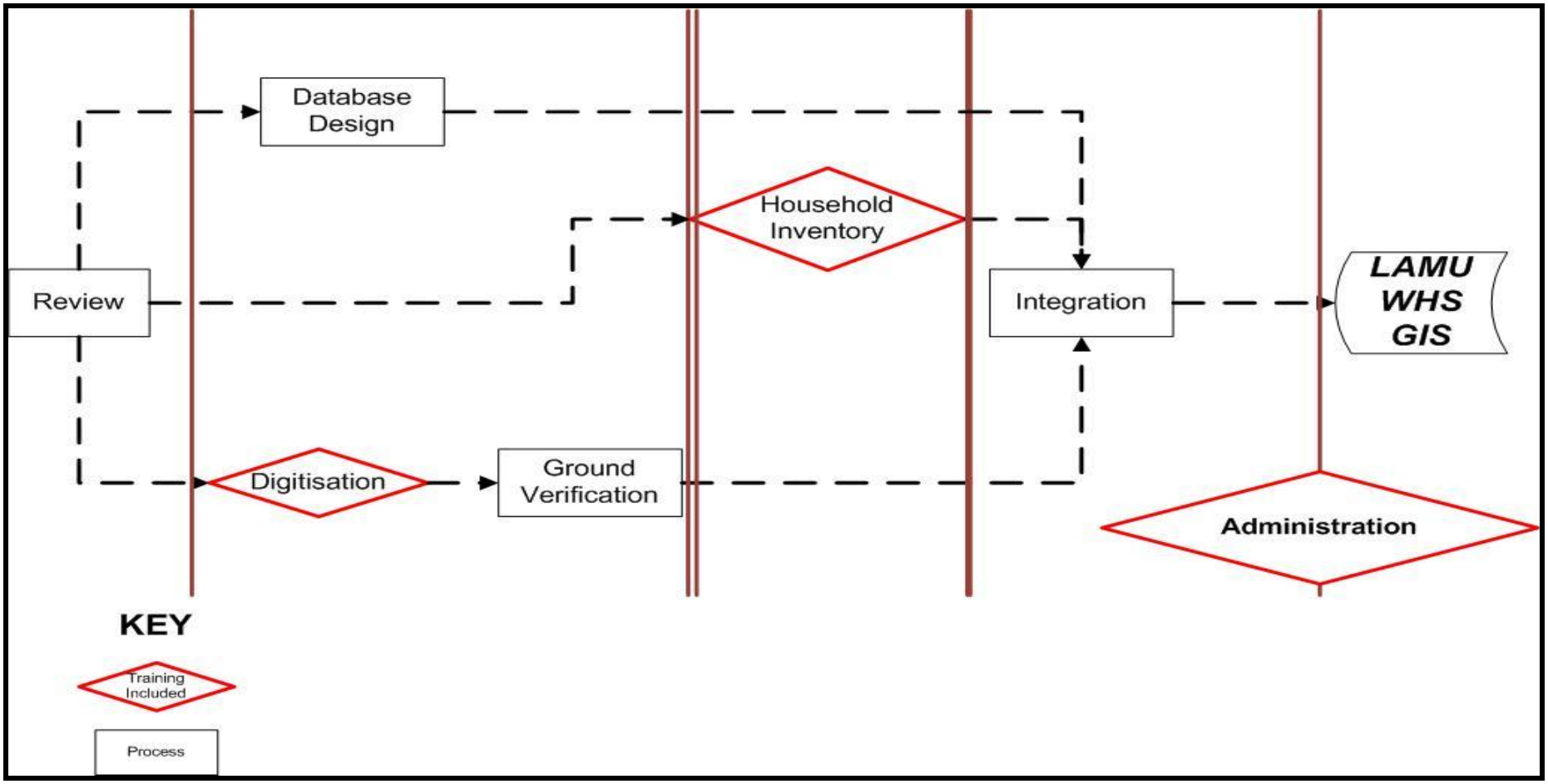

Figure 1. Methodolgy flow chart

The steps taken were as follows:

- Review the large collection of official documents and consultancy reports prepared over the last two decades and relating to Lamu's future, including review of the 1986 Lamu Conservation Plan.
- Review of deliverables/ outputs developed for other World Heritage Sites in order to set a benchmark for standards of deliverables.
- Mapping exercise of the World Heritage Site, Buffer Zone and influential peripheral areas by use of high resolution satellite imagery by digitisers using ArcGIS software.
- Ground verification exercise of the mapping process to ensure mapping accuracy.
- Mapping of Infrastructural facilities within the World Heritage Site through hard copy maps available from the Local Authority.
- Design of a relational database capturing all aspects relevant to Heritage Management.
- Integration of the needs of the Local Authority into the relational database.
- Training data collectors how to use the GIS and the relational database.
- Inventory taking of all households and characteristics of the households in Lamu World Heritage site and the Buffer zones.
- Training administrators of these systems to ensure efficient updating of systems to provide up to date information to policy makers and drafters of the Heritage Management Plan.
- Prepare a GIS and database training manual to be used to train future users and administrators.

Some of the architectural features identified during the household survey

5. SUPPORTING INSTITUTIONS/ PARTNERS

The host institution donated some facilities towards this project, including:

- Desktop computers for data entry
- Office and desk space
- Trained personnel (towo young officers) for project coordination and researcher-

institution liaison.

The Lamu County Council, which is a partner to the NMK in development control issues within the Site, provided plot owner information and a council rates roll (i.e. property tax register) that was used in the household database preparation.

Individual parcels map, in the form of survey sheets, were produced by the Ministry of Lands.

6. FINDINGS

6.1 Deliverables

In the interest of continuity it was important to equip the National Museums with the necessary information, training tools and equipment for its work in the immediate future.

6.1.1 Data

- Digital maps of the World Heritage Site, Buffer Zone and influential peripheral areas.
- Digital maps of infrastructural facilities within the World Heritage Site.
- Mapping out of the National Grid Electrical Wiring within the Stone Town. This was difficult with the relevant authorities citing a potential security risk if the information were to be made public. Negotiations are still ongoing through the National Museums of Kenya.
- A relational database capturing all aspects relevant to Heritage Management including household characteristics.
- The social issues were also incorporated within the same database in order to have useful contextual information on heritage. A comprehensive design marrying the two different aspects in a manner that can be displayed in a map was then developed. A Database Specialist was consulted on the matter. A flat database was also developed for ease of quick reference.
- A GIS and database training manual to be used to train future users and administrators.

6.1.2 Hardware

- 1 high performance Desktop computer installed with Windows XP
- 1 high performance Laptop computer installed with Windows XP
- 1 No. Trimble GPS hand help mapping devices (with Windows Operating System)
- 1 No. desktop/ Laptop ArcGIS end-user Software and Licenses
- 1 No. ArcGIS Spatial Analyst Extension Licenses
- 1 No. ArcPad software and license

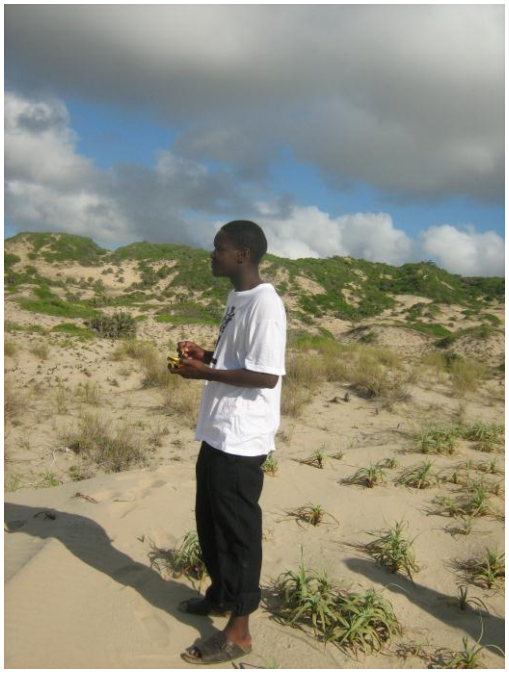

Figure 2 : A Research Assistant mapping out the sand dunes by use of the Trimble GPS. Acquafers under the dunes provide much of the water used in Lamu Town

6.1.3 Training

- Data collectors and research assistants were trained on how to use the GIS and the relational database.
- NMK administrators were trained in GIS to ensure efficient updating of systems.
- A GIS and database training manual was prepared to be used to train future users and administrators.

6.2 Challenges

The project progress did not take the desired path due to a number of factors. These factors, Though disruptive, these were used as positive factors to make the grant experience/ administration better for the next funding programme. The main challenges were:

- Inaequate communication between the sponsors, host organinsation and our research team. It is easier for official institutions and public corporations to deal with consultants and other types of suppliers rather than research teams, simply because the nnecessary administartive procedures are not genrally in place. This usualy needs to unneesary delays.
- Increased cost of travel and accommodation for the Lamu visits. Lamu WHS is a tourist town and the cost of accomodation is very high. NMK was very kind to host me on a number of occasions thus reducing the overall cost of operation.
- Cultural issues or religious obstacles were encountered during the household questionnaire when access was denied to male research assistants. It was therefore necessary to change the approach and use ONLY local female research assistants. This proved to be very successful, quite apart from inolving young girls in the conservation of their town and making them more aware of the important issues at stake.

Figure 3 Female Research Assistants were key to gathering reliable information

7. CONCULSION AND SUGGESTIONS OF FURTHER RESEARCH

The project was successful and the data has already started being used by the conservation officers in the Lamu Fort museum office. The availability of reliable base data has improved the performance of the officers and with time and a change of culture towards embracing technology in the work environment, this will further improve efficiency and effectiveness of the conservation efforts. Members of the public, the County Concil, local businesses and other researchers also have access to the data.

In light of the research question, *"Can comprehensive spatial data be acquired and used in development of a Heritage Management Plan?",* the answer will be emphatically Yes. The database and accompanying maps can be used to better understnd the conservation and heritage of the Lamu World Heritage site and also act as a base for a new Heritage Management Plan.

The possibilities of spatial information are endless and the information collected will act as base data for future researchers. Potential useful topics of exploration are:

- Clan/ ethnic distribution within Lamu Town and related demographic trends
- A more detailed analysis of the built environment
- Documenting and analysing the intricate open space system in the private and public realms
- Economic activities and trends in Lamu island
- Mapping the land and property market and related trends.

Indeed, the effort to maintain the integrity and authenticity of the World Heritage Site requires an aggressive approach to data updating and refinement to support heritage management porgrammes to the high standaards prescrtibed by UNESCO and the National Museums of Kenya itself.

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REFERENCES

Chohan A.Y and Ki P.W, 2005, Heritage Conservation - a tool for sustainable Urban Regeneration, 41st IsoCaRP Congress

Christopher Pound, 2007, Stone Town Zanzibar, State of Conservation; preparation for the periodic review. UNESCO/Zanzibar Stone Town Development and Conservation Authority.

Ghaidan Usam 1976. Lamu: A Study in Conservation. E.A. Literature Bureau, Nairobi.

Nembrini P.G, 2005, Study of the Traditional Wells of Lamu and Shela (Kenya), http://vince.mec.ac.ke/wp-content/uploads/2012/02/Study-of-the-shallow-wells-of-Lamu-web-version.pdf

UNESCO World Heritage Committee, 2001, WHC Nomination Documentation File Name 1055,

BIOGRAPHICAL NOTES

Madi-Jimba Yahya is an Urban Information Analyst and director in a Land Economics and Urban Planning firm in Nairobi, Kenya. He was educated at the University of Nairobi, Kenya and University of Cranfield, UK He has worked on numerous projects for both the public and private sectors. His experience includes working for the WHO (Somalia), the UNECA Regional Centre for Mapping of Resources for Developement based in Nairobi; he also worked for the Rural Payments Agecny (Defra UK) and Scotia Gas Networks (South England, UK) in the past eight years.

Apart from also being a Land Economist who undertakes valuations and feasibility studies for financial institutions, he is also a Digital Strategist recently working on digital initiatives such as Code for Kenya, Star Health Open Data Platform and Uchaguzi election monitoring tool.

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Appendix A: Maps generated from data collected