Book of Proceedings

Of the

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Preface

The Lagos State branch of the Nigerian Veterinary Medical Association in its usual excellent manner is offering to the scientific world the book of proceedings of the 38th Annual General Congress of the Association held at the Administrative Staff College of Nigeria (ASCON) Badagry, between the 9th - 13th of october 2001

The congress had a theme which was: "Advances in information Technology: Impact on Veterinary Profession" and a sub theme: Current Challenges in Transborder Epizootics."

The congress was well attended and attracted very high quality papers as you would read in this publication. We can only thank our resource persons, contributors,and reviewers for a job well done. This book of proceedings is basically divided into two sections, namely, the special presentations on transborder epizootics and secondly the presentations at the scientific meetings. It is our hope that you will find the entire publication highly rewarding.

Dr. Tunji Nasir

Chairman, LOC EKO 2001.

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APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEM (GIS) FOR ASSESSING THE RISK OF TRYPANOSOMOSIS IN APETE AREA, IBADAN, NIGERIA.

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Key Words:Geographical mation Sysem , Risk Assessment, Trypanosomosis

ABSTRACT

Geographic Information System (GIS) was applied to assess the risk of trypanosomosis at Apete area, Ibadan, Nigeria where the University of Ibadan's Veterinary Teaching Hospital has a satellite station. Primary data were collected from physical field observations and interviews with residents and community leaders in the area between September 2000 and March 2001. Secondary data sources included maps from the Oyo State Ministry of Land, Housing and Survey, International Livestock Research Institute ILRI, Internet Web Search and consultation with GIS personnel at the Geography Department of the University of Ibadan. Data analysis was done at DISEG Nig. Ltd Ibadan. Software used included Arcview GIS Version 3.1®, Atlas GIS® and Arc Info GIS. Microsoft Word 98® was used for typing. Epizootiological criteria chosen included the Forest Reserve Area, Rivers and Animal Host locations at Apete area.

Results classified Apete area into high risk and medium risk areas and highlighted the potential of GIS for landscape epizootiological research. Recommendations are made for provision of relevant database of high quality which should be regularly updated. There is need for collaborative efforts with the GIS unit of Geography Department of the University.

INTRODUCTION

Geographical Information Systems (GIS) Technology developed by Geographers, provide opportunities for epizootiologists to study association between ecological factors and the spatial distribution of disease. GIS is a powerful computer mapping and analysis tool capable of integrating large quantities of Geographic (spatial) data and linking geographic and nongeographic data (Athenucci et al., Maguire, 1991). Epizootiologists have traditionally used maps when analyzing associations between location, environment and disease. In the cartography of veterinary diseases, GIS marks a development of ecological (landscape/Geographical) epizootiology. Worldwide, GIS has found application for epizootiological studies of disease, phenomenon in animal populations in the context of their environment (see Thrusfield, 1997). It also has applied value for prediction, prevention and control of diseases and other problems of populations, as well as in education, planning, veterinary decision support system and information systems. The epizootiology of African trypanosomosis is based on the analysis of the different factors that determine the presence of the disease in a given regions. These are the definitive hosts (men, domestic or wild animals), the parasite (typanosomes) and vectors (testsefles (Glossina spp.) and other biting flies). The study area Apete is located within Ibadan on latitude 7°27'N and longitude 3°52'E in the derived savanna regions. According to a recent study (Adeyemi and Esuruoso, 1997) the most prevalent tsetse around Ibadan is Glossina palpalis. The objective of this study was to demonstrate the application of GIS technology to assess the risk of trypanosomosis in Apete Area near the University of Ibadan, Ibadan, Nigeria where the University's Veterinary Teaching Hospital has a satellite clinic located.

3.0 MATERIALS AND METHOD

3.1 DATA ACQUISITION

3.1.1 Primary Sources

Data from this source are acquired as a result of field work and physical observation of the study area. Information collection for this project were from:

a) Physical observation and location of landmark.

b) Interview with the community leaders at Apete Village.

c) Interview with the residents.

3.12 Secondary Sources

(a) Map of Ibadan Sheets: 95 — 35E1, 95 — 35E2, 95 — 35E3, 95 — 35E 4, 95 - 35

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Results classified Apete area into high risk and medium risk areas and highlighted the potential of GIS for landscape epizootiological research. Recommendations are made for,provision of relevant database of high quality which should be regularly updated. There is need for collaborative efforts with the GIS unit of Geography Department of the University.

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Vic 1 - showing rivers, forest settlement and vegetation cover of Apete Village at a scale of 1 : 1000

(b) Literature Review

3.3 SOURCES OF DATA

- Maps of Ibadan were obtained from the map depot of the Oyo State (Secretariat) Ministry of Lands, Housing and Survey
- Internet Web-Search
- International Livestock Research Institute Library (ILRI) Ibadan
- Consultation of textbooks, articles and journals
- Consultation with GIS personnel at Geography Department, University of Ibadan

3.2 SELECTION OF SOFTWARE AND HARDWARE

3.3.1 SOFTWARE

Archview GIS version 3.1® was used for converting (digitizing) the analogue map into a digital map and for further spatial operation (buffer, and overlay).
Atlas GIS® and Arc Info GIS were also employed for overlay, data conversion and merging operations respectively.

3.3.2 HARDWARE

Conversion of analog base maps into digital format was done on AO (24" x 30") Calcomp digitizer drawing board, a Pentium Board CyrixMII with a 64MB RAM and a speed 333 MHZ and an SUGA monitor of 16-bit resolution were used. Paper copies of generated digital map files were printed on a colour Deskjet 840C printer.

3.4 DATA PRE-PROCESSING AND INPUT

Pre processing procedures were used to transform a data set into a compatible form suitable for permanent storage within the GIS database. Various locational data, representing points, lines and polygons were digitized and organized into separate layers of information. Non-spatial attribute information associated with the spatial entities were in a feature attribute table (a tabular data file storing standard attribute about the feature). All these operations were executed to ease analyses, map updating and display.

3.5 DATABASE MANAGEMENT SYSTEM

A Relational Database Management System (RDMS) was developed to facilitate linkage of digital spatial and related attribute data to each classed feature in order to be able to perform spatial analysis.

3.6 CRITERIA

Criteria chosen for this study include:

- Forest reserve area
- Rivers
- Animal host locations

Each of these criteria were highlighted and buffered at certain distance.
Based on the recent work of Adeyemi and Esuruoso 1997, which identified G. palpalis as the prevalent tsetse around the study area, the criteria were applied to G. palpalis

3.7 GIS OPERATIONS

GIS operations carried out include buffering and overlay operations respectively. Although G. Palpalis can travel from between 1.6 to 3.0 kilometers in 24 hours, buffering operations were limited to between 150 and 300 metres due to the limited spatial scope of the study area used in this demonstration study.

3.7.1 Buffering Operation Around Rivers

A 350m (three hundred and fifty meters) buffer was created around the 2 major rivers at Apete viz: River Oluyoro and River Ona

3.7.2 Buffering Operation Around Forest Reserve Area

A three hundred and fifty metre (36Dm) buffer was created around the forest reserve.

3.7.3 Buffering Operation Around Animal Host

A one hundred and fifty meter (150) buffer was created around cattle paddocks identified at the study area.

3.7.4 Overlay Operations were carried out on animal host locations and river buffer, as well as on river and forest reserve buffer to determine high and medium potential risk areas.

Data analysis was carried at DISEG Nig Ltd, Preboye Shopping Complex, Opposite University of Ibadan, Ibadan, Nigeria.

4.0 RESULT AND DISCUSSION

4.1 RESULT

Fig. 1 shows the digitized map of the study area showing the forest reserve, the two major rivers swamp around River Ona, building and houses, including the locations of animal farm and the road network.
Fig. 2 is a buffer of the study areas, showing the middle risk areas i.e overlap of any two of rivers, forest reserve and animal host(cattle paddock).

Fig. 3 is a buffer of the study area, showing high risk areas, where all the three risk areas overlap.

4.2 DISCUSSION

This study has provided geographical representation of the available data relevant to the epizootiology of trypanosomosis at Apete area, Ibadan. The criteria used is this study i.e. forest reserve, rivers and animal host locations were those considered to be fundamental to the epizootiology of trypanosomosis in this part of the country and those for which data could be assembled from secondary sources. According to a recent work (Adeyemi and Esuruoso, 1997), the prevalent tsetsefly around the study area is G. Palpalis.The most striking parameters which have been shown to be important in determing the areas of stability for the survival and development of tsetsefly (Glossina palpalis) at the study area is seen in the habitat provided by the Government forest reserve area, with river Ona that courses through the forest. The river is edged by a swamp and smaller vegetation growth. In this type of habitat, G. palpalis (among other flies), can usually be found through out the year (Howell, 1977). Cattle movement also plays important role, acting as carrier or transport means for the flies. G. palpalis (riverine fly) usually lives in the vegetation which grows on banks or flood plains of rivers, streams and lakes. It likes taller and more ever green forest type than G. tachnoides. It is usually found in fringing forest that has:

a) A width of about 50 metres or more;

b) Little growth near the ground, because it likes a clear line of flight;

c) A continuous canopy (top of trees) to shade it from the sun.

D) A thick wall of vegetation on the outside where the forest meets the wood land, to protect it from the wind;

e) Not much vegetation covering the stream bed, so as not to interfere with its line of flight;

f) Fairly steep banks at the sides of the stream, to give it more shade and shelter at certain times of the day (Howell, 1977).

The areas in Fig. 3 are therefore classified as high risk areas for trypanosomoses.

Middle risk areas are classified as areas where the river buffer overlaps with the animal host locations/sites including man. Reason being that G. Palpalis feeding habits reveals that;

a) Reptiles are the most important host;

b) Man the next most important host;

C) Antelope is fairly important; bush buck is the favourable antelope

d) Domestic animals like cattle is important

It sometimes feeds on birds and also known to feed on other animals including monkey (Howell, 1977). Although the rivers serves as natural habitat for reptiles, from field observation and interview with residents, reptiles have not really been reported but wild animals, game have been reported at the forest reserve area.

The study was restricted only to collection and analysis of available relevant data to determine the risk of trypanosomosis in study area. Therefore field surveys and capture of tsetse was not carried out to identify the particular riverine species present.

5.0 CONCLUSION AND RECOMMENDATION

GIS has wide applications in Veterinary Research, Training and Service Delivery (see Althenucci et al. 1991 and Thrusfield, 1997). It is useful for prediction, prevention and control of diseases and other problems of populations and their environment, as well as being part of the veterinary decision support and information system.

Critical to effective use of GIS in epizoobiology is the availability of current and high quality database (maps, epizootiological parameters etc). The need for a regularly updated, veterinary/epizootiological data base at the Veterinary Faculty is thus highlighted. There is also need for collaboration efforts with GIS experts and personnel such as available in the GIS unit of the Geography Department of the University of Ibadan. The Department of Veterinary Public Health and Preventive' Medicine of the University should pioneer these efforts.

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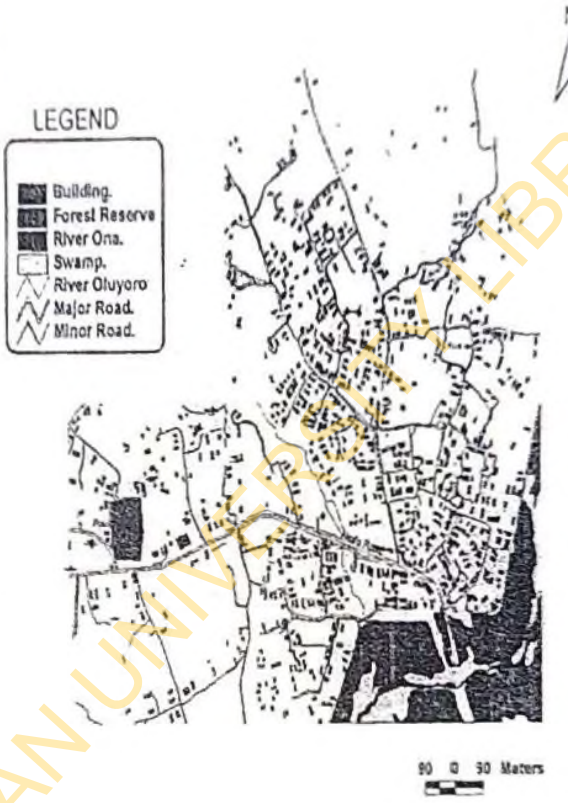

Fig 1 MAP OF APETE AREA IN IBADAN.

F_1 = MEDIUM RISK AREAS.

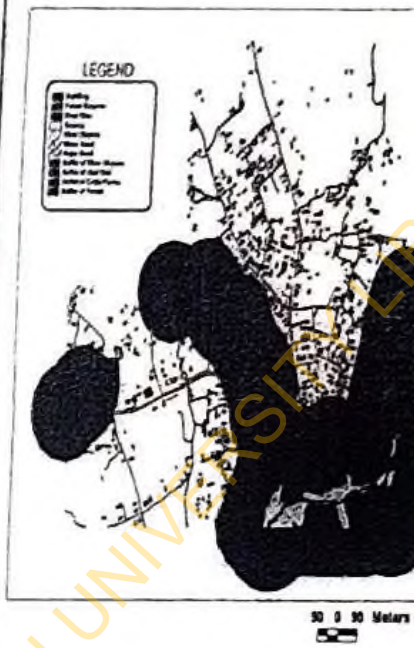

Fig 5 HIGH RISK AREAS.