



Mission Report

**The provision of technical assistance to the
Malawi National Statistics Office with regard
to GIS Implementation and Training**

Prepared by:

Geospace International (Pty.) Ltd.

Francois Bezuidenhout

Prepared for:

**The NSO and the World Bank, General Data Dissemination
System, Socio-Demographic Statistics Project for
Anglophone Africa**

March 2008

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1. Introduction

The Malawi NSO is currently on the eve of their Population and Housing Census enumeration which takes place from the 1st to the 21st of June. They have identified a functional and operational GIS as one of the focus areas which must be addressed in order to achieve accurate spatial analysis, thematic mapping and dissemination of census results specifically and annual mandated statistics in general.

To this end they have requested this Technical Assistance mission which focused on these issues.

The specific objectives, activities and deliverables for this mission was detailed in the Terms of Reference which is included in Annexure 1. The NSO's long term objective is for GIS to act as a successful data creation, integration, analysis, mapping and dissemination tool through the rest of the census processes and to instill the GIS Unit as a service provider for all the NSO line functions. In addition to this is the enhancement of the operations of the GIS Unit and improvement of the skills of its staff regarding GIS principles in general and software use specifically.

The basic objectives and deliverables for this mission are however stated below.

Specific issues covered during the consultancy were the following:

- GIS Unit assessment according to hardware, software, IT infrastructure, data and methodology.
- Institutional analysis of the position of GIS in the organization
- Technical Assistance in GIS Unit planning and implementation
- Determine current staff skill level with staffing and training needs.
- Skilled staff to ensure effectiveness of GIS unit, focusing on specific ArcGis software training, thematic mapping, geodatabase and metadata creation.

Specific outputs:

- GIS Situational Analysis document
- GIS Implementation Strategy document
- GIS infrastructure implementation and upgrading plan
- Skilled staff in GIS software use and thematic mapping

2. Implementation of the consultancy

The mission was implemented by Mr. Francois Bezuidenhout from **Geospace International**. As specified in the ToR, the total mission time was 10 days on site at the NSO with two additional days for preparation and report writing. Initially, the mission was set to take place from the 3rd to the 14th of March. However, due to flight cancellations by Air Malawi the consultant only reached Zomba on the 4th of March. Lost time was however made up over the weekend.

3. Acknowledgements

The consultant would like to thank the NSO Commissioner, Mr. C Machinjili, the Head of Demography, Mr. D Zanera and the Head of the GIS Unit, Mr. M Mwale for their support and cooperation during the consultancy. Special thanks to all the staff at the GIS Unit for their enthusiasm, assistance and positive attitude and their attentiveness during the training. The consultant would also like to thank the GDDS Project of the World Bank for sponsoring the consultancy.

4. Program context

With financial support from the Department for International Development (DFID) of the United Kingdom, the World Bank is implementing a project to assist 21 Anglophone Africa countries to participate in the General Data Dissemination System (GDDS). Participating countries are being assisted to participate in the GDDS through two separate, but linked projects both financed by DFID. The IMF is providing project management and technical support in the area of economic and financial statistics. The World Bank is providing technical support in the area of socio-demographic statistics. Both projects run concurrently until February 2010.

Technical assistance is being provided through the World Bank to help countries implement plans for improvement in population, health, agriculture, labor market, justice and security, management of statistical systems, GIS and small area statistics. The GDDS framework developed by the IMF provides the framework for the detailed elaboration of long-term statistical development strategies. Participating countries have already expressed their requests for technical assistance and both the IMF and the World Bank have developed their assistance strategies. Malawi was one of the countries which asked for technical assistance in the field of GIS and small area statistics.

5. Challenges facing the NSO in Malawi

It is evident that the increased demand for developmental socio-demographic statistics with regard to issues such as poverty and famine monitoring is exposing existing statistics data collection, integration, analysis and dissemination techniques, specifically in a country such as Malawi where **crop vulnerability and food scarcity** is a reality. Developmental issues all have distinct geographic or spatial components which must be part and parcel of the whole statistics collection and creation process for the statistics to be fully relevant and meaningful. The GIS Unit faces a real challenge with regard to educating line divisions within the organization to make use of their skills and potential. The fact that GIS and the use thereof with regard to statistical agencies in developing countries is a fairly new concept leads to inadequate understanding on how it must best be implemented and utilized.

The current GIS unit faces typical challenges of lack of funding and institutional support, insufficient data availability and maintenance as well as skill shortages and lack of government departmental cooperation and data sharing.

The GIS Unit faces the following challenges:

- Inadequate integrated and properly designed data warehouse and database
- Inadequate awareness within the organization as a whole regarding the potential and use of GIS in statistical agencies
- Lack of institutional support regarding the on going maintenance and sustainability of GIS
- Inadequate geographic base data
- Although a sufficient quota staff is in place, more skills development and training is needed for them to see the holistic process and potential of GIS
- Possible inadequate funding and operational assistance after census 2008

The census provides the NSO with the opportunity to arm the GIS Unit with the necessary hardware, software, data and skills to not only implement successful and efficient census mapping but also to act as a corporate service provider for the NSO throughout all of its activities, including inter-censal surveys and data maintenance.

There is inadequate insight amongst some of the NSO decision makers regarding the holistic potential of GIS and how it can benefit the organization in the short and long term. The unit was brought into existence four years ago as a census demarcation and mapping unit and is therefore mainly seen as "the guys who makes the census maps". There is therefore a need for the senior management of the NSO to be educated in the potential and use of GIS in

statistical agencies where it acts as a corporate service provider to the organization in general.

That being said, the immediate management of the Demography division does recognize the need and potential of GIS regarding the NSO.

The lack of skills among some of the GIS staff can only be remedied through hands-on experience and extensive training and technical support. The data and methodology components are severely lacking, limiting the functionality and potential of the GIS Unit.

A fully functional and supported GIS can provide the NSO with the following benefits:

- Greater data analysis and dissemination possibilities, in turn advocating statistics and raising the profile of the NSO
- The creation of an accurate administrative and statistical boundary spatial database
- Accurate, cost effective Census Mapping operations and with the end result being accurate EA demarcation and map creation.
- Facilitating the design and implementation of a Master Sample frame and maintaining this frame for effective survey implementation and operations
- Increasing the scope of spatial statistics analysis and census product creation, while also enabling the NSO to compare and analyse both the 1998 and 2008 census data in one spatial database.
- Further developing IT capacity within the NSO
- Fast-tracking relevant staff skills development
- Acting as a corporate service provider to the NSO
- Increasing the accuracy and effectiveness of census and survey data collection
- Saving cost and time in the long run due to decreased fieldwork activities because of better survey and census implementation methods.
- Building an accurate geo-statistical database

The NSO management recognize the fact that a functional GIS Unit with adequately trained staff will be able to add real value to the census analysis and dissemination phase. Spatial analysis can specifically assist analysts in identifying previously hidden correlations between datasets and trends.

As part of this mission, a detailed GIS Situational Analysis and Infrastructure Assessment document was compiled to detail mission findings and recommendations regarding the GIS Unit. Mission findings was detailed according to the five main components of a GIS, namely:

- Method
- Hardware
- Software
- Data
- People

Recommendations was made according to the following topics:

- Short term goals
- Long term goals
- Hardware requirements
- Software requirements
- Data requirements
- Human resource requirements
- Administrative requirements
- Institutional context

- Management requirements
- External assistance and training
- Maintenance and Support
- Inter-governmental Coordination
- Risks

The full document can be found in the Annexure. The other part of the mission was to provide training to the GIS Unit staff regarding GIS Principles as well as software specific training on ArcGis focusing on spatial queries, thematic mapping, metadata construction and geodatabase creation and principles. Training commenced on the 6th of March and was concluded on the 13th.

Manuals was created specifically for this training using mainly Malawi data for the practical exercises. The focus of the training was practical based with some theoretical focus during the thematic mapping module. In all, 5 manuals were created and they can be found in the Annexure. All 25 of the GIS Unit staff attended the training and the response and participation was good. Key areas for further training was identified which are discussed in detail in the GIS Unit Assessment and Situational Analysis document.

5.1.1 Obtaining the most from the GIS Unit

Institutional re-organization will have to take place with regard to the GIS Unit and its functions within the NSO. The role of the unit must be re-defined as a corporate service provider to the NSO with the following services in mind:

- Spatial data and digital map provider to all divisions and external users
- Spatial database custodian responsible for new data creation and maintenance
- Custodian of the Master Sample frame responsible for its maintenance, Secondary Sampling Unit creation according to relevant survey needs and updating
- Responsible for all spatial analysis according to NSO divisional and external user needs (for economic and socio-demographic data). Analysis to be done in conjunction with relevant unit expertise.
- Responsible for Census Cartography revision and maintenance
- Responsible for GIS attribute data integration, updating and maintenance
- Responsible for spatial analysis and graphic dissemination of the Census Atlas
- Responsible to host the spatially enabled web application spatial database.

6. Overview of meetings, discussions and training

The following meetings and discussions took place:

Wednesday, 5th March

- An introductory meeting was held with Mr. Zanera and Mr. Mwale. During this meeting the schedule for the rest of the mission was discussed.
- Following that, another introductory meeting was held with the NSO Commissioner, Mr. Machinjili. It was decided that a briefing session would be required at the end of the mission.
- Informal discussions was held with Mr. Mwale and Mr. Wachepa where the current status of the GIS Unit and its Census operations were discussed. A question and answer session followed where the consultant asked specific questions relating to the assessment review.
- An introductory meeting followed with the GIS Unit staff where after training issues and scheduling was discussed with Mr. Mwale.

Thursday, 6th March to Thursday, 13th March

Training was provided to the whole GIS Unit in the following:

- GIS Basic Principals and concepts
- ArcGis use, thematic mapping, spatial and attribute queries, geodatabase creation
- Digitizing principles, digitizing in ArcGis, digitizing in Geomedia
- Metadata use and creation in ArcGis

The following persons attended the training:

NAME	POSITION
M Mwale	GIS Unit Head; Statistician
V Mamda	GIS Team Leader; Assistant Statistician
M Wachepa	GIS Team Leader; Assistant Statistician
J Mkandawire	GIS Team Leader; Statistical Clerk
P Ntenda	Senior Cartographer
G Msiska	Senior Statistical Clerk
J Kapalamula	Statistical Clerk
K Manda	Assistant Statistician
O Banda	Statistical Clerk
B Mpelembe	Statistician
J Khakona	Statistical Clerk
C Buleya	Senior Statistical Clerk
E Sabuni	Statistical Clerk
F Kalonga	Statistical Clerk
G Naliya	Statistical Clerk
T Maonga	Senior Statistical Clerk
J Chipili	Statistical Clerk
T Mineyasi	Statistical Clerk
C Chilunga	Cartographic Assistant
H Saidi	Senior Statistical Clerk
B Modi	Statistical Clerk
G Likoloma	Cartographer
H Nkambule	Statistical Clerk
A Chavula	Statistical Clerk
J Nyirenda	Statistical Clerk

Thursday, 13th March

- A debriefing session was held with the Commissioner, Mr. Zanera, Mr. Wachepa, Mr. Osembe and Mr. Freedman where some key issues were raised and discussed regarding the assessment of the GIS and training specifically.

Informal meetings was held every late afternoon with Mr. Mwale and Mr. Zanera to discuss the day's activities, provide feedback and obtain clarification on GIS implementation issues.

7. Overview of technical assistance provided

7.1 GIS situational analysis and assessment

The GIS Unit was critically assessed according to hardware, software, methodology, staff skills and training needs and data availability and use. A report was created and presented to management that detailed the findings and specific recommendations.

7.2 Training

As noted, the following training was provided:

- GIS Basic Principals and concepts
- ArcGis use, thematic mapping, spatial and attribute queries, geodatabase creation
- Digitizing principles, digitizing in ArcGis, digitizing in Geomedia

- Metadata use and creation in ArcGis

Specific training manuals was developed using mostly Malawi data in order to make the practical exercises more effective.

7.3 Additional assistance

The consultant provided additional assistance not detailed in the original terms of reference.

These included:

- Providing the GIS Unit with DNR Garmin software and demonstrating the direct downloading and geocoding capabilities of the software as well as how directly downloaded GPS coordinates can be exported as ArcGis shapefiles.
- The consultant noticed that all the PCs in the GIS Unit was severely affected with viruses and spyware, contaminating the registries specifically of the workstations. Consequently the consultant provided the GIS Unit with free registry cleaner software which was installed on all the PCs. Recommendations regarding the IT security of the GIS Unit were provided in the GIS Unit Assessment document.
- The consultant also provided the GIS Unit staff with a demonstration on the use and functionality of Google Earth and installed it on one of their workstations.

7.4 Training requirements

The current skill levels of relevant staff was assessed and training requirements and options discussed with the GIS Unit staff and management. Recommendations were made as part of the GIS Situational Analysis and Infrastructure Assessment document.

7.5 Maintenance and sustainability

Maintenance and sustainability issues was assessed according to:

- Skills transfer and capacity building
- The GIS itself
- Current and accurate data
- Budgetary issues

Discussions took place with the GIS Unit and NSO Management regarding these issues and the findings and recommendations was included as part of the GIS Situational Analysis and Infrastructure Assessment document.

8. Overview and assessment of problems and shortcomings encountered

8.1 Mission administration and schedule

Very few problematic issues was encountered during the mission itself. The NSO and GIS Unit staff was well prepared and was always available when the consultant needed them. They are well aware of the importance of GIS for the success of the census as a whole and therefore provided assistance freely and participated enthusiastically and with skill.

8.2 Technical and methodological issues

The GIS Situational Analysis and Infrastructure Assessment document discuss in detail methodological, logistical, capacity, equipment and infrastructural problems and shortcomings as well as recommendations on how to address them successfully.

8.3 Institutional Support and training issues

There are certain critical issues which needs to be addressed for the GIS Unit to reach its full potential. These are:

8.3.1 Funding and procurement

The GIS Unit is in the fortunate position to have a large permanent staff compliment assigned to it. However, as yet not all the staff have their own workstations and software to work on meaning many of them are not very productive due to the lack of equipment and software. It is therefore necessary for the NSO to equip the unit staff accordingly, with the necessary ancillary requirements such as a functional LAN and connectivity. The NSO management is aware of this problem and is in the process of addressing it by making the necessary funds available in the short term and in the long term to ensure that these needs are budgeted for in the annual budgetary process.

8.3.2 Training

By the same token, most of the GIS Unit staff have a field operations background with only basic PC literacy and vary limited exposure to GIS software, principles and operations. Therefore additional training is of the utmost importance if the GIS Unit is to become a sustainable asset to the NSO. Again, the NSO management is aware of this and training issues were discussed at length. Moreover, specific allowances will be made for training in the budget for the following financial year and the specific training needs have been detailed in the GIS Assessment document.

8.4 Specific short term implementation

In the short term, the GIS Unit management must ensure that the GIS Unit adds value to the downstream census processes such as enumeration and data analysis and dissemination in particular. They have the software and the skills to do basic spatial analysis and thematic mapping but they need to be afforded the chance to do it. Therefore, the NSO must make them part and parcel of the whole analysis process.

The same pertains to survey planning, analysis and dissemination. These issues are discussed in further detail in the GIS Assessment document.

9. Assessment of the way forward

The GIS Situational Analysis and Infrastructure Assessment document details specific processes that must be achieved in the short and long term in order for the GIS Unit to fulfill its role successfully within the NSO. The Census enumeration will take place in June, meaning that much of the latter part of the year will be focused on doing processing and refining the raw data. This invariably means a lull in activity for the GIS Unit, since their primary focus thus far was the census. This lull in activity will provide the GIS Unit with an ideal opportunity to focus on the following:

9.1 Strengthening skills

The GIS Unit can embark on an in-house skills enhancement programme. Persons within the Unit who are stronger in the use of GIS and has better PC literacy must ensure that all the persons whose skills are not up to scratch are assisted in hands on practical exercises in order to build their skills and confidence regarding GIS use. The manuals provided by the consultant can be worked through again. By that time, according to NSO management, all GIS Unit staff will have their own workstations, although software might still be a problem. Whatever the case may be, care must be taken that each person are afforded the chance to work though the practical exercises on their own since it is the only way to build confidence and skill on GIS software. The Unit can also devise their own exercises using the 1998 Census data to focus on thematic mapping and analysis issues. The consultant is also more that willing to create additional practical exercises for the GIS Unit if they provide him with the 1998 Census data and will do it free of charge.

9.2 Building capacity through survey data analysis

Another activity that the GIS Unit can embark on is the creation of a survey data enhancement programme. For example, the Multiple Indicator Cluster Survey (MICS) was recently completed. The data have been captured and processed. This is an ideal opportunity for the GIS Unit to acquire the data, link it with the relevant primary sampling units and embark on a spatial analysis and thematic mapping exercise. The results can be neatly

documented and presented to the NSO management as an example of how the Unit can add value to survey data analysis and dissemination. It is crucial for the GIS Unit to be pro-active in this regard since they cannot only depend on senior management to improve the awareness of GIS within the NSO.

10. NSO Counterpart actions

The consultant's counterpart at the NSO is Mr. Macleod Mwale. The following actions are suggested for the counterpart:

Short Term:

- Ensure the census mapping process is completed and all relevant enumeration maps are created
- Ensure that Adobe pdf files are created of each EA map.
- Ensure that the GIS Unit plays a part in the Enumeration monitoring and tracking activity by producing thematic maps depicting the progress of enumeration, EA completion, questionnaire collection and enumerator payment.
- Ensure the implementation of the skills strengthening programme after census enumeration has been completed
- Ensure the implementation of a programme where current survey data (for example MICS), is linked to the relevant primary sampling units in order to do analysis and dissemination
- Ensure that all GIS Unit staff receive workstations, adequate office space, furniture and connectivity
- Ensure that the other short term implementation processes as specified in the GIS Assessment document is realised

Long term:

- Ensure that the training as specified in the GIS Assessment document is catered for in the annual budget
- Ensure that the software as specified in the GIS Assessment document is taken into consideration when determine expenditure
- Ensure that the GIS Unit management is made part of the Census data analysis team and that the Unit itself is taken into consideration during the analysis and dissemination process.
- Ensure that the long term implementation imperatives as specified in the GIS Assessment document is fulfilled.
- Ensure that the necessary training and skills transfer activities are undertaken
- Try to acquire the necessary scanned 1:50000 topographic map sheets from the Surveyor General.

11. Deliverables

The following table depicts the expected deliverables, whether they were achieved or not and accompanying reasons.

DELIVERABLE	SUCCESSFULLY COMPLETED
GIS Situational Analysis Document	The second draft of the document was completed and provided to the NSO for input. It has been finalized and can be found in the Annexure.
GIS Implementation Document	GIS Implementation issues was dealt with and is part of the assessment document
GIS Infrastructure and upgrading plan	Infrastructure and upgrading issues have been dealt with and also forms part of the assessment document
Skilled staff in GIS software use and thematic mapping	The training provided was sufficient in providing the GIS staff with a better understanding of ArcGis use and thematic mapping while it also focused on a number of other issues as specified in this document. The NSO indicated the need for additional training covering a number of issues which are detailed in the assessment document.

11.1 Additional Deliverables

This pertains to additional deliverables not specified for this mission.

- Basic training in on-screen digitizing on two different GIS software packages
- Training in GPS data downloading and conversion

12. Annexes

12.1 Annexure 1: Original Terms of Reference for Mission 1

General Data Dissemination System, (GDDS phase 2) Socio-Demographic Statistics Project for Anglophone Africa: Provision of technical assistance as a lead expert for the topic (module) Geographic Information Systems to the Malawi National Statistics Office (NSO), Zomba.

Background

With financial support from the Department for International Development (DFID) of the United Kingdom, the World Bank is implementing a project to assist 21 Anglophone Africa countries to participate in the General Data Dissemination System (GDDS). Participating countries are being assisted to participate in the GDDS through two separate, but linked projects both financed by DFID. The IMF is providing project management and technical support in the area of economic and financial statistics. The World Bank is providing technical support in the area of socio-demographic statistics. Both projects run concurrently until February 2010.

Technical Assistance

Technical assistance is being provided through the World Bank to help countries implement plans for improvement in population, health, agriculture, labor market, justice and security, management of statistical systems, GIS and small area statistics. The GDDS framework developed by the IMF provides the framework for the detailed elaboration of long-term statistical development strategies. Participating countries have already expressed their requests for technical assistance and both the IMF and the World Bank have developed their assistance strategies. Malawi is one of the countries which asked for technical assistance in the field of GIS and small area statistics.

Terms of Reference

Background

The Malawi NSO is currently on the eve of their Population and Housing Census enumeration which takes place from the 1st to the 21st of June. They have identified a functional and operational GIS as one of the focus areas which must be addressed in order to achieve accurate spatial analysis, thematic mapping and dissemination of census results specifically and annual mandated statistics in general.

To this end they have requested a Technical Assistance mission which will focus on these issues.

With regards to the mission itself, it has been agreed that there will be two types of reports. First there is the report of the consultant about the mission, secondly, the report of the staff of the NSO. The consultant will assist the staff of the NSO to draft their report where necessary.

Separately, the consultant will have to draft his own mission report. This report will use the format that will be provided in detail by the World Bank before the mission. It will comprise of: a) introduction, b) background, c) detailed agenda of all working days (in annex), d) description of the type of discussions, e) overview of all technical advises given, f) overview of problems and shortcomings encountered, g) overview of the own assessment of these issues, h) assessment of the way forward, i) list of recommendations of work to be done by the counterpart for the next period till the next visit, j) list of deliverables achieved/not achieved (and why), k) List of persons worked with for each of the days.

The NSO's long term objective is for GIS to act as a successful data creation, integration, analysis, mapping and dissemination tool through the rest of the census processes and to

instill the GIS Unit as a service provider for all the NSO line functions. In addition to this is the enhancement of the operations of the GIS Unit and improvement of the skills of its staff regarding GIS principles in general and software use specifically.

Purpose of the assignment

The purpose of the assignment would be to successfully complete the mission at the Malawi NSO. The following priorities have been set for the mission:

1. Priority 1: GIS Situational Analysis
2. Priority 2: Training and skills transfer

Priority 1 will comprise 50% of the mission time and priority 2 will comprise the other 50%. The total consultant time for the mission is 12 days divided as follow:

- 10 days actual mission time, can also be used in part for report writing
- 2 days consultant preparation and additional report writing time

Following are the objectives and planned activities by priority for the mission:

Priority 1

- Objectives
 - GIS Unit assessment according to hardware, software, IT infrastructure, data and methodology.
 - Institutional analysis of the position of GIS in the organization
 - Technical Assistance in GIS Unit planning and implementation
 - Determine current staff skill level with staffing and training needs.
- Activities
 - Fulfill the necessary functions to accurately implement the objectives listed above.
 - Create GIS situational analysis document with findings and recommendations containing the following:
 - Infrastructure, hardware and software assessment
 - Staff skill and training assessment
 - GIS implementation plan with costs and timelines
 - The use and relevance of Geospatial Information Technology for the NSO in the short and long term

Priority 2

- Objectives
 - Skilled staff to ensure effectiveness of GIS unit
- Activities
 - Practical, hands-on training to cover the following issues:
 - ArcGis software use
 - Spatial analysis and thematic mapping
 - Metadata construction
 - Spatial database design and maintenance
 - Specific GIS operations, such as buffering, geo-coding and geo-processing.

Skill requirements

The consultant would need relevant and GIS experience and skills within the African context and need to read and write English fluently. GIS experience needs to be hands-on and practical instead of purely theoretical.

Deliverables

The deliverables are listed by priority:

Deliverables for Priority 1:

- GIS Situational Analysis document
- GIS Implementation Strategy document
- GIS infrastructure implementation and upgrading plan

Deliverables for Priority 2:

- Skilled staff in GIS software use and thematic mapping

A concluding Mission Report will form part of the final deliverable as well as a report by the NSO on the mission success and value.

Duration

As noted, the total consultant time for the mission is 12 days with 10 days mission time and 2 days preparation time.

Timing

To be completed from the 3rd to the 14th of March, 2008.

12.2 Annexure 2: List of Abbreviations and Acronyms

NSO	National Statistics Office
EA	Enumeration Area
GIS	Geographic Information System
IT	Information Technology
GDDS	Global Data Dissemination System
IMF	International Monetary Fund
DFID	Department for International Development
GPS	Global Positioning System
MICS	Multiple Indicator Cluster Survey

12.3 Annexure 3: List of Participants

Participants from the NSO

Name	Designation
Senior Management	
Mr. C Manchinjili	Commissioner
Mr. D Zanera	Head: Demography
Mr. M Mwale	Head: GIS Unit
GIS Unit	
V Mamda	Assistant Statistician
M Wachepa	Assistant Statistician
J Mkandawire	Statistical Clerk
P Ntenda	Senior Cartographer
G Msiska	Senior Statistical Clerk
J Kapalamula	Statistical Clerk
K Manda	Assistant Statistician
O Banda	Statistical Clerk
B Mpelembe	Statistician
J Khakona	Statistical Clerk
C Buleya	Senior Statistical Clerk
E Sabuni	Statistical Clerk
F Kalonga	Statistical Clerk
G Naliya	Statistical Clerk
T Maonga	Senior Statistical Clerk
J Chipili	Statistical Clerk
T Mineyasi	Statistical Clerk
C Chilunga	Cartographic Assistant
H Saidi	Senior Statistical Clerk
B Modi	Statistical Clerk
G Likoloma	Cartographer
H Nkambule	Statistical Clerk
A Chavula	Statistical Clerk
J Nyirenda	Statistical Clerk
External Consultants	
Mr. H Freedman	Consultant: GDDS
Mr. J Osembe	Consultant: UNFPA

12.4 Annexure 4: Mission Schedule

TIME	ACTIVITY
Tuesday, 4 March	Due to flight cancellations and subsequent delays courtesy of Air Malawi, the consultant only arrived in Blantyre at 11h30 Tuesday evening and arrived in Zomba at 1h30 Wednesday morning. All lost time was however made up by completing the GIS Assessment and Situational Analysis report during the weekend.
Wednesday, 5 March	
9h00 – 11h00	Arrive at NSO. Introductory meeting with Mr. Mwale and Mr. Zanera. Consequent meeting with the two of them and the Commissioner, Mr. C Machinjili.
11h00 – 12h00	Introductory meeting with GIS staff. GIS infrastructure situational analysis
12h00 – 13h00	Lunch
13h00 – 16h00	GIS software, data, training and skills situational analysis
Thursday, 6 March	
9h00 – 12h00	GIS Introduction and Basic Principles training ArcGis training – ArcGis basics, Table maintenance Practical session
12h00 – 13h00	Lunch
13h00 – 16h00	ArcGis Training – Spatial and Attribute Queries Practical session
Friday, 7 March	
9h00 – 12h00	ArcGis training: Statistical concepts and thematic mapping fundamentals
12h00 – 13h00	Lunch
13h00 – 16h00	Practical sessions Case study – the pitfalls of thematic mapping
Saturday, 8 March	
11h00 – 18h00	Compilation of GIS Situational Analysis and Assessment document
Monday, 10 March	
9h00 – 12h00	ArcGis training: Geodatabase principles, building a personal geodatabase
12h00 – 13h00	Lunch
13h00 – 16h00	Practical session Using DNRGarmin software to download and geocode GPS coordinates and create shapefiles

Tuesday, 11 March	
9h00 – 12h00	ArcGis Training: Basic digitizing and data creation principles. Practical session
13h00 – 14h00	Lunch
14h00 – 16h00	ArcGis Training: Digitizing practical session
Wednesday, 12 March	
9h00 – 10h00	ArcGis review
10h00 – 12h00	Geomedia digitizing basics
12h00 – 13h00	Lunch
13h00 – 14h00	Preparation – debriefing presentation
14h00 – 16h00	Debriefing presentation to senior management
Thursday, 13 March	
9h00 – 12h00	Practical review exercises – ArcGis and digitising techniques; thematic mapping
12h00 – 13h00	Lunch
13h00 – 14h00	GPS data downloading and conversion revision
14h00 – 16h00	Training wrap-up and debriefing meetings
Friday, 14 March	
7h00	Leave for Blantyre and airport

12.5 Annexure 5: GIS Situational Analysis and Infrastructure Assessment document

To be provided as an accompanying, separate document

12.6 Annexure 6: Malawi GDDS ArcGis Manual

To be provided as an accompanying, separate document

12.7 Annexure 7: Digitizing in ArcGis Manual

To be provided as an accompanying, separate document

12.8 Annexure 8: Geomedia 4 Basic Digitizing Manual

To be provided as an accompanying, separate document

12.9 Annexure 9: Metadata principles and creation using ArcGis – Presentation

To be provided as an accompanying, separate document

12.10 Annexure 10: Metadata creation using ArcGis – Manual

To be provided as an accompanying, separate document

12.11 Annexure 11: Malawi Country Report

Introduction

The World Bank consultant to the GDDS Phase 2, GIS module, Mr. Francois Bezuidenhout arrived in Malawi on the 4th of March, 2008 and departed on the 14th of March. He was supposed to arrive on the 3rd but due to flight cancellations was only able to arrive on the 4th and begin training on the Wednesday. However, the lost time was made up and the objectives for this mission were reached. The mission was to do a situational analysis and assessment of the current GIS Unit while also providing necessary GIS and software training, focusing on ArcGis. The ArcGis training itself had to focus on thematic mapping, metadata creation and geodatabase creation. The consultant also provided basic GIS principles training and provided us with various software to help us in our GIS operations. It was also necessary for him and to draw up a detailed GIS assessment document with findings and recommendations.

All of these objectives were successfully reached during the mission.

The mission Terms of Reference detailed the specific activities and deliverables for this mission. The following tables are a breakdown of the mission objectives and deliverables with an indication of successful completion or not.

Specific Activities according to the ToR

ACTIVITY	SUCCESSFULLY COMPLETED
GIS Unit assessment according to hardware, software, IT infrastructure, data and methodology.	The GIS Unit assessment was completed successfully according to the items specified
Institutional analysis of the position of GIS in the organization	The institutional analysis was made and findings and recommendations will be part of the final report
Technical Assistance in GIS Unit planning and implementation	The assistance was provided and forms part of the GIS Unit assessment document
Determine current staff skill level with staffing and training needs.	Staff skills levels and training needs was determined and will form part of the final report.
Skilled staff to ensure effectiveness of GIS unit	Training was provided successfully in the following: ArcGis basics and thematic mapping Metadata creation Digitising Geodatabase creation GPS data downloading and geocoding Basic GIS Principles

Specific deliverables according to the ToR

DELIVERABLE	SUCCESSFULLY COMPLETED
GIS Situational Analysis Document	The first draft of the document was completed and provided to us for input and will be completed after the mission.
GIS Implementation Document	GIS Implementation issues was dealt with and is part of the assessment document
GIS Infrastructure and upgrading plan	Infrastructure and upgrading issues have been dealt with and also forms part of the assessment document
Skilled staff in GIS software use and thematic mapping	The training provided was sufficient in providing the GIS staff with a better understanding of ArcGis use and thematic mapping while it also focused on a number of other issues.

Timing

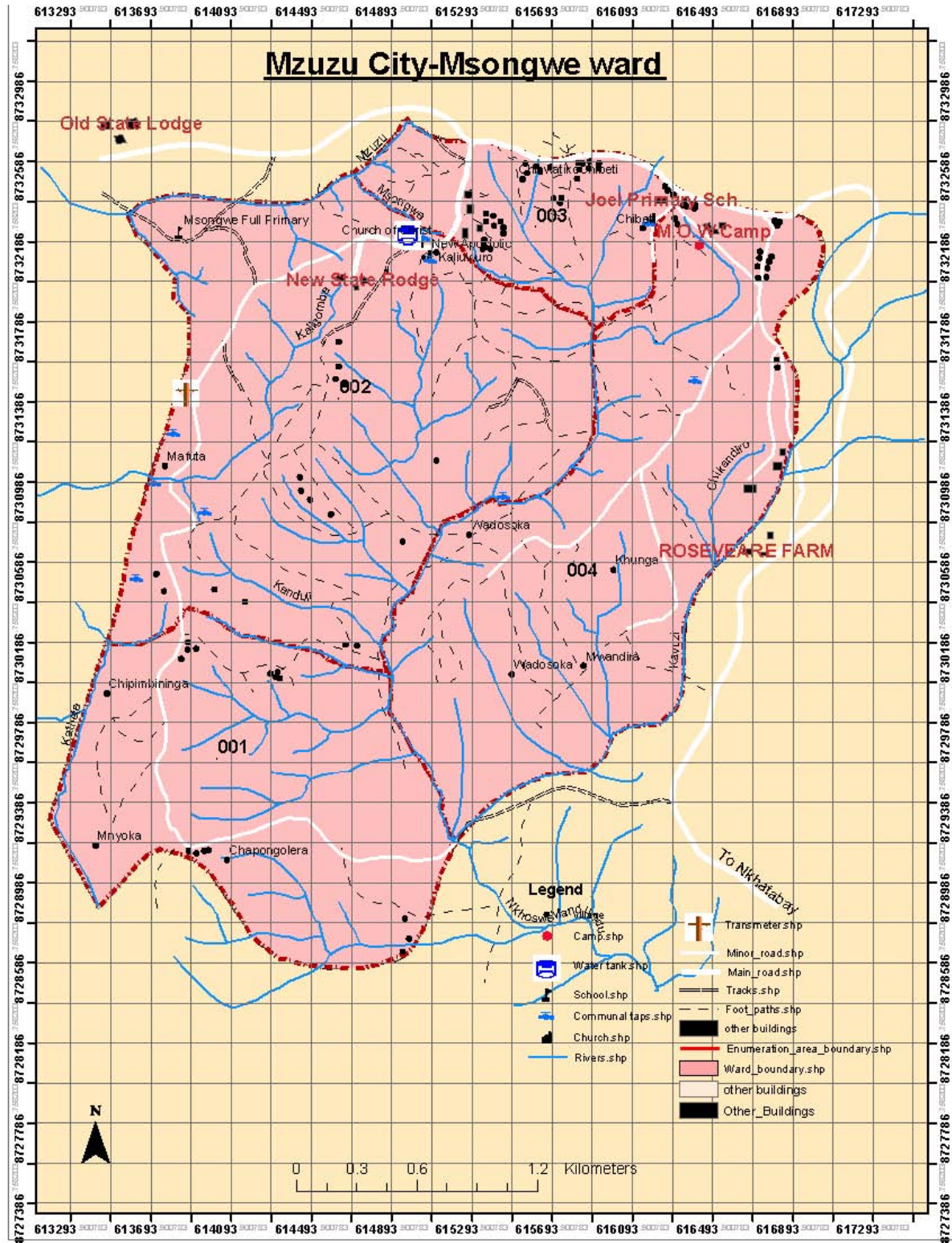
The time allocated to this mission was sufficient and allowed us to cover all the activities successfully.

General remarks

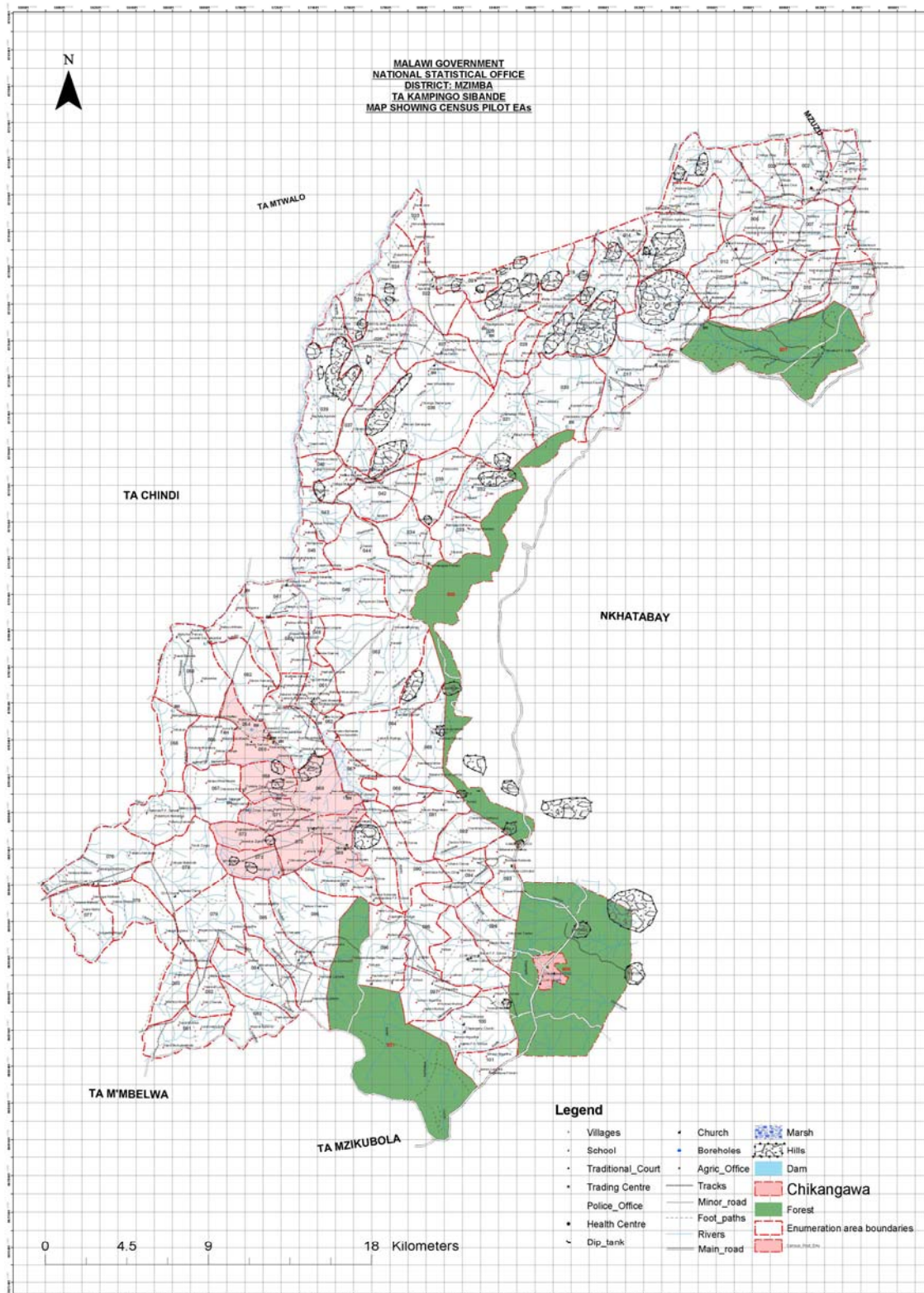
The mission was successful in providing us with the necessary knowledge of what we need to do to move our unit forward and make it sustainable. It also provided us with an understanding of our role within the NSO. The training went well and covered all the aspects that we needed, although we will need a lot more training in future, specifically when the census results are out.

12.12 Annexure 12: Examples of digital EA map products created by the GIS Unit

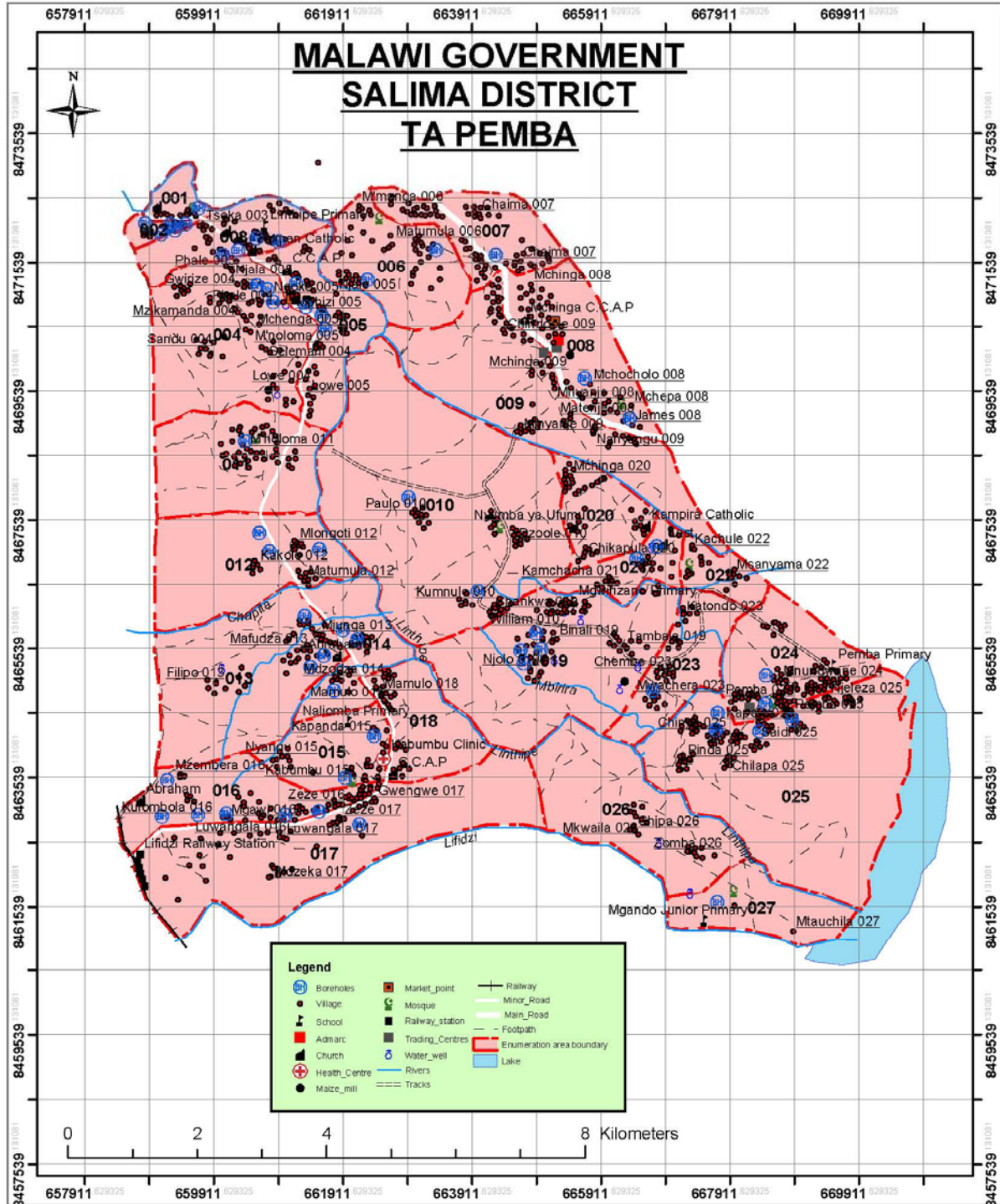
EA Map



District Map



Traditional Authority Map



12.13 Annexure 13: Malawi GIS Mission Debriefing Presentation

To be provided as an accompanying, separate document