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Report of the training workshop on
**GIS & Remote Sensing for effective resource
management in Africa**



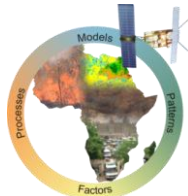
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Sustainable Development of Research Capacity based on GLOWA Volta

**Residence Prestige
Ouagadougou, Burkina Faso**

17 – 20 AUGUST 2010

(TUTORS: NOELLIE RÜTH, DANIEL EILERTZ, DR. TOBIAS LANDMANN)



INTRODUCTION

Within the framework of the GLOWA project activities, the GLOWA VOLTA NGO organized a training workshop on Geographic Information System (GIS) and Remote Sensing from August 17th to August 20th. The global aim of this workshop was to initiate participants into the GIS software, especially concerning the following domains:

- Searching for information provided by satellites;
- Processing and analysis of geographic information;
- Learning how to use GIS and Remote Sensing software.

A total of 23 participants took part in this workshop organized in the Residence Prestige in Ouagadougou. It was facilitated by Dr Barry, general coordinator of the GLOWA project. He began the session at 9 o'clock by welcoming all participants and explained the aims of this workshop to them. He later announced that the GLOWA project was coming to an end and the start of WASCAL project, connected with further workshops, would take place shortly. After that, the coordinator of the workshop, Dr. Kofi Nyarko invited all participants to briefly introduce themselves. The workshop consisted of two modules: Geographic System Information and Remote Sensing.

I. GEOGRAPHIC INFORMATION SYSTEM

1. First session of training

The first session of training began with the installation of the ArcGIS software on the computers of participants. Trainers group came from Germany and consisted of Noellie R uth and Daniel Eilertz. They first presented the theoretical frame of GIS before beginning to show case ArcGIS software applications. This module took them two days. The first session consisted of:

- Introducing the ArcGIS software and its functionality.
- Presentation of standard functions within ARC Map;
- Presentation of tool box functions;
- A set of exercises about recording, selection of elements using several methods, creation of files using existent files and saving them in a folder.
- A practical exercise consisting of extracting west African areas, such as rivers, lakes, cities 100 kilometers around these lakes and rivers and population density in these areas.

The session closed at 4 p.m. During this session, the trainers were asked a set of questions on ArcGIS functionality, which the trainers answered.

- **Question 1:** Why do we not have the same functions box in ArcGIS software as the trainers?
Answer: Because you activated 'typical install' and we activated 'complete install'. So, you have to activate the button 'complete install' to have the same function box displayed, but you will need too much time and free space on your disk to install the software in this way.
- **Question 2:** How will we know if a city is not selected on a map with Arc MAP?
Answer: cities selected are blue on the map and cited unselected are black.
- **Question 3:** How can we know if there is a particular function in ArcGIS software?

Answer: You have to read the software's help document or other documents about ArcGIS on the internet to get a functions list and learn what they can do. If you need a function now, you can find it by clicking on **search** and writing its name.



GIS session with participants



Practical session with participants

2. Second session of training

At the beginning of this second session, participants suggesting to the trainers to go back to the last part of the first session. The trainers showed them again how to create a geographical map. After a short revision, they gave them a set of exercises and practices with ARC map. The first module of training finished at 13 o'clock. These two sessions of training allowed the participants to become familiar with GIS and the ArcGIS software. After the lunch break, the trainers installed the ERDAS software and introduced the theory of Remote Sensing. As in the first session, participants asked a set of questions and trainers answered to these questions.

- **Question 1:** Is there a standard proportionality between the original map and extract map?
Answer: No, there isn't. It depends on the user, who can give his extract map any size regardless of the original map.
- **Question 2:** How can we move a map with the mouse in the ArcGIS software?
Answer: In a tools box, select the hand symbol and slip it on the map to move it.
- **Question 3:** Do coordinates or the grid change when we move the map?
Answer: Try to move and notice. They don't change because the grid and the map are bound (fixed)
- **Contribution:** In order to display all the pictures on a map properly, we have to use the Degree minute unit instead of the UTM unit.

II. REMOTE SENSING

1. Third session of training

The first section of this third session was a training on Remote Sensing with ERDAS software. It was about:

- Obtaining Remote Sensing data;
- Presentation of ERDAS software and data import function;
- Data processing with ERDAS.

The second section was about atmospheric correction. Trainers presented the context of atmospheric correction before installing ENVI software. In order to help participants to understand atmospheric correction well, they gave them a set of exercises to do with ENVI software. Trainers ended the session by introducing the participants to the classification concept. This session helped participants to understand Remote Sensing and to use the ENVI software. The questions asked by participants were:

- **Question 1:** Do bands number 1 to 7 depend on the type of satellite?
Answer: Yes, they depend on the type of satellite. Users were encouraged to read a document about spectral theory.
- **Question 2:** How can we know that such a picture or color on the map is indicative of a particular object?

Answer: refer to the documentation on spectral theory and spectral signatures to identify an object that a picture or color represents. The second PowerPoint slide of the workshop gives the reflectance of various objects. Using reflectance, you can identify an object that a picture represents.



Remote Sensing session with participants



Practical session with participants

2. Forth session of training

The aim of this last session was to estimate the quantity of carbon loss through mapped land use change during a 10 year period. To do this, the trainers used the following steps:

- Determination of a matrix that shows which land use classes changed, as well as the area of change, during a period of 10 years using ERDAS software ;
- Estimation of the areal extend of forest transformed during a period of 10 years ;
- Estimation of carbon quantity that was affected by the transformation during a period of 10 years.

Participants followed these steps and obtained a final result that was saved as an Excel spreadsheet file. This session was rich in debate because participants could not designate other land use changes (apart from forest transformations) They finished this last session with a practical exercise to import GPS points, from a portal GPS devise, into the GIS system on the computer. These four sessions allowed participants to get familiar with satellite data sets, image process routines, analysis methods and how to view and explore their results in a ArcGIS system, ERDAS and ENVI software. Questions asked during this session were:

- **Question 1:** How should one choose the colors to represent transformation or other changes in land use?

Answer: It depends on profession of a person. A town planner and environmentalist should not have a same color. The important thing is to explain the transformation result from the land use change mapping.

- **Question 2:** How do you import parameters for carbon stock changes, based on carbon content of forests and woodlands (non-forests), into an Excel spreadsheet file?

Answer: The carbon stock values per land cover are given from literature references and are universal. You can get default carbon stock changes from land use change also from the internet. They indicate the quantity of carbon loss through transformation of one hectare of forest.

III. CLOSURE OF WORKSHOP

In summary, Mr. Barry expressed his satisfaction on the results of the workshop. He also thanked the trainers for their availability and their effort. He expressed his gratitude to Mr. Koffi, the coordinator of this workshop, for a good unfolding of this training, and thanked the participants for their contributions. He also thanked all those who took part in the organization of this workshop. He reminded participants that other workshops particularly on data bases would take place soon and hoped that they would all participate in these workshops, given the direct connection between this workshop and the latter. He also commented on the social interest of workshops to participants because, beyond training, they help participants to establish good relationships and to make the acquaintance of others. Lastly, he reminded all participants not to hesitate to get into touch with him.

The trainers thanked the participants for their contributions. Furthermore, they encouraged them to repeat all the exercises that they had done during the workshop, in order to check how well they had understood the modules they had been taught.

Participants were asked what they thought about the workshop and provide criticism and suggestions to improve future workshops in this regard. They expressed their satisfaction with the workshop while noting some shortcomings and giving the following recommendations:

- Increase duration of the workshop because time was not really enough to assimilate modules that trainers taught.
- Have ERDAS manuals at participant's disposal, particularly on data importation with ERDAS software.
- Have complete versions of GIS software in order to use all functions they contain.

APPENDIX

APPENDIX 1: PROGRAM OF WORKSHOP

❖ From August, 17th to August 19th 2010

8 o'clock: Beginning of session
9: 30: coffee break
13 o'clock: lunch break
15 o'clock: coffee break
16 o'clock: End of session

❖ Friday, August 20th 2010

8 o'clock: Beginning of session
9: 30: coffee break
13 o'clock: End of workshop and lunch break

APPENDIX 2 : PARTICIPANTS LIST IN OUAGADOUGOU

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19	ZONGO Issa	ABV/WASCAL	76 07 58 03
20	SIDIBE Aminata	ABV/WASCAL	78 05 27 05
21	KOFFI	Coordinator	
22	Noëllie Rüth	Trainer	
23	Daniel Eilertz	Trainer	