

- Presentation of standard functions within ARC Map;
 - Presentation of toolbox functions;
 - A set of exercises about recording, selecting elements using several methods, creating files using existing files, and saving them in a folder.
 - A practical exercise consisting of extracting village boundaries, areas, such as rivers, lakes, and cities 100 kilometers around these lakes and rivers, and population density in these areas. The session closed at 4:45 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.
2. Second session of training: At the beginning of this second session, participants suggested to the trainers to take revision 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 the ARC map. The first module of training finished at 1 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 these questions.
- ❖ Question 1: Is there a standard proportionality between the original map and the extracted 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: To display all the pictures on a map properly, we have to use the Degree minute unit instead of the UTM unit.

3. REMOTE SENSING, Third session of training: The first session of this third session was 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.

GIS session with participants Practical session with participants.

4. The second section was about atmospheric correction. Trainers presented the context of atmospheric correction before installing ENVI software. To help participants 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 depending 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.

5. Fourth session of training: This last session aimed to estimate the quantity of carbon loss through

mapped land use change during a period of 10 years. 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 extent 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 device, 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 an 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 the profession of a person. A town planner and an environmentalist should not have the 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 the 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 changes and also from the internet. They indicate the quantity of carbon loss through the transformation of one hectare of forest.

CLOSURE OF WORKSHOP:

In summary, the CESA Secretary expressed his satisfaction with the results of the workshop. He also thanked the trainers for their availability and effort. He expressed gratitude to Dr. S. B. Bagal, Principal LGNSCOE and Dr. D. P. Joshi, Head of the Civil Engineering Department, and Prof. I. J. Bathe, 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 databases 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 in 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, to check how well they had understood the modules they had been taught. Participants were asked what they thought about the workshop and provided 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 the duration of the workshop because time was not enough to assimilate the modules that the trainers taught.
- Have ERDAS manuals at the participant's disposal, particularly on data importation with ERDAS software.
- Have complete versions of GIS software to use all functions they contain.

Photographs:



Figure 1 A glimpse during theoretical session of remote sensing for a batch of 5 attendees