



**PHASE 1\_3<sup>rd</sup> SESSION ARCGIS TRAINING AT KU GIS LABS:  
INTRODUCTION TO GIS: EXPLORING ARCCATALOG AND ARCGIS TOOLS  
3<sup>rd</sup> SESSION REPORT: 25<sup>TH</sup>-27<sup>TH</sup> JUNE 2014  
SCHOOL OF ENVIRONMENTAL STUDIES COMPUTER LAB**

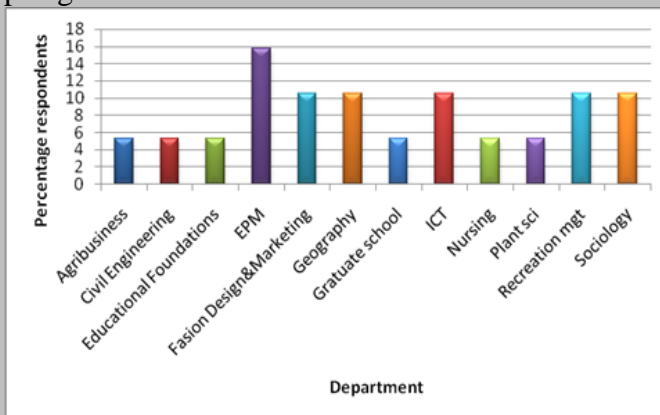
**PHASE 1\_3<sup>rd</sup> SESSION REPORT ARCGIS TRAINING: 25<sup>TH</sup> - 27<sup>TH</sup> JUNE 2014**

**Introduction: GIS Tools (ArcCatalog tools and ArcGIS Tools)**

The 3<sup>rd</sup> Session involved participation of the second group of KU Staff members. Although the majority of staff came from the Department of Environmental Planning and Management, there was representation of staff from 11 other departments providing an opportunity to explore the relevance of GIS to many subject areas. This also gave the opportunity to the training team in conjunction with ICT to expand the access to the ESRI ArcGIS License on Campus so that trained participants can practice what they have learned. The the computer labs wer identified and equipped with ArcGIS as follows:

1. Environmental Studies Computer Labs (Training)
2. Engineering and Technology Computer Lab (Training)
3. Geography Computer Lab (Training)
4. Computer & Information Technology Lab (Training)
5. KU Business and Students Service Centre (KU-BSSC) Computer Lab (Practice)
6. Post Modern Library Research Computer lab (practice)
7. KU Students Computer Centre lab (practice)

The other access points will be established as demanded by the individual Schools especially for postgraduate use.



*Diversity of KU staff participants in the GIS Training*



*KU Staff following the training in Session 3*



## **Day 1**

The training that started on the 25<sup>th</sup> of June 2014 as scheduled attracted 21 staff participants. 18 participants submitted back the pre-evaluation form. The training had targeted mainly academic staff who made 89% of the 18 participants. Two of the trainees were post graduate students (11%). The participants came from diverse departments.

Pre-evaluation forms were filled by the participant with an aim of assessing:

1. How they came to know about the training? 45% of the participant came to know about the training through an email invitation; 25% through website and 15 % each through advertisement notice and networking with each.
2. Which Esri product they have used: Majority of the respondents (50%) reported having not used any of the GIS software's before and the other 50% have been exposed to various GIS or remote sensing software's before.
3. Expectations from the training among the trainees were varied from knowing how to use the software (31%) to learning how to use it in their profession (29%). This demonstrates a need for further training to all academic staff members in the university to use geospatial knowledge for teaching and research.

## **Objectives**

The members of staff were introduced to the objective of the training. The main objective of the training is to teach the participant how to use ArcGIS as a tool for GIS. The other objectives aimed at introducing the participant to:

- i. What is GIS
- ii. What is ArcGIS (focusing on ArcMap and ArcCatalog tools)
- iii. What can ArcGIS do

This was achieved through an overview of what is GIS, how it is related with our Environment, that GIS is not for specific type of people but for all people including communities. The introduction of what is ArcGIS was aimed at bring to the attention of the participants the difference between GIS and



ArcGIS. Participants were therefore prepared to what approach will be taken to make them appreciate ArcGIS as a tool for GIS and demystify the belief that ArcGIS is a complicated tool to use.

Low uptake of the use of ArcGIS software necessitated the confiners of the training to come up with the best approach to teach the participant how to start off with ArcGIS on their own and in a very simple way that is approachable to people who never had any training of ArcGIS software before.

In the training, and after the definitions and concept of GIS was introduced to the participant, the teaching approach that was adopted for the ArcGIS software was to train using prepared data pre-copied to the computers they were using and mainly for Nairobi and Kenya. The copied Student folder contained two folders as shown in Figure 1. Each folder contained different datasets that aimed at training the student to handle data of all types and the character of those data sets.

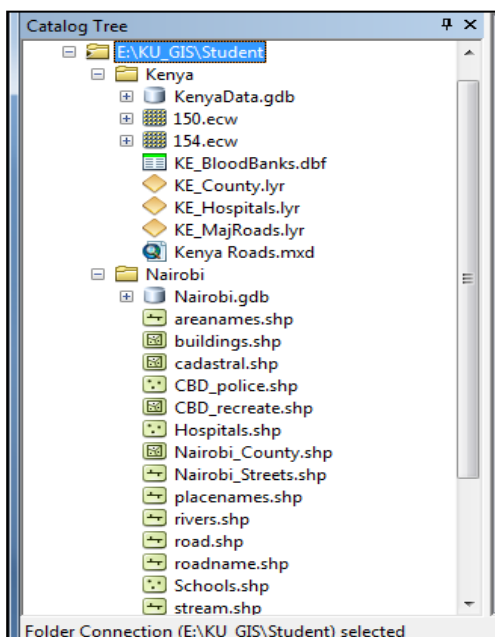


Figure 1: Student Folder Contents

The flow of the training combined the doing and the explanation in a step by step approach. This approach was adopted because in most of the cases when a new technology is introduced to the users, the biggest challenge is usually how to start using the software and how to navigate using the available



manuals. Manuals that are general to the end users sometimes do not consider the very basic concern of people who are not exposed to the technology at the lowest level. This thus puts off those who are not technologically oriented. The challenge is common to all developing countries.

In the first day of training, the basic explanations of Esri ArcLine of tools; ArcCatalog, ArcMap, ArcGlobe, ArcScene, ArcTool boxes and ArcReader were mentioned to the participant.

ArcCatalog was taught from the **Start menu, Program files, ArcGIS path** to show the participant where the software is installed in their computers. This basic approach gave the participants exposure of the path to follow suppose there are no shortcuts created or they use computers different from their own. Extensive explanation of the ArcCatalog was given and participant did the exercise using their computers to open the ArcCatalog and connect to the Student folder containing the pre-copied data. Figure 1 above shows a folder connection session in a Catalog Tree captured during the training. The ArcCatalog was extensively used to explore the character of the data and the information associated with the data.

The next step was to introduce ArcMap using the same approach and participant shown the similarities and difference of the ArcMap as the main working environment and the ArcCatalog as a data exploration tool. This culminated in doing exercise to start ArcMap on their computers, to locate the ArcTool box and closing the software. This ascertained that the student can be able to start the ArcMap program on any computer even when no shortcuts are created on the desktops. Figure 2 shows a screen shot of the training session.



*One of the trainer Mr Antony Gakobo Delivering an illustrated lecture*

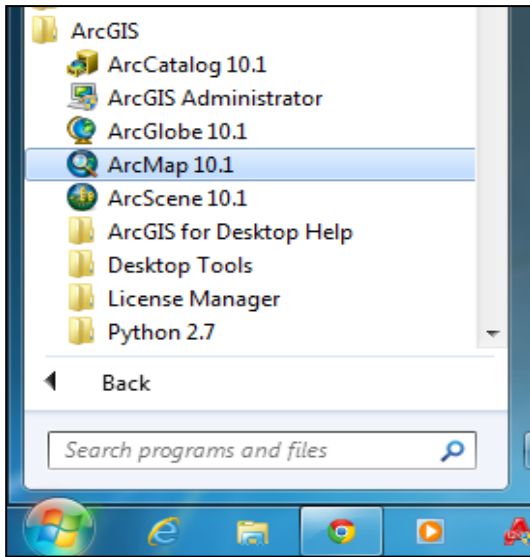


Figure 2: Starting ArcMap 10.1 from the Start.

The afternoon session was used to exercise how to add a map of Kenya with 47 counties and show quantities in graduated colors, using Area field as the value. 10 classes were graduated as shown in Figure 3.

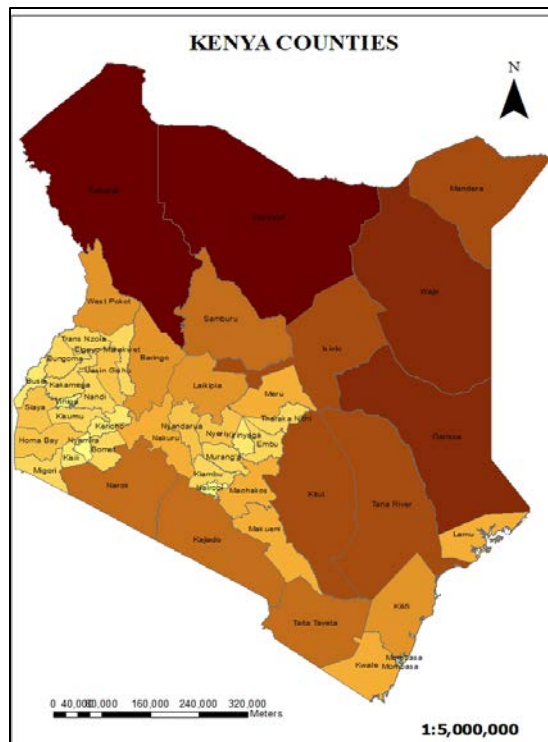


Figure 3: Kenya Counties



A report of the counties (Figure 4) was generated from the attribute table and exported in excel sheet for further editing and presentation.

COUNTY	Female	Male	AREA	PERIMETER
Baringo	0.419	0.581	0.877	5.964
Bomet	0.485	0.515	0.229	2.632
Bungoma	0.482	0.518	0.246	3.076
Busia	0.493	0.507	0.148	2.683
Elgeyo-Marakwet	0.509	0.491	0.245	4.064
Embu	0.403	0.597	0.23	3.339
Garissa	0.497	0.503	3.642	11.281
Homa Bay	0.513	0.487	0.386	3.41
Isiolo	0.508	0.492	2.06	10.181
Kajiado	0.457	0.543	1.774	7.28

Figure 4: County Population Report.

**Day 2**

Day two was a link up of the first day but geared to doing more exercise that opened a lot of explanations to the type of data, the ArcTool box, the data conversion and data projection. A map preparation and presentation closed the afternoon.

**Type of Data:**

Explanation of data geometry using points to represent hospitals, schools population density etc.

KE\_Hospitals Point geometry of Kenya Hospitals layer in the KenyaData geodatabase.

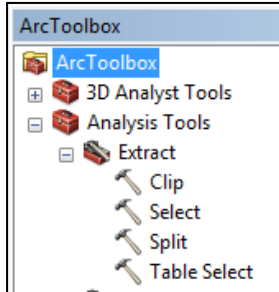
KE\_MajRoads Line geometry to represent linear features like railways and roads.

KE\_Census Polygon Geometry to represent Kenya Census.

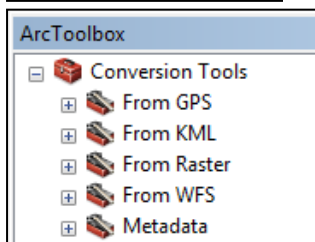
KE\_DEM  
 KE\_Eldoret The grid symbol to represent the raster data.



### The ArcTool Box:

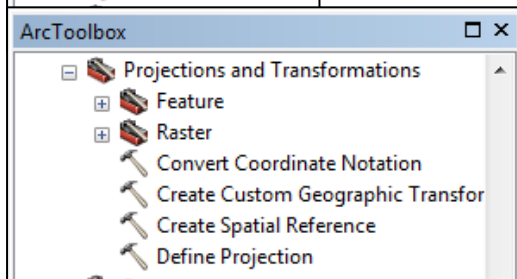


The analysis tools were explained and Select tool in the Extract sub-tool box was used in an exercise to extract a County in the CountyPopulation Geodatabase.



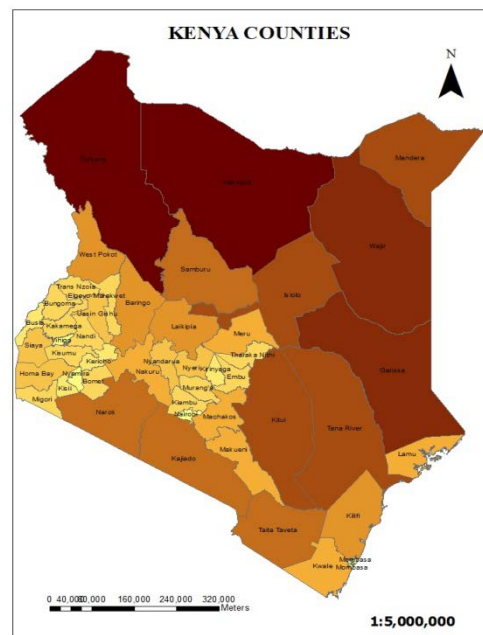
### Data Conversion:

This section was used to show the various tools available in ArcTool box to convert various data from one to the other. Participant appreciated the flexibility of working with ArcGIS using data from a big range of formats.



### Data Projection:

Projections and transformation Sub-tool box in Data Management Tools was expounded and define projection tool used to show how to define feature projections in case the data obtained from sources that never had projection



definition. AreaNames in the Nairobi data was used for the exercise to define the Projection to UTM Arc 1960.

### Map Preparation and Presentation:

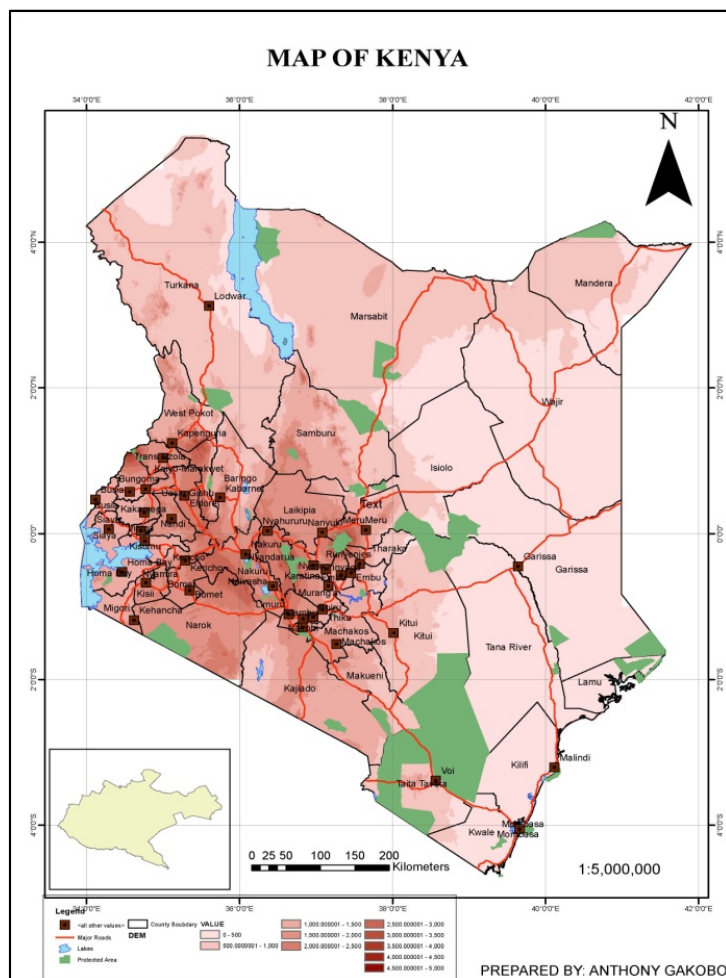
Participants were taken through the process as they do it on their computers to come up with a map.

The County population geodatabase map of Kenya was used to add layer, change their symbology, color, line weight and arrange them for presentation. The resulting map of Kenya shown on the left is the product of the exercise. Layout view was extensively used to add map objects (North arrow, Scale bar, Scale, legend, etc).



### Day 3

Day three started off with a summary of what was done in day two to bring the participant up to speed with what they were taught. A map of Nairobi County from the Students folder was used as an inset for the exercise.



A new data set of the County population stored in the KenyadataGeodatabase, different from what they used for preparing a map was used to expound more on the map objects and how to edit and place them in the layout view. Grids were added to the resulting map of Kenya is shown on the left.

This proved to the participants that indeed they can use the software to produce their own map which can communicate to the intended map user

Data management tool box was explored further and feature analysis tool box using extract tool was used to extract a county from the counties data set.

This exercise was used to give the student a

hand on training in the actual extraction of a feature from feature data set.

This allowed the training demonstrate the power of ArcMap in data analysis and presentation. Participants were shown how to insert different picture into their maps to communicate more using one set of a map.

The afternoon session closed the three day training with introduction to Remote Sensed data. Satellite imageries pre-copied to the Student folder in the computers were used to explain how different bands





record different set of data according to reflecting wavelength. The student were taken through the exercise of adding each band and explained what is contained in it. This was done by asking them what they could see reflected more. Knowledge of the data by Professor Onywere guided the class to understand the band reflecting e.g. the Aberdare forest, the Limuru tea zone, the Kitengela-Athi plains, the Wetlands etc. A combination of all the bands in a stack layer (Figure 5) was used to change the bands color to mimic the natural colors as identified by the class.

This was aimed at exposing the student to Remote Sensing as a set of data source for GIS. Participants appreciated the power in data acquired by satellite as they could see on their screens areas they are familiar with. An exploration of a 0.5 m high resolution image from Quick Bird, 2013 closed the training. Participants appreciated the differences between high and medium resolution images and also the difference coverage in term of Area.

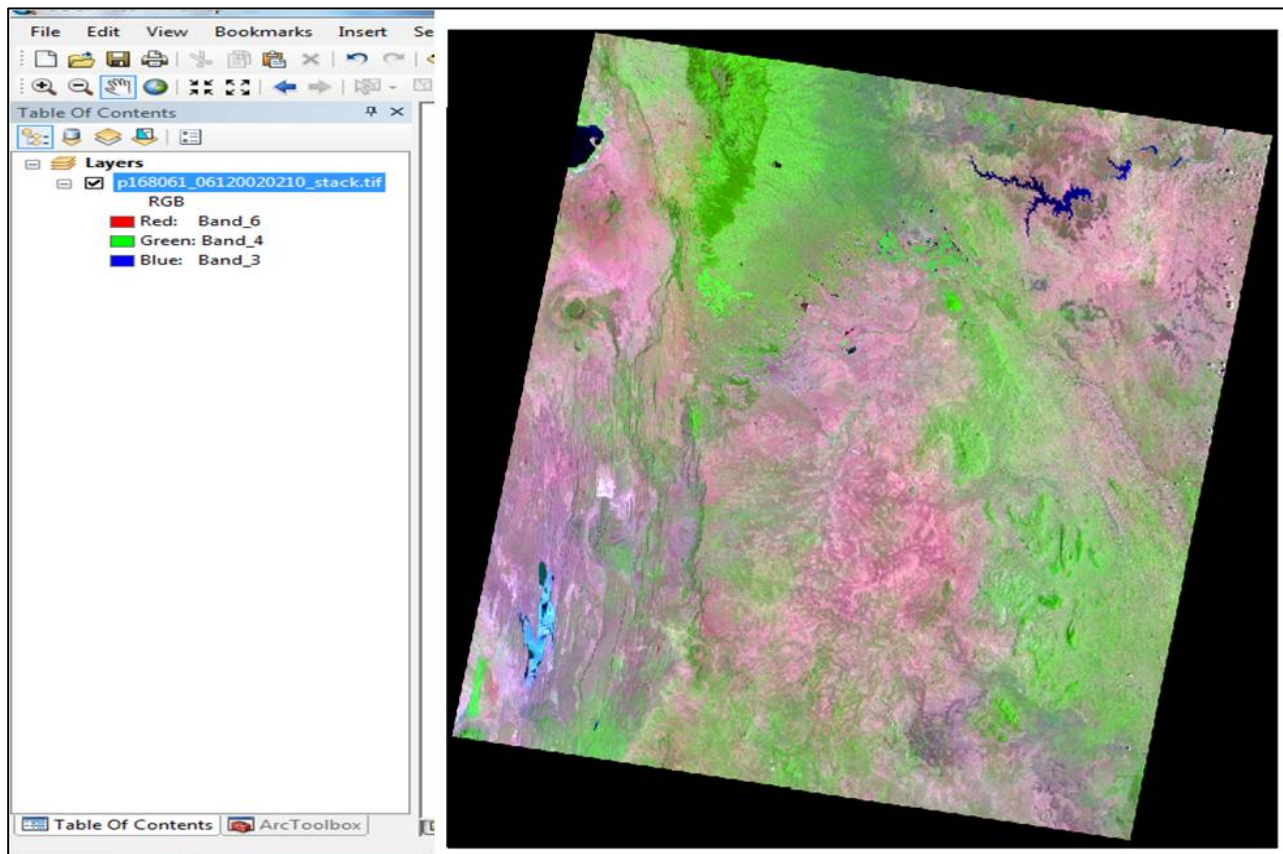


Figure 5: Remote Sensed Data



Video clips and photos of all training session were also captured and are available on the website.

Post-evaluation forms were filled and participants encouraged to continuing using the Lab to practice what they were taught until they come back for the advance training in July. The aim of the Post evaluation was to gauge the overall rating of the training:

1. How the student can be able to apply what they were taught. Over 64% of the respondent indicated they could apply all what was trained.
2. Would you recommend this training to others? 100% yes
  - Did the course meet your expectations? 100% yes
  - The course material was 100% clearly presented
  - Will you attend phase II of the training? 100% yes
3. Item liked most during the training. Presenters' scored 42 % on how well informed they are with the training and practical based scoring 33%.