

## SC404 - GIS for Analysis of Food Security and Sustainability Course

Course Duration: 10 Days

Training Fee: KSH 80,000 | USD 800

Course Registration [Register Here>>](#)

### 1.0. Introduction



Sustainability in the developing world context is poorly characterized, frequently challenged by both endemic food and resource scarcity, food safety, and political and social structures ill-suited for the effective implementation. Many areas around the world are experiencing enormously growth in tourism industry and large population growth, with a focus on urban areas. This growth may be causing changes in the relationship of human and land suitable for agriculture. This leads to decreasing of available fertile land for agriculture and depleting of food production especially with current climate change. Consequently, food security problems become immediate issues.

### 1.1. Course Overview

In this module, a number of food security and spatial analyses will be used to analyze country and household level vulnerability to food insecurity. This module defines sustainability as planning and policies aimed at preserving land suitable for agriculture. The rapid growth urban areas of the Metro-city of Nairobi, Kenya is the defined close system using as a study site; combining models and a rich case study, we introduce an example of spatially-explicit model-based simulations for land use land cover change scenarios within the rubric of sustainability realm for this region.

### 1.2. Course Objectives

This course will enable the participants:

- i. To develop and acquire skills as well as expertise in the application of GIS and remote sensing in analysis of food security and sustainability.
- ii. To develop necessary skills in practical geoinformatics to solve selected research problem of food security and sustainability.
- iii. To introduce multiple aspects of Geospatial technology in the study and analysis food security and sustainability.
- iv. To introduce knowledge and skills in geoinformatics and climate change for food security analysis.
- v. To be able to apply appropriate advanced spatial analysis and work-flows to food security and sustainability issues at a global scale.

### 1.3. Learning System

The teaching and learning system are projected-based learning module driven by hands-on experiments. The module includes context of food security, geoinformatics in food security

analysis, climate change and food security, and application of food security. To complete this module, students will be able to understand food security concept, to explore relationship between climate change and food production, and to use Geospatial technologies to tackle some of these selected issues.

#### 1.4. Course Content/Outline

- i. **Introduction to GIS and RS Data & Food Security:**
  - To introduce the application of GIS and RS tools and data in food security;
  - To explore GIS and RS data and applications in the context of food security in Thailand.
- ii. **GIS and RS as Tools in Food Security Analysis:**
  - Steps in food security analysis, Population targeting with GIS and RS;
  - Communicating and reporting food security with GIS and RS;
  - Use of mobile phone & web app for GIS data collection in assessment and surveys.
- iii. **Food Security Indicators:**
  - What is an Indicator of food security?
  - Calculating indicators method of food security;
  - Exploring multiple aspects of indicators for food security;
  - Collecting food GIS data from households.
- iv. **Climate Change Data and Food Availability:**
  - Introduction to the concept of climate change;
  - The impacts of climate change on food security;
  - Using GIS and RS and climate change data on food availability issues.
- v. **GIS and RS in Accessibility & Sustainable Agriculture Systems:**
  - Principles of sustainable development for the improvement of agricultural production;
  - Application of crop model, GIS and RS related to agriculture systems;
  - A case study of accessibility and sustainable agriculture for Kenya.
- vi. **Using GIS and RS in Food Utilization Issue:**
  - Food utilization: safety, quality and availability;
  - How food safety will affect food security in the selected population?
  - Food-borne disease analysis using spatial statistics & information dissemination to public;
  - Application of GIS and RS to specific cases related to food safety in Kenya.
- vii. **Land use Change Model and Food Stability:**
  - What is Food stability? And What are effects of land use change and food stability?
  - Introduction to advanced GIS and RS in land use change a case specific of Kenya;
  - Land use classification using supervised and unsupervised classification;
  - Application of GIS and RS tools in Land use change modelling and weather variability.

#### 1.5. Case Studies

##### Case Study 1 - GIS Data:

- Creating the field questionnaire of selected topic; Specify spatial data for creating the model;
- Field surveys & data collection by mobile phone or selected tool; Plotting based maps.

### Case Study 2 - Access and Risk:

- Conclude basic concept of food access & specify spatial data for creating the risk model;
- Creating food security risk model for Kenya by using GIS and Remote Sensing methods.

### Case Study 3 - Food Availability:

- Conclude the basic concept of food availability and relationship with climate change;
- Analysis of climate change data and food availability by using GIS and RS methods;
- Specify spatial data and climate data of food availability.

### Case Study 4 - Food Safety:

- Conclude the basic concept of food utilization & safety; Specify GIS data of food safety issue;
- Creating GIS map and layout of food-borne disease using spatial statistics.

### Case Study 5 - Land use Change Model and Food stability:

- Conclude the basic concept of land use change model and food stability;
- Specify spatial data for creating land use change model;
- Creating GIS land use change model of selected food security issues;
- Design & implement GIS projects that integrate GIS & RS data and GPS-based filed information.

## 1.6. Expected Learning Outcomes

On completion of this course, the participants are expected to:

- i. Obtain solid skills and experience in application of geo-information and earth observation techniques in analysis of food security and sustainability.
- ii. Acquire knowledge and skills needed for the collection, interpretation, and management of spatial information, using remote sensing and geographic information systems to support food sustainability.
- iii. Gain in-depth skills using Geospatial tools that help in development and creation of a land use Change Model for Food availability and stability.
- iv. Get acquainted with relevant GIS and other geo-techniques to provide project specific solutions in the field of climate change and food security as well as sustainability.

## 1.7. Training Materials (Hardware and Software)

1. Android Smartphone;
2. A Laptop or PC;
3. Satellite/drone images;
4. ENVI Software;
5. ERDAS Imagine;
6. ArcGIS & Q-GIS;

## 1.8. Training Style and Approach

1. On-site instructor-led training;
2. On-line training (optional);
3. Use of PowerPoint Slides;
4. Fieldwork Activities/Exercises;
5. Use of Case Studies on Food Security;