



Technical Report

**TRAINING COURSE  
ON  
Geoinformatics Applications**

31 January -11 February 2016

Amman, Jordan

**Japan International Cooperation Agency (JICA)  
and**

**International Center for Agricultural Research in the Dry Areas (ICARDA)**



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## EXECUTIVE SUMMARY

### **Name of the project**

Capacity Development for Agriculture and Water Management for Iraq and Regional countries

### **Partners**

Japan International Cooperation Agency (JICA)

International Center for Agricultural Research in the Dry Areas (ICARDA)

National Center for Agricultural Research and extension (NCARE) - Hashemite Kingdom of Jordan

### **Purpose**

To enhance Capacity Development of government officials and researchers who are engaged in irrigation projects and agricultural development in Iraq and other countries.

### **Specific objectives of the training course on Geoinformatics Applications**

Up-to-date knowledge and enhanced capacity in Geographic Information Systems and design, implementation, management, and reporting of agricultural research related to water-use efficiency, drought monitoring, and crop improvement for sustainable agricultural production.

### **Specific outputs**

Nine professionally-trained NARS partners from Iraq, 2 from Jordan and 5 from other countries: 2 from Tunisia, 1 from Egypt, 1 from Lebanon and 1 from Palestine participated on Improving GIS application with emphasis on dry land agriculture. While 9 Iraqis, 2 Jordanians, 1 Tunisian and 1 Lebanese were funded by JICA, the other participants were sponsored by the Arab Fund for Economic and Social Development (AFESD).

### **Specific outcomes**

Design, implement, manage, analyze and report on research and development in GIS application and acquire up-to-date information on research and practical activities in GIS application in each participating country.



## **GENERAL OVERVIEW**

Geospatial technologies (remote sensing, global positioning system and geographical information systems) have progressed rapidly in the 21st century, and are playing an important role in research and a wide array of applications. This training course provided an overview of geospatial technologies and applications, resources available from the public domains (free) as well commercial enterprises, RS/GIS data characterization, analysis and applications, and guidelines for establishing and carrying out a typical RS/GIS based research project.

## **PURPOSE**

To introduce a state of the art geoinformatics platform for pursuing research, outputs and outcome generation. Through this lecture, practice-based training assists scientists with the following:

- (1) To understand potential application of remote sensing/GIS applications;
- (2) To learn the background to general image processing and GIS operation in order to extract and manage spatial information

## **TARGETED AUDIENCE**

Nine professionally-trained NARS partners mainly from Iraq but also with participation from NARS partners in Lebanon, Jordan, and Tunisia that may have an impact on decision makers in their ministries and project interventions. For the full list of trainees, please refer to Annex III.

## **ORGANIZING COMMITTEE**

Mr. Charles Kleinermann, Head, ICARDA Capacity Development Unit (CDU) –  
([c.kleinermann@cgiar.org](mailto:c.kleinermann@cgiar.org))

Dr. Chandrashekhar Biradar, Head, Geoinformatics Unit (GU) ([C.Biradar@cgiar.org](mailto:C.Biradar@cgiar.org))

For list of lectures, please refer to Annex II.

## **COURSE STRUCTURE**

The two-week courses contained a quiz evaluation at the beginning and end of the course, lectures and practical hands on exercises on GIS and RS applications, and use a variety of geospatial data and information.

All theoretical lectures were followed by practical exercises as follows:

### **Topic 1: Fundamentals of Geoinformatics**

#### **Module I: Overview**



Lectures: Introduction to Remote Sensing  
Lab: Basics of Image Display and Visualization  
*Manual, Chapter 1&2: Basics*

### **Topic 2: Data Characteristics and Image Processing**

#### **Module II**

Lectures: Understanding Processes and Sensors  
Lab: Image Processing  
*Manual, Chapter 3&4: Sensors and Resolutions*

#### **Module III**

Lectures: Data Preprocessing and Analysis  
Lab: Data Calibration & Analysis  
*Manual, Chapter 5&6: Preprocessing and Analysis*

### **Topic 3: Classification and GIS Analysis**

#### **Module IV**

Lectures: Multispectral Data Analysis  
Lab: Classification and Analysis  
*Manual: Chapter 7: Multispectral Classification*

#### **Module V**

Lecture: RS/GIS Applications  
Lab: Project: Mapping (topic on specific needs)  
*Manual: Chapter 8: Individual Project*

## **COURSE IMPLEMENTATION**

### **Week 1 from Sunday 19 to Thursday 23 January 2016**

The training program was inaugurated on Sunday 31 January 2016 at ICARDA offices in Amman, Jordan with the presence of Ms. Ako Muto, Senior Representative, JICA Syria Office and Mr. Charles Kleinermann, Head, Capacity Development Unit, and Dr. Chandrashekar Biradar, Head, Geoinformatics at ICARDA. At the end of the opening ceremony a group photo was taken.

After the official opening session, Dr. Chandrashekar Biradar introduced the course content to the trainees and explained to them that each theoretical lecture will be followed by a practical exercise session. After the course introduction, a zero assessment test was undertaken to test the background knowledge of the participants in order to ensure that the level of lecturing, practical sessions and exercises were adapted to the level of knowledge of the group. The knowledge of the trainees was basic, reaching an average percentage score of 15.67% (for more



information about the zero assessment scores, please refer to Annex IV Table 1: Zero assessment test score per trainee and Table 2: General average score per trainee and group. The remaining part of the first day began with a general introduction session on GIS and ArcGIS and was followed by two sessions dedicated to Operations in ArcGIS: Geoprocessing and spatial analysis. The lectures were given by Layal Atassi.

The second day of the course began with two lectures given by Dr. Rana Jawarneh on Basic RS theory backgrounds, ER principles and Multispectral Remote Sensing Systems. The afternoon followed with two sessions on RS of vegetation, Agriculture and Water resources and Land use and Land cover mapping.

The third day of the course was continuously dedicated to Land use and Land cover mapping, and Change detection, Accuracy Assessment, Data sources, Downloads, pre-processing and explore hands on RS data, band composition, display, layer stacking, image spectral enhancement.

On the fourth day of the training lectures, practical exercises covered the following topics: land cover mapping, change detection, perform basic accuracy assessment, creating confusion matrix, and calculating vegetation indices followed by lectures on spatial project on the fifth day.

### **Week 2 from Sunday 7 to Thursday 10 February 2016**

On the first day of the second week Dr. Layal Atassi focused the lectures on operations in ArcGIS – Geoprocessing, Spatial analysis, and map algebra.

On Monday 8 February Dr. Atassi continued to give lectures on operations in ArcGIS – exportation of spatial analysis, and mapping followed by lectures on ModelBuilder, map layouts in ArcGIS and professional map creation, map objectives, design objectives, types of maps, map elements, printing, and exporting maps.

On the following day, the lectures and practical exercises covered the following topics: Web Mapping Overview, Web Mapping solutions, Practical ArcGIS Online, and Google Maps Engine. These lectures were given by Jalal Omari.

The last day of the training began with a final assessment for evaluating their improvement through the courses, which indicate an average score of 61.28%. This was an increase from the zero assessment score of 45.62% (for more information about the zero assessment scores, please refer to Annex IV Table 1: Zero assessment test score per trainee and Table 2: General average score per trainee and group).



The training course ended with the certificate awarding ceremony in the presence of Mr. Ako Muto, Senior representative, JICA Syria Office and Mr. Charles Kleinermann, ICARDA – CDU.

## **GROUP ASSESSMENT**

A zero assessment was conducted on the first day of the training. The results showed that the knowledge of the trainees was basic: 3 trainees received a score under 10%, 4 Trainees between 10 and 20% and 2 reached a score between 20% and 30%. For more information, please refer to Annex 3 Table 1. The average percentage group score at the zero assessment reached a score of 15.67%. For more information, please refer to Annex IV Table 2.

In order to evaluate the knowledge the trainees gained after the two weeks training a final assessment was conducted and the results showed a tangible improvement. The percentage group score increased by 51.46% (15.67% zero assessment test group percentage score to 67.13% final assessment average group percentage. Four trainees received a score between 70 and 80% while 5 trainees received a score of more than 60% (See details in Annex IV: Table 1 and 2).

## **GENERAL COURSE EVALUATION by TRAINEES**

Overall, the evaluation of the course by the participants was positive (details in Annex V). The list of the three most interesting ideas/concepts that the trainees learned in the course includes all course topics. Trainees stressed that the main relevant topics were on ARC-GIS mapping, Remote Sensing Analysis, Classification of Plan. The trainees also suggested that such courses will need to be extended to a one month training course due to the technicality of the subject matter.

## **CONCLUSION**

The course was successfully executed as planned, and most trainees requested that the course duration should be three weeks instead of two weeks: two weeks for Remote Sensing and one week for GIS as some participants expressed difficulties in following up with all the exercises because trainees have different levels of GIS knowledge and background.

The evaluation that took place at the beginning and end of the course showed an average improvement rising to 45.62% which indicates a substantial increase as compared to the zero assessment.

Based on trainee recommendations to extend the period of training, ICARDA may develop for the next JICA-funded training program contract opportunities to the most qualified trainees who attended the previous course related to geoinformatics application since this took place in the past for the training implemented in Aleppo under JICA contracts between 2013-2016.