

Feed the Future: Innovation Lab for Integrated Pest Management Trip Report

Country Visited: Philippines

Dates of Travel: 06-16, March 2017

Travelers' Names and Affiliations: Sek Pisey (Royal University of Phnom Penh), Chhun Sokunroth (PDAFF Battambang, Battambang University), Chou Cheythirith (GDA, Nagoya University).

Purpose of Trip: Statistical training course (March 6-10, 2017 – Chhun Sokunroth, Sek Pisey and Chou cheythirith participated) and on-the-job training in weed research and management (March 13-16, 2017 – only Chhun Sokunroth participated).

Sites Visited: IRRI, Los Banos, Laguna, The Philippines.

Description of Activities/Observations:

- March 6-10, 2017, BEDDA (Basic Experimental Design and Data Analysis) training, attended by Chhun Sokunroth, Sek Pisey, Chou Cheythirith
The training covered topics such as introduction to statistics, introduction to STAR (R-based Statistical analysis software – IRRI's), experimental design (including commonly used experimental design), ANOVA, pair-wise mean comparison, correlation and linear regression analysis, STAR demo problem. For the training we received the software copies, training manual and certificate (Figure 1). BEDDA training schedule and course information is included as an annex 1.
- March 13-16, 2017 on-the-job training in weed science and management (Chhun Sokunroth)
 - Toured the field and screen house trials (Figure 2,3) of the weed science group at IRRI. Introduction to research equipment and facilities. Conduct a simple screen house experiment on the effect of flooding on rice weed species.
 - Toured the weed science laboratory and conducted a germination and viability test of rice and weed species (Figure 4). Continued the introduction to the laboratory equipment, including the use of weighing balance, incubator, oven, seed counter, and leaf area meter. Had a review of the weed identification.
 - Introduction to proper herbicide application technique, including the part of the sprayer, calibration and correct application. Did a one on one review of the use the STAR program using the data gathered from the weed management trial in Battambang province.
 - Conducted parameter measurement (emergence count, dissolved oxygen, electrical conductivity, pH, and temperature) in the field trail at IRRI Experiment Site. Documented and gathered data (emergence count) in the flooding experiment at the screenhouse. Toured the International Rice Genebank.

Suggestions, Recommendations, and/or Follow-up Items:

STAR will be used to analyze the data gathered through the students' research projects under EPIC. The experimental design section of the training was immensely useful to illustrate the different design that can be employed for each student's research project and facilitate discussion with them afterward. Chhun Sokunroth's extra stay at IRRI weed management was requested by the student in order to familiarize himself with the basics of weed research in rice ecosystem.

List of Contacts Made:

Name	Title/Organization	Contact Info (address, phone, email)
Dr. Virender Kumar	Weed Science Crop and Environmental Sciences Division	Virender.kumar@irri.org
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Image 1. Awarding the certificate of completion to the BEDDA participants (Chhun Sokunroth depicted in the picture).



Image 2. Touring greenhouse experiments at IRRI weed science.



Image 3. Touring field experiments at IRRI weed science.



Image 4. Simple weed germination study at IRRI weed science (brushing up on methodology to be used in Cambodia).

Annex 1. BEDDA training course info and schedule

Basic Experimental Designs and Data Analysis Using STAR

Course Description

The course is designed to acquaint researchers with the principles of experimental design, basic experimental designs used in crop research, analysis of variance, and correlation and regression analysis. It also introduces the Statistical Tool for Agricultural Research (STAR), a user-friendly software that uses GUI created in Java and functions developed in R to assist crop scientists in the design and analysis of data. The course is intended for researchers in the Agricultural and Biological Sciences. It employs a combination of lecture, group exercises, and hands-on exercises using STAR.

Course Content

- Basic statistics
- Principles of experimental design
- Basic experimental designs
- Analysis of variance and mean comparison
- Partitioning sum of squares
- Data transformation
- Missing data
- Simple correlation and linear regression analysis

Training Objectives

- Review basic statistical concepts
- Describe the three essential components of an experimental design and explain the importance of each component
- Identify the advantages and disadvantages of using the different experimental designs
- Generate randomization and electronic field book for basic experimental designs using STAR
- Perform project, file and data management in STAR
- Construct analysis of variance table for basic experimental designs and perform the analysis using STAR
- Perform mean comparison and partitioning of sums of squares
- Determine the appropriate transformation for a given set of data
- Discuss missing data
- Perform simple correlation and linear regression analysis

Day 1

AM – Introduction to statistics (Zhella Morantte)

PM - Introduction to STAR (Zhella Morantte)

- Environment
- Project and File Management
- Data Management
- Basic Statistics
- Exercise 1

Day 2 (March 7 2017)

AM – Introduction to Experimental Design (Alaine Gullés)

- Exercise 2

PM - Commonly Used Experimental Designs (Alaine Gullés)

- Completely Randomized Design (CRD)
- Randomized Complete Block Design (RCBD)

- Split-plot Design
- Strip-plot Design

Day 3 (March 8 2017)

AM – STAR: Randomization and Layout (Alaine Guller)

- Exercise 3
- Exercise 4

PM - Analysis of Variance (Alaine Guller)

- CRD
- RCBD
- Split-plot Design
- Strip-plot Design
- Exercise 5
- STAR: Pairwise Mean Comparison (t-test) (Alaine Guller)

Day 4 (March 9 2017)

AM – STAR: ANOVA and Mean Comparison (Zhella Morantte)

- Exercise 6
- Partitioning sum of squares (Alaine Guller)
- STAR: Partitioning sum of squares (Alaine Guller)

PM – Assumptions, Transformation and Missing Data (Zhella Morantte)

- STAR: ANOVA and data transformation (Zhella Morantte)
- Exercise 8 (Zhella Morantte)

Day 5 (March 10, 2017)

AM – Simple correlation and linear regression analysis (Zhella Morantte)

- Exercise 9
- STAR: correlation and regression (Zhella Morantte)
- Exercise 10

PM – Course evaluation