

Training on Data Analysis and AI Application for ANR projects in Cambodia: Estimating Crop Yields Gaps in Rice SDP project areas

10-12 January 2023 in Phnom Penh

Background

During the lockdowns and movement restrictions due to the COVID-19 pandemic, [the Rice SDP project](#) management unit had explored ways to remotely monitor project implementation with the support of the Global Agriculture and Food Security Program (GAFSP) funding. To estimate the productivity improvement of project beneficiaries for each crop season, data scientists and AI experts have drawn plot boundaries, estimated crop yields at the individual plot levels, and [mapped the distribution of estimated yields within nine irrigation schemes](#) based on a crop survey, satellite data, and geotagging of surveyed individual plots.

The estimation results were discussed at [the virtual workshop](#) and field consultations with women farmers groups and found to be useful: Although the precision in estimating yields needs improvement for project monitoring and evaluation purpose, the use of remote sensing technologies and AI has shed light on crop yield gaps prevalent among 16,000 beneficiaries in the entire project command area, particularly for female-headed households. This innovative approach is a useful tool for facilitating effective stakeholder discussions, targeting, and planning for project activities.

Objective

At the request of the royal government of Cambodia, the Rice SDP project office and ADB will host a training workshop to discuss the technical process of the crop yield estimation at the individual plot level. Participants will also discuss with experts some potential use of data analysis and AI for designing and implementing effective development projects in the country.

Participants

40-46 GIS and data experts in the Ministry of Agriculture, Forestry, Fisheries (35) ; Ministry of Planning;(5) and the Ministry of Land Management, Urban Planning and Constructions (6). All the training sessions will be broadcasted via zoom and interested ADB staff are invited to virtually join the sessions.

Trainers

Ms. Ren Avell Flores, Geospatial Intelligence Analyst, Thinking Machine Data
Mr. Joshua Cortez, Geospatial Machine Learning Consultant, Thinking Machine Data
Mr. Mateusz Urbańczyk, QED ai
Ms. Leah Goeke, QED ai

Venue

Hyatt Regency Phnom Penh
#55, Street 178, Sangkat Chey Chumnas Khan Doun Penh
Phnom Penh, 12206
Cambodia
Tel: +855 23 600 1234

Provisional Agenda

Day 1: Tuesday, 10 January 2023

Time	Agenda	Resource Persons
08:30 – 09:00	Registration	
09:00 – 09:05	Introduction	Michiko Katagami, Principal Natural Resources & Agriculture Economist, ADB
09:05 – 09:15	Welcome remarks	H.E. Ros Seilava Secretary of State, MEF and Program Director, Rice-SDP, and Rice-SDP AF Jyotsana Varma Country Director, Asian Development Bank
09:15 – 09:25	Photo shooting	
9.25 –9.35	Introduction of Program	Ren Avell Flores, Geospatial Intelligence Analyst Joshua Cortez, Geospatial Machine Learning Consultant
9:35 – 11:05	Module 1: Project Background [90 mins / 1.5 hrs.] a. Case Study: ADB Crop Yield Estimation Project <ul style="list-style-type: none">○ <i>Background & Context</i>○ <i>Methodology</i>○ <i>Results</i>○ <i>What did we learn?</i>■ <i>Data quality insights</i>■ <i>Data quality recommendations</i>	

Time	Agenda	Resource Persons
11:05 – 12:05	Module 2: Open Data for Social Impact [60 mins / 1 hr.] <i>a. Open Data and possible sources</i> <i>b. Open Data in Action</i> <i>i. Case study 1: Detected Drivers of Deforestation with Machine Learning</i> <i>ii. Case study 2: Aquafarm Detection for Mangrove Restoration using Satellite Imagery</i>	
LUNCH BREAK		
13.30 – 16.30	Module 3: Introduction to Geospatial Analysis - Vectors [3 hrs] <i>a. Data Types (Raster vs Vector)</i> <i>b. Geospatial Concepts and Operations</i> <i>c. Vector Spatial Analysis on Python</i> <i>i. Hands-on exercises</i> <i>d. Raster Spatial Analysis on Python</i> <i>i. RasterIO Hands-on Exercises</i> <i>e. Going Further using Google Earth Engine</i>	

Day 2: Wednesday, 11 January 2023

Time	Agenda	Presenters
8.30 – 8:45	Recap of Day 1, Q&A,	
8:45 – 11:15	Module 4: <i>1. Geo Visualization [40 min]</i> <i>a. Static Maps using Geopandas and Matplotlib</i> <i>b. Interactive Map using Folium</i> <i>2. Classical Machine Learning [1 hr. 50 min]</i> <i>a. Introduction to Machine Learning</i> <i>b. Classical Machine Learning Models</i> <i>c. Classical Geospatial ML Applications: Poverty Mapping</i>	Ren Avell Flores, Geospatial Intelligence Analyst Joshua Cortez, Geospatial Machine Learning Consultant
LUNCH BREAK		
12.20– 13.20	Module 5: <i>1. Introduction to Computer Vision (CV) [1 hr.]</i>	
13.20 – 15.50	Module 6: <i>2. Geospatial CV Applications [2.5 hrs.]</i> <i>a. Land Cover and Land Use Classification</i> <i>b. Crop Field Deliniation using Semantic Segmentation</i>	

Time	Agenda	Presenters
15:50 – 16:30	<p>Module 7: Feedback and way forward</p> <p>participants' feedback on the training</p> <p>Discission on potential for applying the data analysis approach learned to ongoing and planned projects</p> <p>Opportunities/ideas of the use of data analysis and AI for Cambodia, and any constrains to try them out</p> <p>Q&A with instructors</p>	

Day 3: Thursday, 12 January 2023

Time	Agenda	Presenters
9.00 – 9:15	Recap of Day 2, Q&A,	
09.15 – 09:30	Introduction to QED and Overview of Morning Agenda	Mateusz Urbańczyk, QED ai
09:30 – 10:30	<p>Module 8: Field Boundaries</p> <ul style="list-style-type: none"> • Motivations • Methodology Overview, Geosurvey, Artificial Intelligence, Maps • Results: Performance Metrics and Cost-Benefit Analysis • Live Demo • Discussion and Q&A 	Mateusz Urbańczyk, QED ai
10:30– 11:00	<p>Module 9: AgTech I</p> <ul style="list-style-type: none"> • Crop Mapping • Mobile Data Collection (ODK + Customization) • Tag • Q&A 	Mateusz Urbańczyk, QED ai
11:00 – 11:30	<p>: AgTech II: ScanSpectrum</p> <ul style="list-style-type: none"> • Motivations • Technology • Demonstration • Applications • Q&A 	Mateusz Urbańczyk, QED ai Leah Goeke, QED ai

Time	Agenda	Presenters
11:30 –12:15	AgTech III: ScanForm <ul style="list-style-type: none"> • Motivations • Demonstration • Applications • Cost-Benefit Analyses • Q&A 	Leah Goeke, QED ai
12:15 – 12:45	Discussions on AgTech applications in Cambodia <ul style="list-style-type: none"> • Summary of the QED ai session • participants' feedback on the training • Discussion on potential for applying the data analysis approach learned to ongoing and planned projects 	Mateusz Urbańczyk, QED ai
12:45 – 13:00	Closing Remarks and Way forward	Chanthou Hem, Senior Project Officer, ADB Rice-SDP PMU