

GIS WORKING GROUP

Minute of meeting 26 June 2019

Yangon

1. INTRODUCTION

Agriculture sector is often in advance of others in use of GIS and Remote Sensing technology. The introduction of mobile applications and AI is changing production, analysis and access to information in this sector. This meeting aims to make an update on the innovative technologies used by stakeholders in agriculture in Myanmar.

2. PRESENTATIONS

1.1. VILLAGE LINK by Adrian Soe Myint

Village Link is mainly focused on farming services, promoting the use of digital technology to increase sustainability and productivity.

The Mobile app, free of charge, is Htwet Toe <http://www.htwettoe.com/>. The interface is similar to Facebook and designed specially to link farmers with information from agronomists, weather forecasts and financial services.

Close to 90% of the 350,000 users are farmers and the remainder are technicians. Around 50,000 monthly active users, 3500 users per day.

Back in 2018, Village Link obtained the Geodata for Agriculture and Water (G4AW) grant from the Netherlands Space Office in a consortium with Awba (Myanmar agriculture company), Miaki Myanmar, Dept of Agriculture and 3 Dutch companies, specialized in Remote Sensing and AI for weather analytics, crop monitoring and land monitoring.

1. Weather analytics: the goal is to automatically generate crop and regional specific advisories based on weather forecast. The use of 9x9km resolution images results in about 20'000 unique forecasts points in Myanmar. This allows for micro-climate specific analysis. The company monitors and deduces rainfall, wind speed and spraying suitability 4 days in advance. Based on these they provide advisories services on crop specific farming activities and weather alerts. They also develop models and algorithms to predict potential pest outbreaks and disease risks.
2. Crop monitoring: 15 different crops are classified using satellite data (Sentinel 2, 10m resolution), coupled with ground-truthing data. The monitoring of NDVI is then included in a crop growth model to monitor growth stage and predict crop biomass and yield.
3. Land Monitoring: Sentinel 1 (SAR) is used to assess damage on large scale crop growing areas in case of flooding

Village Link Agri intelligence platform aims to provide:

- Real-time weather image data
- Near real-time dashboard with prevision analytics to farmers
- Automatic pest detection AI – farmer can post a photo of the pest and this is recognized by the AI system which can immediately advise re steps to take.

Discussion

What is your ground truthing methodology and how to classify multi-crop farming practices? 120 surveyors to do monitoring over one season (3 months) on 50 plots (>1 acre, distant to each other) for each crop variety and location. Data is collected every 12 days to correspond to satellite imagery availability to track one crop development on the ground in relation to the satellite imagery. Priority areas are Bago, Mandalay, Ayeyarwady, Sagaing and Shan.

Types of crop modeling? Crop classification, crop extent, yield (based on the biomass) and growth stage. The model is operational for rice, nearly complete for potato, corn, tomato, and under development for chili, sesame, groundnut and cotton. Priority focused on food crops first.

Accuracy of the crop modeling? Crop growth model is 94% accurate

Target users? Free for individual farmers, business for corporates

Training and e-literacy to farmers? intention to provide hands-on training to farmers. Also providing training to Dept of Agriculture extension officers to share with farmers, and accompany in early visits to the field to ensure they are confident in the knowledge from the training.

Farmers are providing data via the app. What about data ownership and privacy? The company sells the analytics based on the mass data collection – individual personal information is not shared.

Monitoring of fall army worm? It is difficult to identify the exact location and spread of the affected fields. For the moment the app provides generic advices and products to use for treatment.

What are the actual users' behaviors?

- Most popular information for farmers is the responses to direct questions from farmers (around 80 questions answered daily), followed by crop price for 380 crops, weather and crop guide. Village Link is working with Yezin Agricultural University to curate the answers to questions.
- Cold calls to monitor farmers' satisfaction with the answers.

Flood information?

- To determine the stage of flooding, Sentinel 1 is used as a proxy to complement info from lake and river levels. Interpolation is used to determine flood levels. Info not currently being disseminated.
- Crop damage currently being used for the insurance purposes – flooding is used as a proxy to determine payments (whether the area was flooded and for how many days).

1.2. GREEN WAY by Thein Soe Min

The Green Way Agri Livestock app started in 2016. <http://www.en.greenwaymyanmar.org/>
The aim is to have an inclusive platform where all the stakeholders can better link up farmers, traders, business centres, technical experts, consumers.

It covers over 95% of townships, over 100,000 farmers, 3'900 experts for agriculture and over 1'000 experts for dairy farmers. Plan to develop services for chicken and pigs farms. It includes traders since 2018. It is using an easy registration system for farmers based on the MIMU Pcode system.

The app is customized based on user type (farmers, experts) and location:

- Farmers register location and type of crops they are growing to understand what is grown in which areas. It also allows them to link with contact details of experts near their particular areas
- Created a forum to answer farmers questions – match question to the right expert for the answer
- Cropping guidelines by location down to township level- www.greeninnovator.com
- Survey system to gather data by region and types of users – could provide this service to NGOs
- Cropping guidelines specific to location and crop variety
- Useful addresses by location – Dept of Agriculture, experts and looking to add organisations which may be able to support as well as microfinance institutions
- Farming record feature also just released. Farmers can record information on their plots, crops, expenses and activities (eg which fertilizer, when added, cost, etc.). This gives them an overview at the end of the season on how much was spent, their yield, etc. Information can be available to experts, prior to farmers agreement.
- Seeking to also add GIS information for better mapping of the plots. But need to ensure that there are clear practical steps that are easy for farmers to use given low digital/mobile literacy.
- Only 20% of farmers have digital literacy. Have addressed this by piloting the tool extensively with farmers before finalizing and through a training programme for farmers together with Myanmar Book Centre.
- The dream is to create a traceability system accessible to all. For example through a QR code on a given product, consumers could access information on the farmer location, fertilizers used, etc. Such traceability would also improve traders and farmers income.
- Market place (under development) – to connect buyers with markets/ shops in their nearby townships and an asset marketplace which allows farmers to search where to get quality seeds and supplies. Supported by GSME association. Payment gateways system also included (supported by FHI 360).
- Can later employ AI for image detection and big data. Will invite everyone to upload their crop photos than can be used publicly for free.

Discussion

- Access to family records? It is accessible to experts for training purposes, with the agreement of the farmers
- What is the added-value for farmers to record and share their data? Farmers can easily calculate their profits or loss at the end of the season.
- Crop price info is being collected by the various apps – can this be gathered and shared at local level so as to take into account transport and other costs which change what they can receive? There is no real incentive for traders to share information on crop price – hence Green Way is using the market place feature instead.

- How to address farmers with no network? No solution as of yet. Not currently including a call centre as it is too costly, and cut off from the local practices, hence developing app to link up with the right experts who have the knowledge local.
- Using Unicode for easier data management to support information sharing with the farmers. Has a system that Zawgyi users can read unicode and when they ask question, it is converted into unicode and saved in the system.

1.3. FAO by Roberto Sandoval

GIS assisted initiatives on Early Warning Early Action (EWEA)

FAO recent project launched with MOALI and DMH on setting up an early warning early action approach for agriculture sector in Myanmar. IFRC and WFP are also doing some aspects of this approach, piloted in other countries including in Vietnam and the Philippines.

Developing EWEA for floods, cyclones and drought. The latter is by far the most difficult because of the slow onset nature of drought, it is difficult to trigger. The monitoring system to set up is based on multiple layers of information. It requires historical data over the last 30 years such as DMH data on Temperature, rainfall, solar radiation, wind, etc. – the more that can be included the better for the model.

The project will be included in the Mother and Child Cash Transfer programme of DSW in Rakhine State, as a mean to release cash transfer for early action.

Fall Armyworm

The Fall Armyworm is a transboundary insect pest which reached Myanmar in late 2018 and is currently found in Ayeyarwady, Bago, Mandalay, Yangon, Sagaing Regions and Shan State. It likes maize but can eat more than 80 additional species of crops. It can fly over 100km per night and must be addressed at the worm stage.

FAO is helping to institutionalize the monitoring and management of this pest problem. It is converting and adapting a mobile app developed in other countries.

FishAdapt project

Critical infrastructure, resource use (land, marine), hazard and evacuation infrastructure mapping including drone/ satellite images and participatory mapping approach. Of particular attention is a fishing heat map enabling information on types and location of fishing use that highlights areas at risk of over-fishing. Mapping is completed in 9 villages out of 120.

2. ROUND TABLE

1. MIMU

- MIMU and OneMap Myanmar are supporting the government to develop a National Coding System. This is going to be the Government P-codes standard. It is planned to be launched in August.
- MIMU will release a new P-code version in August and ensure the transition between the two codes.
- New road network digitized between 1:10,000 to 1:50,000 scales. Shp files released on the MIMU website

- Ward boundaries shp file will be soon released
 - Town locations already released with an additional 36 towns
 - basic QGIS training videos to be released soon for wider use
2. The Asia Foundation
 - Data from 2017 GAD Township profiles being digitized for calculation of Township Development Indicators. Difficulties for agriculture measurement units as they vary from one location to another
 - 2018 GAD Township profile to be released in October 2019
 3. WASH Cluster
 - Distinct maps of camps and villages with WASH cluster activity
 4. HEALTH Cluster
 - Working on the Early warning alarm response system for diseases in Rakhine
 - Cluster contact list up to date
 - On-going development of the website
 5. EGS team
 - Resource mapping for 60 villages – critical infrastructure, resource use (land, marine), includes drone mapping and participatory mapping approach and supporting villages interested to protect specific areas to collect required information.
 6. Proximity designs
 - Laying the ground for more data analytics. Will launch sesame research including piloting drone usage for spraying and monitoring NDVI. Also working on information gathering relating to micro-weather usage.
 7. IPA
 - Agricultural research in progress. Impact evaluation using randomized control research.
 8. Joint Peace Fund
 - Rolling out information management system and will certainly be users of the GIS information for M&E (around 100 indicators being traced) with offline app to capture detail of incidents as they happen. Need to capture geolocation. Working on how to avoid duplication of reporting across different initiatives and capturing contextual information on what is happening in the areas in which they are working.
 9. WWF
 - Community forest mapping – updating rubber plantation info with mobile application based on Google Earth Engine platform.
 10. Terra Impact
 - Development of crop growth model to link to crop prediction models. Tackling from the ground up (ground truthing info) to link to satellite data to make it actionable at local level for small holding farmers.
 - Mostly focusing on NDVI maps – match with information reported by farmers on the ground.
 - Working with a Dutch university – created the standardized way of mapping every crop from 0-100 points – adding the NDVI maps to this allows crop stage prediction.

- Looking at how to add pest sightings with the models.
- 11. East West Management Institute (EWMI)
 - Mapping parcel data from landholders and interest to link to the applications and systems being discussed. EWMI is interested to work with others to design a decentralized system with options for digital identities relating to land ownership, credentials and details for credit loans, etc. It is implemented in Canada.
 - Awba is already implementing digital identity of individual farmers but just to keep track of their purchases.
- 12. Village link
 - Phase of gathering ground truthing data from 6 regions, 5 crops, 10 varieties – 120 people in the field gathering the ground truthing data on monsoon rice, sesame, chili, cotton and corn.
- 13. GIZ
 - Planned hands-on trainings for Ministry of Energy to collect ground-level data to plan electrification.
- 14. Phandeevar
 - Undertaking data analysis and developing a model for forecasting air quality. The aim is to share the air quality heat map on Facebook.

3. AOB

- The Myanmar government is planning to launch its first microsatellite in the next 2 years – to be built in Japan. It is linked to Ministry of Transport and Communications to aid in weather forecasting, resource management and disaster management.
- A start-up company is planning to launch in 2022 a CubSatellite equipped with a hyperspectral imager, controlled by a neural network. Instead of transmitting every image taken, including cloud cover, the satellite will process the data live and transmit only useful processed information to the user (heat map, fire extent, etc.). This may be a game changer in the way satellite images are used and processed.
- The Survey Department is drafting a Law on Surveying activities. It includes several restrictions for land surveying and map producers in country such as:
 - Companies or organizations shall register and get a license to have the right to perform surveying or produce maps
 - Anybody without a license who undertakes surveying or map production shall be fined at least 10 lakhs kyat. Furthermore, the assets used shall be seized for the public purse

It is not clear throughout the draft law if it only applies to topographic mapping and surveying. Our understanding is that the intention was to focus on maps derived from topographical survey data collected by government and private sector entities and it was not intended to cover or affect the sorts of maps humanitarian and development actors produce and use. MIMU is following up with OneMap and the Government to ensure clarification of scope and definitions of this draft law.

Attendance list

	Organisation name	Function	Contact Name
1	AGS	Team leader	U Tun Tun Thein
2	EWMI-ODI	Senior Advisor	Pyrou Chung
3	EWMI-ODI	Senior GIS Officer	Min Htun Htun Naing
4	FAO	Fisheries Specialist (Disaster Risk Management)	Roberto Sandoval
5	FAO	Zaw Min Thein	GIS Specialist
6	GIZ	Promotion of Rural Electrification (RELEC)	Ashish Dhankhar
7	Green Way	Co-founder	Thein Soe Min
8	Green Way	Android Developer	Linn Wah Zaw
9	Impact Terra	Business devlpt executive	Floris Sonnemans
10	Impact Terra	Business Intelligence	Francesco Scandola
11	Innovations for Poverty Action	Research Associate	Maxine Wang
12	Innovations for Poverty Action	Research Associate	Zin Nwe Win
13	Joint Peace Fund	Systems & Technology Advisor	Dragos Salageanu
14	Joint Peace Fund	Information Management System administration	Ye Myat Min
15	Landesa	Mapping and documentation coordinator	Yan Naing Soe
16	Phandeeyar	Data Analyst	Alexander Beatson
17	Proximity Designs	Data Scientist	Xander van den Eelaun
18	Proximity Designs	Head of Data Analytics	Sohee Hyung
19	The Asia Foundation	Database Management Consultant	Thandar Phru
20	UNHABITAT	Programme Associate	Kyu Tin Cho
21	UNHABITAT	IEC Associate	Naw Khine Thazin
22	UNICEF	WASH Officer (IM)	Mee Mee Thaw
23	Village Link	Data coordinator	Quyen Mcgrath
24	Village Link	Chief Executive Officer	Adrian Soe Myint
25	Village Link	IT Developer	Si Thu Aung
26	WHO	Information Management Officer	Pyae Phyo Kyaw
27	Wildlife Conservation Society	GIS Coordinator	U Nyan Hlaing
28	WWF	Spatial Planning & GIS Officer	Kyaw Zay Yar Aung
29	MIMU	Manager	Shon Campbell
30	MIMU	Information Management Specialist	Catherine Lefebvre
31	MIMU	Data Manager	Ei Ei Thein
32	MIMU	GIS Associate	Zaw Win
33	MIMU	GIS Assistant	Khin Thandar Tun
34	MIMU	GIS Assistant	Thet Zaw tun