

Activity report: Knowledge Sharing Meeting & Capacity Development Workshop in Malaysia

APN project “Knowledge Sharing and Capacity Building Workshops for Precision Agriculture using UAVs techniques in the South and Southeast Asian Region”



13 – 17 July 2022, Kota Kinabalu Malaysia

Summary

A knowledge sharing meeting for stakeholders were held over the course of one day, on 13 July 2022 at Courtyard hotel Kota Kinabalu Malaysia. The meeting was attended by various stakeholders including researchers as faculty members of universities in Kota Kinabalu, representatives of the Sabah Forestry Development Association (SAFODA) and Sabah Parks, start-up agriculture drone entrepreneurs, project collaborators, and supporters. Over the course of day, the different stakeholders gave presentations about different aspects and perspectives on drone agriculture applications. The talks covered current opportunities, and perceived difficulties to implementation (specifically in the Malaysian context) and were followed by question-and-answer sessions between speakers and other participants. The meeting created an opportunity for stakeholders to meet, exchange ideas, and broaden their network.

Between 14 and 17 July, a workshop was held at the Universiti Teknologi Malaysia (UiTM) campus in Kota Kinabalu. The workshop included lectures and hands-on training activities that aimed to (1) explain current issues faced in agriculture, and how drones and other smart agriculture approaches can address those issues; and (2) the workshop included practical sessions where participants were exposed to different components of processing and analyzing drone imagery data. The workshop concluded with a (3) field excursion, where participants saw the handling of actual agricultural drones on a farm and had a chance to interact with farmers and drone operators and ask questions.

This workshop was well received and was attended by 40 participants that included university students, rice farmers, commercial agriculture drone operators, representatives of government institutions, and other university faculty members.

Day 1: Knowledge Sharing Meeting

Purpose

The purpose of the knowledge sharing meeting was to present about the APN funded project to the project members and expert community; project goals, objectives, and activities; discuss about the ongoing activities and implementation and management plans. This meeting will also provide an opportunity to discuss about the roles of various partners and stakeholders in the project implementation and how to promote UAV/drone-based precision agriculture techniques to local farmers.

Proceedings

The meeting was held at the Conference room facilities at the 1Borneo Courtyard hotel in Kota Kinabalu. The participants arrived around 9:00 for registration and refreshments. When all participants had come, the meeting was opened by Dr. Alexius Korom of UiTM, who is a project collaborator, and was the local host for the meeting in Malaysia. Subsequently there were short presentations (15 min) by subject experts, that covered topics like the overview of the project activities in Malaysia and other collaborating countries, regulatory frameworks for use of drones in Malaysia, agricultural policies related to use of drones in Malaysia, etc. (the full schedule of presentations is given below). Between the presentations there were question and answer sessions for the participants.

From several discussions during the Q&A as well as brain storming session, it was apparent that the various stakeholders, especially from government agencies were interested to adopt drones in their activities. Faculty representatives from other universities explained that they were planning to introduce an undergraduate program in their faculty focusing on technologies in agriculture (including use of drones). There was then discussions around what topics should be included in this type of syllabus, and how education can help with the development of capacity in the next generation.

One pertinent concern raised by participants was how farmers could be engaged and could be convinced to adopt the technologies. Reasons cited were high costs, wariness among farmers toward this type of new technology, etc. One participant who was a farmer and has a start-up drone spraying service explained some of the difficulties he faced, and how he engaged farmers. One key point was that he tried to approach young farmers first, who were more receptive and curious about the use of the drone on their fields. Other participants explained the possible role of the local agriculture ministry. The agriculture ministry occasionally holds events/activities for farmers to introduce new farming ideas/best practices and technologies. The agriculture ministry could use these platforms and their available resources to also engage farmers about the use of agricultural drones.

At the end of the day a brain storming session was held, were participants tried to identify solutions and a roadmap for future development of drones use in agriculture. Please see the pictures



Participants listening to speaker at the knowledge sharing meeting on 13 July 2022.



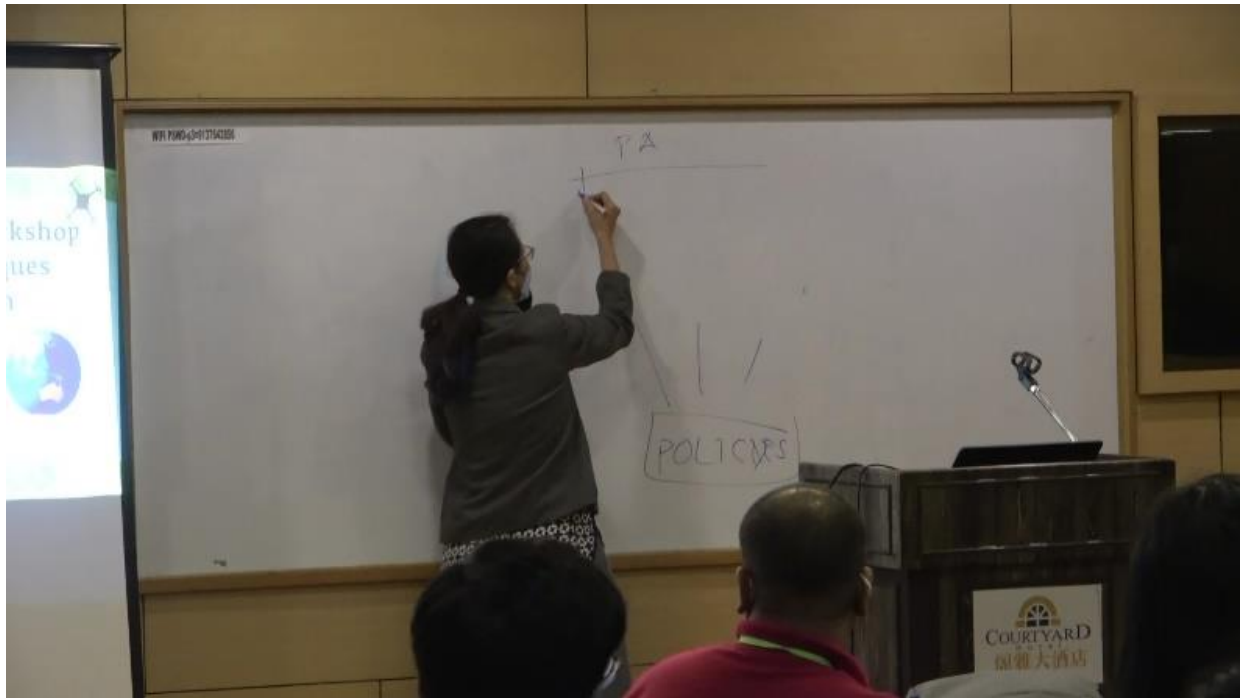
Group photo of participants at the stakeholder meeting



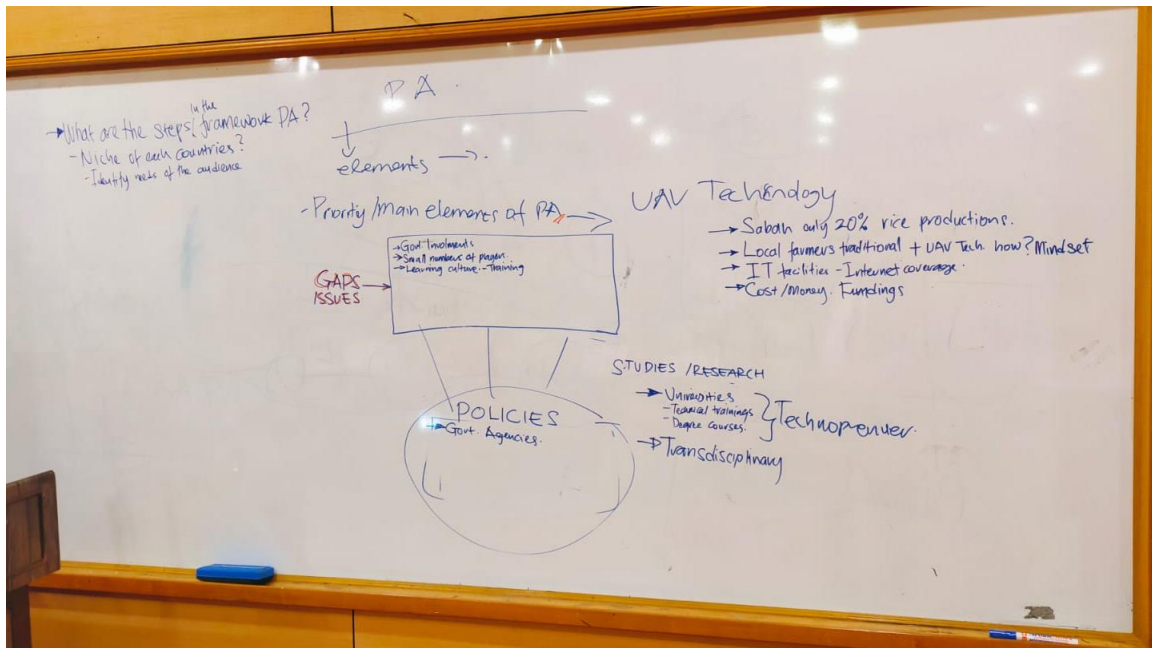
Participants listening to Dr. Alex at the knowledge sharing meeting on 13 July 2022



Discussion during the brain storming session



Making mind maps during the brain storming session



mind maps during the brain storming session

Full day schedule

Date/Times	Events	Venue/Resource Person
Tuesday 12 July 2022	Arrival of International Guests/Check-in	Courtyard Hotel 1Borneo
Wednesday 13 July 2022		
09:00-09:30 (30mins.)	Registration & Morning refreshment	Meeting room
09:30-09:35 (5mins.)	Welcome and inaugural speech	Ts. Gs. Dr. Alexius Korom (UiTM, Sabah)
09:35-09:50 (15mins.)	APN Project overview briefing	Assc. Prof. Dr. Ram Avtar (HU)
09:50-10:05 (15mins.)	Capacity Development Programme in Sabah	Ts. Gs. Dr. Alexius Korom (UiTM, Sabah)
10:05-10:15 (10mins.)	Question, answer and discussion	Chairperson
10:20-10:30 (10min.)	Break time	All
10:30-10:45 (15mins.)	Sharing from Government agency	Ministry of Agriculture and Food Industries (MAFI) Representative.
10.45-11.00 (15mins.)	Precision Agriculture and implementation in Sabah from policy perspective	Dr. Haidy Henry Dusim (UiTM, Sabah)
11.00-11.10 (10mins.)	Question and answer	Chairperson
11.10-11.25 (15mins.)	Sharing from Government agency	Dept. of Agriculture Representative
11.25-11.40 (15mins.)	Sharing from expert in Sustainable Agriculture	Expert from Faculty of Sustainable Agriculture, (UMS)
11.40-12.00 (20mins.)	Question, answer and discussion	Chairperson
12:00-13:30 (01hr.30mins.)	Lunch break	All
13:30-13:45 (15mins.)	Sharing from local private company. CAAM Certified RCoC-B and CAAM Certified RCoC-AGR	Captain Naru Kiob, Founder NK Robotics
13:45-14:00 (15mins.)	Collaborators sharing: The project prospects in Indonesia	Prof. Dr. Wirastuti Widyatmanti (UGM)
14:00-14:10 (10mins.)	Question, answer and discussion	Chairperson
14.10-14.25 (15mins.)	Collaborators sharing: The project prospects in Bangladesh	Assc. Prof. Dr. Tanjinul Hoque Mollah (JU)
14.25-14.40 (15mins.)	Collaborators sharing: The project prospects in Vietnam	Dr. Huynh Vuong Thu Minh (CTU)
14.40-14.55 (15mins.)	Collaborators sharing: The project prospects in India	Assc.Prof. Dr. Ashwani Kumar Aggarwal (SLIET) or Prof. Dr. Dharmendra Singh (IIT) (*Online)
14.55-15.10	Question, answer and discussion	Chairperson

(15mins.)		
15:10-15:20 (10mins.)	Coffee break	All
15:20-16:20 (60min.)	Brainstorming session and discussion about project implementation	
16:20-16:25 (5mins.)	Closing Remarks by project leader.	Assc. Prof. Dr. Ram Avtar (HU)
16:25-16.30 (5mins.)	Announcement about hands-on workshop.	Chairperson
18.00	Networking meeting	TBA

Day 2: Capacity Development Workshop (day 1)

Proceedings

The capacity development workshop was held in Dewan Ibnu Battuta hall at UiTM on 14 – 16 July 2022. The meeting was attended by students, and most of the participants of the previous day's knowledge sharing meeting (40 people in total). The proceeding was opened by the deputy rector of the university, who gave a short speech in which he highlighted the importance of new technologies that can support agriculture. During the rest of the day there were four lectures by the collaborators attending from partnering universities in Indonesia, India, and Japan. These lectures covered current challenges in agriculture such as climate change, increased need for sustainable production, and so on. The lectures also introduced the concepts of precision agriculture, and how drones can be used in agriculture. There was also a lecture about regulations and safety aspects of using drones for agriculture in Malaysia. These lectures were recorded and will be made available as resources on the project website. The participants were served lunch and tea break at the venue. The activities continued until 5 pm and the full schedule of the workshop activities is included below.



Deputy rector of UiTM is giving opening remark to start the training program



Group photo of participants at drone agriculture capacity development workshop on 14 July 2022, Universiti Teknologi Mara, Kota Kinabalu, Malaysia.

Day 3 – 4: Practical Sessions

On the 15th and 16th of July the workshop focused on practical hands-on sessions where participants were shown how to process drone imagery data using photogrammetry software, and how to analyze the outputs to measure the health of crops and extract other biophysical parameters like the height of oil palm trees. Finally, the steps of setting up drone flight plans were explained, in preparation of the following day's field-excursion. These practical sessions were presented by the project supporters – postgraduate students affiliated at the collaborating universities, and who assisted with the development of the various materials used during the workshop. The practical sessions were held in a very interactive style, with supporters moving between participants and helping everyone to follow along with the steps on their own laptop computers. We taught how to process UAV data using various open source and commercial software and various processing steps mainly how to generate a orthomosaic and points clouds using raw UAV data. On each of these days lunch was served at the venue. The schedule of the events can be seen in the full schedule included below.



Participants in practical session learning how to process drone imagery on their computers.

Day 5: Field Excursion (17 July 2022)

On Sunday (17th July) the participants met at the UiTM in the morning and departed by bus to the countryside to meet farmers and see live demonstration of agricultural drones. The visit was to the field of a rice paddy farmer who attended the sessions on the previous days. He explained the activities on his farm to the other participants; and students and government officials could ask questions related to the farming activities, challenges faced, etc. The farmer also explained how he foresaw drones being used to assist with spraying on the farm in the future. Much of these conversations were recorded by audio and can be made available later. Next, certified drone operators gave the other participants demonstration of how drones are set up and flown. The one pilot who also owns a small drone spraying business gave a small demonstration of how the spraying drone operates.

At the end of the demonstrations a group photo was taken, and then the group went for lunch together at an eating place near the farm. The group then returned by bus to the UiTM campus, and this marked the end of the entire workshop.



Participants help prepare agricultural sprayer drone for demonstration flight.



Paddy farmer explaining the activities on his farm and answering questions from students and other participants.



Demonstration of UAV flight using Phantom4 multispectral and Argos fertilizer spray drones



Students are learning how to make a UAV flight plan and how to use remote controller

Conclusion

The general sense was that participants from different backgrounds were happy to be exposed to the use of drones and were excited to incorporate it into their own respective activities. (For example, representatives of the forestry authority SAFODA brought along a drone that their department had acquired earlier but did not know how to use. In the practical sessions and field excursion they were helped to set up and fly their drone successfully, and were given exposure to processing imagery from drones, and gain useful information from it.) The participants also could strengthen their professional networks, and possibly important relationships were established that may help the longer-term adoption of drones in the area. The project collaborators who had come from Indonesia, India, Bangladesh, and Vietnam also had a chance to see all the activities at this first workshop. The experience and lessons learnt from the week can be used to arrange effective workshops also in the other collaborators' countries in the upcoming months.

Finally, the presentations, lectures hands-on sessions and some of the discussions during the week were documented by video, and these will be prepared to be available to a wider audience.

The project organizers are greatly thankful the APN for providing the funding to materialize this 5-day program in Malaysia.



Group photo after demonstration of drones during field excursion.

Full schedule for capacity development workshop (14 – 17 July 2022)

Date/Times	Subject	Venue/Resource Person
Thursday 14 July 2022 (Day 1)		
09:30-09:50 (20mins.)	Registration/Morning refreshment	UiTM KK Campus
09:50-10:05 (15mins.)	Opening speech	UiTM Rector, Datuk Prof. Madya Dr. Hj. Abdul Kadir Bin Hj. Roslin
10:05-10:10 (5mins.)	Group Photo	All
10:10-10:25 (15mins.)	APN capacity development hands-on-training overview	Assoc. Prof. Dr. Ram Avtar
10.25-11.10 (45mins.)	Lecture 1: Introduction to precision agriculture.	Associate Professor Dr. Ashwani Kumar
11.10-11.15 (5mins.)	Question, answer and discussion	Chairperson
11:15-12:00 (45mins.)	Lecture 2: Introduction to challenges in conventional agriculture: climate change, demography, etc.	Assoc. Prof. Dr. Ram Avtar
12.00-12.05 (5mins.)	Question, answer and discussion	Chairperson
12:05 -13:05 (01hr.)	Lunch break	All
13.05-13.50 (45mins.)	Lecture 3: Introduction of UAVs, definitions, terminologies, operation and regulation in Malaysia.	Ts. Gs. Dr. Alexius Korom & Dr. Haidy Henry Dusim
13.50-13.55 (5mins.)	Question, answer and discussion	Chairperson
13:55-14:40 (45mins.)	Lectures 4: Introduction to the use of UAV in precision farming.	Professor Dr. Wirastuti Widyatmanti
14.40-14.45 (5mins.)	Question, answer and discussion	Chairperson
14.45-15.40 (55mins.)	Computer setup & preparation for hands-on training.	Facilitators
15:40-16:00 (20mins.)	Afternoon break & discussion.	Facilitator & participants
Friday 15 July 2022 (Day 2)		
9:30-10:30 (1hr.)	Practical 1: Hands-on training module on UAV Structure from Motion (SfM) data processing: Orthophoto, point clouds & DSM generation.	Facilitator & participants
10.30-10.40 (10mins.)	Tea break/refreshment	All
10:40-11:40	Practical 1: Continue..	Facilitator & participants

(1hr.)		
11.40-12.00 (20mins.)	Question, answer and discussion	Facilitator & participants
12:00-13:30 (1hr.30mins.)	Lunch break	All
13:30-14:30 (1hr.)	Practical 2: Hands-on training module on UAV data processing and analysis I	Facilitator & participants
14.30-14.40 (10mins.)	Question, answer and discussion	Facilitator & participants
14.40-15.40 (1hr.)	Practical 3: Hands-on training module on UAV data processing and analysis II	Facilitator & participants
15:40-16:00 (20mins.)	Afternoon break & Discussion. Certificates giving	All
Saturday 16 July 2022 (Day 3)		
09:30-11:40 (2hrs. 10mins.)	Practical 3: Continue.	Facilitator & participants
11.40-12.00 (20mins.)	Question, answer and discussion	Facilitator & participants
12:00-13:00 (01hr.)	Lunch break	All
13.00-15.10 (2hrs. 10mins.)	Practical 4: Hands-on training module on UAV data processing and analysis III	Facilitator & participants
15.10-15.30 (20mins.)	Afternoon break, question, answer and discussion	All
Sunday 17 July 2022 (Day4)		
07.00-10.00 (3hrs.)	Travel from Kota Kinabalu to Kota Marudu	Mr. Thomas & William Wong Farm in Kota Marudu
10.00-	ETA arrival at Kota Marudu & Breakfast	All
11:00-13:00 (2hrs.)	Site demonstration: 1. Demo data collection using UAVs 2. Demo field data collection 3. Collaborators discussions with Farmers & participants.	All
13:00-14:00 (2hrs.)	Lunch break, closing	All
14:00-18.00 (4hrs.)	Travelling back to Kota Kinabalu, Stop by at local souvenir stall & tea break.	All
18.00	ETA arrival at Kota Kinabalu	All

PROGRAMME: List of participants

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PROGRAMME FEEDBACK

Timestamp	General Evaluation: [The overall experience of the workshop is positive.]	General Evaluation: [My knowledge of the subject matter has improved.]	General Evaluation: [This workshop enhances the ability to share knowledge/skills with others.]	General Evaluation: [The allocation of time is adequate.]	Content: [The content of the workshop is in line with my official work.]	Content: [The content of the workshop is appropriate to the level of competence & easy to understand.]	Content: [The explanations given helped me understand the content of the workshop.]	Content: [The explanations are easy to understand.]	Management: [Adequate workshop materials.]	Management: [The venue of the workshop was satisfactory.]	Management: [The services provided throughout the workshop were satisfactory.]	Suggestions for improvement.
2022/07/14	5	5	5	5	5	5	5	5	5	5	5	5
2022/07/15	4	5	5	5	5	4	4	4	4	4	5	5 Excellent.
2022/07/16	5	5	5	5	5	5	5	5	5	5	5	5
2022/07/16	5	5	5	5	5	5	5	5	5	5	5	No improvement are needed. All goes well!!! 5 Awesome!
2022/07/16	4	4	4	4	3	5	5	5	5	4	4	The room temperature is too cold. I could not focus because I am trying to get comfortable throughout the course.
2022/08/01	5	4	4	4	4	4	5	4	5	3	3	5 Excellent.
2022/08/01	5	5	5	5	5	4	4	4	4	4	4	4
2022/08/01	5	5	5	5	5	5	5	5 4;5	5	4	4	4
2022/08/01	5	5	5	5	5	4	5	5	4 3;4	4	4	4
2022/08/01	5	5	5	5	5	5	5	5	5	5	5	5 good
2022/08/01	4	4	4	4	3	4	4	4	5	4	4	The workshop could be improved by participation of more number of stakeholders.
2022/08/01	4	4	4	4	3	5	5	5	5	4	4	The settings for the air conditioner made the room too cold and I could not focus a lot.
2022/08/01	5 3;5	4	4	4	3	4	5	5	5	4	4	4
2022/08/01	4	4	4	4	4	3	3	4	4	4	4	4 Looking for next workshop
2022/08/01	4	4	4	4	3	4	3	4	3	3	3	It would be better to have hands on practical (software application) in the computer laboratory setting.
2022/08/01	5	4	5	4	4	3	4	5	4	3	3	3
2022/08/02	5	5	4	4	4	5	4	4	4	4	4	5
2022/08/02	5	5	5	5	5	5	5	5	5	5	5	5
2022/08/04	4	5	4 3;4	4 3;4	4	3	4	3	4	4	4	The objective of developing network within interested parties is well met, but in technical aspects, in-depth understanding of the technologies will require more hands-on training.