REPORT

Asian Summer School in Bangkok 2018

Geoinformatics for Sustainable Agriculture

13 - 24 August 2018

Sponsors Support:

Visionary Value Japan Inc., Japan
(Prof. Shigeo Sakikawa)

Adin Research, Inc. Japan
(Dr. Koji Sasaki)

Chubu University Asian Institute of Technology

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1. Summary

Chubu Institute of Advanced Studies, Chubu University, and Remote Sensing and GIS (RS&GIS) Field of Study, jointly organized the "Asian Summer School in Bangkok 2018" program from 13th to 24th August 2018 at Asian Institute of Technology, Pathumthani, Thailand. The theme of the program was "Geoinformatics for Sustainable Agriculture".

A total of 16 participants, 9 nationalities, came from 10 universities and organizations located in 9 different countries participated in this program. The average age of participant in the summer school are 24 years old. From Japan, six participants from Chubu University joined. Among participants from Japan, there are six undergraduate students (English language and Culture, Constructional Engineering, Civil Engineering and Astronautics & Aeronautics). For non-Chubu students, there are four graduated students: two Cambodian employees from Aruna Technology Ltd. (Survey Department and GIS Department), one Indian doctoral student from Indian Institute of Technology Bombay (Centre of Studies in Resources Engineering) and one Vietnamese chief operating officer from ThinkLABs (Research and Development Department). There are six undergraduate students: two Thai students from Silpakorn University (Geography Department) and Srinakharinwirot University (Geography Department), one Bangladeshi student from Jahangirnagar University (Geography and Environment Department), one Filipino student from Bicol University (Geodetic Engineering Department), one Nepalese student from Kathmandu University (Department of Civil and Geomatics Engineering) and one Pakistani student from Sukkur IBA University and University of Agriculture Faisalabad (Business Administration and Institute of Business and Management Sciences). The summary of participant is present in Table. 1.

Several lectures and field trips were conducted during the 12 days of this program. 9 lecturers are from different Fields of Study in AIT (Remote Sensing & GIS, Computer Science and Information Management, Agribusiness Management, Agricultural Systems and Engineering and Water Engineering and Management). In addition, four external lecturers are from other organizations which is Michigan State University, Thailand's National Electronics and Computer Technology Center, University of Alberta and Chubu University. Moreover, six visits and field trips were conducted to connect what participants learned from lectures with the real world. Participants visited Geo-Informatics and Space Technology Development Agency (GISTDA), Khao Hin Sorn Royal Development Study Center, LoomSook Farm, The Golden Jubilee Museum of Agriculture Office, PASCO (Thailand) (Air Survey Company, Japan) and Bang Kra Chao. Furthermore, it is also to stimulate motivation of undergraduate students to endeavor their own research.

English is used as the main communication in lectures and daily life during the program. It made a deep impression of importance of globalization to the participants. However, in order to prepare participants to be ready for lectures conducted in English and well communication during the program, English Communication course organized by AIT language center was provided for participants who were welcome to join as pre-program. During the program, we also requested participants to share their background of study and working, interest and expertise that crossed cultural and disciplinary boundaries. Aside from study, the participants made new friends from different countries as the international society and built up good relationship and connection for support each other in the future. At the end of the program, we received good responses and many positive comments referring to a wonderful time they obtained during the program. This supports the fact that Asian Summer School in Bangkok 2018 Program ended in large success.

Since 2009, Chubu University and AIT build a cooperative relationship, especially in the field of Geoinformatics and sustainable development. In September, 2011, Chubu University and AIT agreed on the Memorandum of Understanding about the academic cooperation. This Asian Summer School program falls within the scope of the Memorandum of Understanding between Asian Institute of Technology and Chubu University dated September 16, 2011. This program is also planned by Chubu University as a milestone towards Asia Campus project of MEXT, Japan, for which Chubu University and AIT jointly applying.

In addition, we would like to thank each department and personnel of Chubu University, Division of Academic Affairs and RS&GIS FoS, also AIT for the tremendous supports such as preparing a handbook, a detailed schedule of lecture and field trip, and any other logistics support. Also special thanks to Visionary Value Japan Inc., Japan (Prof. Shigeo Sakikawa), and Adin Research, Inc., Japan (Dr. Koji Sasaki) for their financial support to establish this program. We would like to thank to each organization and individual who participated and some of whom shoulder their own expenses.

Table. 1 Summary of participants

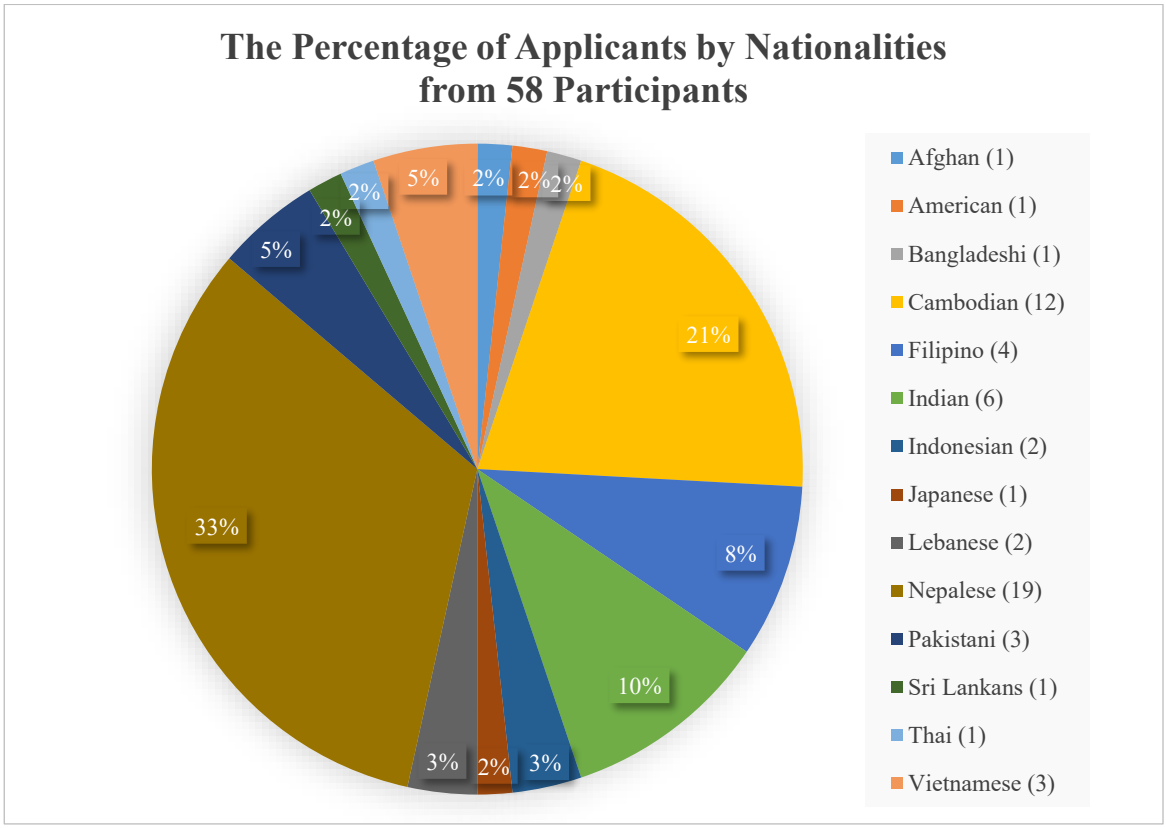
No.	Name	Age	Sex	Country	Grade	Field of study	University/Organization
1	Hiroya Sahashi	24	M	Japan	M1	Constructional Engineering	Chubu University
2	Masayuki Shimazaki	22	M	Japan	UG4	Civil Engineering	Chubu University
3	Hiroaki Honda	21	M	Japan	UG3	English Language and Culture	Chubu University
4	Narumi Takahashi	19	F	Japan	UG1	English Language and Culture	Chubu University
5	Mizuki Yamamoto	19	F	Japan	UG1	Astronautics & Aeronautics	Chubu University
6	Natsumi Shimizu	21	F	Japan	UG3	English Language and Culture	Chubu University
7	Faiyad H Rishal	19	M	Bangladesh	UG2	Geography & Environment	Jahangirnagar University
8	Honey Rose Penes	20	F	Philippines	UG5	Geodetic Engineering	Bicol University
9	Radhika Bhandari	24	F	Nepal	UG4	Civil & Geomatics Engineering	Kathmandu University
10	Wirawee Linsuwanon	21	F	Thai	UG4	Geography	Silpakorn University
11	Tarique Ahmed Abbasi	19	M	Pakistan	UG2	Business Administration	Sukkur IBA University and University of Agriculture Faisalab (Joint Degree Program)
12	Mukesh Kumar Vishal	36	M	India	Doctoral	Ph.D.	Indian Institute of Technology Bombay
13	Sami Sivuth	37	M	Cambodia	Surveyor	Surveying Department	Aruna Technology Ltd.
14	Suong Sovan	40	M	Cambodia	Consultant	GIS Department	Aruna Technology Ltd.
15	Vu Hai Nam	28	M	Vietnam	COO	Research and Development Department	ThinkLABs
16	Sasawat Thangthira	22	M	Thai	UG4	Geography	Srinakarinwirot University

2. Purpose

The participants will learn issues what related to sustainable agriculture in Asia, GIS, and how does it contribute to issues. Then they will understand the present situation and problems of Asian countries prosperously developing, and the value of GIS as a tool. Also they will realize the rapid progress and problems accompanying the advance in Asia through field trip. All lectures will be delivered in English. The participants will experience absorbing knowledge in English and understand its importance. This summer school will help participants have international sense and awareness of the problem for the participants' thesis.

3. Program Admission

There are totally 58 applicants from 14 countries who applied for Summer School in Bangkok 2018. The age of applicants ranges from 19 to 40 years old and most of them are 20-30 year old (46 participants or 80%).



In order to select potential candidates, Prof. Honda and Dr. Sarawut, coordinator of the program, made a decision based on certain criteria, background of study, experience, and potential to explore research interest from the program.

4. Participants

Universities and Organizations:

Aruna Technology Ltd.

Bicol University

Chubu University

Indian Institute of Technology Bombay

Jahangirnagar University

Kathmandu University

Silpakorn University

Srinakharinwirot University

Sukkur IBA University

ThinkLABs

Countries:

Bangladesh

Cambodia

India

Japan

Nepal

Pakistan

Philippines

Thailand

Vietnam

Participants:

Chubu University

Hiroya Sahashi
(Japanese)
1st -Master Student
Constructional Engineering

Masayuki Shimazaki
(Japanese)
4th–year undergraduate student
Civil Engineering

Hiroaki Honda
(Japanese)
3rd–year undergraduate student
English Language and Culture

Chubu University

Narumi Takahashi
(Japanese)
1st-year undergraduate student
English Language and Culture

Mizuki Yamamoto
(Japanese)
1st-year undergraduate student
Astronautics & Aeronautics

Natsumi Shimizu
(Japanese)
3rd–year undergraduate student
English Language and Culture

Jahangirnagar University

Friyal H. Rishal
(Bangladeshi)
2nd–year undergraduate student
Geography & Environment

Bicol University

Honey Rose Penes
(Filipino)
5th–year undergraduate student
Geodetic Engineering

Kathmandu University

Radhika Bhandari
(Nepalese)
4th–year undergraduate student
Civil & Geomatics Engineering

Silpakorn University

Wirawee Linsuwanon
(Thai)
4th–year undergraduate student
Geography

Sukkur IBA University

Tarique Ahmed Abbasi
(Pakistani)
2nd–year undergraduate student
Business Administration

Indian Institute of Technology Bombay

Mukesh Kumar Vishal
(Indian)
Doctoral Student

Aruna Technology Ltd.

Sami Sivuth
(Cambodian)
Surveyor

Aruna Technology Ltd.

Suong Sovan
(Cambodian)
GIS Consultant

ThinkLABs

Vu Hai Nam
(Vietnamese)
Chief Operating Officer

Srinakarinwirot University

Sasawat Thangthira
(Thai)
4th–year undergraduate student
Geography

5. Lecture Program

Date	Topic	Lecturer/Facilitator
6-12 Aug	RS-GIS Summer English Communication Program	AIT Language Center
13 Aug	Ubiquitous Geoinformatics	Prof. Kiyoshi Honda
	Health GIS	Dr. Shinya Yasumoto
	Interoperable Geoinformatics&Location Base Service	Dr. Sarawut Ninsawat
14 Aug	Global Navigation Satellite System (GNSS)	Dr. Sanit Arunpold
	Mobile video processing platform for agricultural	Dr. Matthew N. Dailey
	UAV and applications	Dr. Sanit Arunpold
15 Aug	Aerospace and Satellite technology	Dr.Tai Nakamura
	Interoperable Geospatial Data Platform for Smart Agriculture	Prof. Kiyoshi Honda
	Global Climate Change Impact and Water Resource	Dr. Sangam Shrestha
17 Aug	Hand on: UAV, GNSS experiment in the field and processing	Dr. Sanit Arunpold
	Hand on: UAV Data processing	Dr. Sanit Arunpold
20 Aug	Hand on: Crowd sourcing for Geospatial data (OSM)	Dr. Sarawut Ninsawat
	Hand on: Geospatial Analysis using Free Open Sources Software (FOSS)	Dr. Sarawut Ninsawat
21 Aug	Linking Climate Information, Remote Sensing and Modeling for Decision Support in Agriculture	Dr. Amor V.M. Ines (online)
	Sensors and Big Data for Society	Dr. Apichon Witayangkurn
	Agriculture GIS	Prof. Nitin Kumar Tripathi
22 Aug	Agribusiness Management: Global Perspective	Dr. John K. M. Kuwornu
	Smart Farm Initiative in Thailand	Pisuth Paiboonrat
	The Internet of Things: Implications for Smart Agriculture	Conrad Nobert

6. Field Trip Program

Date	Field Visiting
16 Aug	Geo-Informatics and Space Technology Development Agency (GISTDA)
18 Aug	Khao Hin Sorn Royal Development Study Center, Chachoengsao
	LoomSook Farm, Chachoengsao
19 Aug	The Golden Jubilee Museum of Agriculture Office
23 Aug	PASCO (Thailand) Co., Ltd.
	Bang Krachao, Samut Prakan

7. Comments on Lectures

All participants were requested to give the feedbacks on the lecturers by submitting a homework every day. The main purpose of a homework is to obtain what the participants have learned from the lecture and also, to get the comments and suggestions for further improvement. The table below presents the result of participants' submissions.

Name	**August 2018**										
	13	14	15	16	17	18	19	20	21	22	23
Hiroya Sahashi	o	S	o	o	o	o	o	o	o	o	o
Masayuki Shimazaki	o	o	o	o	o	o	o	o	o	o	o
Hiroaki Honda	o	o	o	S	S	S	o	o	o	o	o
Narumi Takahashi	o	o	o	o	S	o	o	o	o	o	o
Mizuki Yamamoto	o	o	o	o	o	o	o	o	o	o	o
Natsumi Shimizu	o	o	o	o	o	o	o	o	o	o	o
Faiyad H Rishal	o	o	o	o	o	o	o	o	o	o	o
Honey Rose Penes	o	o	o	o	o	o	o	o	o	o	o
Radhika Bhandari	o	o	o	o	o	o	o	o	o	o	o
Wirawee Linsuwanon	o	o	o	o	o	o	o	o	o	o	o
Tarique Ahmed Abbasi	o	o	o	o	o	o	o	S	o	o	o
Mukesh Kumar Vishal	o	o	o	o	o	o	o	o	o	o	o
Sami Sivuth	o	o	o	o	o	o	o	o	o	o	o
Suong Sovan	o	o	o	o	o	o	o	o	o	o	o
Vu Hai Nam	o	o	o	o	o	o	o	o	o	o	o
Sasawat Thangthira	o	o	o	o	o	o	o	o	o	o	o

The meaning of the symbols

O = Submitted
X = Not submitted
S = Cannot attend because of sick

In this section, each lecture will be briefly described and some of the comments from participants related to that lecture will be presented.

RS-GIS Summer English Communication Program

Conducted by: AIT Language Center, **Date:** 6-12 August 2018

The participants learned four skill of English language including listening, speaking, reading and writing. Also, they learned about the listening process including the common problems in listening and how to apply listening strategies in their studies and lives. Moreover, the class introduced the participants to listening and presentation skills related to topics which conducted in Asian Summer School in Bangkok 2018 program such as Remote sensing, GIS, Environmental problems, Climate Change and Global Warming. The lectures used many methods in the class such as group discussion, brainstorming, and presentation to help the participants communicate efficiently. Furthermore, the participants got chance to communicate with each other, interview foreigner students and presentation in English.

Hiroya Sahashi *(1st Master Student, Constructional Engineering)*

I would like to practice oral communication in English. Interviewing people from various countries in the university was a nervous but valuable experience.

Masayuki Shimazaki *(4th-year undergraduate student, Civil Engineering)*

I decided to attend this class because I want to improve my English skill. This class was very useful for me.

Hiroaki Honda *(3rd-year undergraduate student, English Language and Culture)*

I learned that I need to be clear and using understandable sentences when I do presentation. I knew more academic phrases for presentation.

Narumi Takahashi (1st-year undergraduate student, English Language and Culture)

I am participating in Asian Summer School. I prepare my English skill for this camp and I would like to learn more.

Mizuki Yamamoto *(1st-year undergraduate student, Astronautics & Aeronautics)*

I didn't have vocabulary about environmental issues. This class can improve my skills, learned more vocabulary and also learned how to do presentation.

Natsumi Shimizu *(3rd-year undergraduate student, English Language and Culture)*

I enjoyed this class and this class improves my English skill.

Ubiquitous Geoinformatics

Conducted by: Prof. Kiyoshi Honda, **Date:** 13 August 2018

The participants learned that the ubiquitous geo-informatics mean the acquisition of the geospatial information by various applications anywhere and real-time. The topic includes satellite remote sensing, field sensor network, real time mapping, modeling and simulation, and high-performance computing. The satellite technology enables the near real-time information on Earth. Moreover, the lecturer introduces the utilization of high and low resolution satellite in several benefits. However, the technology that provides the real-time data is the field sensor network, compass camera and UAV.

Hiroaki Honda *(3rd–year undergraduate student, English Language and Culture)*

I learned that we have three ways to use GIS. They are camera, heat, and radars. And they have each different analyzing skills.

Masayuki Shimazaki *(4th–year undergraduate student, Civil Engineering)*

Satellite usually benefit ubiquitous. Ubiquitous need satellite. I want to learn more about satellite. It was the best composition as the first lesson.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

I have learned many things in this course but what I am interested is UBIQUITOUS work and its definition. Moreover, it became useful when ubiquitous plus Geo-information especially in agriculture sector. Of course, not only agriculture purpose. I will apply it to any sector which fit to my purposes.

Mukesh Kumar Vishal *(Doctoral student, IIT Mumbai)*

I learned about various power full applications of GIS and RS. Mostly I will apply in precision agriculture. This was wonderful lecture no need to improve.

Health GIS

Conducted by: Dr. Shinya Yasumoto, **Date:** 13 August 2018

This lecture introduces how Geographic Information Systems (GIS) can update research on health. In particular, we will focus on things which could not be achieved without GIS (The topic can be extend to a study on agriculture field). Moreover, this class learned about application of GIS in Snow's Cholera map and Sunlight analysis using 3D urban modelling.

Hiroya Sahashi *(1st Master Student, Constructional Engineering)*

I learned why is GIS important to understand human health. I thought that it could be useful at the stage of urban planning of the design. It was good that we could practice the specific problem "How many hours are sunshine duration for each calculation point?" of using software.

Honey Rose Penes *(5th–year undergraduate student, Geodetic Engineering)*

GIS is a very good tool to geodetic engineers. Since I am taking up geodetic engineering, I must have knowledge in GIS and understand its capabilities so that I can present my future clients with maps that can show the things they need to know. I can show them maps and models that they can readily and easily understand. It is important to give them what they want and help them with decision making. I will use GIS to acquire, store, analyze, and display geographical data because I know that GIS can provide accurate output and it is also cost effective.

Tarique Ahmed Abbasi *(2nd–year undergraduate student, Business Administration)*

We learned about the key role of GIS in health sector for health improvements. It is used in public and health sciences. Such as in the areas of sunlight analysis using 3D urban modelling etc.

Sasawat Thangthira *(4th–year undergraduate student, Geography)*

I learned about Health GIS and its application. Everything is very good.

Interoperable Geoinformatics & Location Base Service

Conducted by: Dr. Sarawut Ninsawat, **Date:** 13 August 2018

The participants learned about Location Based Service, Augmented reality and Virtual reality, how to apply Geoinformatics data to the Open Geospatial Consortium (OGC) web service, web GIS, software development efforts, online data archives and applications.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

I learned about Location-based service for the spatial solving including basic webGIS, application of LBS, Interoperability of Open Geospatial consortium (OGC), OGC web services (OWS), SOS, Dynamic 3Dgeneration would be an advantageous situation.

Suong Sovan *(GIS consultant, Aruna Technology Ltd.)*

What have you learned from this course, I will be apply as Location Based Services. My suggestion for further improvement of this course, need to prepared more detail for handout of each section.

Mizuki Yamamoto *(1st-year undergraduate student, Astronautics & Aeronautics)*

I need to have Internet, GIS and mobile services when I get LBS.

Wirawee Linsuwanon *(4th-year undergraduate student, Geography)*

I learned more about Geoinformatics and realize how it closer to our lives.

Global Navigation Satellite System (GNSS)

Conducted by: Dr. Sanit Arunpold, **Date:** 14 August 2018

The participants obtained the basic knowledge and concept about GNSS which are GNSS products, GNSS requirements, GPS segment, the principle of measurement, orbit comparison and GPS positioning. Moreover, they learned how to use GPS, GPS type and application.

Honey Rose Penes *(5th-year undergraduate student, Geodetic Engineering)*

As a future geodetic engineer, understanding the underlying principles behind GNSS can help me produce accurate output. Geodetic Engineers use survey grade GNSS receivers to establish controls and by understanding the principles behind, I will be able to use these positioning systems wisely and correctly.

Radhika Bhandari *(4th-year undergraduate student, Civil & Geomatics Engineering)*

We learnt about the basics of GNSS and the errors associated with it. The idea can be used with pets, navigation and surveying. Also, we can use it in running event analysis for any kind of information (economic, socio-cultural or others) keeping the privacy anonymous.

Natsumi Shimizu *(3rd-year undergraduate student, English Language and Culture)*

I learned about GPS. It's difficult for me to understand but I try to do my best.

Masayuki Shimazaki *(4th-year undergraduate student, Civil Engineering)*

I understood GNSS from this course.

Mobile Video Processing Platform for Agricultural

Conducted by: Dr. Matthew N. Dailey, **Date:** 14 August 2018

The participants learned about image processing in the context of Vision Systems. The useful of image processing in all phases of agriculture, image processing in pre-harvest applications, the chromatic restoration of an image, mobile robot in agriculture, 2D mapping with laser range finders, mobile video processing for agricultural crop mapping, 3D geometry and pinhole cameras, Mapping with stereo vision and occupancy grids and 3D modeling with time of flight cameras.

Faiyad H Rishal *(2nd–year undergraduate student, Geography & Environment*)

I had many ideas like mobile GIS, Image classifications etc. I'll apply those while using GIS, RS.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

It was really technical and mathematics course. A lot writing description on white board shown us about explanation, example, formula, pictures and graph. He raised up many questions to students in order to make them involve with his class room. I was clearer about final measurement from drone (healthy / unhealthy, water content, canopy spread, fruit, plant and weed). The two methods of computing number via mathematics, it is known as SIFT: Scale-Invariant Feature Transform and another one is known as SURF: Speeded Up Robust Feature. SURF is more efficiency implementation then SIFT. I will apply this for agriculture purpose by using drone when I get back to my country.

Tarique Ahmed Abbasi *(2nd–year undergraduate student, Business Administration)*

We learned about 3 D geometry and about pinhole cameras there working principles and parameters. Use and value of mobile robots in agriculture. About 2 D mapping with laser range finders. Mobile vedio processing for agricultural crop mapping for exact information and higher accuracy.

Radhika Bhandari *(4th–year undergraduate student, Civil & Geomatics Engineering)*

This lecture contained the topics little far from what I have learnt till now. I have learnt about the possibilities of deep learning and machine vision in agriculture. We can explore this topic more and use it to automate processes like object detection, resolving kind of disease, knowing state of plant ripening etc.

UAV and Applications

Conducted by: Dr. Sanit Arunplod, **Date:** 14 August 2018

The lecturer presensted the definition of UAV and the its components, which are platform and sensor. Moreover, the lecture will also give the sample of UAV application.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

Unmanned aerial vehicles are used across the world for civilian, commercial, as well as military applications. This is an incomplete list of those applications. - Inspection & Monitoring - Surveying & Mapping - Solarpark & PV Inspection - Condition Survey & Civil Engineering - Precision Agriculture - Aerial Imaging - HR Photos & Stills - Aerial Imaging HD Film & Video - Computer Vision - Flight Dynamics.

Radhika Bhandari *(4th–year undergraduate student, Civil & Geomatics Engineering)*

I have learnt about the prospects of UAVs and drones. In addition, I liked the concept of making 3D models of archaeological places for future. Plus, plant health study can also be implemented in future.

Honey Rose Penes *(5th–year undergraduate student, Geodetic Engineering)*

For a future geodetic engineer like me, UAVs will be our best friend in surveying. GEs use survey grade UAVs in their big projects to save time and energy. Utilization of airborne survey instruments can help GEs produce accurate output. As a future GE, if I have enough knowledge on UAVs, its types, capacities, pros and cons, it will help me decide which UAV is suitable for a certain project.

Suong Sovan *(GIS consultant, Aruna Technology Ltd.)*

What have you learned from this course, I will apply as Management for Palm counting and Health Analysis.

Aerospace and Satellite Technology

Conducted by: Dr. Tai Nakamura, **Date:** 15 August 2018

This lecture separates into two main sections which are "Aerospace and Human Space" and "Human Space Technology". The objectives of the space engineering development are to go to outer space, to utilize resources in space, to build infrastructures in space and to develop new technology. In the second part, the scientific researches in space will be presented to give the general information about the Japanese experiments on the international space station.

Wirawee Linsuwanon *(4th-year undergraduate student, Geography)*

I know more about Aerospace and Satellite technology how satellite work and how important of these technology.

Mukesh Kumar Vishal *(Doctoral student, IIT Mumbai)*

It was awesome class to know details about Aerospace and Satellite Technology. Important point to highlight as learning was to get acquainted about characteristics of space environments and secondary environmental elements. Being a research scholar of agriculture domain it was interesting to know research life phenomenon in space specially influence of the microgravity environments on the growth of plants. It has open my avenues of understanding and perspective towards plant breeding specially mutation in space environment for novel variety development and behavior of plant in other corner of space.

Tarique Ahmed Abbasi *(2nd-year undergraduate student, Business Administration)*

The lecture was very effective, we all know that now world is changing fast and satellite technology has proved its important role in the development of modern world technologies. We cannot deny or ignore this field. So I learned more about this modern world technology the use of GPS, GNSS and I also know about the working of satellite and spaceships.

Mizuki Yamamoto *(1st-year undergraduate student, Astronautics & Aeronautics)*

Aerospace and satellite technology. The activities of ISS man in space.

Interoperable Geospatial Data Platform for Smart Agriculture

Conducted by: Prof. Kiyoshi Honda, **Date:** 15 August 2018

From this course, the participants learned the importance of using geospatial data as the need of precision farming for higher productivity. Moreover, the impact of climate change also the one challenge for smart agriculture. The lecturer also demonstrated the topic about Agriculture 4.0 which have the objective to change mass production to lean production. Finally, the future of smart agriculture is emphasized to participants which are vertical integration to horizontal integration. Moreover, the sensors will be the important components that can help for smart agriculture.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

An open GIS system allows for the sharing of geographic data, integration among different GIS technologies, and integration with other non-GIS applications. Cloud based sensor back-end service and OGC's standard enables quick deployment and flexible operation of sensor node. Web service technologies offer a time- and cost-effective way to access multi-dimensional data in a user-tailored format and allow for rapid application development or time-series extraction.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

This is the second time on this topic by Dr. Honda. Of course it clearer than the first day. Real time update of ubiquitous geoinformatics is quite efficiency contribute to agriculture. Here is the summary of procedure. Satellite RS, UAV, Soil investigation, Weather, Water, Agri-Machine App, and Sensor Network were the equipment and application to process cloud & data integration. Model calibration is the second stage. We do crop model (computer program) to model calibrate. The scenario simulation of modeling shall be applied for decision make. It is good to know this latest technology for agriculture sector. I propose this method and technique to Cambodia agriculture firms.

Honey Rose Penes *(5th–year undergraduate student, Geodetic Engineering)*

It is never bad to be aware of things that pertains to agriculture. Agriculture as one of the hottest topics today, it is important to understand the challenges the topic faces so I can formulate solutions of my own to help the community which is now relying in modern technology in solving problems. It is also good to be aware of the capabilities of the system you are using to be able to get the data needed and to arrive with good output.

Hiroaki Honda *(3rd–year undergraduate student, English Language and Culture)*

We can analyze agricultural information with using IGDP and we can suggest when is the harvesting to farmers.

Global Climate Change Impact and Water Resource

Conducted by: Dr. Sangam Shrestha, **Date:** 15 August 2018

The participants learned about the water availability and water management challenges. Firstly, the lecturer tried to emphasize the participants about the current situation about the global water resources. Secondly, the observed and expected impact of climate change on water resources will be presented. Thirdly, the lecturer shown the adaptation to climate change such as the seawater desalination plant or the reduction in water demand for irrigation. Finally, the case study about the assessment of climate change impacts on water availability and water transfer are highlighted to show the research on future climate scenarios.

Radhika Bhandari *(4th-year undergraduate student, Civil & Geomatics Engineering)*

Dr. Sangam Shrestha provided us brief knowledge on climate change and its prospective effects on water resources. We came to know about differences between climate variability and climate change, sea and ocean; the little things that we ignore. In addition, we came to know how climate change is qualitatively as well as quantitatively affecting water resources and adaptation measures different countries have implemented to tackle this problem.

Narumi Takahashi (1st-year undergraduate student, English Language and Culture)

I watched TV program about climate change when I was child. Then, I'm interested in climate change. And now, I learned details about it. So, I will try to use this knowledge to solve this problem. As a part of this effort, I joined my hometown event to clean the river. My family has participated every year.

Mizuki Yamamoto *(1st-year undergraduate student, Astronautics & Aeronautics)*

Effect of climate change and increasing population for water.

Wirawee Linsuwanon *(4th-year undergraduate student, Geography)*

The real meaning of climate change and how it effects to the resources of water.

Hand on: UAV, GNSS Experiment in the Field and Processing

Conducted by: Dr. Sanit Arunplod, **Date:** 17 August 2018

The lecture shown the UAV flight by the field experiment that using the DIY UAV to capture the image inside AIT. The participants learned about the use of "Mission Planner" which is the open source application for flight planning. Moreover, the participants learned and try to use GPS in the field.

Tarique Ahmed Abbasi *(2nd-year undergraduate student, Business Administration)*

First if all we learned about the functions of drone or UAV its controllers and working process and exchange of data. We also learned how to fly the UAV how to control. We can get many advantages by UAV such as in the field of Agriculture, in the field of space technology for mapping taking photos cover many far areas and many more. By GNSS application we find our location practically and find some hidden bottle caps with the help of GNSS application that assure us it is fruitful and work accurately.

Honey Rose Penes *(5th-year undergraduate student, Geodetic Engineering)*

Today, I had the chance to fly a UAV. It was fun and very enjoyable, at the same time, it was very educational. As a future geodetic engineer, it is good to know how to fly a UAV because a survey-grade UAV is now acceptable for surveying and to be able to catch up with modern survey techniques is an advantage. I will be able to produce better output with the knowledge I got from this course. I was able to know how to operate a UAV, how you open/start the equipment, how to manipulate the camera angle, the suitable flying mode depending on the purpose, the manipulation of the sticks to move effortlessly, how to take photos and videos, how to know the battery status, how to change the contrast of the camera, and many other things.

Radhika Bhandari *(4th-year undergraduate student, Civil & Geomatics Engineering)*

This course had field work, so it was fun to do. WE learnt to fly drone firstly and also carried out GNSS experiment in field to find predefined spots. This knowledge can be applied in drone data capture and GNSS survey.

Natsumi Shimizu *(3rd-year undergraduate student, English Language and Culture)*

I learned how to use UAV.

Hand on: UAV Data Processing

Conducted by: Dr. Sanit Arunplod, **Date:** 17 August 2018

For this lab session, the lecturers taught the participants to use "Agisoft photoscan" for processing the UAV image to be 3D model.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

This lecture is dedicated to Agisoft tools allowing visualization and processing of data generated by UAV (Unmanned Aerial Vehicle). Emerging drones' technologies and their applications in civil areas open new perspectives in various fields of application. Images coming from UAV sensors represent huge volumes and require complex processing to be used properly. Agisoft tools allowing processing these data to take the most out of it. This lecture, after reviewing theoretical aspects and acquisition methods, presents the Agisoft project.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

It was first time for me to process software called Agisoft PhotoScan Professional. It quite simple software easy to learn (I have some features background). It is open software, I will get it and practice with my future work. I will process two programs and compare the result.

Mukesh Kumar Vishal *(Doctoral student, IIT Mumbai)*

UAV has a great application in agriculture especially precision agriculture and remote sensing. This lecture gave me an idea of basics of UAV data processing i.e. image stitching, how to obtain the quality data and process it. Also I came to know about some open domain free software for processing UAV Data. In future I will apply in pest diseases dynamics and monitoring study in agriculture specially my seed spice crops and will develop some signatures for it. It was a great opportunity of learning.

Faiyad H Rishal *(2nd-year undergraduate student, Geography & Environment*)

Same as above. It's very important to process image after using UAV, this is starting and I'll take it too far.

Hand on: Crowd sourcing for Geospatial data (OSM)

Conducted by: Dr. Sarawut Ninsawat, **Date:** 20 August 2018

The participants learned about background of OpenStreetMap (OSM) which are definition of OSM, policy, data source of OSM, data collections and data management of OSM.

Hiroya Sahashi *(1st Master Student, Constructional Engineering)*

Through in-campus fieldwork, I learned how to add information to the open street map. I wanted to do it at Chubu University too.

Suong Sovan *(GIS consultant, Aruna Technology Ltd.)*

I will be apply it in the future as, Data Collections of field survey by using OSM and Field Paper.

Narumi Takahashi (1st-year undergraduate student, English Language and Culture)

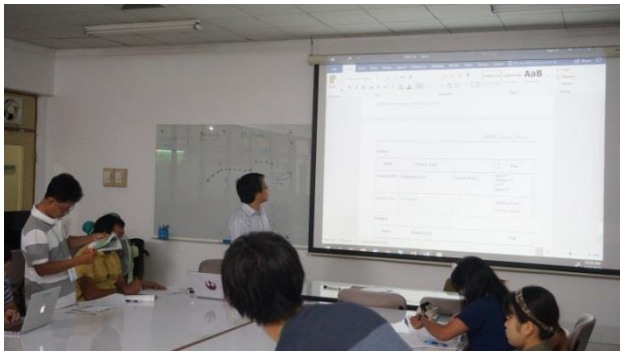
I learned about the OSM and its application.

Sasawat Thangthira *(4th-year undergraduate student, Geography)*

I learned about how to use Streetmap and edit by crowed sourcing.

Hand on: Geospatial Analysis using Free Open Sources Software (FOSS)

Conducted by: Dr. Sarawut Ninsawat, **Date:** 20 August 2018



The participants learned about QGIS analysis which is provided common functions and features to provide a GIS data viewer. Furthermore, they learned about Vector analysis. They get chance to use QGIS software to understand GIS applications and solve sample problem (dataset) using analysis tools.

Honey Rose Penes *(5th-year undergraduate student, Geodetic Engineering)*

QGIS is not new to me but I never tried using this software for data processing. I learned how to operate QGIS and was able to do some simple analysis. I can use the knowledge I got from today's lab to make some more complex analysis in the future. If you know what kind of data your software supports you will be able to gather data or convert data in that format. It is easy to use and I will be able to use this in my future projects.

Radhika Bhandari *(4th-year undergraduate student, Civil & Geomatics Engineering)*

We learnt to use some of geoprocessing tools in QGIS and carry out multi-criteria analysis. We can apply this knowledge to various kinds of analysis.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

QGIS, it was first time for me. I never used it before. Good to know many GIS software. It's might work for other reason when ArcGIS not available. I got his points of his topic geospatial analysis by used GIS tool.

Faiyad H Rishal *(2nd-year undergraduate student, Geography & Environment*)

I practiced a real life problem which will help me doing project in the future.

Linking Climate Information, Remote Sensing and Modeling for Decision Support in Agriculture

Conducted by: Dr. Amor V.M. Ines, **Date:** 21 August 2018

From this course, the participants learned about the linking of the climate information to develop the model for supporting in Agriculture. Firstly, the topic about the climate risk management is presented. Secondly, this management can help in the decision in both of local and regional scale. The decision at the local scale is farmers' decision analysis such as risk index for planning optimal supplementary irrigation in dryland agriculture. On the other hand, the decision at the regional scale is the food security such as Philippines crop yield prediction. Finally, the topic is the improving information for decision support that can increase the lead time and accuracy for decision support.

Hiroya Sahashi *(1st Master Student, Constructional Engineering)*

I learned how to link climate information data and use data assimilation method to improve prediction.

Tarique Ahmed Abbasi *(2nd–year undergraduate student, Business Administration)*

I learned most of information about the informing Decisions at local and regional levels that are directly or indirectly will be in the favour of farmers. Secondly local decisions can easily be applied to interact farmers thinking and aware them with important information such as how, where, what and when to sow, harvest, irrigate, apply fertilizer each and everything.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

Climate change alters the agriculture production conditions and food security of developing countries, increasing the frequency and depth of risk to agricultural production and incomes. The actions required for improving adaptation to climate change are needed now, and their impacts on risk management can also be assessed in the present as opposed to a distant future. Efforts in improving adaptation to climate change have often been obstructed by the perceived need to focus in possible climate scenarios that were too far in the future and too uncertain at the spatial scales that are most needed to inform decisions and policies (regional to local scales).

Mizuki Yamamoto *(1st-year undergraduate student, Astronautics & Aeronautics)*

It was really difficult for me. But I could get a lot of vocabulary.

Sensor and Big Data for Society

Conducted by: Dr. Apichon Wittayangkurn, **Date:** 21 August 2018

The participants learned about the different of data, information and knowledge. Also, they learned about big data including meaning, characteristics (i.e. Volume, Variety, Velocity and Veracity), development and services & infrastructures. Moreover, the case studies and applications such as Mobile phone as Human sensors and Emergency Evacuation.

Hiroaki Honda *(3rd-year undergraduate student, English Language and Culture)*

First, I leaned what data is. I learned data processing cycle it's about input, processing, and output. Next what I learn was Big Data there are four things, Volume, Variety, Velocity and Veracity. We use big data such as twitter, google, yahoo, Facebook and so on. And I got to know what iCloud look like; it is just gigantic bunch of computers. Finally, I learned we can know about what is human behavior from people flow with GPS.

Radhika Bhandari *(4th-year undergraduate student, Civil & Geomatics Engineering)*

It was complete new topic for me and was a good lecture. We came to know about data, its advantages and disadvantages, privacy issues, Big Data, Hadoop and few examples. This knowledge can be used in understanding Big Data and its implications.

Honey Rose Penes *(5th-year undergraduate student, Geodetic Engineering)*

In the future, it is important to have a clear definition of these three terms: data, information, and knowledge. Also, we must use data and information in a good or excellent quality so that we can produce a good output. As stated, correct output totally depends on the input data. It is important to verify data to determine whether the collected data is correct as required. It is also advisable to convert data so that the computer system can read and understand the data. We should also be aware of the format of the data and in what format our data will be saved to. I learned that if I ever have a problem with my data, I can contact the data provider if my data is incomplete, have missing parts, or with error or noise. Big data for society is very useful and we can apply it in disaster management and response, in tourism, in health, in transportation system, in emergency evacuation, and in almost any phenomena or event.

Wirawee Linsuwanon *(4th-year undergraduate student, Geography)*

How big data work nowadays, the use and concept of big data.

Agriculture GIS

Conducted by: Prof. Nitin Kumar Tripathi, **Date:** 21 August 2018

The participants learned about the basic of Remote sensing and GIS. How to apply remote sensing and GIS in agriculture. Furthermore, the application of Remote sensing and GIS for agriculture in case study which is Improving the Accuracy of Aboveground Biomass and Carbon Estimation Using LiDAR Metrics.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

Aboveground biomass (AGB) is defined as the total amount of aboveground oven dry mass of a tree that is expressed in tons per unit area. Accurate estimation of AGB, also referred to as dry total biomass, in forested areas provides an indication of the potential energy that is stored in cellulosic material. Light detection and ranging (LiDAR) is a relatively new type of remote sensing that promises to provide forest biomass estimation accuracies that equal or exceed those obtained using other remote sensing techniques.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

LiDAR technology is quite high technology in last 10 years. It's useful for many purpose (survey, mapping, infrastructure, ancient temple investigation, irrigation, disaster, earthquake, forest inventory, biomass and carbon investigation). The interested of this topic is methodology of combination of field survey and LiDAR points cloud. It will be profitable to apply this method in Cambodia.

Tarique Ahmed Abbasi *(2nd-year undergraduate student, Business Administration)*

Lidar metrics is one of most accurate and good technology, the important thing of lidar data was to work for the improvement in the accuracy of estimation techniques for above ground biomass and carbon. In the future we can get most accurate information and will apply that information for researches in that field. As we know carbon is pollution so trees are natural air coolers that absorb all the carbondioxide gas and make the environment cool and normal.

Honey Rose Penes *(5th-year undergraduate student, Geodetic Engineering)*

I really liked the last lecture for today. I learned a lot of things I can use to improve my thesis paper. It is also about acquiring data from field observations (which Geodetic Engineers use to collect data) remote sensing using satellite, and LiDaR. I have learned the advantages and the disadvantages of these three methods especially how good LiDaR is in terms of producing DSM, DTM, and CHM. Also, to improve the accuracy of my model, in my analysis, I must consider important and necessary variables. It is never bad to have an exhaustive search if you really want a good output. I can use this knowledge to produce better outputs in the future.

Agribusiness Management: Global Perspective

Conducted by: Dr. John K.M. Kuwornu, **Date:** 22 August 2018

The participants learned about food and agribusiness such as growth of the food and agribusiness system, contemporary issues in agribusiness and systems approach to agro-industrial analysis. Moreover, the lecturer explains more sample case studies.

Tarique Ahmed Abbasi *(2nd-year undergraduate student, Business Administration)*

As this was my major subject and I revised all the things that I learned last year. Further new thing was four topics that are international linkages, institutional linkages, National linkages and Macro-Micro policies. I understand the role of government in improving farmers and agriculture business conditions. Basically the lecture was very interesting and informative.

Masayuki Shimazaki *(4th-year undergraduate student, Civil Engineering)*

The business of agriculture is very difficult. But, I felt that agriculture will become more prosperous due to drones and automation technological innovation.

Narumi Takahashi (1st-year undergraduate student, English Language and Culture)

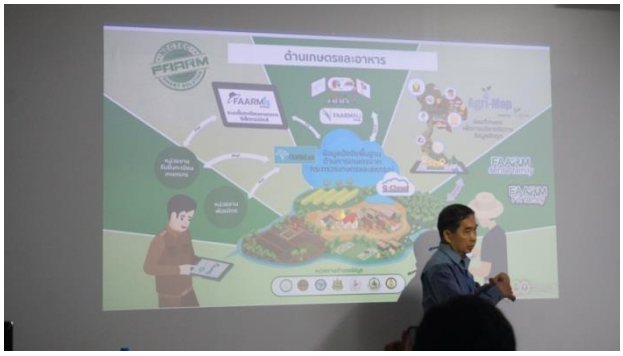
Before I came this Asia summer school, I had ignorance about Agribusiness Management at all. However, I was aware of the current situation of Agribusiness Management. I was shocked by this situation and remembered same news that happened in Japan. So, I think I should tell this knowledge to the people.

Natsumi Shimizu *(3rd-year undergraduate student, English Language and Culture)*

I learned about preside agriculture.

Smart Farm Initiative in Thailand

Conducted by: Pisut Paiboonrat, **Date:** 22 August 2018



The participants learned about the smart agriculture project in Thailand. The lecturer starts with the new technology and innovation approach for Thailand 4.0. The role of ICTs in agriculture is the one important topic for supporting the smart farmers. The example of E-agriculture solutions is the data visualization named "AgriMap and What2 Grow" provided as web mapping service. Not only the location based service, there are also the development in Area based service such as field operators from UAV or sensor.

Hiroya Sahashi *(1st Master Student, Constructional Engineering)*

I learned about advanced agriculture in Thailand.

Hiroaki Honda *(3rd–year undergraduate student, English Language and Culture)*

I learned there are less people who are farmers in Thailand because they think farm needs to work hard and low income but it is said it's not true. For good farming, we should use technology when we analyze the field. It is required to educate younger generation in order to be superb farmers.

Suong Sovan *(GIS consultant, Aruna Technology Ltd.)*

I will apply it in the future as Smart Farm, E-Agriculture and Mobile Application for Soil Testing.

Sasawat Thangthira *(4th–year undergraduate student, Geography)*

Thailand 4.0 and Smart farm.

The Internet of Things: Implications for Smart Agriculture

Conducted by: Dr. Conrad Nobert, **Date:** 22 August 2018

The participants learned about IoT and their application. IoT is interested by people around the world. Not only lecture but also group work was established in this class. The lecture included about principle of IoT. In the practicing session, participants brain storming for make new technology that compose of IoT.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

Internet of Things (IoT) refers to an emerging trend where more devices are connected to users and other devices via the Internet IoT enable smart, networks that allow different devices to function together or independently. Almost any device or product with electronic on-off controls can now be equipped to connect to the Internet. Applications of IoT in Agriculture: Precision Farming, Agricultural Drones, Livestock Monitoring, Smart Greenhouses, etc Thus, the IoT agricultural applications are making it possible for ranchers and farmers to collect meaningful data.

Masayuki Shimazaki *(4th–year undergraduate student, Civil Engineering)*

I thought that everyone is interested topics. Recently, the development of IT technology is tremendous. Our opinion will be realized.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

The topic is about IoT. The first IoT was created 1982 and it has developed become more and more popular. In this topic was anything about sensor and smart device to provide real time information (weather, temperature, water, soil and fertilizer) of agriculture purpose.

Mukesh Kumar Vishal *(Doctoral student, IIT Mumbai)*

Today we cannot imagine world without IoT. Everywhere in all aspect of life and living IoT exists. Prof Nobert exposed us to the different aspects of sensors, actuators and internet devices and also technologies to for developing low cost IoT devices and different consortium working for same. Especially his 10 minutes class exercise to come up with owns IoT device was great. In future this will help to develop our own IoT to solve specific problem domain. It was great learning experience.

8. Comments on Field Trip

GISTDA Sriracha

Date: 16 August 2018

GISTDA is a public and core organization of Thailand. GISTDA was established on November 3, 2000. GISTDA is responsible for space all technology and geo-information activities. Today, GISTDA is developing a worldwide network of distributors to allow the users to use and access to all GISTDA products.

Hiroya Sahashi *(1st Master Student, Constructional Engineering)*

We were able to hear valuable stories from people who are doing space projects in Thailand including the artificial satellite THEOS.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

I can see really operation from satellite ground station. In this office I got knowledge about satellite technology such as S-Band, X-Band, Panchromatic 2m, Multispectral 15m, Pan-Sharpening 2m, Passive Sensing and Active Sensing. In satellite image processing office. I learn about their operate satellite operate image processing. How they store data from satellite and imagery data. There are about 30GB/day. They store them in server at GISTDA ground station. The exciting place was Space Inspirium. I like this place very much (Pictures about satellite and space craft, imitate of astronaut and space craft room ... etc.). The most exciting was three games one is Gyroscope, another one is Marswalk and last one is VR Sphere.

Natsumi Shimizu *(3rd-year undergraduate student, English Language and Culture)*

I saw satellite replica and big computers first time. I was so surprised that big computer's room is so cold. But it's so important for big computers. I learned it. And I experienced weightlessness like staying space. It was so fun! Good experience. It was difficult to learn universe for me, but I like to learn universe, so I was so excited. It was so nice experience for me.

Narumi Takahashi (1st-year undergraduate student, English Language and Culture)

This place was amazing. I had opportunity to learn many things about satellite technology and also the satellite of Thailand. The lectures and museum was very good.

Khao Hin Sorn Royal Project and Development

Date: 18 August 2018

His Majesty the King has established this study center since 1979. It focuses on novel agricultural developments facilitated by the cooperation of public and private sectors. The large plot of land was once barren, but with the development of water sources, forest conditions, land and animal husbandry, the area has been completely transformed. Now the area serves as a model and an example for development for other areas. Experiments in agriculture as well as demonstration plots are available to visitors and farmers looking to learn.

Hiroya Sahashi *(1st Master Student, Constructional Engineering)*

I learned the background on the development of this facility.

Suong Sovan *(GIS consultant, Aruna Technology Ltd.)*

What have you learned from here is every good for sustainable for development area.

Tarique Ahmed Abbasi *(2nd-year undergraduate student, Business Administration)*

The Royal development study center was an amazing place for researchers and farmers. I learned about different species of Fruits, vegetables and chilies that I have only listened but now I practically know and I can plant it in my home town agricultural area.

Wirawee Linsuwanon *(4th-year undergraduate student, Geography)*

The new theory of King Rama XI which is about him to manage your land in the most beneficial way.

LoomSook Farm

Date: 18 August 2018

This farm owner is Mr. Chatchai Lomsookwatthana who is interested in melon and smart farming system. Melons are planted in close system (greenhouse). This melon farm is controlled using smart farming system such as watering, fertilization and monitoring of the melon growing factors (e.g., light, humidity and temperature). Moreover, their productions are warranted by GAP standard.

Faiyad H Rishal *(2nd–year undergraduate student, Geography & Environment*)

Various types of agriculture I learned, I learned how one can be a smart farmer and to produce for form him and the nation.

Mukesh Kumar Vishal *(Doctoral student, IIT Mumbai)*

Visiting Loomsook farm was a great experience to interact a young farmer and to see smart farm initiatives which is attracting youths. How a young farmer is applying precision agriculture technologies at their farm specially to monitor fertilizer application efficiently and accurately in melon farming which is important aspect for making profit at small farm. I also learned how melon and cucumber farmers of Thailand are making their clusters and are connected with each other for quality information dissemination and even exporting those melons for good earning. Kudos to LoomSook farmers for his effort!

Narumi Takahashi (1st-year undergraduate student, English Language and Culture)

I learned about how to grow the melon. I impressed two things to come here. First one of the things that had been effective use of the machine. I realized that I had been trapped in prejudice that farmers don't use the machine. Last one of the things that farmers are good publicity. I have no idea that farmers use SNS. I was enjoyed this visit.

Honey Rose Penes *(5th–year undergraduate student, Geodetic Engineering)*

This farm is very inspiring. I had a thought of investing in smart farming. This place made me realize that farming and technology are good combination and we can gain profit and at the same time help the community grows. You grow, the community also grows. This opportunity was great that maybe if I have the resources and the time, I can start my own business and also be able to share the idea from this farm to the world.

Golden Jubilee Museum of Agriculture

Date: 19 August 2018

This museum is the learning tourist attraction, which have both of indoor and outdoor museums. The participants have the chance to observe at The King Loves Us Museum". This museum shows the talents of His Majesty the King in agriculture, royal rituals related to agriculture. Moreover, the museum also presented about the traditional of Thailand such as market, old style shop or old house. After the sightseeing around the museum, the participants viewed the 3D animation about the talents of His Majesty the King in the Rainmaking story.

Hiroaki Honda *(3rd–year undergraduate student, English Language and Culture)*

I have learned that they do not use chemicals for growing plants and there is program that we can know how to grow field.

Sami Sivuth *(Surveyor, Aruna Technology Ltd.)*

I always hear from our friends (Khun Yai and Arisa) talking about Magister King Rama IX. I did not know he is Magister King Bhumibol Adulya Dej just know today. Regarding to museum, outside museum I saw traditional everyday living agriculture around museum buildings. Volunteer agriculture was selected for learn (1 month) about agriculture then they have to grow and feed in order to survive him/her self. He/she has 6 months for learn and practice in here. He/she will remove if they cannot pass 1 month exam. Inside building, I learned from 3D movie about father and son. This movie was described about the agriculture problems (rice field without water, no any drainage system, fuel very expensive and farmers do not have knowledge about agriculture etc.). After King Rama IX knew these problem, he solve the problems by using efficiency method in order to improve farmer's profit with sustainable agriculture. The 23 Royal Principles of Carrying out Developmental Work were models of work efficiency for the benefit of interested audience in agriculture sector. 1-Systematic fact gathering, 2-Exploding from inside outward, 3-Problem solving micro-focused, 4-Work step by step, 5-Geosocial-Base Development, 6-Whole Picture, 7-Avoiding Textbook Rigidity, 8-Economy, Simplicity Maximum Benefit, 9-Simplicity, 10-Participation, 11-Common Good, 12-One-Stop service, 13-Nature is its own Doctor, 14-It takes evil to flight evil, 15-Plantation forest in people's hearts, 16-Our loss is our gain, 17-Self-reliance, 18-Ability to live (comfortably) and to eat (decently), 19-Sufficiency economy, 20-Loyalty, Honesty and Sincerity, 21-Work happily, 22-Phra Mahajanaka (book) perseverance and 23-Know, Love, Unite. There are not just theories but also inside museum we can see a lot of tradition agriculture tool, equipment, music tool, pictures etc. To learn about.

Wirawee Linsuwanon *(4th-year undergraduate student, Geography)*

The new theory of the King Rama IX in the real demonstrations and saw a Thai culture exhibition.

PASCO (Thailand) Co., Ltd.

Date: 23 August 2018

PASCO (Thailand) Co., ltd. is the company offering a full range of professional services in Aerial Photography, Digital Photogram-metry & Mapping, Surveying and GIS, both in Thailand and internationally. With this program, the participants got a chance to observe line mapping, orthophoto and 3D map process sections.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

The group companies of PASCO CORPORATION are constantly in pursuit of the most advanced technologies in the areas of the acquisition and processing of geospatial information. Based on the results obtained through the active utilization of these technologies, the PASCO Group provides products and services that underpin secure and comfortable lives for the people around the world. PASCO Thailand provides geographic information for a wide range of fields, including aerial surveying, digital terrain model generation and topographic maps. The company provides GIS (geographic information systems) and IT technical support in both Thailand and Japan and offers a number of services related to maps and GIS throughout the world.

Masayuki Shimazaki *(4th-year undergraduate student, Civil Engineering)*

I like maps. So, I was pleased to be here. Actually the map was found to be made from aerial photographs.

Radhika Bhandari *(4th-year undergraduate student, Civil & Geomatics Engineering)*

We got to see real world working from PASCO. WE learnt about their processes of orthophoto generation, POI project (on going), QC. The sriking part was that they were using different software for each step of their process from Aerial Triangulation to orthophoto generation.

Honey Rose Penes *(2nd-year undergraduate student, Geodetic Engineering)*

I have seen how the company manages operations. I got to meet the President of the company as well as its Technical Engineers working so hard. I have learned that quality is important. I must take a good look of my outputs are the inputs in good quality; are my outputs in good quality. A good quality input can give a good quality output. It is important to take good care of the company's reputation by maintaining the excellent quality of the products.

Bang Krachao, Samut Prakan

Date: 23 August 2018

Bang Krachao have been known as the "green lungs" of the Bangkok. The participants have the opportunity to go to "Herbal Joss Stick Home", which is the eco-tourism for teaching the adaptation of agricultural or natural products. In this place, the participants learned how to color the fabric with the traditional ways of Thailand.

Hiroaki Honda *(3rd-year undergraduate student, English Language and Culture)*

We went to rural area then we got to know how cloth and bags dyed that was interesting for me. And I also learned there is still traditional artificial skill in Thailand.

Vu Hai Nam *(Chief Operating Officer, ThinkLABs)*

Baan Toop Hom offer tie-dying workshops for 160 baht per person, which can be selected with different patterns on T-shirts and can also be done by ourselves. It can be unique to fit your style!

Suong Sovan *(GIS consultant, Aruna Technology Ltd.)*

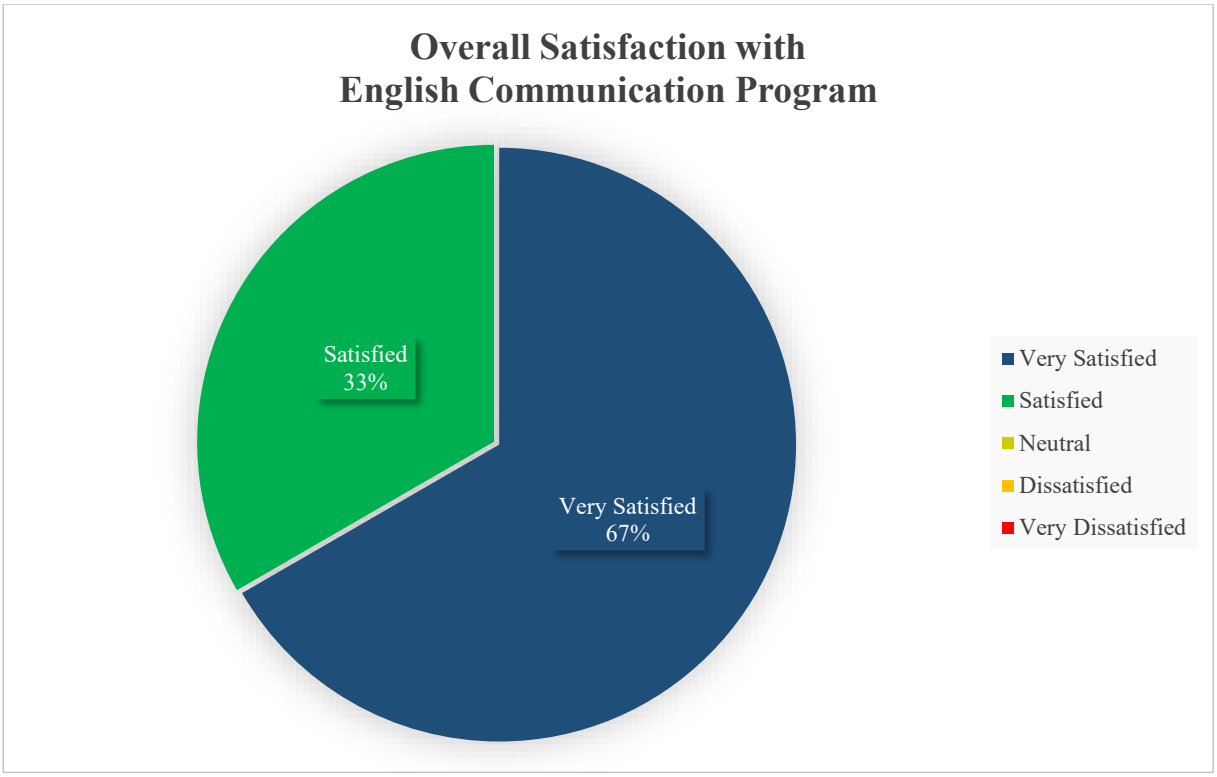
I have visited Bang Krachao to learn how to make a tie-dye fabric.

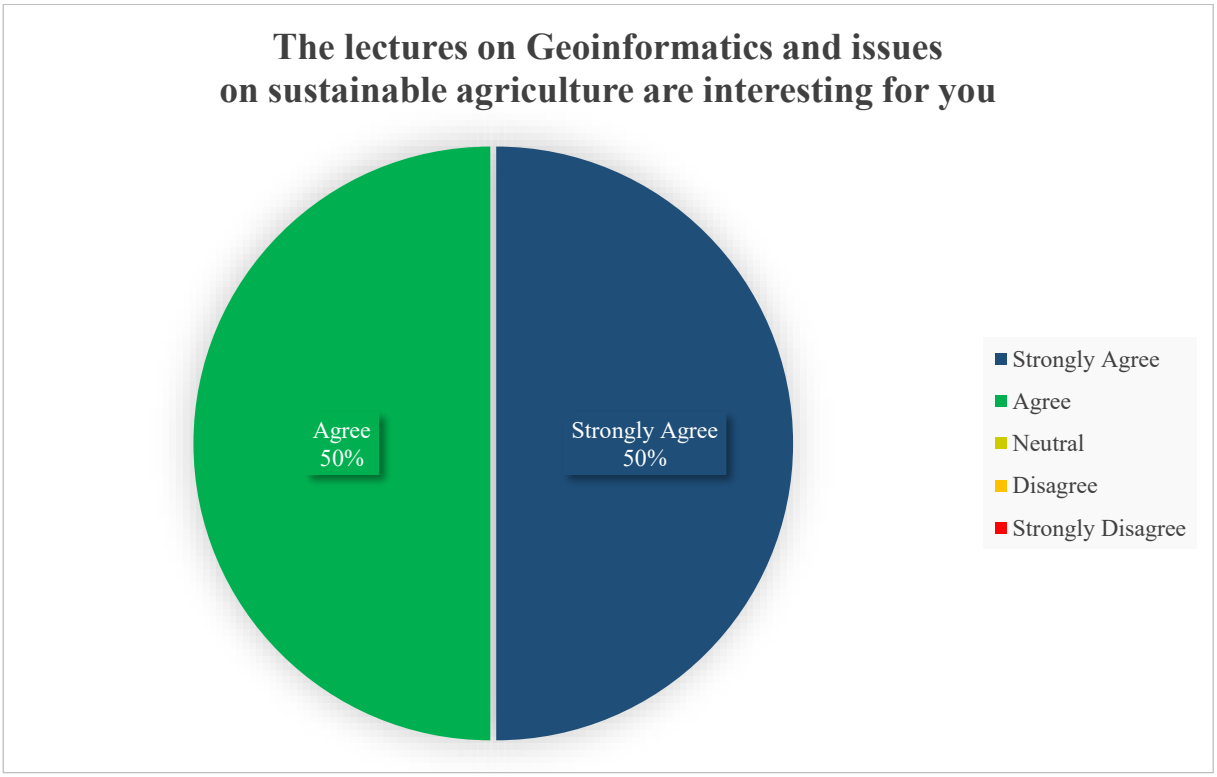
Natsumi Shimizu *(3rd-year undergraduate student, English Language and Culture)*

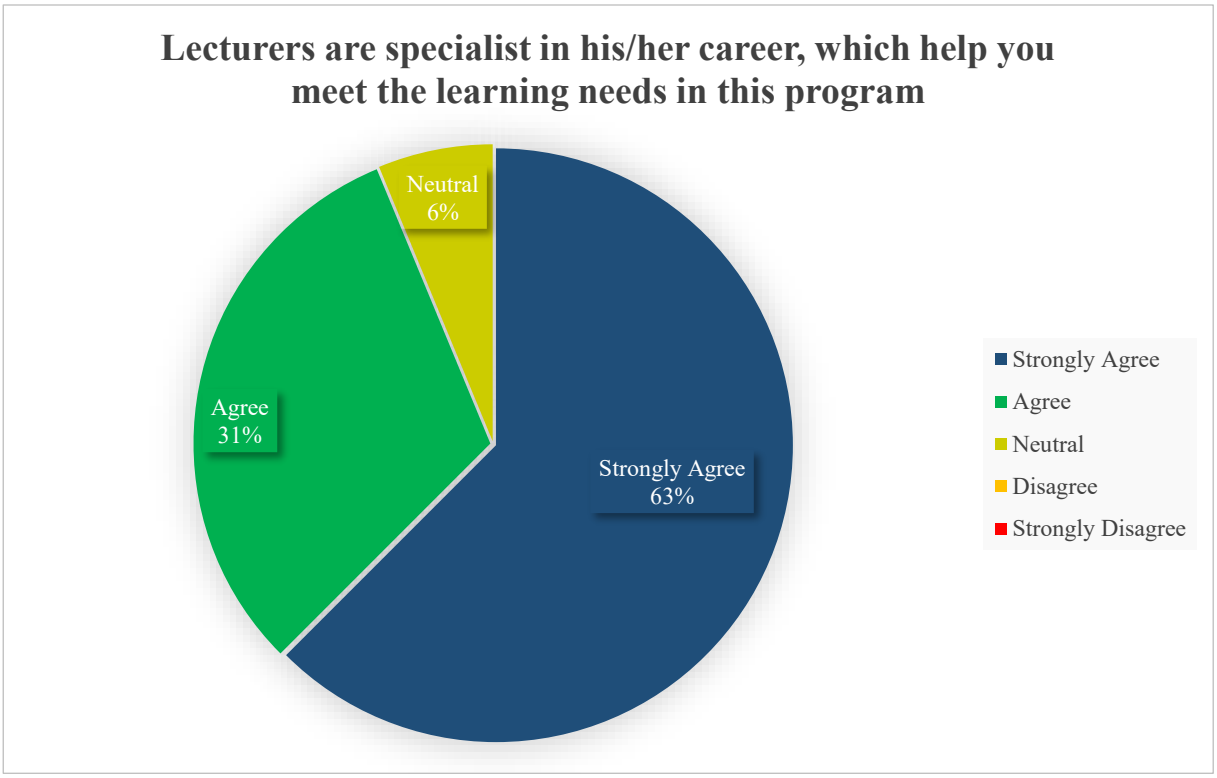
I learned how to make clothes.

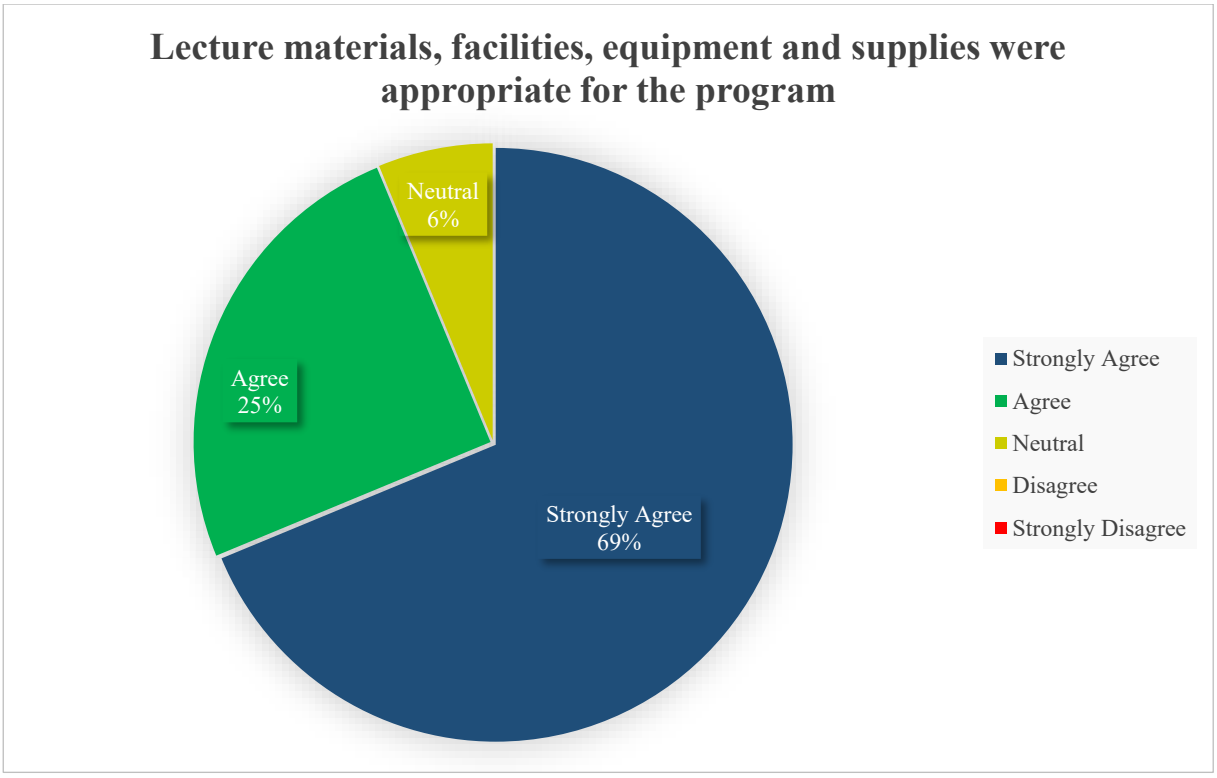
9. Program Evaluation

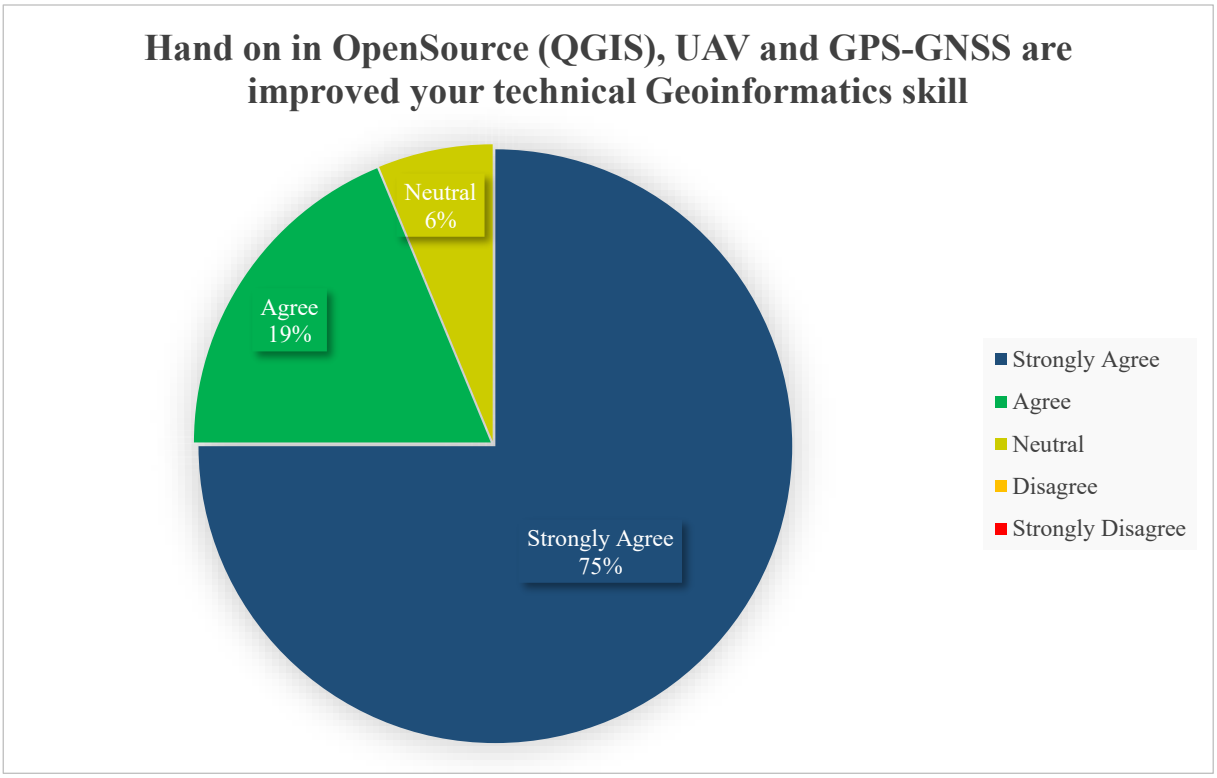
In this program, the evaluation forms were prepared for receiving feedbacks from participants in order to evaluate the program and identify weak point for improving further. The results from the first part are displayed as the pie charts below.

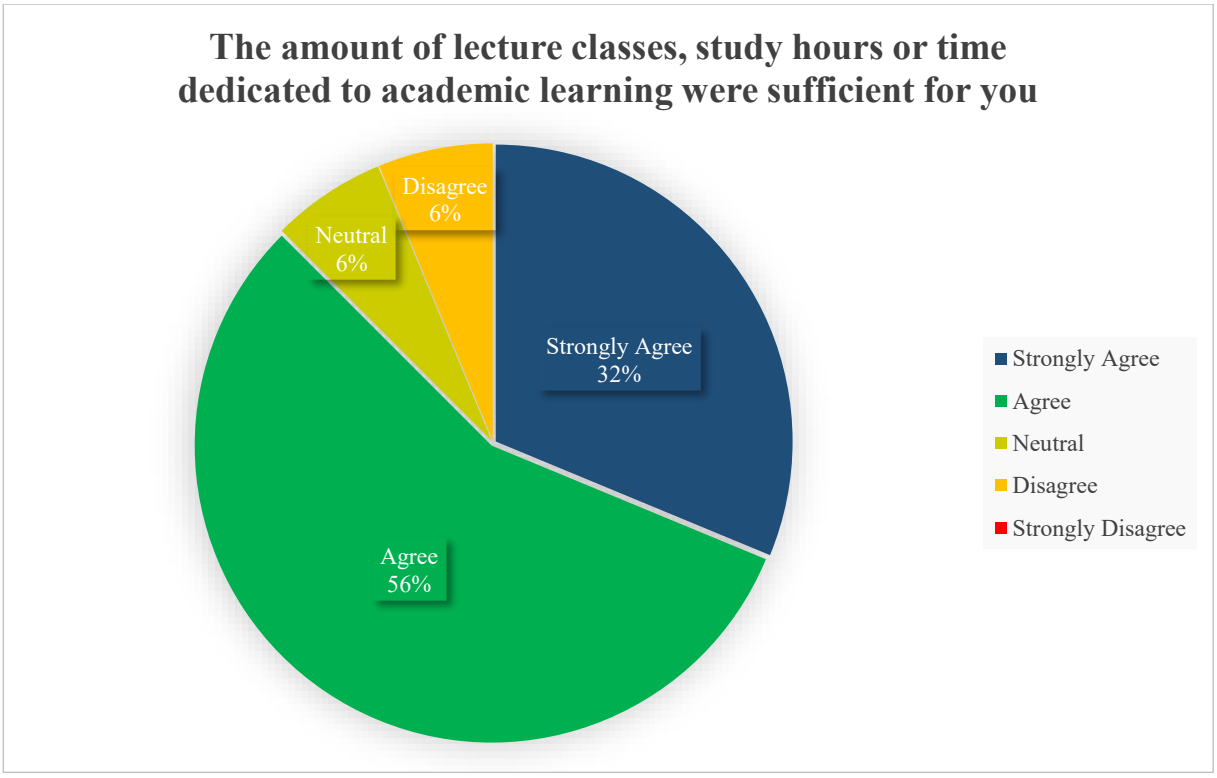


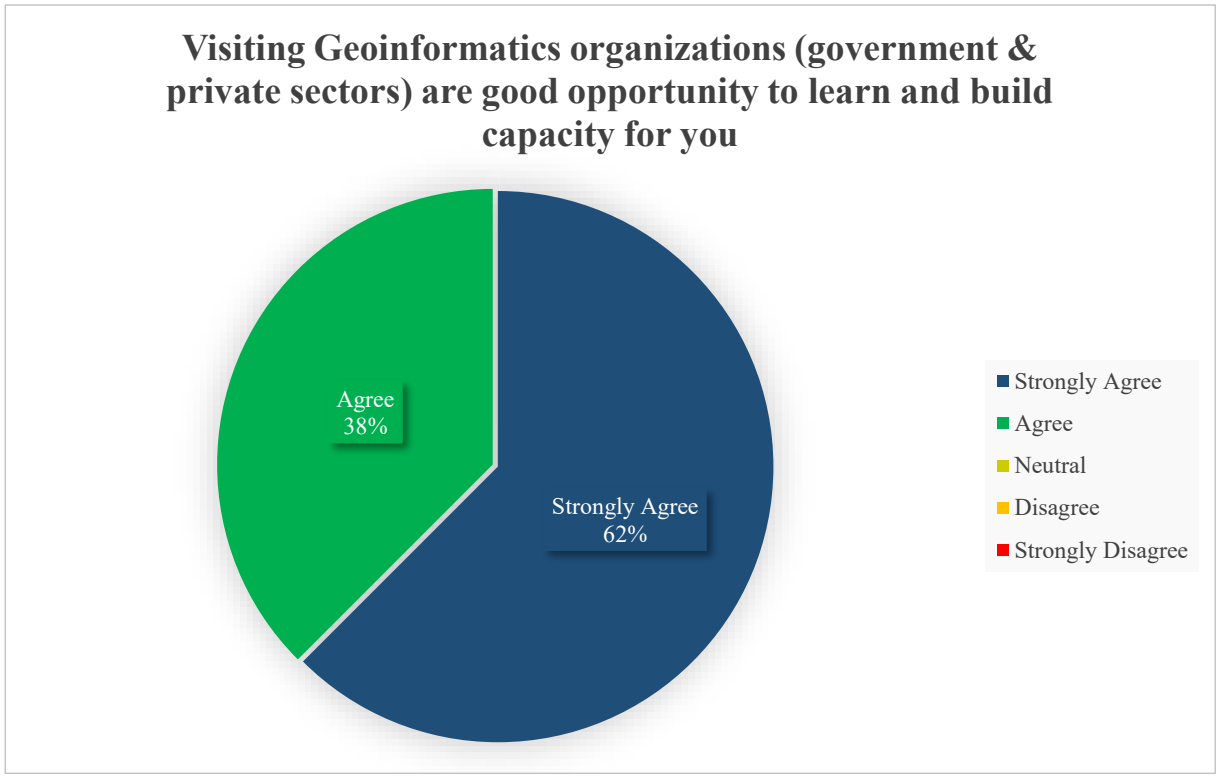


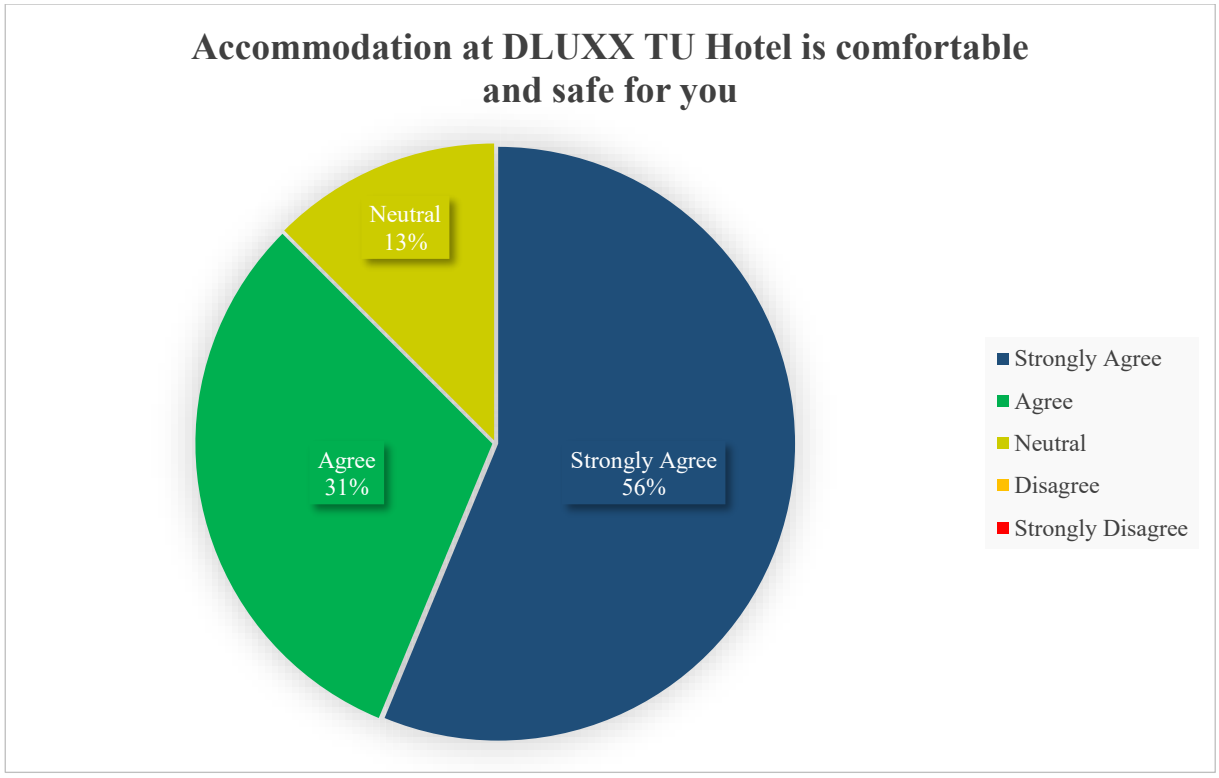

Lecturers are specialist in his/her career, which help you meet the learning needs in this program
Neutral 6%
Agree 31%
Strongly Agree 63%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

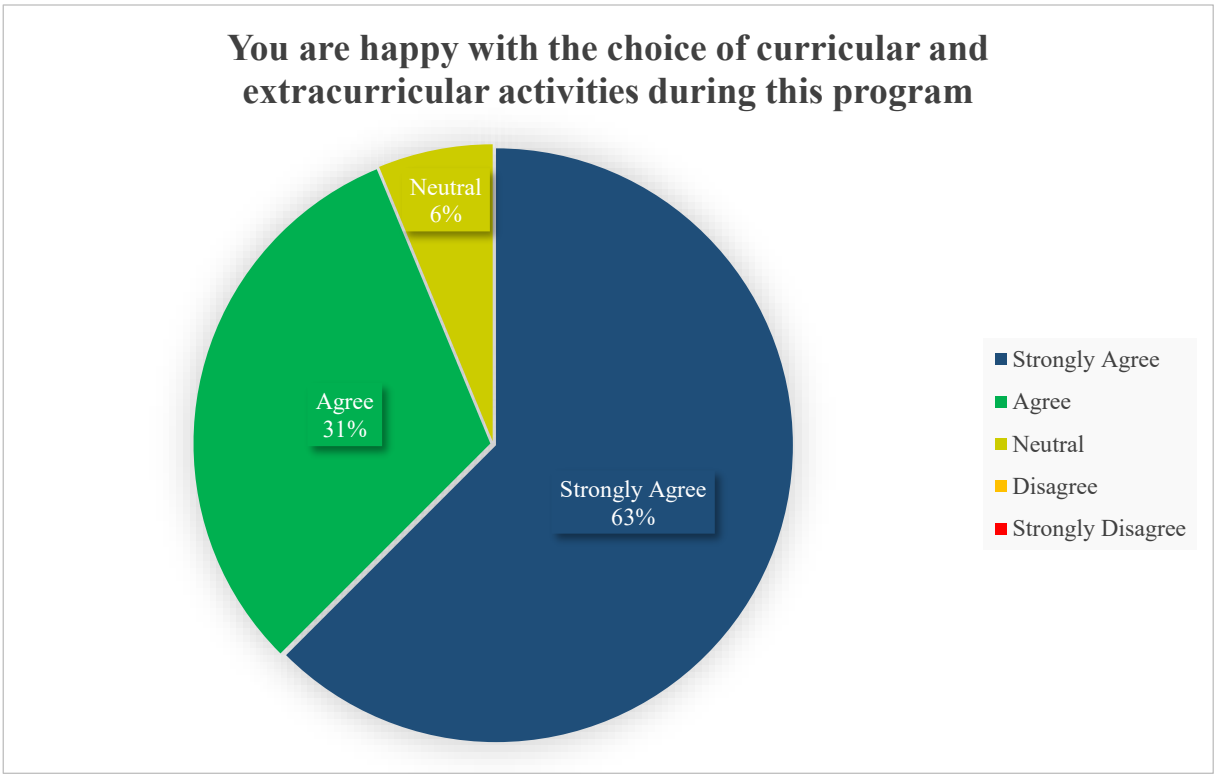

Lecture materials, facilities, equipment and supplies were appropriate for the program
Neutral 6%
Agree 25%
Strongly Agree 69%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

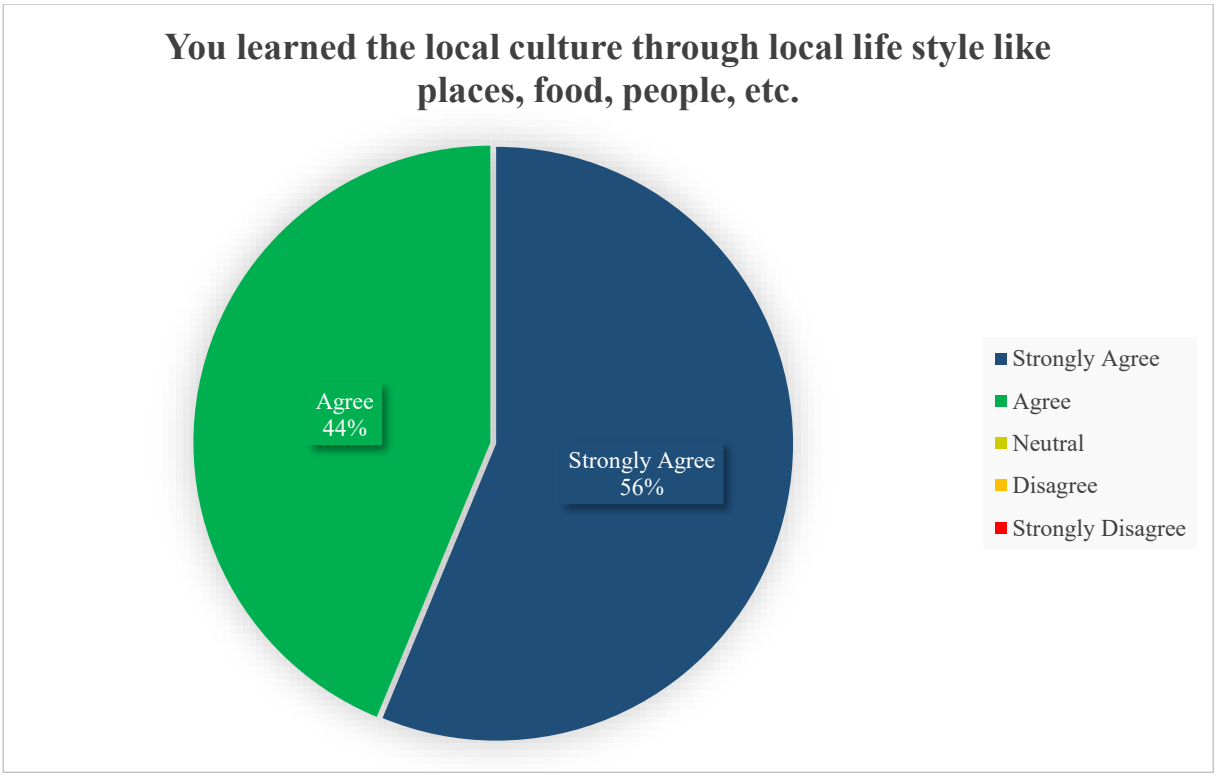

Hand on in OpenSource (QGIS), UAV and GPS-GNSS are improved your technical Geoinformatics skill
Neutral 6%
Agree 19%
Strongly Agree 75%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

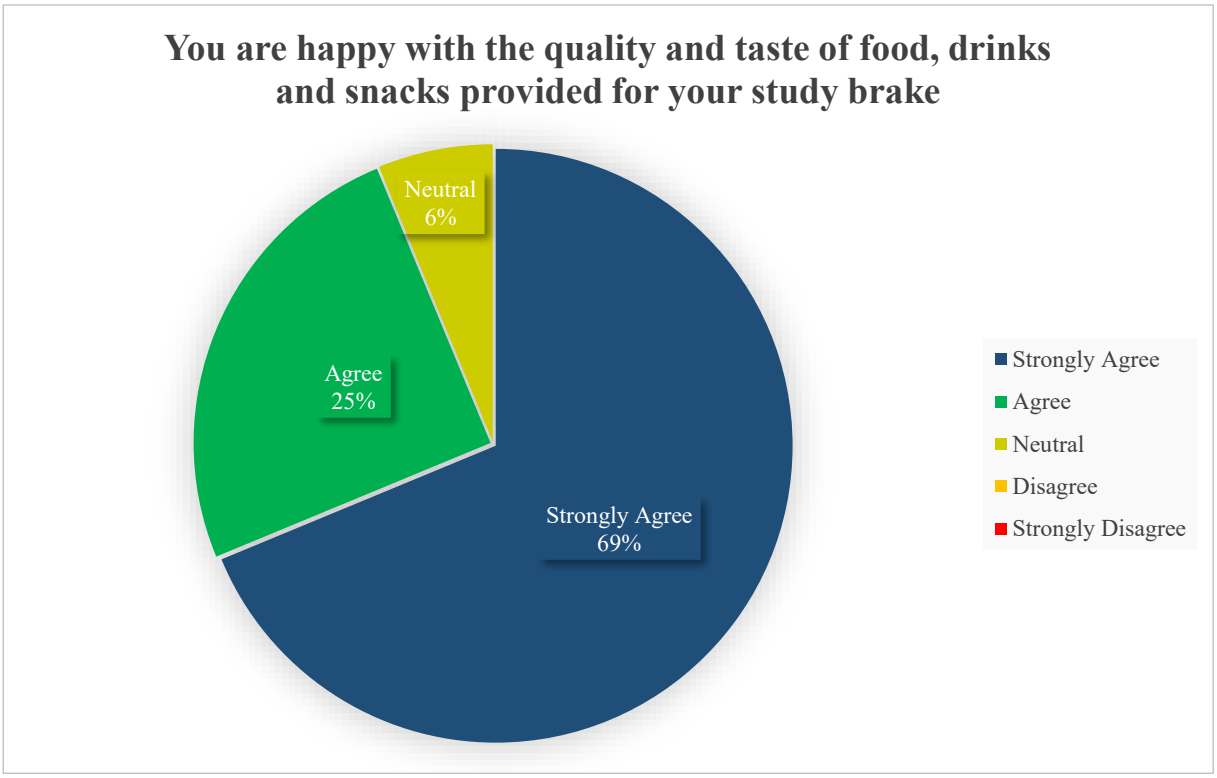

The amount of lecture classes, study hours or time dedicated to academic learning were sufficient for you
Disagree 6%
Neutral 6%
Strongly Agree 32%
Agree 56%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

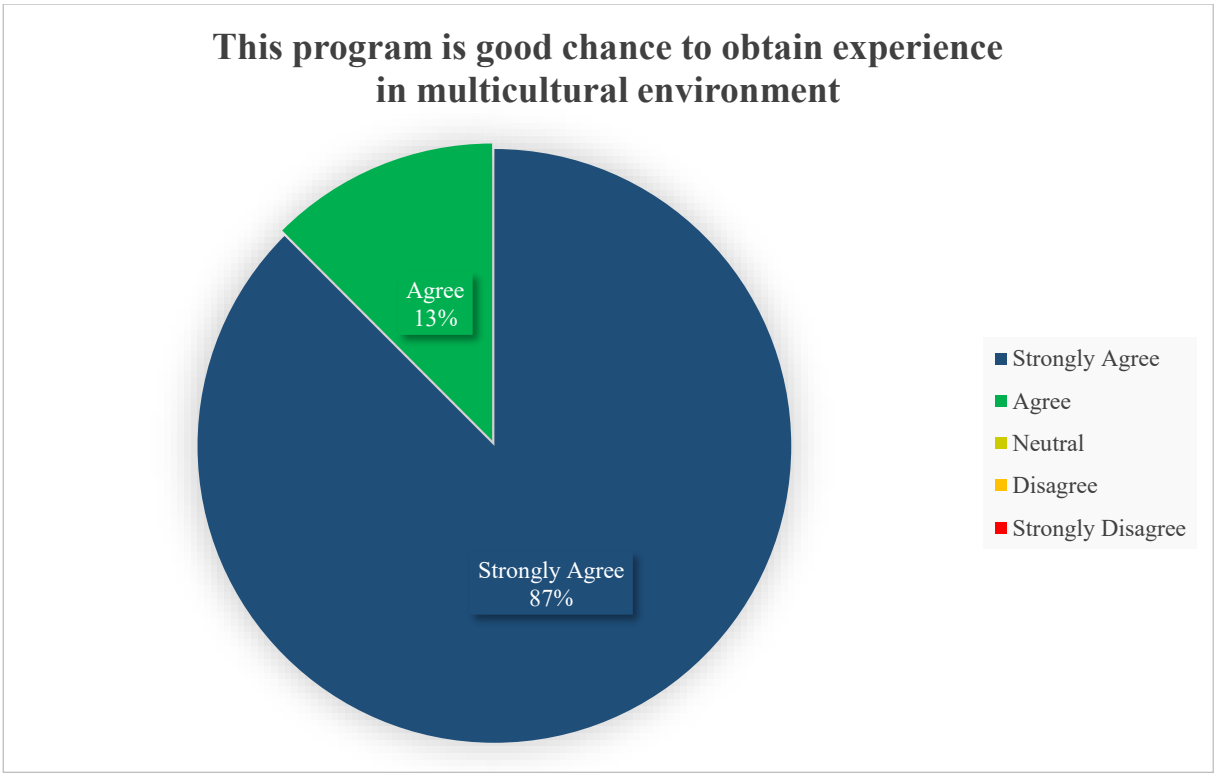

Visiting Geoinformatics organizations (government & private sectors) are good opportunity to learn and build capacity for you
Agree 38%
Strongly Agree 62%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

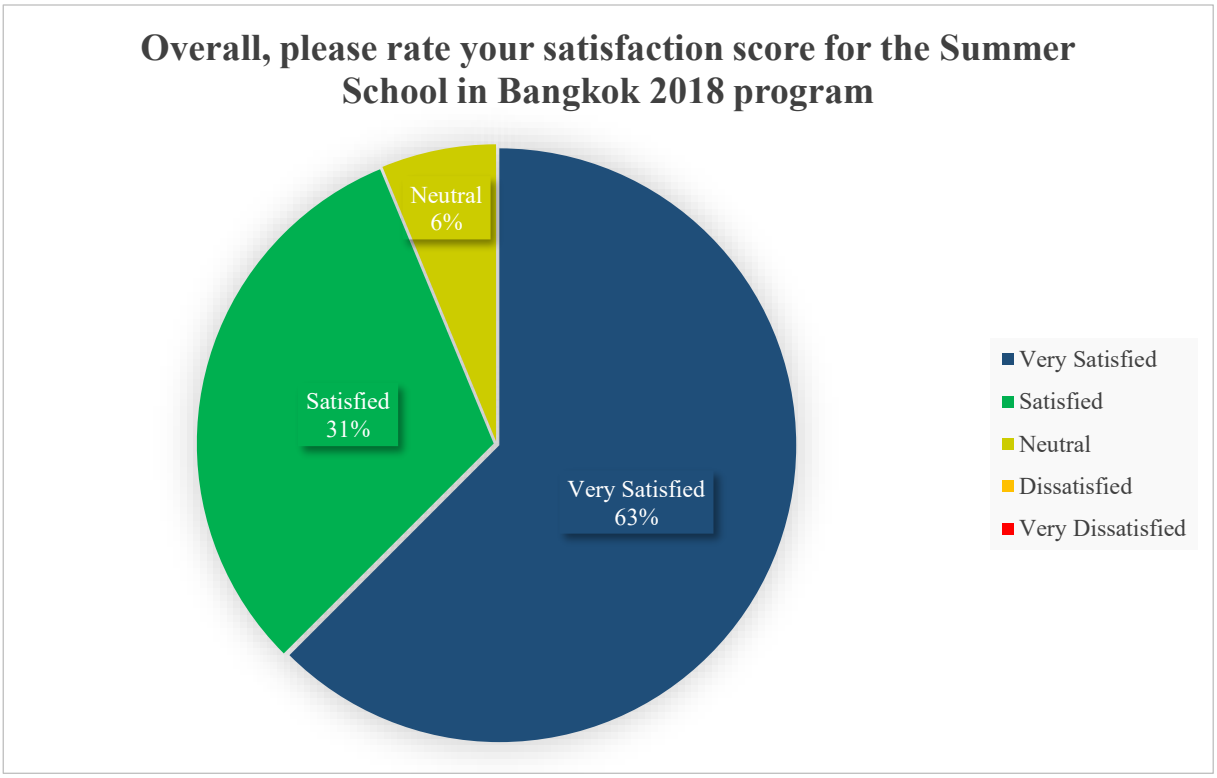

Accommodation at DLUXX TU Hotel is comfortable and safe for you
Neutral 13%
Agree 31%
Strongly Agree 56%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

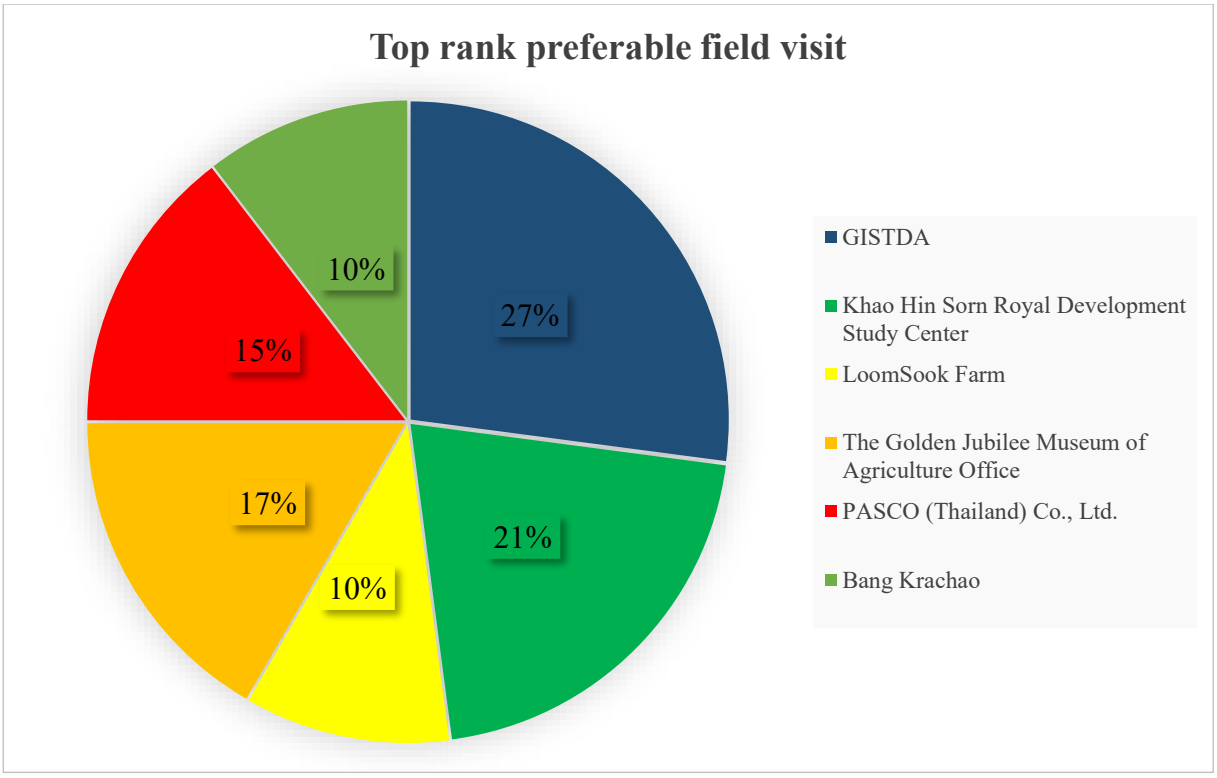

You are happy with the choice of curricular and extracurricular activities during this program
Neutral 6%
Agree 31%
Strongly Agree 63%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


You learned the local culture through local life style like places, food, people, etc.
Agree 44%
Strongly Agree 56%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


You are happy with the quality and taste of food, drinks and snacks provided for your study brake
Neutral 6%
Agree 25%
Strongly Agree 69%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


This program is good chance to obtain experience in multicultural environment
Agree 13%
Strongly Agree 87%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


Overall, please rate your satisfaction score for the Summer School in Bangkok 2018 program
Neutral 6%
Satisfied 31%
Very Satisfied 63%
Very Satisfied
Satisfied
Neutral
Dissatisfied
Very Dissatisfied


Top rank preferable field visit
10%
27%
15%
17%
21%
10%
GISTDA
Khao Hin Sorn Royal Development Study Center
LoomSook Farm
The Golden Jubilee Museum of Agriculture Office
PASCO (Thailand) Co., Ltd.
Bang Krachao

The second part shows suggestions from participants as follows.

- ❖ I love this camp.

- ❖ All lectures, seminars and other events held by the program contributed immensely to the increase of my intellectual capabilities such as critical thinking skills, eloquence, argumentation, creativity, proactiveness, allowing me to have a broader approach towards an issue, considering its various points of view; all that was possible due to the great competence of the program's faculty, including its directors, lecturers and instructors, who encouraged us the whole time to reflect, not giving us ready answers, but rather introducing us to an objective train of thought. I am genuinely grateful.

- ❖ I love the program. Every aspect is nice. Food, travel, accommodation, learning experience. Good job. This is not a big deal for me, but please put lively activities after every meal or tell the lecturers to give a more lively presentation. Thank you so much for this opportunity.

- ❖ Thanks inviting me such a great program. I had a lot of fun here. Thai food are good but some were difficult to eat for me. Totally, I got many new experiences and having fun. Thank you.

- ❖ I am sincerely thankful for Sa and Yai's support.

- ❖ I'm glad to participate in this program.

- ❖ I was really happy to be able to participate. Thank you so much for planning.

- ❖ I had good experience. I keep study and use English. And I'll improve my skill.

- ❖ I'm so happy to meet all participants. Thank you for all professors. I'll never forget.

- ❖ Asian Summer School 2018 was very knowledgeable and empowering experience for me. I was very delighted to know about the new theory of agriculture. Field trips were interesting and refreshing. Accommodation was very nice and comforting. The study environment was varied with multinational background ensured developing our abilities. The time for lectures were little less but suited only for brief introduction to the subject for those who are not related to the subject matters. The overall experience was great. I loved every bit of it.

- ❖ Over all the summer school was more than expectations. Beside the study tours one day trip should be there on Sunday for the visit of other historical places and beaches in Bangkok.

- ❖ It's a good course for Asian people to participate to know about Geoinformatics systems and technology contain with an intensive lecture for students who has a different field of study. This program give me a memorable experience and should be organize in every year

- If the summer school has advance course and select the participants have the same background and training focus on one or two subject of summer school. ex: Study about Remote Sensing and GIS. or Smart Agriculture.

- I think, if possible please add more lecture (or relate) about climate change, adaptation and problem solving. I am appreciated with this program. I wish to send my new generation for the next program. For some topic more classes may be facilitated for interested participants like for computer vision and climate change with case studies and e-paper materials. For smart farmers field, a group of farmers may be arranged for interaction, this could provide better insights.

- I was so happy to participate the program. But one thing, maybe some basic online class should be provided before the event. I was having some difficulties with many advance lecture. Everything was fine, safe and sound. Thanks to the whole authority for this wonderful opportunity.

10. Conclusion and Recommendation

The Asian Summer School in Bangkok 2018 Program was organized by the cooperation from AIT and Chubu University which it aims the participants to gain more experience and knowledge, especially in the issue of "Geoinformatics for Sustainable Agriculture". Additionally, activities such as hands-on were provided for the participants to improve their technical skills for their career. Furthermore, under the international society, they could learn and exchange the different cultures via many Field Visit and activities such as Pizza Party and field trip at Chachoengsao province to build a good relationship with each other.

According to the result of program evaluation, 63% of participants voted that they are very satisfied in the overall satisfaction of the program. In parts of the satisfaction of each statement had the average score in 4 to 5. The participants voted that the multicultural environment of this camp had the highest score.

Anyway, there was some suggestion from participants obtained from program evaluation. Mostly, participants gain knowledge, friendship and new experiences. Some students realized the importance of English skill and have the motivation for focusing on practicing the English skills after going back to hometown. Some participants mentioned about the difficulties of understanding all the lectures and should select the participants have the same background such as RS, GIS or Smart Agriculture. Moreover, some participant also suggested that some basic online class should be provided before the event such as advance lecture.

Based on the participants commented in the program evaluation about advance topics of lecture and difficult due to various background in short period, the E-learning can be offered in advance before start program.

For visiting Geoinformatics organizations (government and private sectors), the participants strongly agree to get a good opportunity to learn and build capacity. Because the class in AIT cannot provide real work. The participants gain new experience and see the real time processing. However, there are some comments from participants such as need to spend more time for explore and if possible we should stay outside for one night, it will be good for of them.

For accommodation and food, the participants were satisfied with accommodation since it was safe, convenient and surrounded by good environment. Moreover, the organizer tried to provide food for multicultural as much as possible. However, there were some participants who requested to eat only some certain food. Hence, to discuss about preferable types of food for individual participant should be done before starting the program. In addition, the requirement about the spicy or non-spicy food should be added to registration form.

In summary, the program achieved the main purpose that the participants could gain some experience and knowledge related to GIS for sustainable agriculture. According to the evaluation, most of the participants were very satisfied with the program and from the assignment asked to submit, the participants could give interesting answer with their deep understanding and inspiration from each lecture. Also, this program could successfully motivate the participants to gain more enthusiasm for exploring knowledge in RS-GIS and pursue higher education level in AIT or other universities. Most importantly, the program could build international relationship which will be expanded our RS-GIS network, and finally become strong connection which will support each other in the future.

Appendix 1: Program Photo Gallery

Opening Ceremony

13 August 2018

Lectures

13 – 24 August 2018

Relax Time: Pizza Party & Presentation

15 August 2018

Geo-Informatics and Space Technology Development Agency (GISTDA)

16 August 2018

Relax Time: Party with GIS & Remote Sensing Student

17 August 2018

Khao Hin Sorn Royal Development Study Center

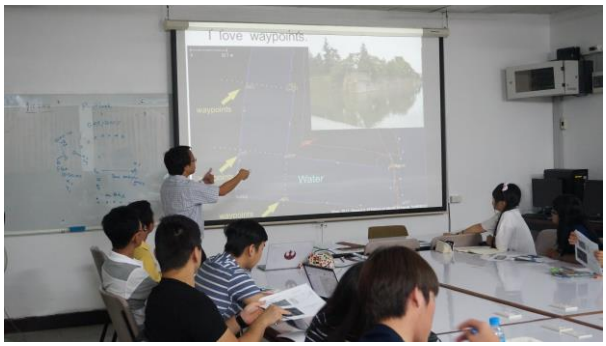
18 August 2018

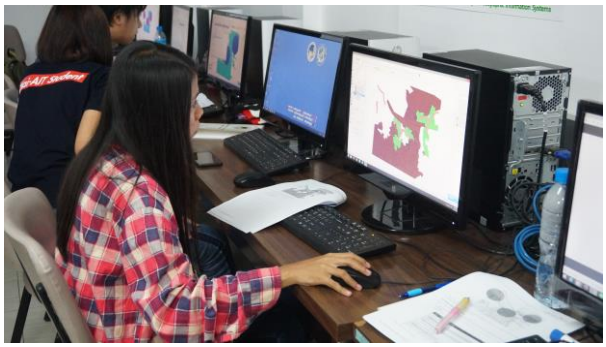
LoomSook Farm

18 August 2018

The Golden Jubilee Museum of Agriculture Office

19 August 2018


I love waypoints
waypoints
Water



PASCO(Thailand)Co.,Ltd.
~ Company Introduction ~
PASCO

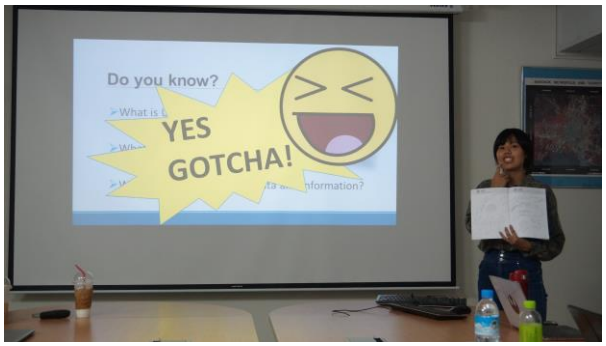
PASCO Thailand Company Ltd.
Stereo Plot
PASCO Thailand
GIS

PASCO
Thailand

Bang Krachao
23 August 2018

Individual Presentation & Closing Ceremony

24 August 2018



Appendix 2: Questionnaire

Survey
Summer School in Bangkok 2018
Geoinformatics for Sustainable Agriculture
13 - 24 August 2018

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The lectures on Geoinformatics and issues on sustainable agriculture are interesting for you	(5)	(4)	(3)	(2)	(1)
2. Lecturers are specialist in his/her career, which help you meet the learning needs in this program	(5)	(4)	(3)	(2)	(1)
3. Lecture materials, facilities, equipment and supplies were appropriate for the program	(5)	(4)	(3)	(2)	(1)
4. Hand on in OpenSource (QGIS), UAV and GPS-GNSS are improved your technical Geoinformatics skill	(5)	(4)	(3)	(2)	(1)
5. The amount of lecture classes, study hours or time dedicated to academic learning were sufficient for you	(5)	(4)	(3)	(2)	(1)
6. Visiting Geoinformatics organizations (government & private sectors) are good opportunity to learn and build capacity for you	(5)	(4)	(3)	(2)	(1)
7. Accommodation at DLUXX TU Hotel is comfortable and safe for you	(5)	(4)	(3)	(2)	(1)
8. You are happy with the choice of curricular and extracurricular activities during this program	(5)	(4)	(3)	(2)	(1)
9. You learned the local culture through local life style like places, food, people, etc.	(5)	(4)	(3)	(2)	(1)
10. You are happy with the quality and taste of food, drinks and snacks provided for your study brake	(5)	(4)	(3)	(2)	(1)
11. This program is good chance to obtain experience in multicultural environment	(5)	(4)	(3)	(2)	(1)
Statement	**Very Satisfied**	**Satisfied**	**Neutral**	**Dissatisfied**	**Very Satisfied**
12. Overall, please rate your satisfaction score for the Summer School in Bangkok 2018 program	(5)	(4)	(3)	(2)	(1)

Please rank only top 3 of preferable organizations/ attractive places that you visited during the program in order of satisfaction, from 1 to 3, where 1 is the most preferable.

_____ GISTDA
_____ Khao Hin Sorn Royal Development Study Center
_____ LoomSook Farm
_____ The Golden Jubilee Museum of Agriculture Office
_____ PASCO (Thailand) Co., Ltd.
_____ Bang Krachao

Comment & Suggestion:

_____
_____
_____
_____
_____
_____

Thank you for your cooperation