The 19th International Students Summit on Food, Agriculture and Environment

Youth Transforming Thoughts on Sustainable Agriculture and Resource Management to Connect Local and Global Community

September 18 - 19 and 21, 2019

Setagaya Campus
Tokyo University of Agriculture
1-1-1, Sakuragaoka, Setagaya, Tokyo, Japan

2019 TOKYO

Organized by
Tokyo University of Agriculture（Tokyo NODAI）

Supported by

Tokyo University of Agriculture Education Support Association
Setagaya City Board of Education

The Nineteenth International Students Summit (ISS) on Food, Agriculture and Environment

Youth Transforming Thoughts on Sustainable Agriculture and Resource Management to Connect Local and Global Community

September 18 - 19, 21, 2019, TOKYO
Statement

The world is now facing a crisis of sustainability, and we see it tremendously important to draw together the wisdom and vitality of youth, the torchbearers of the future of mankind. There are especially wide-ranging missions for agricultural students, as agricultural science plays a key role in the solution of fundamental problems in food production and safety, environmental conservation, energy, and human health. The system of food production and consumption is without a doubt closely related to the condition of the natural environment, the stage of economic development, and food culture in each country, and their patterns and problems reflect regional characteristics. It is thus important to understand how agriculture and food systems should be organized and maintained in each society.

Tokyo University of Agriculture (Tokyo NODAI) organized the "International Students Summit (ISS) on Food, Agriculture and Environment" to provide students from our global partner universities with an opportunity to gather and exchange views and ideas on global food, agricultural, and environmental issues, and also to discuss their own roles in sustainable development.

This year, the 19th ISS will be held on September 16-22, 2019 at Tokyo NODAI (Setagaya campus). The theme for this summit is "Youth Transforming Thoughts on Sustainable Agriculture and Resource Management to Connect Local and Global Community", which was adopted at the 18th ISS. We hope the participating students to focus on their activities undertaken at each university in their presentations and discussions. The framework of student activity as to the rationale, methods, implications (economic, social and cultural), and constraints should be clarified in order to foster their contributions to the solution of global problems for the sustainability of this world.

Organizing Committee & Students Committee,
International Students Forum,
Tokyo University of Agriculture

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To the audience of the 19th International Students Summit
Please turn off your cell phone or set it to silent mode.
No food and drink is allowed in the auditorium.
When you ask a question, please state your question briefly first, and then explain the background of your question.

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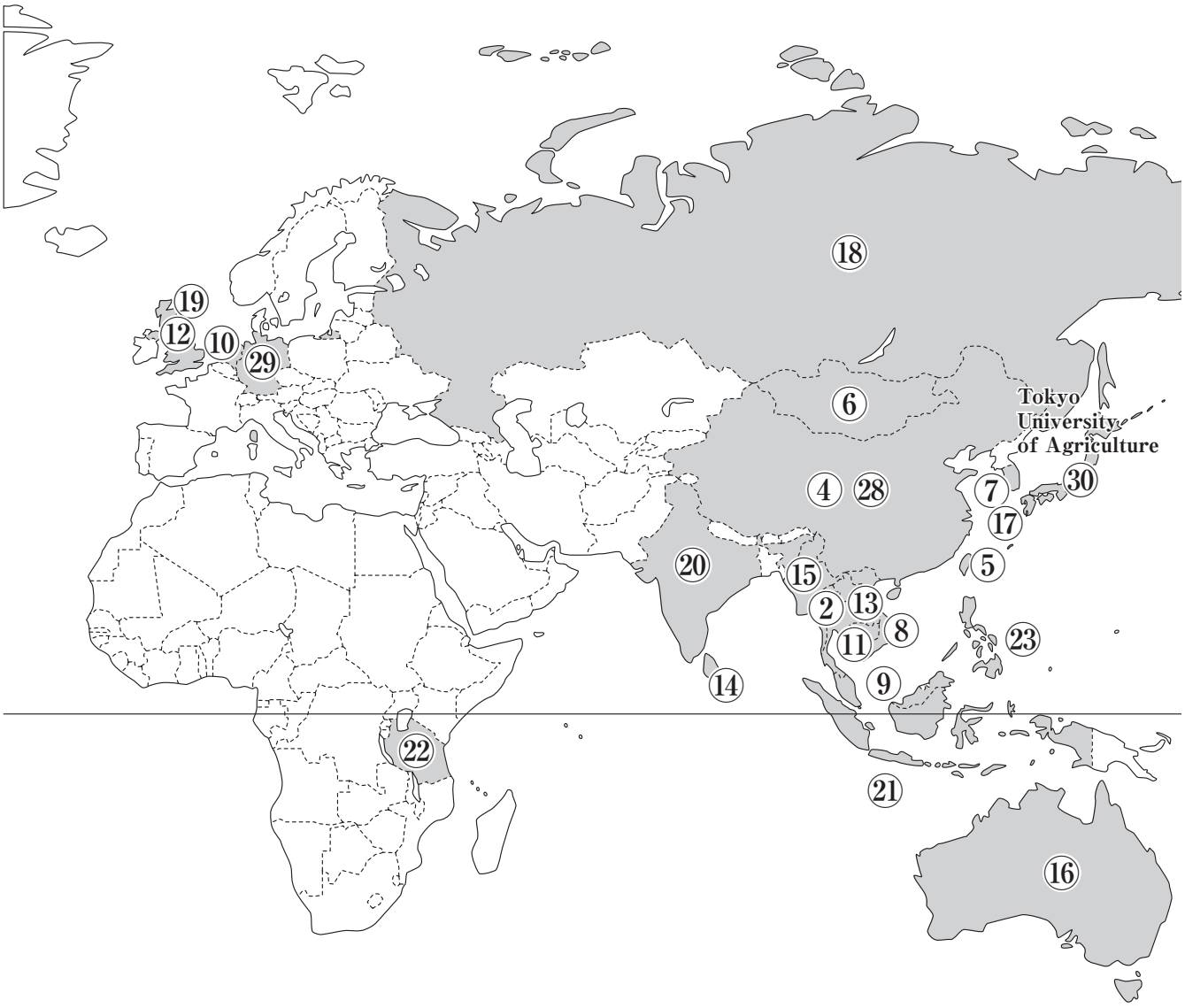
The 19th ISS Participating Universities



① Michigan State University
② Kasetsart University
③ University of British Columbia
④ China Agricultural University
⑤ National Chung Hsing University
⑥ Mongolian National University of Life Sciences
⑦ Kyungpook National University
⑧ Vietnam National University of Agriculture
⑨ Universiti Putra Malaysia
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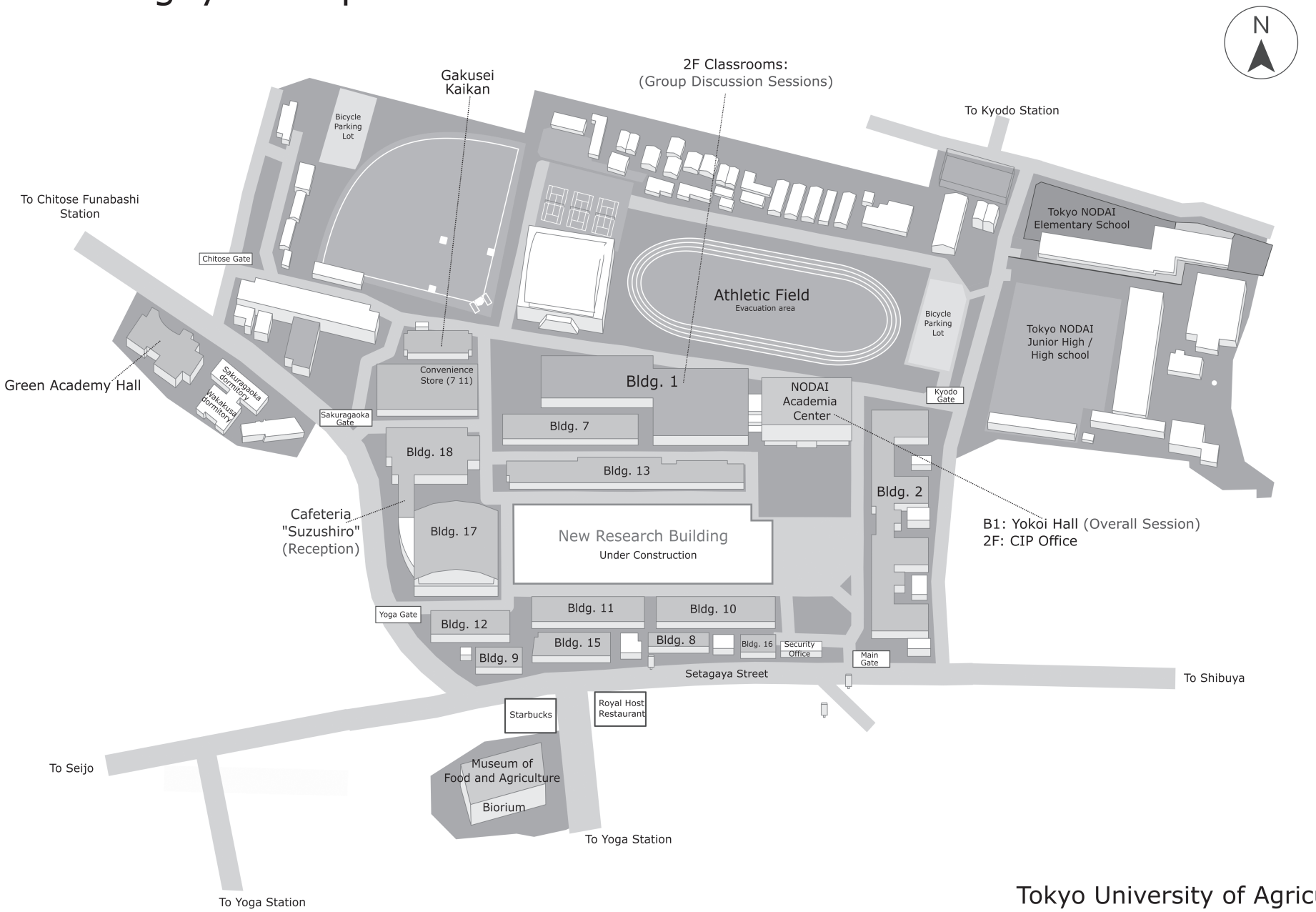
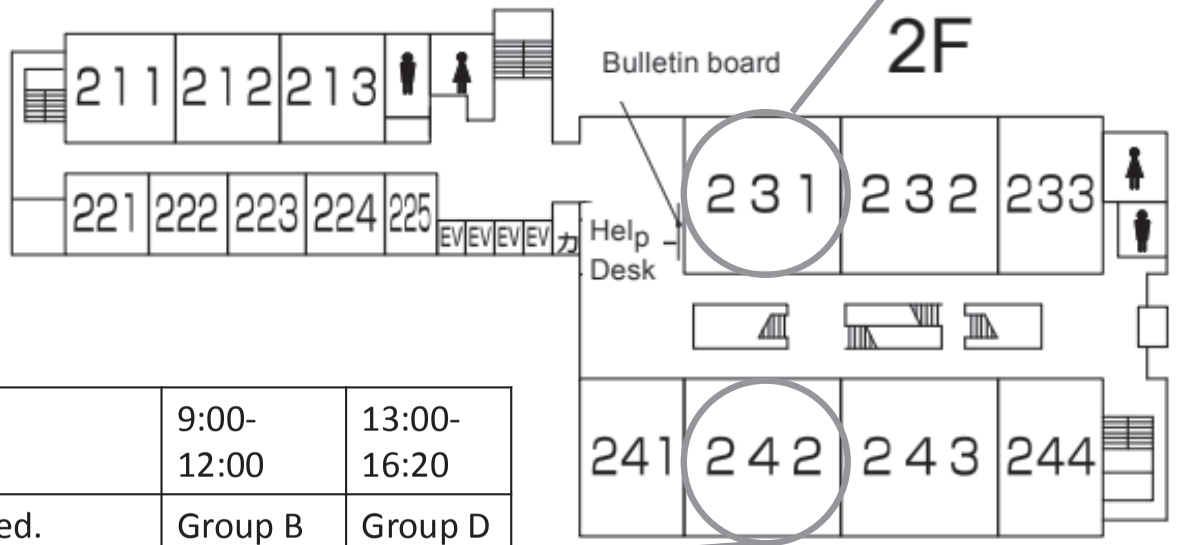
Setagaya Campus



Tokyo University of Agriculture

Building 1 - Floor Map

	9:00-12:00	13:00-16:20
Wed. Sept. 18th	Group A	Group C
Thurs. Sept. 19th	Group E	Group G



	9:00-12:00	13:00-16:20
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Thurs. Sept. 19th	Group F	

Group Discussion

*Please note that there may be two sessions occurring simultaneously

Wednesday, September 18th

【Morning Session】

Group A: Students' Actions in the Field of "Agriculture"
Classroom 231 (Building 1, 2nd floor)

9：00	**Registration opens**
9：25	**Opening remarks**
9：30－ 9：50	**【Rethinking the Rural Economic Development】** Jose H. Quintero Beltran, *Chapingo Autonomous University*
9：50－10：10	**【Our Activities in Japanese Rural Area: Ikumi】** Moeka Numata, *Tokyo University of Agriculture*
10：10－10：30	**【Contribution of Scholars and Students from CAU in Practicing Sustainable "Nested Market"】** Chen LiRan, *China Agricultural University*
10：30－11：00	Poster Session **【Sustainable Agriculture and Resource Management: Prospects and Challenges】** Navdeep Godara, *Chaudhary Charan Singh Haryana Agricultural University* **【Solar Pump Monitor to Improve Sustainability of Renewable Energy for Smallholder Farmers in Nicaragua】** Francis Gunnar Durmin-Vernette, *The University of British Columbia*
11：00－11：20	**【An Establishment of Rendering Facilities in Rural Area Contributes to Less Environmental Contamination and Brings More Employment Opportunities】** Sainkhuu Enkh-Otgon, *Mongolian National University of Life Sciences*
11：20－12：00	**Session Group Discussion**
12：00～	**Break**

【Afternoon Session】

Group C: Students' Actions in the Field of "Agriculture"
Classroom 231 (Building 1, 2nd floor)

13：00	**Registration opens**
13：25	**Opening remarks**
13：30－13：50	**【Indian Agriculture and Food Security: Constraints and Solutions】** Sunny Maanju, *Chaudhary Charan Singh Haryana Agricultural University*
13：50－14：10	**【Agriculture in Laos】** Sopha Cheauloy, *National University of Laos*
14：10－14：30	**【The Role of Sustainable Agriculture Tanzania (SAT) in Promoting Invovlement of Some SUA Students in Sustainable Agriculture and Resource Management Activities】** Mariam Mbonde, *Sokoine University of Agriculture*
14：30－15：00	Poster Session **【Awareness and Utilization of Agricultural Waste in Mongolia】** Ninjbulgan Sugir, *Mongolian National University of Life Sciences* **【Research on Viet Nam Action Plan for the Management of Antibiotic Resistance in the Livestock Production and Aquaculture】** Duy Khac Le, *Vietnam National University of Agriculture*
15：00－15：20	**【Readiness and Level of Implementation of Malaysian Sustainable Palm Oil (MSPO) among Palm Oil Smallholders】** Ainatul Husna Binti Ahmad Azuddin, *Universiti Putra Malaysia*
15：20－15：40	**【Status of GAP in Myanmar Sustainable Agriculture】** Sai Htet Lin Aung, *Yezin Agricultural University*
15：40－16：20	**Session Group Discussion**

Session Program

*Please note that there may be two sessions occurring simultaneously

Wednesday, September 18th

【Morning Session】

Group B: Students' Actions in the Field of "Environment"
Classroom 242 (Building 1, 2nd floor)

9：00	**Registration opens**
9：25	**Opening remarks**
9：30－ 9：50	**【Community Farm Park in China】** Zhang YinLi, *Beijing Forestry University*
9：50－10：10	**【VNUA Youth Embark on Finding the Potential Application of Bioactive Compounds Derived from Streptomyces as Bactericidal Agents Against Pathogenic Bacteria on Pleurotus Ostreatus】** Son Duy Thai Vu, *Vietnam National University of Agriculture*
10：10－10：30	**【Soil Fertility and Soil Organic Carbon in Cassava-based Cropping System Under Conservation Agriculture】** Sour Mengyou, *Royal University of Agriculture*
10：30－11：00	Poster Session **【Exploring Sustainable Food and Agriculture of Taiwan from 2019 Taiwan In My Eyes-120h】** Yi-Jing Tsai, *National Chung Hsing University*
11：00－11：20	**【Integrated Control of Exotic Invasive Grass in the Carajás National Forest, Amazônia, Brazil】** Saulo Fabrício da Silva Chaves, *Federal Rural University of Amazônia*
11：20－12：00	**Session Group Discussion**
12：00～	**Break**

【Afternoon Session】

Group D: Students' Actions in the Field of "Food"
Classroom 242 (Building 1, 2nd floor)

13：00	**Registration opens**
13：25	**Opening remarks**
13：30－13：50	**【The Indigo Food Coloring Extracted from Hydrobionts】** Mateev Vladislav, *Far Eastern Federal University*
13：50－14：10	**【Future Food Development based on Heat Stable Probiotic - Bacillus clausii】** Kim Namhyeon, *Kangwon National University*
14：10－14：30	**【Food Literacy in the Classroom: Connecting Students, Food, and Community with Experiential Learning】** Misa Noriko Gillis, *University of British Columbia*
14：30－15：00	Poster Session **【Uplifting the Awareness of Sri Lankans About the Possibilities of Using Information and Communication Technology in Sustainable Agriculture and Resource Management to Connect Local and Global Community】** Erabaddegoda Vidyasekara, *University of Peradeniya* **【Sustainable Livestock in Brazil】** Mayara Pardi Ikeda, *University of São Paulo* **The Sales Strategy of Yuko, Kamikatsu-specific Flavorful-acid Citrus and Component Analysis** Sora Takahashi, *Tokyo University of Agriculture*
15：00－15：20	**【A More Sustainable Future Requires Micro-interventions at the Local Level: Reducing Exposure to Harmful Agrochemicals】** Brenda Shirley Ortiz Herrera, *La Molina National Agricultural University*
15：20－15：40	**【Social Economic Value of Retail Waste】** Decio de Azevedo, *University of Reading*
15：40－16：20	**Session Group Discussion**

Group Discussion

*Please note that there may be two sessions occurring simultaneously

Thursday, September 19th

【Morning Session】

Group E: Students' Actions in the Field of "Agriculture"
Classroom 231 (Building 1, 2nd floor)

9：00	**Registration opens**
9：25	**Opening remarks**
9：30－ 9：50	**【Agroforestcape: A New Paradigm of Indonesia's Agroforestry Based on Blockchain Technology for Food Sovereignty and Environmental Sustainability】** Mahtuf Ikhsan, *Bogor Agricultural University*
9：50－10：10	**【Promotion and Making an International Platform for Agro-Tourism Focused on Sustainable Agriculture】** Jayalathge Bhagya Sri Kolitha Jayantha, *University of Peradeniya*
10：10－10：30	**【Solidarity Agriculture: An Approach for Students and Interested People to Uplift their Awareness for Sustainable Food Production】** Philip Werkmann, *University of Applied Sciences Weihenstephan-Triesdorf*
10：30－11：00	Poster Session **【Engaging Youth in Agriculture: Key to the Future of Food Safety】** Nur Ieffah Binti Muhammad Khalil, *Universiti Putra Malaysia* **【Nodai Presents a New Agricultural Project】** Itsuki Takata, *Tokyo University of Agriculture*
11：00－11：20	**【Application of Black Soldier Fly (Hermetia illucens) in Sustainable Agriculture】** Huai-Shiuan Huang, *National Chung Hsing University*
11：20－12：00	**Session Group Discussion**
12：00～	**Break**

【Afternoon Session】

Group G: Students' Actions in the Field of "Environment"
Classroom 231 (Building 1, 2nd floor)

13：00	**Registration opens**
13：25	**Opening remarks**
13：30－13：50	**【Effects of Ecosystems Services on Crop Farming and on Land Fisheries】** Barend Kok, *Wageningen University*
13：50－14：10	**【Learning and Activities in University Lead to Sustainable Agriculture and Resource Management】** Lalita Songkun, *Kasetsart University*
14：10－14：30	**【Students in the Field of Dry Land Salinity in Western Australia】** Zedekiah Briginshaw, *The University of Western Australia*
14：30－15：00	Poster Session **【Characterization Of The Urbanization Process Of The Amazon, Dispersion And Urban Fragmentation】** Leonardo de Almeida Oliveira, *Federal Rural University of Amazônia* **【SINERGY (Smart Grid Renewable Energy System) Development of Intelligent Renewable Energy Power Network to Improve the Electrification Ratios of Bucolic and Outer Island Indonesia】** Habibul Fuadi Hanif, *Bogor Agricultural University*
15：00－15：20	**【Forestry and Capercaille Management in Scottish Stronghold Areas】** Kyle Connor Sharpe, *University of the Highlands and Islands*
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Session Program

*Please note that there may be two sessions occurring simultaneously

Thursday, September 19th

【Morning Session】

Group F: Students' Actions in the Field of "Education"
Classroom 242 (Building 1, 2nd floor)

9：00	**Registration opens**
9：25	**Opening remarks**
9：30－ 9：50	**【The Study on Recognition on Social Farming in Korea】** Yubin Han, *Kyungpook National University*
9：50－10：10	**【Empowering Youth Through Community Gardening Education】** Cameron Leigh Jenkins, *Michigan State University*
10：10－10：30	**【Youth Transforming Thoughts into Practice to Make the Brazilian Sugar-Energy Sector Even Greener】** João Vitor Napolitano Viotto, *University of São Paulo*
10：30－11：00	Poster Session **【The Study on Recognition on Social Farming in Korea】** Seri Joo, *Kyungpook National University* **【Starting the Conversation: How Engaged Students are Shaping College Campuses through Sustainable Thought】** Gabrielle Shoshana Gamily, *Michigan State University* **【Conservation & Rescue of Ethnobotanical Knowledge and Importance of Medicinal Plants Used in Indigenous Communities in Papantla, Veracruz, Mexico】** David Jonathan Lara Reirners, *Chapingo Autonomous University*
11：00－11：20	**【The Youth Will Not Let the World Die: A Consolidated Effort to Sustainability】** Jhean Laila Sinfuego, *University of the Philippines Los Baños*
11：20－12：00	**Session Group Discussion**
12：00～	**Break**

Overall Session Program

Saturday, September 21st Venue: Yokoi Hall

12：30～ **Registration**

13：00－13：10 **Opening Address by Dr.Katsumi Takano President of Tokyo University of Agriculture**

Session Conclusion Part 1

13：10－13：25 **Group A: Students' Actions in the Field of "Agriculture"**

13：25－13：40 **Group B: Students' Actions in the Field of "Environment"**

13：40－13：55 **Group C: Students' Actions in the Field of "Agriculture"**

13：55－14：10 **Group D: Students' Actions in the Field of "Food"**

14：10－14：20 **Break**

14：20－14：50 High School Poster Presentation Session

Session Conclusion Part 2

14：50－15：05 **Group E: Students' Actions in the Field of "Agriculture"**

15：05－15：20 **Group F: Students' Actions in the Field of "Education"**

15：20－15：35 **Group G Students' Actions in the Field of "Environment"**

15：35－15：45 **Break**

15：45－16：15 High School Poster Presentation Session

16：15－16：45 General Discussion

16：45－17：00 Closing Ceremony

17：10－17：20 Commemorative Photo

17：30－19：30 Reception

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High School Student Poster Presenters

1 **【The system of food production ～Problems and solutions～】**

Sola Okoshi, Chie Inui, Riko Matsunaga

The First High School, Tokyo University of Agriculture

2 **【Impact of Red-Eared Slider's invasion】**

Hinane Kanazawa

The Second High School, Tokyo University of Agriculture

3 **【Securing water resources for our future : lessons from Australia, an arid continent】**

Airi Ouchi, Aoi Okuno, Sakina Shimizu, Miki Sorata, Keina Watanabe

The Third High School, Tokyo University of Agriculture

4 **【What role do supermarkets play in consumer's ethical consumption?】**

Mizuki Fukuda

Senior High School at Sakado, University of Tsukuba

5 **【The impact of advanced clean water treatment on rising of temperature and ecosystem in Tamagawa Josui】**

Yui Adachi, Emi Ikeda

Tokyo Soka Senior High School

6 **【Solution for food waste using nudge. "Nudge" : a small action that encourages something to happen】**

Suzu Taniguchi

Kanagawa Prefectural Yokohama Senior High School of International Studies

GROUP DISCUSSION A

Students' Actions in the field of

Agriculture

September 18th, Wednesday

Morning Session

Classroom 231
(Building 1, 2nd floor)

Rethinking the Rural Economic Development

Jose H. Quintero Beltran
Universidad Autónoma Chapingo

The most important trouble in the agri-food sectors here in Mexico is inequality.

The real thing is that this is not a tiny problem, it covers many areas of the society's environment. Rural development policies are not being as effective as society demands, that's why it is pertinent to rethink rural development models as well as their effective implementation. It must be ensured a minimum level of opportunities for all the people.

I will talk about rural development under a comprehensive perspective, in one where we can talk about the match of digitalization of agriculture, the impacts of sexism in rural areas, the urgency to change the paradigm of the public budget to begin to give greater weight to investment in public goods and not so much in private ones, the relay of older generations in the food production chains, etcetera.

The number of people living in extreme poverty stands at 836 million. (World Bank, 2018)

We must stop thinking about the micro and move also to the macro issues, the IFAD estimates that three-quarters of the extremely poor and food-insecure people live in rural regions, this topic will be developed under the idea of the relevance of re-encouraging a system of a cooperative economy as an alternative for social coercion in rural regions and a tool for economic strengthening of these communities against some voracious market agents, but also will be a talk about what can cooperatives do with trade and their buying-supplies issues and how can this improve rural communities.

For this talk, I will use my experience in these fields, I will get in details about the 4S model we implemented during a year with rural families in three different mexican regions and about how our paradigm changed when we measured the impacts generated specifically with children; which were much more significant than those obtained with adults.

Youth can (and should) be involved in the progress of the rural economy, I am convinced that the best way to do this is through the transfer of knowledge; agriculture has been abandoned for many years and the knowledge generated in the university classrooms has not reached the people living in the agri-food sector successfully.

There are large areas of opportunity for entrepreneurship and the application of talent in the world's food production; from the applications of data analysis, such as the creation and reproduction of technology, and so on. That is why I will talk about some success stories of ventures that have helped the progress of the rural economy in Mexico.

I will focus during this presentation on the impacts we can obtain in the struggle for the fight against poverty, understanding it as a structural problem that needs structural and cross-cutting solutions not only to the production issues, but also in the relevance of a political agenda that attacks areas like education, inequality, gender gap and progressive policies.

Our Activities in Japanese Rural Area, *Ikumi*

Moeka Numata
Tokyo University of Agriculture

About 30% of Japanese farmers are over 65-year-old, and in 2018 the average of farmers age was over 66-year-old.the farming population is decreasing and aging of farmers will continue. Thus, farmer aging is one of the most important problem in Japanese agriculture.

To address this problem ISF-japan students started Student Taking Action that we call STA in Ikumi area. Ikumi area is in Shimada City, which is located in Shizuoka Prefecture. Main production in the area is agriculture and forestry. This area is an example of the problem of decreasing population and aging of farmers. To raise awareness to increase migration to the area, a project developing new product might help to make Ikumi better known.

When we decided to introduce a new product, we by share information obtained at our school festival. We started to sale product since 2010. These products are popular at our school festival; therefore we can provide advice, that we have received from our consumers. To share consumer's opinion to farmers in Ikumi, it as decided to incorporate the consumer opinion to create a new product.

Ikumi is famous for green tea. We decided to develop a new product of green tea. We talked with farmers and new product was born. We named it "Ikuminchi-cha". Green tea can harvest 4 times a year. The price depends on when it is harvested. The lowest price tea is harvested in autumn. Ikuminchi-cha uses autumn green tea to raise farmer's income. It was decided to sell Ikuminchi-cha in tea packs instead of tea leaves, as many customers informed us "tea packs are easy to drink better than tea leaves." Our new product has been sold out every year.

Ikuminchi-cha has two problems. The first problem is production of Ikuminchi-cha can't catch up to demand. The second problem is we can sell only three days once a year. So, it was decided to increase effective in raising awareness.

And to put emphasis on marketing. We created an Instagram account for public relations in 2018. And we will distribute leaflets at next our school festival.

Getting interested in the area through our products and knowing the area through the leaflet is important in rising awareness. We think it is increasing immigration and decreasing the aging trend. As many people visit Ikumi.

Contribution of Scholars and Students from CAU in Practicing Sustainable "Nested Market"

LiRan Chen
China Agricultural University

Nowadays, how to guarantee food safety from the source meanwhile ensuring the profitability of producers has become one of the most important problems in the food industry throughout the world. To address this, scholars and students in China have thought of how to combine predominant form of smallholder farming with utilizing resources sustainably to supply better food, while making smallholders become more competitive in the food market. Professor JingZhong Ye in China Agricultural University (CAU) has come up with a concept called "Nested Market" which provides an opportunity to bridge smallholders and consumers in the supply chain. Nested Market focuses on producing food sustainably by using existing techniques available farming resources based on the raw materials and farming techniques they have in small and variable scales. In 2010, 12 students from College of Humanities and Development Studies of CAU have discussed about a plan of experimenting Nested Market before they implemented it in SangGang, a remote village in HeBei Province. They then instructed farmers to promote their products through E-commerce meanwhile also used their own social networks in the city to help gather over 1000 consumers into the nest. Students bridged both sides also by letting them meet in person. Producers could get hands-on knowledge to improve the qualities to meet the need from consumers, and over 80% producers have reduced using pesticide in farming to provide safer products according to journalist Ma YuPing from China Youth News. Until 2018, 96.2% of smallholders in SangGang have got rid of poverty by earning more than 10 thousand RMB annually. As the program expands, students from College of Food Science and Nutritional Engineering will join the nest and help producers to enhance the traditional food process techniques with modern technology, also provide nutritional value evaluation and hazardous materials such as pesticides testing on agri-products for consumers. As the price of agri-products are 30%-60% higher than in village market and much lower than in the city, farmers could profit more and consumers could get higher quality produces with lower prices. The success in alleviating poverty attracted the attention of government which gave more technical and financial supports. This model has already been applied successfully in other villages in China. It is sustainable and can be adopted widely in different regions in the world.

An Establishment of Rendering Facilities in Rural Area Contributes to Less Environmental Contamination and Brings More Employment Opportunities

Sainkhuu Enkh-Otgon
Mongolian University of Life Science

The purpose of this study is to inspire local youths, herders, and slaughter houses in recycling of animal by-product in order to prevent further environmental pollution by creating a new opportunity of business and employment to the unemployed locals.

According to statistics from 2018, Dornod province had 2.3 million livestock and it consists of Sheep (48.2%), Goat (28.2%), Cow (10.2%), Horse (13.1%) and Camel (0.3%). Dornod province slaughters around 300 thousand livestock annually. Around 43% -50% of liveweight of livestock are being abandoned as animal by-product.

There are four main slaughterhouses in the Province. Daily 6.1 tonnes (annually 1685.6 tonnes) of bones are being wasted at the slaughterhouses and sent directly to the local landfill. There is no rendering facility to recycle the bones. Therefore, this causes the bones to decay, which provides a favorable environment to harmful diseases and pollutes the environment.

In order to make this project effective, we have educated the local unemployed youths and formed a group of youth to work on this project. The purpose of the group is to inform the local residences about the opportunities of rendering business in the province and the threat to the publichealth. The agreement between the group and local government has been made to support the locals whom are inspired to start a rendering business.

In Mongolian rural areas, local people's quality of life is lower and have higher unemployment rate. Because of these problems numerous young people leave countryside. Consequently, it leaves the countryside uninhabited and becomes a serious consideration for extinction of traditional nomadic culture of Mongolia. By fulfilling this project, a vast number of traditional nomadic herders will have an idea of a new profitable opportunity by selling their waste and protecting the environment from pollution at the same time. Furthermore, youth's movement toward urban areas will decrease by ensuring their quality of life.

When the project is put into effect, environmental pollution and public health problems will decrease due to rendering animal waste bones. Because rendered bone meal can constitute mixed ration feed to livestock, herders will get access to a healthier and nutritious feed for their livestock, thus decreasing the loss of livestock in the harsh winters. This has a direct impact on meat prices and the herder's quality of life.

By adapting rendering technology that is common globally but has not yet been developed in Mongolia, we are confident that it will bring a positive impact to our agricultural sustainability.

Sustainable Agriculture and Resource Management: Prospects and Challenges

Navdeep Godara

Chaudhary Charan Singh Haryana Agricultural University (CCS HAU), Hisar, India

Farming is a profession of hope and reflects the doubt of uncertainties in agriculture. These uncertainties are both natural vis-à-vis man made. In India, Agriculture employs about 50 percent of nation work force and provide livelihood for majority of population. In addition, food accounts almost half of household expenditure, which acts as vital component of inflation. India is caught between national demand of food at an affordable price and generating necessary income to provide basic amenities for majority of its population. Keeping this in view, sustainability in agriculture through resource conservation technology is the most pertinent solution to subdue this stint [1] . Globally, the emerging challenges in agriculture are also due to excessive exploitation of fresh water in agriculture as irrigation, impoverished soil, reduction in land holdings, climate etc. Spearheading for smart farming through water management, soil management, integrated farming system (IFS), small farm mechanization, integrated nutrient management (INM), climate smart cropping is the immediate need of the hour. Besides, the disposal of paddy residue is the major challenge among agrarians. Hence, paddy residue management is of another utmost importance as it contains nutrients and improves soil-plant-atmospheric continuum. The amount of residue generation should be accessed, its utilization in-situ and ex-situ, emphasize harmful effects of residue burning on human health, soil health and environment. The agricultural waste opens vivid options for its versatile usage and is possible if residue is collected and managed properly [2] . Integrated farming system should be followed with proper planning and conservation agriculture needs to be practiced, as through zero tillage, mulching, stubble management, which will increase the yield with sustainability. Farmers have to adopt climate smart cropping. Smart farming techniques will pave the way of development within farm unit. Youth as pivot, entice sustainability vis-à-vis food security. The education system of agriculture in India includes the program of rural agricultural work experience (RAWE) and experimental learning programmes during under graduation, which help the youths to render their services to farmers and get acquainted with their challenges. The various startups initiated by the youth that gives direct connectivity of farmers to consumers, ensure better income for famers, employment generation and consumer satiation. The level of sustainability thus can be enhanced with inclusive efforts.

Solar Pump Monitor to Improve Sustainability of Renewable Energy for Smallholder Farmers in Nicaragua

Francis Durnin-Vermette
University of British Columbia

Climate change exacerbates poverty and natural resource degradation globally. Since smallholder farmers are among the most susceptible to the effects of climate change, it is essential to support the adaptive capacity of their communities and livelihoods. 90% of Nicaraguan farmers rely solely on rain to water crops, but droughts, floods, and unpredictable weather are becoming/increasingly common due to climate change, which is directly detrimental to the crop yields and livelihoods of Nicaraguan farmers.

ENICALSA is an organization that provides solar pump irrigation systems to smallholder farmers in Nicaragua. ENICALSA has identified that a monitoring device with 3G connection attached to farmers' irrigation systems would expedite repairs and thereby reduce pump downtime, which is beneficial for farmers. UBC Sustaingineering has partnered with ENICALSA to develop a reliable, low-cost monitoring device that can be easily retrofitted onto existing farmers' solar pump irrigation systems. The device also has the potential to monitor factors including temperature and humidity which can inform farmers' management decisions such as planting dates and irrigation regimes. Whereas the retail price of an equivalent monitoring device exceeds C$915, the device designed by UBC Sustaingineering costs less than $30 to produce.

ENICALSA and UBC Sustaingineering have conducted an impact analysis, taking into account environmental, social, and economic sustainability metrics to determine if the solar pump monitoring device will enhance the sustainability of Nicaraguan agriculture. Qualitative and quantitative data were collected in 2016/2017 through on-farm interviews with 30 farmers who received solar pump irrigation systems. Overall, solar pump installation improved household income, though the economic benefit varied between households.

GROUP DISCUSSION B

Students' Actions in the field of

Environment

September 18th, Wednesday

Morning Session

Classroom 242
(Building 1, 2nd floor)

Community Farm Park in China

Zhang Yinli
Beijing Forestry University

Since the reform and opening up, China's economy has developed rapidly, urbanization is accelerating, and the level of urbanization is constantly improving. However,it is because the excessive development of urbanization and the high density of city dwellers that have led to a sharpening contradiction between construction land and green land.The reduction of green land has made the living environment of the residents worse.What is more,high-level urbanization development has led to the adjustment of the food consumption patterns of residents,and the quality requirements for food have gradually improved.

In order to gradually improve the current situation,many communities have begun to create community farm park,which means bringing agriculture to cities. Community farm park can be used to cultivate flowers, vegetables, and so on to promote community development. It can also be a space shared by community residents.

On the ecological level,the "sustainable" design concept and some ecological technologies used in community farms, such as garbage sorting and recycling, rainwater harvesting and utilization, and kitchen waste composting, have strong practical operability.

As far as the social level is concerned, the location of shared community farms is mostly urban idle land, and it is often neglected in management and the environment is dirty.In the process, the land vitality of these idle plots can be restored, providing an environment for nearby residents to communicate, learn from each other and share together, improve the environmental quality of nearby communities and enhance community cohesion.

Teenagers are also willing to participate in community farm park because of their curiosity. College students will form small teams and come to the community to popularize knowledge about plants and crops, especially students from Beijing Forestry University, will use their professional knowledge to educate people in the community about farm plant science. In addition, teenagers will also help the community to organize some exhibitions during the holidays, and plant plants or crops in the farms, which can be displayed more vividly. What is more, the community also organizes a variety of parent-child activities, so that children can experience the joy of planting flowers and trees ,which they can be closer to nature.The creation of community farm park allows teenagers to experience self-sufficiency and a precious pastoral farming experience.It is to go to work in person to understand that food is not easy to get and teenagers can also develop the ability to innovate in labor.In addition,by planting, maintaining flowers and plants,it also enables teenagers to raise awareness of responsibility and environmental protection.As a result, they can gradually cultivate the great faith of building beautiful China from the construction of small homes.

However, due to the lack of popularity in China, there is relatively little research on community farm park. Therefore, it is necessary to learn from foreign mature theories and practical experience, combined with the characteristics of urbanization in China, to explore the possible ways which are suitable for China.

VNUA Youth Embark on Finding the Potential Application of Bioactive Compounds Derived from *Streptomyces* as Bactericidal Agents against Pathogenic Bacteria on *Pleurotus Ostreatus*

PhD. Nguyen Xuan Canh & VuDuyThaiSon
Vietnam National University of Agriculture

Pleurotus ostreatus belongs to the genus *Pleurotus* which is widely consumed **all over the world** because of its flavor, taste and high nutritional value (Nguyen Huu Dong et al.,2002) and some medicinal properties used in cardiovascular treatment (Cao Xuan Thu, 2000). This mushroom was reported to have the Mevinolin- anti-cancer (Demain AL, Sanchez S., 2009). Currently, *Pleurotus ostreatus* is one of the main sources of income for many regions in Vietnam, accounting for about 70% of the country's output and enhancing the sustainable agricultural development (Nguyen Nhu Hien & Pham Van Du, 2013).

However, P. *ostreatus* has sufferred the disease cause by H10 strain from Bacillus genus, with the symptoms of yellow mucus beneath the fruiting body and then spreading to the upper body lead to shrunk and dry. Fruiting bodies contain a lot of yellow brown spots then being rot (Nguyen Huu Dong et al.,2002). It has detrimental impact on their quality and yield of P. *ostreatus*. **Currently, using chemical drugs as a treatment make endanger for global people health, lead to environmental pollution and reduce significantly sustainable development in Agriculture.**

Streptomyces is known as a group of prokaryotes distributed widely in nature and capable of **antibiotics production** (Ngo Dinh Quang Binh, 2005). The use of *Streptomyces* to inhibit pathogenic bacteria is considered as an effective and eco-friendly method of environment. Understanding this issue, we carried out the experiment "**Vietnamese Youth embark on finding the potential application of bioactive compounds derived from *Streptomyces* as bactericidal agents against pathogenic bacteria on *Pleurotus ostreatus***".

The purpose of this experiment is 1. Student launch the research activities using *Streptomyces* to create bio-active compounds to prevent pathogenic disease, 2. Assess the impact of the product on the environment, 3. Select households to grow *P. ostreatus* to implement the project, 4. Students action on direct instruction of households, 5. Develop orientation and future sustainability and a action plan for the short and long term.

This project is participated by different organizations (Bio-scientific research club- an official club of Vietnam National University of Agriculture, Mushroom Research Institute and 2 student research groups and over 20 people related.

Soil Fertility and Soil Organic Carbon in Cassava-based Cropping System under Conservation Agriculture

SOUR Mengyou

Royal University of Agriculture

In Cambodia, 43% of total land area is degraded causing the reduction of arable land productivity and disrupt sustained agricultural productivity and food security (Bai et al., 2008). Conventional tillage (CT) causes soil degradation, the loss of soil organic carbon (SOC), the decrease in soil fertility, the loss of biodiversity and leads to the decrease in crop yield (Akowuah, 2012), whereas conservation agriculture (CA), including minimum or zero-tillage, crop rotation or intercropping and permanent soil cover, is a set of management practices to reverse those negative impacts from CT (Naab et al., 2017). Thus, the aim of this study was to assess the impacts of conservation agriculture practices on soil fertility and SOC in cassava-based cropping system. The experiment was conducted in Mollisols soil in Battambang Province and initiated in 2010. This experiment consisted of 4 treatments including (i) CA1 (Millet + *Crotalaria Juncea* rotated with maize + mungbean with no-till), (ii) CA2 (Cassava with chisel plow) rotated in crop pattern annually, (iii) CT1 cultivated cassava under plow and ridge and (iv) CT2 farmer's plot cultivated cassava traditionally. Soil samples were collected in 2017 at three depths (0-5, 5-10 and 10-20cm). At the depth 0-5 cm, the result indicated that permanganate oxidizable carbon (POXC) and SOC were higher in both CA treatments at 1.28 g kg^{-1} and 28.85 g kg^{-1} respectively. Cation Exchange Capacity (CEC) was increased in CA1 and CT1 but decreased in CA2 and CT4. At depth 5-10 cm, the least amount of POXC was recorded in CT treatments by 1.03 g kg^{-1} in contrast to the CA where the top number were shown by 1.15 g kg^{1}. Soil Stable Aggregate (SSA) of 5-10 cm depth were at the highest number of 771.77 g kg^{-1} in CA1, whereas the other treatments were statistically lower. The highest total N (TN) were shown in CA2 at 5-20 cm depth by 1.32 g N kg^{-1}, by contrast, the lowest number were from CT2 by 0.63 g kg^{-1}. Available P (AP) were found non-significant at 0-10 depth, while higher numbers were from CA2 and CT2. In conclusion, CA increased POXC, SOC, CEC, SSA, TN and AP higher as compared with CT since CA practices remain residue on soil decreasing soil erosion and accumulating soil organic carbon and increase nitrogen fixation from legume crop rotation.

Integrated Control of Exotic Invasive Grass in the Carajás National Forest, Amazônia, Brazil

Saulo Fabrício da Silva Chaves, Rafael Gomes Viana, Alexandre Franco Castilho, Gabriel da Silva Vasconcelos, and Treyce Stephane Cristo Tavares

Federal Rural University of the Amazon

The Carajás National Forest (CNF) is a Brazilian Amazon protected area created to protect an extremely endemic environment of Amazon ecosystems. The occurrence of invasive species shows a great socioeconomic and environmental impact as the damages caused by global climate change (LEVINE & D'ANTONIO, 1999). Biological invasions threaten biodiversity conservation and natural ecosystems, as they compete with native species, modify community dynamics and change habitats (VITOUSEK et al., 1997). Several countries adopt invasive exotic plant control. There is little information about exotic plant control techniques in Amazon region. This work aimed to evaluate integrated control of exotic invasive grass in the CNF. The experiment was installed in an area of 800 m^2 inside CNF, showing a high infestation of invasive grass *Urochloa decumbens*. The area was divided into eight blocks(10 x 10 m each): 1. Mechanical weeding (MW); 2. MW + seed mix (SM); 3. MW + SM + planting of tree seedlings (PTS); 4. Herbicide (H); 5. H + SM; 6. H + SM + PTS; 7. MW + H + SM + PTS; and, 8. Control. SM was composed by: *Crotalaria spectabilis, Cassia fastuosa, Bauhinia longipedicellata, Mimosa acutistipula* and *Solanum crinitum*. Seedlings were planted each 2 m and were constituted by *Anadenanthera colubrina, Swietenia macrophylla, Inga edulis, Dalbergia latifolia* and *Bixa orellana*. Twelve months after installation of the experiment, a square inventory of 0.5 x 0.5 m was recorded for 10 times in each block. Density and dry mass of exotic plants were measured. The lowest exotic grass density and dry mass were observed on treatments 6 and 7, differing from all treatments. It may be due to the lesser resurgence of invasive species by the action of mechanical weeding, shade and herbicide application. Mechanical weeding and herbicide application may reduce the reserves of exotic grass propagules. Shade and native plant competition may reduce exotic invasive grass growing. The integrated control may decrease the amounts and ecological impacts of herbicide in the environment. Besides, tree seedlings and seed mix strategies helped to repopulate the area with native plant species. These two types of managements may be applied in any part of the world; however, it is necessary to use local native plants species as a component to integrated management of exotic plants. They may also be used for both degraded area recovery and agriculture.

Exploring Sustainable Food and Agriculture of Taiwan from 2019 Taiwan In My Eyes-120h

Yi-Jing Tsai
National Chung Hsing University

I joined "2019 Taiwan in my eyes-120h" as the leader with three foreign students from Sri Lanka, Honduras and El Salvador to study sustainability in food and agriculture and UN Sustainable Development Goals (SDGs). During the event, we visited several benchmark enterprises to conduct on-site field visits exploring sustainability dimensions and also our own selected sites to explore Taiwan's sustainability dimensions. I was responsible for constructing ideas, contacting local people, making video and final presentation. It was a great event associated with sustainability and connect global and local community that I would like to share. We realized how important it is to connect local and global community in this event. I guided the international students to explore Taiwan's sustainability dimensions. They were amazed and convinced these ideas would be great to implement in their countries. In total, there were students from more than 10 different countries in the event and visited different cities and villages in Taiwan in this program. International students and locals were connected to inspire creativity and thoughts. We visited food surplus kitchen, 1919 food bank, Wen-Xian community and Trash amusement park, which are related to sustainable agriculture, food security, waste management and rural development. Mr. Lin at 1919 food bank collaborated with a NGO in Jordan through using black solider fly as food waste management system, which supported the SDGs of no poverty and zero hunger. A local pet store owner influenced other cat owners to compost the cat sand as part of no-waste vegetable production system, which is a great story about the SDGs of responsible consumption and production. Edible food that would be a waste after the market closed were collected by Huamei surplus restaurant from venders to provide food for people in need in the community, which improved the sustainability of the community and reduce hunger. Trash amusement park not only makes organic compost from food waste for the farmers, but also provides environmental education to the citizens, which helped make Taichung city sustainable. We can expand these ideas of sustainability in food and agriculture not only in Taiwan, but also other countries.

GROUP DISCUSSION C

Students' Actions in the field of

Agriculture

September 18th, Wednesday

Afternoon Session

Classroom 231
(Buillding 1, 2nd floor)

Indian Agriculture and Food Security: Constraints and Solutions

Sunny Maanju
Chaudhary Charan Singh Haryana Agricultural University

The Indian agricultural sector contribution to GDP has dwindled to 15.4% (2017), which is still higher than world's average (6.4%) [1] . India is the second largest producer of agricultural production, amounting to 12% of world's agricultural production. Several constraints viz. dominance of small and marginal land holdings (85%), limited land and infrastructure, improper credit facilities, lack of timely supply of agricultural inputs besides research and marketing facilities, absence of desired extension activities, lack of improper implementation of policies and programs, ever growing Indian population, erratic and uneven distribution of rainfall and uncertainty in agriculture adversely affect farmer's income. By 2050, with the global population expected to reach 9.8 billion, our food supplies will be under far greater stress and will need 60-70% more agricultural produce to meet food demands [2] . Food security in India could be ensured by increasing productivity, decreasing post-harvest losses, reliable bulk and cold chain storage system, food processing and opportunities for value added products. Resource Conservation Technology, resource recycling, integrated pest and nutrient management, integrated farming system and their management is an urgent need to achieve sustainable development goals. Such modern day concepts are the effective ways for generating income as these techniques led to maintenance of soil fertility and plant nutrient supply to an optimum level which can easily be adopted by the youth. Urbanization, industrialization, climate change and stubble burning have led to environmental degradation issues. Insects, pathogens and weeds have made chemical pesticides an integral part of crop production. Youths are aware of the fact that to safeguard their own future, these hazardous pesticides should be replaced by integrated pest management. The young Indian farmers are in digitizing phase, which are actively forming groups on social networking sites to exchange the latest available technology and are adopting smart and profitable agriculture. Innopreneurship (innovation+ entrepreneurship) abilities are gradually being inculcated in Indian farmers to promote sustainable agriculture. The challenges could be overcome by educating youth, improving extension activities and adding agriculture in high school course curriculum. Various Experiential Learning Programs and Agri Business Incubation Centres are also needed to be set up to encourage the students to explore innovative ideas. Due to the sincere efforts of Govt. through Public Private Partnership and skill development entrepreneurship have paced up. Youth have the capability to think of agriculture as a business and profession. They could initiate the vertical expansion of agricultural sector which may lead to "Ever Green Revolution".

Agriculture in Laos

Sopha Cheauloy
National University of Laos

Laos is a landlocked country. Most population is a farmer. Local people are familiar with nature. They engage in fishing in the Mekong River, hunting, and the gathering wild foods. In the tropical forests of Laos, there are also many edible wild plants and foods that are gathered, primarily by women. (nationsencyclopedia.com) The forest area has decreased in the recent year. The biodiversity is not various and some animals are instinct because the activities of people by hunting wild animals for foods and cutting trees to make income. People must be more aware of natural resources. I am studying at faculty of Forestry Science. I will use my knowledge to help people in my hometown. Urban dwellers have unused land. They could grow fruits to sell in the market. In the beginning it is not easy for villagers. We will show them that they will make incomes from the unused land that they already have. As youth or who studied in this field need to guide and give them advice. First, we will start in the small village to grow bearing trees such as mango trees, orange trees, tamarind trees, etc. It will take a few years for the trees to produce fruits, but they can remain in production many years. While we are waiting for the fruits we can plant vegetables in the space between the trees and then gather organic vegetables to sell in the market to earn money. After the trees bear fruits we will open farm for tours to visit in order make a tourist sightseeing, it is also the way to promote this activity to the other people. They can pay a fee for entry. They can eat fruits, but cannot take them out. If they want to buy and bring home they can buy in front of the farm. Then we will sell fruits to the other village and other town. This activity is a sustainable development. Villagers can earn money, have foods to eat, and keep the environment. Youth must involve with local people to show how to start doing the activities. Youth who has joined the activities will get knowledge and new viewpoint to develop their community when they get back to their hometown. They don't need to work in the organization they can have their own project to make a good income.

The Role of Sustainable Agriculture Tanzania (SAT) in Promoting Involvement of Some Sua Students in Sustainable Agriculture and Resource Management Activities

Mariam Mbonde

Sokoine University of Agriculture

Agriculture as the key economic activity in rural areas accounts for more than half of the country's income generation, supports livelihoods of more than 80 percent of the population, contributes about 29 percent of GDP, 30 percent of export earnings, 65 percent of inputs to the industrial sector and employs about 75 per cent of the total labour force. Notwithstanding its major contribution to the socio-economic development of Tanzania, it is highly dominated by the aging population, while according to the Tanzanian population and housing census of 2012 about 67%(15,587,621 individuals)of labour force comprises youths aged between 15 and 35 years[1] and mostly unemployed. The Government of the United Republic of Tanzania having realized the low involvement of youths in agriculture for various reasons, has come up with different initiatives (e.g. National Strategy for Youth Involvement in Agriculture 2016-2021and National Employment Creation Programme 2006 – 2010) in order to promote youth involvement in sustainable agriculture including resource management.

In order to complement efforts made by the Government of the United Republic of Tanzania, Sokoine University of Agriculture students have been involving themselves in sustainable agriculture activities in collaboration with the NGO known as Sustainable Agriculture Tanzania an organization that was registered in June 2011. SAT emerged from a sister NGO known as "BUSTANI YA TUSHIKAMANE" that had practiced sustainable agriculture for a couple of years in Morogoro. Additionally, there are about 74 similar NGOs under Tanzania National NGO Coordination such as Morogoro Youth Agribusiness Foundation, ANSAF, AMSHA Institute, TOMOKO Farms and the Sokoine University Graduate Entrepreneurs Cooperative (SUGECO). SAT like other NGOs that target youth has provided SUA students with a platform for renewed interest in agriculture through dialogue, debates, action-research and dissemination that have provided them with an opportunity to reflect their thoughts and carry out their activities hovered around sustainable agriculture and resource management.

The purpose of this paper is to shed light on the philosophy and approach used by SAT in collaboration with SUA students, achievements and impacts realized, challenges encountered and efforts made to redress the situation in an endeavor to transform youths' thoughts on sustainable agriculture and resource management while connecting the local and global communities.

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[1] The official definition of youth in Tanzania refers to young men and women aged between 15 and 35 years.

Readiness and Level of Implementation of Malaysian Sustainable Palm Oil (MSPO) among Palm Oil Smallholders

Ainatul Husna Ahmad Azuddin
Universiti Putra Malaysia

Palm oil is a major agricultural commodity and the biggest contributor to Malaysian agriculture's Gross Domestic Product (GDP). Around 3.6% out of 7.8% of agriculture GDP is contributed by palm oil. Malaysia is the second largest palm oil exporter in the world after Indonesia, and fulfilled almost 40% of the world's oil consumption. The European Union (EU) countries are the second significant importer of Malaysian palm oil after India. However, Amsterdam declaration in 2015 that the EU will ban unsustainable palm oil by 2020. The Amsterdam declaration posed threat to the Malaysian palm oil industry. The reason given in banning unsustainable palm oil is because EU claimed that palm oil is causing deforestation which leads to climate change and creating a lot of environmental issues. This decision not only will affect the country's income but also will affect the palm oil sectors along the supply chain especially the smallholder palm oil estates. Nevertheless, Malaysian Prime Minister promised that "every single drop of our palm oil will be sustainable" indicating that the government has pledged to produce 100% sustainable palm oil by the year 2019 through Malaysian Sustainable Palm Oil (MSPO) Certification Scheme. MSPO Certification Scheme is to ensure that all palm oil producers are to follow certain procedures and standards in palm oil planting management and oil palm production. Otherwise, EU will ban unsustainable palm oil and consume other types of oils such as soybean and rapeseed oil. Thus in order to ensure that the oil palm industry is ready to implement MSPO, Universiti Putra Malaysia is embarking in a study to measure the smallholders' intention to fully implement MSPO. In order to understand and to capture the readiness of oil palm smallholders' involvement in MSPO scheme, Universiti Putra Malaysia's (UPM) students carried out a survey among the smallholders to gauge their intention to participate in the MSPO program to ensure all palm oil produced by Malaysia is sustainable. The involved students are from the Faculty of Agriculture. Structured questionnaire was developed under the supervision of one of the lecturers. Ten groups of students consisting five people per group was assigned to 20 smallholders to find out the current management practices by the oil palm smallholders and a concurrent advisory service will be rendered by the students if the practices were not in line with the MSPO procedure or guidelines. Some of the findings that were very pertinent regarding the oil palm management by the smallholders were the open burning and excessive use of pesticides and herbicides. Thus a demonstration was conducted by agriculture students the next day to all smallholders on how to manage their farm in a proper way so as to reflect the sustainability of palm oil production. The demonstrations conducted were to do proper pruning of old frond and on how to use insecticides and pesticides accordingly in order to produce sustainable oil palm production.

Status of GAP in Myanmar Sustainable Agriculture

Sai Htet Lin Aung
Yezin Agricultural University

Sustainable agriculture in Myanmar is pioneered by a large population of small-scale rural farmers. Approximately 70 percent of the country's population depends on agriculture for food and income(ADB, 2013). According to Myanmar is diverse in topography and different climatic conditions; it is favorable for growing over 100 varieties of vegetables in Myanmar (MoAI, 2012). Nowadays, Myanmar people will face a problem of unsafely vegetables in the local market and good agricultural practice (GAP) is one of the solutions for sustainable agriculture development in Myanmar. The mainly purpose of GAP is to improve the quality of agricultural produces and safety aspects. The objective of this study is to observe status of GAP in vegetable production with safety aspect and nutrition of consumers. The study site was outskirt of Yangon region and value chain through producers, brokers, sellers from local markets, consumers nearby production places. Review of literature and other relevant documents to get an overview of food safety issues in vegetables production in study areas of Myanmar, that were not directly covered by methodology. Collecting information werefarm practices, utilizing of agro-chemical according to the instruction of DoA, use of compost, harvest time of vegetables with GAP guideline, harvest system, post-harvest handling preparation to market, grading, washing, use of good water, packaging practices, transportation system, traditional selling system and temporary storage system. In this study, three types of market system were observed by directly producers to consumers, through brokers and retailers to consumers and through brokers, wholesalers and retailers toconsumers. It is suggested that small farm holders should follow GAP guideline with safety aspects for sustainable vegetable production. All farmers used chemical fertilizers and pesticides excessively but most of them have lack of knowledge on the systematic use. The 80% of farmers were not using with suitable protective clothingand equipment for using pesticides. There had not been trained for the use of sprayers and pesticide,and personal hygiene practices. The possible activities and motivation on sustainable agriculture in Myanmar should be performed by awareness programs for food and environmental safety, trainings by highlighting the misuse of agrochemicals in current vegetable production, to protect hazards for farmers and consumers, basic and vocational education for young adults, to develop research and to establish reasonable market.

Awareness and Utilization of Agricultural Waste in Mongolia

Ninjbulgan Sugir
Mongolian University of Life Sciences

Mongolian nomadic lifestyle is connected with environment through pastoral livestock husbandry. Therefore, since the ancient time nomadic tradition includes many different ways to sustain the environment and utilization of waste which are animal's dry dung used as a fuel in order to save trees, fill the dug holes in the ground with a soil before leave the place and during each seasons shift their livestock to different areas for avoid overgrazing and prevent soil erosion.

Since its inception, the Mongolian People's Republic has devoted considerable resources to developing crop production and on the other hand agricultural wastes beneficially exploited in the industries and by the farmers. However, due to privatizations in 1990, development rate of the agricultural sector weakened followed by utilization of agricultural wastes nowhere to be found.

Globally, 140 billion metric tons of biomass is generated every year from agriculture. In Mongolia estimated that about 1.7 Mt of agricultural waste is generated every year. These wastes are not utilized properly by farmers due to lack of interest, unavailability of proper technology and ignorance of the farmers of its value as well as practice and experiences for utilize agricultural waste for incorporation of waste. Our aim is to make farmers understand these wastes are valuable raw material for produce number of useful product and there is nothing waste in agriculture, everything can be converted into something useful that can be additional income for their livelihood. Thus, this report illustrates the awareness and utilization of agricultural waste by the farmers in Mongolia. Agricultural wastes taken under study are wheat waste, horticultural waste, livestock waste, poultry waste and biogas waste.

The result revealed there was huge difference between awareness and utilization of agricultural waste. Thus, to fully utilize waste there is need of increase in number of agricultural extension workers, new technologies and trainings that will encourage and interact with the farmers to make valuable products from the waste generated on their farm.

Research on Viet Nam Action Plan for the Management of Antibiotic Resistance in the Livestock Production and Aquaculture

Le Khac Duy
Vietnam National University of Agriculture

The birth of antibiotic marks a revolution in the field of bacterial infection treatment. The use of antibiotic not only brings massive benefits in the curing patients but also be utilized in agricultural and producing purposes.

Recently, antibiotic resistance has been a common yet un-controllable phenomenon, which left several harmful effects on both human and animals's health. Therefore, it is urgent to find a solution to prevent and control antibiotic resistance.

Futhermore, antibiotic resistance has become a global health issue, especially in developing countries. It is recorded that thousands of people die each year due to antibiotic resistance. Plus, the spending on it has risen up to trillions USD.

Vietnam is in the list of countries having the highest antibiotic resistance rate. Meanwhile, some bacteria have developed resistance to nulti antibiotic with the increasing level of endurance. Vietnam is regarded as the lowland of the antibiotic resistance situation. Bacteria being able to resist antibiotic cause longer illness; even mild ones such as flu or angina can now take weeks to heal.

The following part is about Viet Nam Action Plan for the management of Antibiotic Usage (AMU) and prevention and control Antibiotic Resistance (AMR) in the Livestock Production and Aquaculture.

GROUP DISCUSSION D

Students' Actions in the field of

Food

September 18th, Wednesday

Afternoon Session

Classroom 242
(Building 1, 2nd floor)

The Indigo Food Coloring Extracted from Hydrobionts

Vladislav Matveev
Far Eastern Federal University

Bivalve molluscs are important marine harvest species. The delicacy production made of *Anadara broughtoni* and *Spisula sachalinensis* has a high biological and nutritional value. Today's manufacturing technologies of food production include the use only molluscs' «feet» and, actually, other parts are simply thrown away into the trash. Nowadays, one-third of food produced for human consumption is lost or wasted, which amounts to about 1.3 billion tonnes per year. Food is lost and wasted throughout the supply chain from initial agricultural production all the way to final household consumption. Food that never gets eaten also represents a waste of resources. So, this situation of food waste must be controlled by the people themselves and by special organizations both.

The most of precious waste of molluscs is the blood and intracavitary fluid which consists a large amount of precious water-soluble (B_1, B_2, B_6, B_{12}, PP, C etc.) and fat-soluble (A, E, D, K) vitamins. Despite this fact, the blood consists polyunsaturated fatty acids (especially contains a lot of omega-3 fatty acids) that are incredibly important for health. Nowadays, most people don't get enough omega-3 fatty acids. Blood of molluscs is blue that because consists hemocyanin (equal to human hemoglobin). That's why I would like to recommend using the hemocyanin for dying and fortification dairy food products, in particular – yoghurts, ice-creams, probably some margarine and non-alcohol fizzy beverages. Our latest research has shown that hemocyanin gives a blue color only at pH below 6.5. Blue food will be pretty attractive for consumers. Blue color helps reduce appetite, and in the future, weight also calms the human psyche.

Technically, the natural blue food coloring hasn't developed and formulated so far. There is only synthetic blue food coloring in food systems that could harm a human organism (synthetic food coloring has a potential carcinogenic effect), also these substances have no nutrition and biological value.

I faced some challenges with extraction and purification of hemocyanin from blood molluscs. The thing is, blood can be easily contaminated by some biological toxins, bacteria, viruses. Basically, hemocyanin is a breathing protein which c an easily denaturated by heating, acidification, ionizing radiation, using washing agents (detergents), therefore these purification processes should be eliminated. The omega-3 fatty acid also may be destroyed by heating, but by adding an antioxidant to food systems, such as gamma-tocopherol, it is possible to reduce the omega-3 destruction.

However, even though the hemocyanin is too sensitive to damage, this substance is not that expensive at all. Like I said, blood is serving as a waste of manufacturing processes; use such material like a hemocyanin in food industry is cheap and cost-effective. Moreover, using molluscs' blood let people make recycling.

Future Food Development based on Heat Stable Probiotic - *Bacillus clausii*

Nam Hyeon Kim, Ramachandran Chelliah, and Deog Hwan Oh

Kangwon National University

The global market of probiotic is anticipated to achieve USD 31.1billion by 2025 as well as a compound annual growth rate (CAGR) of 7.6% over the next 5year period. It will be predictable to reach USD 44.9billion in 2050. Asia-Pacific and Europe lead the global probiotics market owning to its demand, whereas Asia-Pacific is also expected to be the most promising market in the near future. Most of the available data on quality focuses on probiotic products containing *Lactobacilli* and *Bifidobacteria*, while very few data are available on spore-forming probiotics. The present study evaluates the probiotic efficiency and stability of *Bacillus clausii*. The *Bacillus clausii* were analyzed for viability in simulated gastrointestinal conditions reveled high resistance to pepsin (58%), bile salts and pancreatin (70%), and low pH (41%). In addition, *Bacillus clausii* showed 42.87% moderate auto-aggregation efficiency and higher co-aggregation ability with *Escherichia coli* ATCC 35150, *Bacillus cereus* ATCC 13061, and *Staphlyococcus aureus* ATCC 13150 which were 44.6%, 59.7% and 30.9%, respectively. *Bacillus clausii* was sensitive to ampicillin, tetracycline, vancomycin, clindamycin, penicillin, kanamycin, gentamycin and imipenem but resistant to trimethoprim, chlorophemical, erythromycin, norobiocin and methicillin, the safety assessment were evaluated based food application. The results from this study indicate *Bacillus clausii* were considered to be promising probiotic candidates. The heat and pH stability of *Bacillus clausii* was extremely heat stable (90 and 100℃ for 60 min). The survival rate was 96.31% at 90℃ for 30 min, 84.37% at 90℃ for 60 min), 93.75% at 100℃ for 30 minutes and 82.76% at 60℃ for 60 minutes. The stability for the change of pH was 41%, 87%, 84.7%, 88.1%, 99.7% and 84% survival rate for 4 hours at pH 2, 4, 6, 8, 10 and 12, respectively. In addition the safety assessment of *B. clausii* were confirmed based on absence of hemolysis, gelatinase, biogenic amine (BA) production and further the toxicity were estimated to absent in *Caenorhabditis elegans* model. In conclusion, the current analysis clearly demonstrates that of the probiotic efficiency and heat stability of *B. clausii* towards the development of value added ready to eat value added food product development. Such as dairy, non-dairy, cereals, baked products, fermented meat products, dry foods and others. Dairy products are the largest application market for probiotic foods. Probiotics have also emerged as a critical part of the animal feed industry with a demand for estimated to cross USD 32.2billion by 2030.

Food Literacy in the Classroom: Connecting Students, Food, and Community with Experiential Learning

Misa Gillis
University of British Columbia

During the summer of 2018, I was an intern with an organization called Think&EatGreen@School(TEGS). TEGS conducts research on food literacy in British Columbia and provides small school and community grants that support food literacy projects in Vancouver. The TEGS'definition of food literacy is "the ability to make decisions to support the achievement of personal health and a sustainable food system considering environmental, social, economic, cultural, and political components" (Cullen et al, 2015). As an intern, I was able to see how these concepts could be taught to young students using experiential learning, a process of action followed by reflection.

My main role was to liase with teachers from 7 elementary schools who received a TEGS grant, visiting their classrooms and assisting with final reports on the projects they conducted. Most of the initiatives centered around developing school gardens and getting the students involved with Project Chef, a cooking program that focusses on healthy food, where it comes from, and its connection to community. The value of these various activities was apparent. Every teacher I spoke to described how they could see resulting differences in their students' behaviour. One teacher described how her students' initial hesitation turned into passionate enthusiasm as they learned to take ownership of the garden they were building and tending too, while another related how she observed her students' interest in, and consumption of, fruits and vegetables increase after her class participated in Project Chef. One of the highlights of my internship was attending the "Harvest Celebration" of one elementary school, where students enjoyed fresh salads and potato gnocchi made from ingredients they grew themselves.

In total, TEGS distrubuted $25 000 in small grants among twenty-three Vancouver schools in the 2017/2018 school year. As a result, over 3200 students directly engaged in food literacy activities, with the help of over 300 teachers, school staff, community members, and parents.

Through these projects, the students were gaining food literacy skills not in a traditional classroom setting, but with hands-on, experiential learning. More research is needed to determine the impact of these initiatives on behaviours later in life. From my observations, my opinion is that this exposure to food and agriculture from a young age has real potential for creating a generation of food citizens who engage with, and advocate for, their food system.

A More Sustainable Future Requires Micro-Interventions at the Local level: Reducing Exposure to Harmful Agrochemicals

Brenda Ortiz Herrera
La Molina National Agricultural University

An increasing world population demands more food but, what kind of food do we eat? Industrial agriculture is responsible for the massive production of crops, generally fully dependent on agrochemicals and with a very serious environmental footprint. Agrochemicals and their waste are dangerous for the environment and human health, for example, when they pollute water and we use it for consumption in our daily activities or for irrigation, when they are dragged by the air they can reach nearby towns or other crops. Risk of direct exposure to agrochemicals is greatest are farmers, farm workers and their families: a recent example took place in the Andean rural region of Ayacucho, Peru, where a massive intoxication with agrochemicals poisoned 103 people and caused 9 deaths (El Comercio, 2018). Investigations showed that agrochemicals and their containers were accidentally mixed with food, a situation not unusual with smallholders in remote rural areas worldwide. Changes at a global level need to start at the local level, assisting farmers and businesses in their transformation to a more sustainable situation. Students of agricultural sciences are participating in various initiatives to improve knowledge transfer in relation to the best use of agrochemicals, minimizing the problems for the environment and human health. I have been participating in an initiative to collect agrochemical containers, training for the correct application, talks with students, farmers and companies about the importance of the proper handling of agrochemicals and their residues. In my first experience a group of students collected more than half a ton of pesticide containers in 3 hours in a village located in the outskirts of the city of Lima. These residues go to temporary collection sites and then are taken to a recycling plant. At the beginning of these initiatives, first they only occurred in Lima but now they are in the departments of higher agricultural production and it is expected that in the future it will reach the whole country. Synthetic pesticides in Peru are more than 95% of all pesticides used, while biological pesticides still account for less than 5%(Cruz, 2017). The use of biological pesticides is increasing but even few people realize how dangerous chemical pesticide residues can be, this is the biggest obstacle. Sustainable food systems based on agroecology, acknowledging the importance of smallholders and family farming in the conservation of biodiversity and rural traditions require a stronger participation of university students like us.

Social Economic Value of Retail Waste

Decio Edward de Azevedo Greenwood
University of Reading

In the developed world, food scarcity is primarily a problem with food management, rather than production. There is food abundance, but in countries like the UK food bank reliance has risen, while simultaneously restaurants and supermarkets dispose of good "expired" food. Some businesses donate this food to food banks, but insufficient clear financial value of waste to society and the environment has meant that good food is wasted in retail. Clear economic systems of rerouting unnecessary waste onto plates is needed.

Retail owners know how much expired food costs them and include this in their prices. However, these prices do not reflect the original environmental cost or how much society and the hungry value this "expired" food. A recent movement of small companies, that collect waste food for delivery to either food banks or "eat cheap" restaurants, positively addresses this. Companies like "Too Good to Go" have created mobile phone apps where customers track what food is being discarded and buy it at discounted prices before it is wasted ("Join our Food Waste Revolution", 2019). Currently, "Too Good to Go" have little student involvement but seek student support and have recently launched a website which promotes action around this issue, including in schools and universities.

Another recent success is "The Real Junk Food Project", which collects good "expired" food from local businesses, then serves it to their guests in a "pay what you want" manner and has already fed over 250,000 people ("The Real Junk Food Project - Let's Really Feed The World", 2019). They rely on donations and volunteers to sustain their business, but are crucial for their communities, providing affordable good food for the poorest. These projects serve students and provide voluntary and paid positions to students.

Companies like these have positively reintegrated "expired" food into the food distribution chain, assisting waste reduction and giving financial value to said food. However, there are insufficient financial incentives for all businesses to reroute expired food to the plates of the hungry. Therefore, more work is needed to nurture actions that accurately reflect the socio-economic and environmental cost of food production and waste, an area where student research and talent investment is key.

Although not working with these projects, I am passionate about this topic, having previously felt conflicted when disposing of good food whilst working in retail. This is a topic I am interested in exploring further in the future.

Join our Food Waste Revolution. (2019). Retrieved from https://toogoodtogo.co.uk/en-gb
The Real Junk Food Project - Let's Really Feed The World.(2019). Retrieved from https://trjfp.com/

Uplifting The Awareness of Sri Lankans about The Possibilities of Using Information and Communication Technology in Sustainable Agriculture and Resource Management to Connect Local and Global Community

E. V. R. T. Vidyasekara
University of Peradeniya

In relation to Sustainable Agriculture and Resource management in Sri Lankan context, the degree of using information and communication technology (ICT) is in a very lower level. It has been identified that, this has become a huge barrier to connect the Local and Global community. Thus, It is a timely need to make the citizens aware, about the possibilities of using ICT in Sustainable Agriculture and Resource Management. To achieve the expected change in the awareness, farmers, school students, teachers and common consumers from selected areas in Sri Lanka were selected to carry the message to the society. All the awareness programs were based on all the operations related to farm to fork food supply chain.

As the first phase, a survey was conducted to gain an understanding about the extent to which ICT is used on Sustainable Agriculture and resource management by giving a questionnaire covering the farm to fork food supply chain. Schools students, teachers and farmers from different age groups were selected from regions where digital literacy is moderate. After the survey a friendly discussion was conducted to make them knowledgeable to use ICT n the above purpose.

The second phase of the project linked with phase 1 since the educational session in second phase was designed based on the results of phase 1. Farmer organizations which ICT is not frequently used in their operations, school students and teachers, as the agents to carry a massage to the society were the targeting groups of second phase.

For the third phase a set of common consumers were selected to conduct a survey to gain an understanding about the extent to which ICT is used by the consumers when they are to plan a healthy meal. Depending on their standpoint fourth phase was conducted as awareness program to use ICT in planning a healthy diet with the support of mobile applications. The sixth phase was oriented to make the connection between consumers and the farmers. Farmers were given the knowledge to supply their products in a way that supporting the consumers to plan a healthy diet.

In summary, it is suggested to use the connection explained in the sixth phase to make a connection between Local and Global community.

Sustainable Livestock in Brazil

Mayara Pardi Ikeda
University of São Paulo

Brazil contains the second largest cattle herd and the second largest beef production in the world (USDA, 2019). And, it is estimated that Brazil will be responsible for around 40% of the world's food production increase until 2050

Approximately 50% of the grasslands used for cattle production in Brazil are in a severe degradation level (Dias, 2014). Those areas have limited capacity to contribute for high yield livestock production nor are able to help for environmental preservation. A major challenge, then, how to produce a valuable food – animal protein – without increasing the use of natural resources, including native areas.

To achieve a sustainable livestock production, it would be desirable to "Feed animals less human food", "Raise regionally appropriate animals", "Keep animals healthy", "Adopt smart supplements", "Eat quality not quantity", "Tailor practices to local culture", "Track costs and benefits" and "Study best practice" (Nature, 2014). It is necessary to develop an intensified production, taking into account local environment and input availability.

Using bioeconomic system, many researchers in Brazil are looking for adapted plants and coproducts, recycled from the industries, that do not compete with human food. By-products from citrus and soy processing industries, manioc leaves, titônia and coffee-hulls are some of alternatives studied.

At my current internship, at the Animal Nutrition Laboratory-LANA, in the Center for Nuclear Energy in Agriculture-CENA, University of São Paulo, I am involved with several researches looking into methods to feeding cattle with sustainable alternatives such as Titônia (a very adaptable plant in Brazil's climate) and soy crust (a residual product from industries). We look to find a balance between the five steps to achieve a sustainable livestock, proposed by Nature, and "Reduce losses, encourage reuse and recycling, and promote sustainable consumption" as proposed by FAO (2018).

Other extension groups at ESALQ follow the same path, such as NutriBov (Bovine Nutrition Group), GPP (Pasture Research Group) and CPZ (Zoo-technical Practice Club). Together, they try to contribute to develop an effective progress in the sustainable livestock chain. The connection between youth members from all these groups, looking into a sustainable agriculture are essential to improve insightful actions and connect global and local communities.

Sales of regional resource by students and constructing sales strategy used evaluation of ingredient (Case of citrus called *YUKO*)

Sora Takahashi

Tokyo University of Agriculture, Department of fermentation science (Jozo)

Kamikatsu town is aging population in Tokushima pref. It's necessary to increase population. We have been to this town on field practices in spring and summer and learned Kamikatu's agriculture (the past 5 times). To advertise agricultural products of Kamikatsu town, We constantly have sold those on market in Tokyo (Ginza), instead of farmers (since 2016,2-6times/month). By such connections, these sales are carried out by NODAI students. From such reason, to achieve sustainable agriculture, it's important to sell products to inform goodness of local ingredients (here, I describe below as regional resource to match the theme of this summit) and that students become to be able to sell regional resource. However, It is needed anything to persuade consumers on sales by students because they don't trust us very much. For the above reason, I think it is important to show goodness of them based on evidence. Then, we constructed sales strategy by extracting sales point from evaluation of ingredient and analysis. In this case, we focused on *YUKO* (One of a citrus, which is around kamikatu town only) Kamikatsu produce the most it in Japan(more than 80%). It isn't sold well and the production number is decreasing because it's not well-known and is cheap unit price. From above reason, I picked up *YUKO* as a representative of regional resource. Now, there are many kind of regionally limited citrus in Japan. This activity is meaningful from a viewpoint of regional activity, too.

We analyzed fruit juice of citrus including YUKO, vinegar and ponzu(the condiment used soy source with citrus) and took evaluation of ingredient from Brix・Acidity・Amino acidiy・Composition of organic acid・Estimated value of taste compared sensory evaluation test to clarify goodness and extract sales point of *YUKO* and *ponzu* used *YUKO* which are Kamikatsu specially products.

As a resolute, we knew that they are low unfavorable and clear taste and don't inhibit other sensitive taste of materials when it uses dishes. When these evaluation introduced sales on our market in Ginza (Tokyo),but it isn't long, it showed tendency of sales amount so much. These are thought for our achievement of making differentiation from other similar items and sales correspond consumer's palatability and improving seller's comprehension.

To conclude, nowadays, the food shortage is ceasing. We, people in developed country, have to think that the agricultural products are luxury goods and know goodness of regional resource. From this, we advertise goodness of *YUKO* as regional resource to increase follower of *Kamikatsu* town. To achieve that, we apply this method to other products(for example, Awa bantya tea) and make sales strategies from different angle. In the process, we ,students, become seller of regional resource and aim "sustainable agriculture" in term of sales of rural regional resource in urban area.

GROUP DISCUSSION E

Students' Actions in the field of

Agriculture

September 19th, Thursday

Morning Session

Classroom 231
(Building 1, 2nd floor)

Agroforestcape: A New Paradigm of Indonesia's Agroforestry Based on Blockchain Technology for Food Sovereignty and Environmental Sustainability

Mahtuf Ikhsan
Bogor Agricultural University

The growing number of Indonesia's population is still facing hunger problem which led to serious challenges of food sovereignty. Food sovereignty is dependent on the availability of productive agricultural land. Nevertheless, Indonesia's agricultural land will decrease significantly by 291,922 ha in 2050 due to land conversion and climate change (BAPPENAS, 2010). Meanwhile, there are more than 35.75 million hectares of ex-concession forest areas in Indonesia, which without proper management will lead to environmental sustainability menace (APHI, 2016). Agroforestry is an alternative solution to overcome the problems of food sovereignty and degradation of agricultural land. However, agroforestry systems that are currently implemented in Indonesia still face various problems related to their ineffective and inefficient supply chains. Therefore, the development of a new paradigm called Agroforestcape (Agroforestry Landscape) for Indonesia's agroforestry based on blockchain technology is essential to address food sovereignty and environmental sustainability targets. This study was conducted by using market gap analysis in comparison between existing agroforestry systems in Indonesia and the role of technology. Agroforestcape can be implemented by using the plant composition of *sengon buto*, teak, *lamtoro*, mangrove, pepper, rice, sago, and cassava through three planting models, namely 2D, 3D, and 4D agroforestry. An agroforestry model of 1 million ha is predicted to increase food production significantly to feed 50 million people and provide additional income through timber commodity. Converting agricultural land to agroforestry intensified carbon absorption three times higher for the 20 years ahead (Sanzech, 2000). Blockchain technology enables various stakeholders to directly exchange agroforestry data among themselves without any assistance from a third party. Blockchain can also guarantee efficiency and accountability of agroforestry institutions. The use of blockchain technology through web and mobile applications will be promoted by forestry extension officers and head of farmers group. Youth will participate as field facilitators for the implementation of Agroforestcape program. They will guide the farmers through Agroforestcape workshop and create a survey tool for community mapping on agroforestry enterprises together with Institute for Research and Community Services of Bogor Agricultural University. The implementation of Agroforestcape has several obstacles such as financial requirements and feasible digital ecosystem for local community. Hence Agroforestcape will be integrated with government projects, such as One Map Policy, Social Forestry, and Smart Village to ensure program sustainability. Agroforestcape based on blockchain technology is expected to encourage the growth of agroforestry system in Indonesia towards food sovereignty and environmental sustainability targets in the future.

Promotion and Making an International Platform for Agro-Tourism Focused on Sustainable Agriculture

Jayantha J. B. S. K
University of Peradeniya

Sri Lanka is recognized as an agricultural country even though its contribution to the GDP is around 6.9% in 2018 (Ministry of Agriculture, 2018) as 27% of the population represents agriculture sector (Department of Census and Statistics, 2017). However, up to date, world's agriculture sector including in Sri Lanka faces many problems such as reduction of crop and livestock production due to several factors including climate change. With the reduced profits from farming and with the availability of diverse biodiversity in different farming systems worldwide including in Sri Lanka, my intention is to promote agricultural tourism which is focused on sustainable agriculture (SUSAG tourism). A survey conducted at the beginning using a questionnaire, evident fully revealed that most of the communities lack direct access to find out specific farming systems which are focused on environmental friendly agriculture. In order to implement this idea, as an initiation, online platforms will be developed in Facebook. As promotions through Facebook linking local and international farming communities proceed, a website will be developed to facilitate this further. Thus, connections will build up among local and international experts, farmers, and students via knowledge sharing, technology transfer, and site visits. This enables global communities to share the indigenous knowledge, exposure and constructive thoughts on products and practices. As this concept promotes sustainable agriculture, as a long term point of view, youth also will engage in sustainable agriculture focusing tourism as it will be an ideal income source for them with technological advances. Recently, youth involvement in tourism industry has increased in Sri Lanka. Youth as the torchbearers of the future generation, they aspire to do a change with more energy and attitudes. Since, they already have developed an interest in contributing to tourism, they can link the farmers with online platforms, aware the farming communities and further they will be guiding the rural farmers to develop their farms to match the tourism requirements. In addition, youth with innovative ideas could implement their own novel concepts along with SUSAG tourism. As this progress, we expect to address the issues such as attracting tourists during off seasons and proper planning of available sites to be available throughout the year as most of agro lands are seasonally cultivated. Considering the novelty of this concept and the possibility to contribute for many sustainable development goals (decent work and economic growth, partnerships for the goals, climate action, zero hunger and no poverty) with the involvement of youth, this could lead to a sustainable future.

Solidarity Agriculture
An Approach for Students and Interested People to Uplift Their Awareness for Sustainable Food Production

Philip Werkmann
University of Applied Sciences Weihenstephan-Triesdorf

At the end of this century up to 85% of the world population will live in cities. Already 50% of the world population is living in growing metropolitan areas currently ("The Metropolitan Century," 2015). This urbanization has a big impact on agricultural production and the relationship between consumers on the one hand and producers on the other. Consumers from big cities loose more and more contact to the farmers and their work. In general, knowledge about food production and processing decreases. A growing misunderstanding between the two sides is to be noted. Especially, younger people who have spent their whole childhood in a big city never had the chance to get into agricultural production or had the responsibility for their own food production.

One possibility to get the city population back into contact with the agricultural production and the origin of their groceries again is solidarity agriculture. A method which is attractive to young people and students. The concept of solidarity agriculture is on the one hand based on a group of consumers and on the other based on a cooperative farmer or agricultural producer. The groceries will not be sold on a classic market or processing industry but run through an own organised circle of "producing-selling-consumption".

In this concept, participating consumers have a contract with a farmer. They pay an annually determined fee to the producer of which he can cover his costs and gains his profit. Mostly, this fee is paid on a monthly basis. Frequently the consumers have the chance to participate in simple labour issues, such as weeding or harvesting by hand. In return, the consumers get the agreed amount of the harvest or, if the producer is processing food, the processed products.

In summary, solidarity agriculture shows a high potential to close the growing gap – regarding to urbanization – between producers and consumers. In Germany a rising number of consumers and producers in or close to urban areas take the opportunity to get benefits of solidarity agriculture. Meanwhile, there are different varieties of this concept to find. I myself worked on a farm at the suburban of Darmstadt who leases a part of their farmland to students and other interested people on a yearly basis. To begin with, the farmer plants vegetables and afterwards the students and others have the responsibility for cultivation and harvesting. Also, at the university where I study farmers in the neighbourhood sell vegetable boxes to students. We can buy them weekly for a fixed price and get what is seasonally produced on the field.

This various types of "Solidarity Agriculture" could be a great chance for students and interested people from urban and rural areas to combine knowledge transfer, social cooperation and to get themselves back into agricultural production and processing.

Application of Black Soldier Fly (*Hermetia Illucens*) in Sustainable Agriculture

Huai-Shiuan, Huang
National Chung Hsing University

Food production and agriculture production produce large amount of wasted material such as rice hulls, cull fruits and vegetables. Management of plant waste material produced in agricultural production system during pre-harvest and post-harvest are increasing concerns which have been addressed world-wide. Black soldier fly (*Hermetia illucens*) is an insect which has high efficiency in bioconversion by digesting and degrading almost any kind of waste. For example, manure, food waste, and agricultural by-products can be digested in a very short period of time (Manurung, 2016). Moreover, it has been reported that black soldier fly (BSF) can accelerate the speed of degradation, eliminate the smell of waste and reduce the *E-coli* in manure (Erickson, 2009). It was discovered that from 10 tons of food-waste, 300 kg of dried larvae and 3,346 kg of compost are produced (Salomone, 2017). Furthermore, prepupae are rich in protein, and many studies have shown that it can be an alternative source of protein for livestock animals and perform as a good supplement (Bondari, 1987) (Sealey, W. M., 2011). BSF could be a rising star of a circular economy that creates a zero-waste food production cycle. In Taiwan, the use of larvae as composting agent and prepupae as animal feed were adapted among a small group of environmental conscious producers. I explored the use of BSF compost as a vegetable fertilizer as an option to increase the use of BSF in zero-wastes food production cycle. In my study, larger leaf area was recorded in BSF compost treatment with the ratio of nitrogen content was not affected. BSF digested material provided a good source of organic matter as a fertilizer and may effectively improve soil conditions, such as soil acidification. The biggest global challenge of adapting BSF as a composting agent, animale feed or use as fertilizer is to comply with current food safety and other regulations of using black soldier fly. More scientific research and public awareness is needed to provide the practicality and safety data to the public of the black soldier fly in order to establish related regulations.

Engaging Youth in Agriculture: Key to the Future of Food Safety

Nur Ieffah Muhammad Khalil
Universiti Putra Malaysia

Agriculture sector is always given special treatment and for that reason, it is one of the largest contributor to Malaysia Gross Domestic Product (GDP). Nevertheless, the agriculture contribution was basically coming from commodity crop such as oil palm meanwhile the contribution of cash crops such as vegetables, fruits, paddy and livestock are small. In spite of that, these cash crops and livestock are very important because they supply food to the people. The concerned about food safety has been discussed for years mainly in the incidence of food poisoning and the amount of chemical residual especially in vegetables were above the permissible level. In the same token, the processed food also giving a threat to food safety in the sense that most of the processed food using chemical and additive to add the time utility to the products. Along these lines, engaging youth especially those who have agriculture background is important because these youths have been exposed to the importance of sustainable agriculture practices and the importance of conserving bio-diversity and environment in their respective classes and practical trainings. These youths were also being exposed to the importance of organic farming, Malaysia Good Agricultural Practices (MyGAP) and also sustainable procedures for crops likes paddy, oil palm and others cash crops and commodity crops. In addition to these, involvement from government sector such as Ministry of Primary Industry and non-government sectors are very encouraging. In doing so, UPM students were introduced to the modern and high tech agriculture that are sustainable and environmentally friendly. This will encourage more youth to engage in agriculture which is seen as hard work, toiling the land and working under the scorching sun. This will ensure the food that being produced are safe and free form the excessive use of chemical and others unwanted chemicals.

Nodai Presents a New Agricultural Project

Itsuki Takata
Tokyo University of Agriculture

This ISS theme has 2 tasks: sustainable agriculture, and resource managements to connect between global and local communities. Each task is serious topic in the world.
I introduce Nodai project (APC: Agricultural Public Corporation) through this ISS, because APC has much possibility to solve those 2 tasks. As a premise, APC has not started completely yet. But it must be going to start in 2020. Besides it is carried out in Kitashiobara village, Fukushiama pref. Nodai cooperates with the village from 2013, then students visit and act some events there twice a year.

Above all, there are 2 purposes of APC. ① Establish agricultural company and promote to accomplish sixth-order industrialization. ② Increase various populations through integrated agriculture and tourism. APC works as an agricultural company and carries out various programs.

Then, there are 10 programs to achieve them. These 10 programs are distinguished benefit from non-benefit. Benefit programs are made use of managing APC and returning funds to local farmers. Non-benefit programs are made use of attracting tourists and developing Kitashiobara village.

The main program concerned with sixth-order industrialization is processing and selling products, for example processing corn products and polishing rice. The main programs concerned with increase various populations are agricultural tour and experiencing agriculture, for example, green tourism, opening café or restaurant, selling products at tourist sites, accepting educational trip, and so on.

Now, 1 activity is carried out. It is feeding emu in abandoned farms. This activity is based on 2 programs, agricultural demonstration, and restoring abandoned farms. Emu is secondly the biggest bird and their oil are applied to cosmetics. This activity started 2 years ago, then about 20 babies were born this year. In the future, the number of emus will increase more than 400, and making products applied to their oil, meat, and eggs.

We cannot decide whether APC will succeed or not right now. But I hope and expect APC has opportunities to solve those 2 tasks.

GROUP DISCUSSION F

Students' Actions in the field of

Education

September 19th, Thursday

Morning Session

Classroom 242
(Building 1, 2nd floor)

The Study on Recognition on Social Farming in Korea

Yubin Han
Kyungpook National University

As there are increasing interests in environments, agriculture also focus how to manage their resource. And there are variety of agriculture types to protect environments with solving some social problems. Social farming is one kind of these agriculture types. It is producing variety of social services based on multifunctionality agriculture to the vulnerable in society. It contains not only social rehabilitation, curing from cultivation, and offering a job for social vulnurable class, but also nature education, reducing their stress, food safety for common people. Also, through social farming, government can save their policy cost - cause social farming makes unifying social class- and they regard nature is the most important thing, so it makes it possible for them to achieve sustainable agriculture. And now, social farming exists care farming, green care, and farming for health, also their concepts are used mixed.

Nowadays, Korea has lots of problems like unifying social class between multicultural people and Korean, increasing interests on their own health, and finding the ways to solve problems of the aged - especially in country. Social farming cause additional earnings to farmers who is suffered from instability rural household incomes, and lots of advantages based on multifunctionality of agriculture to user. Therefore, this study addresses the recognition on social farming and find out the concept which is people knowing about social farming ,thier program preferances, and their willing to pay on participating in program. In this step, I selected social farming programs refer to leading overseas cases-especially Europe's one. However, commonly social farming is a huge concept, so this study only focuse the cure farming which is the most popular type of social farming in Korea. As a survey method, I conducted a questionnaire survey with people living in Daegu and Gyeongsangbuk-do. Based on the results, I could figure out how activate social farming in Korea related on results which were derived from the questionnaire survey analysis, and which common factors they contains to increase people's participation in social agriculture in Korea.

Empowering Youth Through Community Gardening Education

Cameron Jenkins
Michigan State University

Community after community, our world faces childhood hunger, food insecurity, and widespread obesity. Over 821 million people around the globe endure food deprivation, with 112 million in the United States alone. These issues can be more pronounced in underserved areas as it is in some parts of the greater MSU community. Involving youth in community gardening education, such as the Junior Master Gardener Program (JMG), can help resolve these issues. Community gardening can be defined as a shared piece of land gardened by a group of people on private or public land. These gardens can be found in residences as well as institutions.

Through MSU Extension, I worked as an interdisciplinary Food, Health, and Nutrition Education Support Intern. One of my primary projects was leading and implementing the JMG program at two underrepresented areas surrounding MSU. Approximately 20 elementary aged youth enjoyed the benefits of cultivating nourishment from their communities' own soil. Additionally, this program educated the children regarding the origin of fresh produce, how food aids their bodies, and how to build community through shared gardens all the while combating food insecurity.

JMG is a hands-on gardening experience that involves cultivating the land, educating about nutrition, and developing a respect for the environment. Besides the learning experience of growing fresh produce, other life skills are obtained—leadership, cooperation, commitment, and empowerment.

In my internship, I expanded the JMG criteria and added elements creating a personalized version of the program. A typical session lasted two hours in the garden where the students began with gardening activities of planting, watering, and weeding while learning basic plant biology and environmental aspects. Next, an activity focusing on nutrition education, cooking, or physical activity took place. Throughout 12 weeks, the participants also worked on community service projects such as donating their produce and creating flyers about nutrition.

Educating the youth using community gardens, especially those in underserved areas where access to healthy food is challenging, creates sustainable change in global issues of food insecurity, environmental problems, and obesity risk. This program's research illumines that the empowerment of youth through nutrition leads to higher test scores in school and greater overall respect for themselves.

Creating community gardens improves access to fresh foods, which creates increased food security, improved dietary habits, and lower risk of health related diseases. Out of the seventeen sustainable development goals, this program falls into the goals of Zero Hunger, Good Health and Well Being, and Responsible Consumption and Production. Incorporating children in a gardening education empowers them to make healthy decisions about their lives and creates awareness for the environment in their community.

Youth Transforming Thoughts into Practice to Make the Brazilian Sugar-Energy Sector Even Greener

João Vitor Napolitano Viotto
University of São Paulo

Rapid human population and income growths result in higher demand for food, water, energy and other products. Agriculture is a key source of many of these resources and it has received pressure to increase production, particularly in Brazil. Unfortunately, in many situation, higher productions cause environmental problems such as the production of wastes that result in water and soil pollution.

Sugarcane, an important source of food (sugar) and bioenergy (ethanol and electricity) is a good example of this duality. Brazil is the world's top sugarcane producer, with an estimated $29x10^6$ t of sugar and $33x10^9$ liters of ethanol produced in 2018/2019 (CONAB, 2019), boosted by a government's program called RenovaBio. However, the production of ethanol from sugar cane generates a large quantity of a corrosive, liquid byproduct called vinasse. This byproduct is expected once only the sugar, which represents less than 20% of sugar cane juice composition, can be turned into alcohol by the yeast. All other suspended solids, organic compounds and moisture become this concentrated residue.

The proportion vinasse to ethanol production is 14:1, which results in more than 450 billion liters of vinasse *per* year. If improperly managed, it has the potential to become a huge pollution problem. Historically, vinasse has been thrown back at sugarcane fields for fertirrigation, which is the cheapest way to dispose of it, causing soil exhaustion and salinization. It started to become an important issue after strong incentives from the Brazilian government increased exponentially the national ethanol production during the Oil Crisis in the '70s. Since then, several alternative solutions have been studied.

Our college has been active on tackling the vinasse issue. A search on our Graduate thesis database revealed over 30 entries related to this problem in the last decade alone. This is an indication of the youth engaged on sustainability, with positive outcomes. Some of the solutions proposed are the use of vinasse as raw material for Biogas production, generating energy from waste and concentrated fermentation technique, which lowers the amount of vinasse produced per liter of ethanol.

I currently participate on the studies for concentration of vinasse solids, which separates salts and organic matter of known concentrations with potential use as. It would also increase the pumpability of the liquid, allowing mills to fertirrigate larger areas, reducing its negative impact of salinization and water-soil pollution. Although not ideal, this alternative is an important improvement and it was a major contribution from ESALQ's research.

These research shows that such activities at universities can help improve sustainability and resource management in the agricultural chain. It also engages youth into building a system that ensures production of resources demanded by the population, minimizes the environmental impact and, therefore, improves local conditions – mitigating impacts of pollutants – and generates global benefits by making these resources available worldwide.

The Youth Will Not Let the World Die: A Consolidated Effort to Sustainability

Jhean Laila Sinfuego
University of the Philippines Los Baños

Youth involvement is an important weapon in our journey to sustainability. In the Philippines, the youth help through simple ways like sharing news articles, and experiences on social media and makes global efforts easier to mobilize. The University of the Philippines Los Baños (UPLB) engage in academic partnerships to further students' knowledge on global strategies in attaining sustainable agriculture and incorporating it into the country's local conditions. Moreover, students of UPLB are required to conduct their own research and strive to make impact with it. Agricultural bio-technology students work on the improvement of crop varieties to adapt with climate changes. Likewise, agricultural economics students research on the efficiency, productivity and marketing of agricultural products to help increase income and lessen the costs of Filipino farmers. These students also organize seminars that give light on the different agricultural issues, as well as spread knowledge on ways the students can help or invest in agriculture through speakers working in the agriculture sector.

Student organizations like AIESEC engage in different projects targeting the United Nation's Sustainable Development Goals. They help develop a community through their members, partners and exchange participants. They also raise awareness on agribusinesses like Sierreza, a community of indigenous farmers, that make demand for the farmers' produce and keep them from doing illegal and dangerous livelihoods to earn fast cash. Another is the UP Genetic Researchers and Agricultural Innovators Society. They host bootcamp in high school campuses to raise interest in youth to agriculture. Through this activity, the number of freshmen students who signed up for agriculture-related degrees seemed to increase. Additionally, they conduct community visits to have deeper understanding of what the farmers need and deliver it.

Agencies like the Food and Agriculture Organization partners with student organizations such as the Young Entrepreneurs Society to organize projects in local communities encouraging youth involvement in sustainable development. Under this project, youth groups cultivate vegetables and herbs in their backyards and schoolyards using recyclable materials including plastic bottles, worn out jeans, shoes, and tyres. Schools like the Paciano Rizal Elementary School and Kapayapaan Integrated School organizes feeding program and adapts this program into their curriculum. Programs like these make the youth realize the effects of their local actions into the global community and result into a more responsible youth. As our national hero once said, "the youth is the future of our motherland" and they will not let the world die.

The Study on Recognition on Social Farming in Korea

SeRi Joo
Kyungpook National University

As there are increasing interests in environments, agriculture also focus how to manage their resource. And there are variety of agriculture types to protect environments with solving some social problems. Nowadays, Korea has lots of problems like unifying social class between multicultural people and Korean, increasing interests on their own health, and finding the ways to solve problems of the aged. And also, there are lots of cases about social farming in global community solved these of problems. Thus, this study considered Korea's current state of social farming, and how could it work efficiently based on leading overseas' case. Social farming is producing variety of social services based on multifunctionality of agriculture to the vulnerable in society. This occur many parts of country not only farming village. And they have variety of purpose, like curing the people, labor integration, community development, and training farmers. Because of this, social farming exists in many forms, and it is difficult defining clearly what is social farming. However, social farming cause changing in the perception of agriculture, additional earnings to farmers who is suffered from instability rural household incomes, and lots of advantages based on multifunctionality of agriculture to user. Therefore, this study addresses the recognition on social farming and if there are little recognition, I will find the solution to increase their recognition. And if there are high recognition, I will study the way to make more effective social farming based on leading overseas' case.

First, to enhance understanding of oral presentation, I show some pictures of social farming. In Europe, they have lots of leading social farming studies, so especially I show the their cases. Using images and charts which explain social farming's positive effect, I could help student to understand. Second, I represent our questionnaire that how many people know social farming concept and their willing to pay on participating in program. And then, I summarize survey results using the charts and diagrams for helping people's understanding easily.

Starting the Conversation: How Engaged Students are Shaping College Campuses Through Sustainable Thought

Gabrielle Gamily
Michigan State University

In the face of a global catastrophe, lack of education, hands-on experience, and encouragement take the form of environmental apathy within college campuses. At many universities like Michigan State University(MSU), it's easy for students to ignore the individual and collective environmental impacts students enact upon a changing ecosystem. Like many schools, MSU struggles with common issues like food waste, with around 1,129 pounds of food wasted every day within MSU's culinary and dining services (MSU Residential and Hospitality Services, 2018). Other issues include recycling, with recyclables making up 37% of MSU trash collection (MSU Recycling Center, 2018). These issues are often a result of lack of youth education programs on topics related to resource management and sustainable agriculture.

The Residential Initiative on the Study of the Environment program, or RISE, is aiming to reinvent how sustainability is implemented on college campuses by engaging students in workshops, resources, and hands-on experiences in order to transform their college experience for themselves and their peers. Students within RISE join co-curricular teams in which students are given unique and valuable experiences in community engagement through student government, organic farming, composting and vermicomposting, health and wellness, and many more. The RISE program allows students to gain skills such as creating meaningful dialogues around the impact of agriculture on a local and global scale. RISE students encourage sustainable actions on campus by pursuing majors and minors within the Department of Community Sustainability, bringing sustainable practices to different fields, or joining clubs and groups on campus that encourage sustainable activism. RISE gives students the ability to become leaders in sustainability who help influence youth to become aware of resource management within local and global communities.

RISE is beneficial to the students within the MSU campus because of the knowledge gained, which is then transferred through learning programs for the youth. When students come to campus, they are exposed to many sustainable initiatives like the RISE pollinator garden, greenhouses, clean plate initiative meals, and recycling initiatives. Youth workshop training programs focusing on sustainability and improved environmental resource management are ways that MSU is helping to transform youth worldviews. If these types of educational programs were implemented into middle schools and high schools across the globe, young students would learn how to become engaged in their own community. These living-learning programs transform youth worldviews by exposing them to best practices within local and global sustainable communities.

Conservation & Rescue of Ethnobotanical Knowledge and Importance of Medicinal Plants Used in Indigenous Communities in Papantla, Veracruz, Mexico

Lara-Reimers, David.

Chapingo Autonomus University

Traditional medicine is considered as the first health care system resource to treat ailments in several countries (Fidelis et al., 2018; Mezrag et al., 2017) and about 80% of people in the world depend on traditional medicine according to the World Health Organization (WHO) (Yabesh et al. 2014).

Traditional medicine studies include ethnomedicine, the most used practices by people that live in rural areas and indigenous communities and it is easily affected by factors such as economic activity, socio-economic level, migration, access to new health care systems, new herbal products, etcetera (Pérez-Nicolás et al., 2017). The diversity of medicinal plants is very high in a country such as Mexico, in which more than 50 indigenous languages are spoken and which is very well known for its biological diversity.

At the national level, the most of the Mexican indigenous populations live in rural areas (61.1% in communities with less than 2,500 inhabitants) (Coneval, 2012). The country contains a wide variety of higher plants(30,000)which are not explored in their totality and a high number are endemic species (Bye et al., 1995).

In fact in Mexico the traditional medicine is the first alternative to treat ailments because many drugs are expensive or not always available locally (Hernández et al. 2003).

Veracruz is one of the richest states with regard to biological and cultural diversity.(Rzedowski, 1981). The medicinal flora of Veracruz was used as remedy to treat several diseases, including digestive system, skin, reproductive system, or religious-cultural practices (Gheno-Heredia et al., 2011). In the study area as in other regions, the recording of traditional knowledge is not widely promoted. Moreover, the preservation of knowledge is still carried out in oral form from generation to generation (Cussy-Poma et al., 2017).

77 out of 212 municipalities in the state have moderate poverty (Rivera and Ramírez (2014). It is therefore important to consider ethnobotany as an alternative and sustainable way of treating certain diseases.

The study area, geographically known as Totonacapan, is located in the northern part of Veracruz. This region represents about 5.97% of the total area of the state of Veracruz. To the study it collected information on the use of medicinal plants in 16 communities in Papantla, Veracruz.

The municipal territory is mainly devoted to agriculture(68%). Totonacapan has a population of 622 846 inhabitants. 32.5% of Totonac population works in the primary sector and around 66,000 people in Papantla have indigenous roots.

The study aims to identify the current medicinal plants used, register the traditional knowledge, and analyze how this knowledge impacts in the totonacas communities.

In this study, a number of 85 informants have recognized a total of 101 medicinal plants belonging to 51 families. Asteraceae was the family with the highest number of plant species that the informants knew. Plant parts were used to treat several ailments as poisonous bites, cancer, gastro-intestinal disorders, infective diseases and other disorders. Informants reported that the most common plant part used was leaf tissue (55%); and decoction (38%) and infusion (29%) were the forms used to prepare natural remedies. In Veracruz area, local populations take the herbal remedies orally (72%).

The most represented family were Asteraceae and Rutaceae with both having 8 species, followed by Fabaceae (6 species), Myrtaceae, Malvaceae and Apocynaceae (4 species), and Euphorbiaceae, Lamiaceae, Meliaceae and Poaceae with 3 species.

GROUP DISCUSSION G

Students' Actions in the field of

Environment

September 19th, Thursday

Afternoon Session

Classroom 231
(Building 1, 2nd floor)

Effects of Ecosystems Services on Crop Farming and on Land Fisheries

Barend Kok
Wageningen University

In my research I linked ecosystem services (ESS) in the Netherlands to both crop farming and on land fisheries. ESS summarize the benefits society receives from certain parts of nature or environment (World Resources Institute, 2005). The Millennium Ecosystem Assessment (World Resources Institute, 2005) identifies four types of ecosystem service: **1. Provisioning services**: Timber, fuel, fresh water and others **2. Regulating services**: Climate- and flood regulation **3. Supporting services**: Nutrient cycle and soil formation **4. Cultural services**: Aesthetic and spiritual values. The provisioning of ESS services by nature thus plays a holistic role in the world's society.

ESS in Potato Crop Production and Fish Production

Farmers and fishermen are barely aware that ESS can have a(n) (in)direct effect on their production(Smith & Sullivan, 2014). What I tried to accomplish in my research is linking ESS to these two types of businesses in order to evaluate the role of the ESS in their operations. Water is needed to cultivate potatoes, so clean water availability can be considered an input in potato crop production. A fertile soil is needed for potatoes to grown sufficiently, so soil fertility is also considered an input in the potato sector (Ridgway, 2018). For the production of fish, both habitat for species (fish need a clean and livable place in the wild to sufficiently grow and reproduce) and disease regulation (ill fish cannot reproduce and cannot be eaten) are inputs in the fishery sector (Todd et al., 2010).

Substitutability Possibilities of ESS

After assessing which ESS could possibly have an effect on production, I assessed what could be expected to happen with ESS in the future. All four ESS can be expected to decrease in the coming 50 years, where disease regulation and water availability are probably going to decrease.

After this, I assessed the severity of the decrease of ESS for businesses. Water availability and disease regulation are rather important for potato farmers or on land fisheries, the other ESS are also important but to a smaller extend. This high reliability and decrease in ESS could be a great burden and thus the degree to which an ESS can be substituted by other inputs had to be assessed. I found that all four ESS were either hard or very costly to substitute. An important and declining ESS that is hard or costly to substitute will probably be a great burden on the profit and future viability of a business.

Conclusion

This obtained fact could be used in policy making. A business that(indirectly)advantages from an ESS could also be held more responsible for preserving or conserving the ESS. For example, a crop farmer could be designated to be more responsible for preserving clean water availability (either monetary or in terms of preserving practices).

This research provides a simple but clear framework to assess more sectors. Therefore, it is important that these finding are presented here, to inspire others to assess other sectors in order to completely map the current situation. A more complete picture of existing ESS and their effects would help to create appropriate policies regarding the environment, ecosystems and its services.

Learning and Activities in University Lead to Sustainable Agriculture and Resource Management

Lalita SONGKUN

Kasetsart University Kamphaeng Saen Campus

This study would introduce and encourage the new generation to learn and understand how to work on sustainable agriculture and resources management with the philosophy of sufficiency economy. The philosophy has been initiated by His Majesty King Bhumibol Adulyadej, and proposed to people of Thailand. At Kasetsart University, there is the philosophy of sufficiency economy course, which its philosophy is consisted of moderation, prudence, and social immunity. The students learned and applied the knowledge from the course to their agricultural activities. They had a chance to visit the communities that have successfully applied the philosophy of sufficiency economy. One of the case studies was at Ban Plak Mai Lai community that people there were considering the philosophy of sufficiency economy to solve their problems such as debt, soil deterioration, high exploitation of resources with less return, etc. After learning about the philosophy of sufficiency economy, members of the community changed their mindset on all activities they have, they should consider costs, returns, consumer demand, and productivity. Finally, the community has succeeded to solve most problems. The community was established as an organic agriculture learning center by using recycle and up-cycle of agricultural products in the community to promote sustainable agriculture and resource management. At present, the learning center work on integrated farming with an emphasis on organic agriculture. They plant 9 types of plants in the same plot. They do rotation cropping that the produces could harvest throughout the year. They grow pest-repelling plants next to other kinds of vegetables and also use herbs and bio extract to reduce the usage of pesticides. Students applied the knowledge they have learned both inside and outside of the classroom on their activities of growing vegetables to earn income. They use compost and manure from animal farms on campus to reduce the usage of chemical fertilizers, and pesticides for the safety of producers and consumers. In addition, students also realized that recycle and up-cycle or using resources efficiently can reduce production costs and earn more income. This activity encourages the students to learn about farming that decreases the bad impact on the environment. In conclusion, these activities will continue to encourage awareness of sustainable agriculture and resource management to students every year. The philosophy of sufficiency economy could make the new generation aware of sustainable agriculture and resource management. Moreover, the students can apply this philosophy to develop their community and country in the future.

Students in the Field of Dry Land Salinity in Western Australia

Zed Briginshaw
University of Western Australia

Soil salinity is the gradual rise of water table bringing salt to the surface and currently affects 4.5 million hectares of highly productive low lying farm land in Western Australia (Department of Primary Industries and Regional Development, 2018). This occurred when in Western Australia in response to the clearing of native plants and the subsequent rise in ground water containing salts formerly stored lower in the soil profile (Bennett & Macpherson, 2003). When left unchecked dry land salinity causes crystallised salt to come to the surface, making the soil unfertile and unable to grow traditional crops or native plants (Taylor & Hoxley, 2003).

From working in the wheat belt town of Harrismith in regional Western Australia I have observed the effects of dry land salinity on crop production, as well as assessed the effectiveness of remediation practises used to combat the rising water table. Farmers in the region have portions of their property that are either no longer suitable for broad acre or areas where yield is being negatively affected by salinity. Individual farmers and institutions in Western Australia have been working to develop technologies to mitigate the effects of soil salinity, including digging deep drains and planting species with deep root systems to protect against the rising water table (Taylor & Hoxley, 2003). These two processes have individual issues, and both suffer from growers not seeing immediate return on investment and having high opportunity costs (Clarke, 2019).

Students at The University of Western Australia have expressed an interest in being better equipped to advise growers on how to manage saline soils. Furthermore, "students don't learn enough about the limitations surrounding cropping" (J. Howard, local farmer from South Stirling). I will present findings from a student survey investigating how undergraduate students' best engage with the topic, and how growers feel regarding the connection between University course content and current salinity issues. Developing innovative solution to addressing soil salinity will be strengthened by establishing the views of both students and growers. Furthermore, findings will be of value to other students based in countries, such as Sub Sahara Africa and the Middle East (Qureshi, 2015), that face similar environmental challenges.

Forestry and Capercaille Management in Scottish Stronghold Areas

Kyle Sharpe
University of the Highland and Islands

Within certain areas the Cairngorms National Park, there is continuing management of the endangered Capercaillie (*Tetrao urogallus*) and existing native and commercial forestry plantation. There are a variety of factors which may result in decreasing numbers of the species, currently 1,100 remaining. Factors include; deer fencing, predators, disturbance from recreational use and a decrease in food sources and habitat. The continuing demand for timber supplies and the need for preservation present conflicting land uses (RSPB, 2019; Cairngorms National Park, 2019).

Several action plans have been implemented in previous decades, with no positive effects on increasing Capercaillie numbers. One theory, which is particularly important for commercial forestry, is that due to the creation of commercial forestry blocks, the overall light levels on the forest floor decrease. This, in turn, reduces natural light, which allows species such as Blaeberry and other shrubs to thrive, providing food and habitat. In addition, the birds are often fatally injured when colliding with deer fencing, as a result of this, the number of fences, introduced along with commercial forestry in the 1970s with a resulting decline in Capercaillie numbers, has now been reduced dramatically within the Cairngorms National Park (BBC, 2019; Game and Wildlife Conservation Trust, 2019; SNH, 2019).

Without current intervention, Capercaille would likely have become extinct. The social effects would be the decrease in tourist numbers in the area, due to the loss of a focal species. This would reduce income and cultural aspects of the local area, resulting in decreasing quality of life. The environmental benefits proposed by existing management plans are largely positive, by reducing intensive forestry with open woodlands, this would prove beneficial for Capercaillie and overall biodiversity. (Game and Wildlife Conservation Trust, 2019)

Several organisations are actively involved with conservation of Capercaille such as; Integrated Land Use Conference(ILUC), RSPB, Cairngorms National Park and Scottish Natural Heritage. The ILUC is an annual UHI student conference, which promotes breaking down barriers within the land management sectors, in order to promote integration. The conference actively encourages students to design plans and initiatives which can help to improve integration of land uses and promote sustainability. At the end of the conference students including the author leave with their group participation designed initiatives/objectives, which can then be presented to employers and industry leaders, in order to promote greater management stability and integration, this ensures continuing participation. (University of the Highlands and Islands, 2019)

Characterization of the Urbanization Process of the Amazon, Dispersion and Urban Fragmentation

Leonardo de Almeida Oliveira
Federal Rural University of the Amazon

In Brazil, the Amazon has the largest area of continuous and preserved tropical forests in the world. Recent data indicate that deforestation rates are reaching levels that exceed 15%. These values warn of frequent changes in land use and land cover leading to serious environmental problems, such as the conservation of the region's biodiversity, changes in the carbon and hydrological cycle, and directly affecting local and global climate change. Issues such as these are objects of study of the scientific community, drawing attention to preservation organizations and international opinion. In addition to the environmental issue, we have observed in recent decades that the region has experienced the highest rates of urban growth in Brazil. The diversification of economic activities and resulting population changes have restructured and reorganized the network of human settlements in the region. The perception of the Amazon in the early 21st century presents patterns and spatial arrangements of a different Amazon: in the middle of the tropical forest a complex urban fabric was structured, leading to the creation and use of the term "urbanized forest" by the researchers who study and follow the occupation of the region (Becker, 1995). However, the urban population growth was not accompanied by the implementation of infrastructure to guarantee minimum conditions of quality of life. Living conditions in cities and urban settlements are one of the biggest and worst environmental problems in the Amazon. The urbanization of the region is undergoing a structuring phase, characterizing itself as a "frontier" region, where the dynamics of cities are still very intense and stable, including the emergence of new urban settlements.

Human and capital migration from the rest of the country, with or without official support, has put pressure on indigenous peoples and traditional communities, who increasingly aspire to the benefits of development that can meet their needs without undermining their traditions. Therefore, it is important to study the socio-environmental and economic aspects related to urbanization and urban expansion, particularly the emergence of precarious settlements, new occupation areas and territorial discontinuities. In this way, through frequent participation in the localities, doing a work of awareness and clarification in the areas involved in the process, we verified the importance of involving in the context young people, mainly children of members of these occupied areas, promoting information and discussions that can be used to characterize and try to solve the process of urban expansion of the Amazon.

Sinergy (Smart Grid Renewable Energy System) Development of Intelligent Renewable Energy Power Network to Improve the Electrification Ratios of Bucolic and Outer Island Indonesia

Habibul Fuadi Hanif
Bogor Agricultural University

The population in Indonesia is in the fourth largest in the world. In 2010, population data in Indonesia according to the Central Statistics Agency (BPS) reached 237.5 million. This large number has consequences for the magnitude of energy needs, one of which is energy of electricity (Ministry of Energy and Mineral Resources, 2015). Moreover, with the condition of conventional electricity networks that are not optimal, have low efficiency, and have a lot of power shortages (losses) during distribution. This has an impact on Indonesia's electrification ratio that has not been evenly distributed, such as rural and Outer Islands. In 2018, the average of Indonesia electrification ratio is 97.78%. However, there are still some regions that have below-average electrification ratios, namely East Nusa Tenggara (59.85%) and Papua (61.42%) which are dominated by the outermost rural areas. This is caused by the region and topographic conditions that make it difficult for the electricity distribution process. Meanwhile, the rural and outer regions of Indonesia have renewable energy potential that can be developed according to user / customer needs. SINERGY present by uses renewable energy in its operations that integrated with smart grid , where is able to integrate the actions or activities of all users from the generator to the consumers to be more efficient, sustainable, economical and safe(Weedal, 2010). We can control use of electrical energy through information obtained in real time and also able to conduct electricity sales transactions to the government to create an energy-independent society. Smart grid has the ability to detect, anticipate, and respond to problems that occur on the network system through interaction of censor-base control in real time. Therefore, if there is a distribution disruption in an area, the base control will quickly back up conditions with allocate electricity sources from closest power supply by reroute system. In its implementation, SINERGY requires considerable operational costs to make a renewable energy power plant as the main source of energy for the community. This also requires challenges in terms of regional topography that is not easy. However, SINERGY teaches us as a young generation to be able to contribute to an equal distribution of energy in society by educating the importance of preserving the environment as alternative energy for the future. So, this program is able to create a society that is independent of energy and love in maintaining the environmental sustainability.

MATERIALS

TOKYO DECLARATION

International Students Summit on Food, Agriculture and Environment
Date: November 19 - 20, 2001
Venue: Tokyo University of Agriculture, Tokyo, Japan

In commemoration of 110th Anniversary of the Founding of Tokyo University of Agriculture, an International Students Summit on Food, Agriculture and Environment in the New Century is held. Students from twelve countries and area in the world participated and discussed about present conditions and future issues on food, agriculture and environment. With this opportunity, we air our opinions and views raised in this Summit documented in this Tokyo Declaration, which we propose to the world.

1. Agriculture carries an important role of producing food for mankind to live. With the remarkable population increase since the 1950s, food production has been greatly increased through the Green Revolution, but negative effects to the environment and health occurred due to the intensive use of chemical fertilizers and agricultural pesticides. For now and the coming years, global food production increase and poverty alleviation are vital and agriculture plays an important role. "Therefore, we aim at sustainable development in the New Century through the recognition of the value of agriculture as a life industry, and the respect of the unique ecosystem and wisdom of each region. Through the collaboration between traditional agriculture knowledge and wisdom, and modern science and technology, we endeavor to develop environment-friendly technologies and production systems. Eventually, we hope to develop and promote a new form of organic agriculture which will meet social, economic and environmental requirements."

2. Based on science and technology development, various new technologies are being developed and spread in the agricultural field. Among them, biotechnology, especially Genetically Modified Organisms (GMO) is considered the mainstream technology. Consumers also have strong concerns regarding GM crops and foods. "Therefore, we recognize the potentials of biotechnology including GMO based on judgment with right knowledge. At the same time, we, as agricultural students, need to study and research more about the safety of biotechnology especially GMO in relation to human health and environment, and we have a role of disseminating result-related information to consumers."

3. In each region, history gave birth to food culture and molded people. By definition, food should be consistently safe from production to consumption. "Therefore, we create a new system wherein we can continuously be supplied and be able to consume safe foods. Each actor in the system, based on the social infrastructure provided and improved by the government, should consider the importance of safety issues such as pesticide residues at the production level, and post harvest and food additive usage problems at the processing and distribution levels. At the same time, we, as consumers, must think better of healthy regional food culture and are urged to cooperate and understand the added costs for commodities that are produced in a safe and environmentally friendly way."

4. Nowadays, although trade liberalization is progressing under the WTO system, all countries and areas do not have access to fair food distribution because economic infrastructure and social infrastructure gaps still exist. "Therefore, we promote Regional Self-sufficiency mainly for staple foods by making use of the unique ecosystems and regional individuality from the local point of view. Then, in the global point of view, food self-sufficiency in the whole of Asia can be achieved if food self-sufficiency is promoted in each area."

5. In the years to come, we, the students have a huge role to play. More international cooperation is encouraged through human resource exchange and sharing knowledge to overcome barriers such as academic disciplines and geographic borders. "Therefore, we, as the core group consisting of students from thirteen (13) countries and areas, aim to create an International Students Network. Also, we share a new and same value, wherein we need to create a new social system where an environmentally benefiting and safe food production, distribution, processing and consumption exist."

In realization of this *Tokyo Declaration*, we take an oath to make an *International Students Summit Action Plan* for each country and area.

November 20, 2001
Tokyo

International Students Summit Action Plan

In line with the Tokyo Declaration adopted during the 1st International Students Summit organized by the Tokyo University of Agriculture held last November 19-20, 2001, the action plan has been drawn up in this 2nd International Students Summit. As part of the future generation, we students commit ourselves to the following actions.

General Actions

- ✧ We shall study issues of food, agriculture and environment in holistic manners. We shall serve as a bridge between producers, consumers and professionals for the betterment of the society.
- ✧ We shall not limit ourselves to studying; we shall raise our own awareness and put our ideas into practice.
- ✧ We shall reconsider and emphasize the cultural aspect of agriculture.
- ✧ We shall appreciate and conserve our respective traditional technologies and institutions.

Specific Actions

Environmental Conservation

- ✧ We shall study and make public the roles and values of agriculture and environment, by participating in farm training and the like in rural areas.
- ✧ We shall conduct various campaigns and promotions of the present condition and prospects of agriculture and agricultural communities; and deepen consumers' understanding and interest on agriculture and environment.
- ✧ We shall vigorously promote environmentally friendly agriculture such as organic agriculture for establishing the system of stable supply of safe food.

Biotechnology

- ✧ We shall encourage unbiased research and undertaking. We shall publicize scientific information and research results about biotechnology.
- ✧ We shall vigilantly investigate food biotechnology such as GMO and inform the public about the results.

Food Safety

- ✧ We shall review our respective dietary life, conduct surveys and research on food from farm to table, and update the public about recent findings.
- ✧ We shall encourage strict labeling of food. We shall charge appropriate social responsibilities to any company found to have committed food safety violation.

Food Security

- ✧ We shall reduce food wastes. We shall avoid over consumption to conserve resources and promote health.
- ✧ We shall consume what is needed rather than what is demanded, on the basis of energy-saving local production and local consumption framework.
- ✧ We shall promote home production of food using any available space.

Students Network

- ✧ We shall establish the "International Students Forum," on food, agriculture and environment.
- ✧ As a body, we shall actively lobby and take actions on relevant issues, and represent youth in national and international conferences.

The above action plan shall serve as the basis for the country or area level action plans to be made by students of the respective participating university. Thus, we urge the participating universities to make their respective action plan as soon as possible.

November 17, 2002
Tokyo, Japan

Establishing International Students Forum (ISF)

Agricultural science plays a vital role in solving the fundamental problems of human beings in relation to food, environment, human health, and natural resources and energy. Because food production and consumption systems are closely related to the condition of the natural environment, the stage of economic development and food culture in each country and area, their patterns and problems reflect regional characteristics, requiring a multiple region-oriented approach.

Tokyo University of Agriculture organized the International Students Summit on Food, Agriculture and Environment in the New Century in 2001 and adopted the "Tokyo Declaration".

In line with the action plan adopted at the 2nd International Students Summit in 2002, we hereby agree to organize the International Students Forum (ISF), a students' network for the betterment of food, agriculture, and environment problems.

1. Objective

International Students Forum (ISF) promotes information exchange and discussion among the students of agricultural and other related sciences, in order to solve the problems common to human beings, such as environmental conservation, development of harmonious food production and establishment of food safety.

2. Organization

- ISF consists of Committees of International Students Forum set up in the participating universities.
- Members of the respective ISF Committees play an active part while in school and resign from ISF automatically at their graduation.
- Each ISF Committee decides the matters on the management respectively in each country and area.

3. Role

- ISF Members constantly make effort toward solutions of the problems common to human beings such as world environmental conservation, promotion of sustainable food production and establishment of food safety.
- ISF Members exchange information and opinions via the Internet. (Internet International Conference)
- Representatives of ISF committees in the respective universities get together on a regular basis and hold an international conference to present the results of research and study. (International Students Summit, ISS)

4. Activities

- ISF Members play an active role as students for solutions of food, agriculture and environment problems.
- ISF Members work in accordance with the common theme agreed upon at the International Students Summit for the whole year.
- ISF Members are expected to present the results of the previous year's activity and decide on the common theme for the following year.

5. Participating Universities

○ Universidade de São Paulo, Brazil
○ China Agricultural University, China
○ Tokyo University of Agriculture, Japan
○ University Autonoma Chapingo, Mexico
○ Wageningen University, Holland
○ University of the Philippines Los Baños, Philippines
○ Kasetsart University, Thailand
○ Hanoi Agricultural University, Vietnam
○ The University of British Columbia, Canada
○ Bogor Agricultural University, Indonesia
○ Kyungpook National University, Korea
○ Mongolian State University of Agriculture, Mongolia
○ The State Agriculture University of La Molina, Peru
○ National Chung-Hsing University, Taiwan
○ Michigan State University, USA

6. Secretariat

Secretariat of International Students Forum is set up at NODAI Center for International Programs, Tokyo University of Agriculture to take care of related administrative matters.

November 17, 2002
Tokyo, Japan

Establishing Global Network for Environment, Food and Agriculture (Global NEFA)

Since 2001, the International Students Summit (ISS) has been the venue for student discussions on relevant global issues on food, agriculture and environment. Due to the call for a students' network as documented in the adopted "Tokyo Declaration" and "Action Plan", the International Students Forum (ISF) was established in 2002. In total, there have been more than 400 student-participants from around the world. Most of us have already graduated and are now part of the working society. Using the knowledge and experience we gained in the ISS, we are now playing an active role in different fields in various countries. However, there have been limited opportunities to meet and exchange information among ourselves. Therefore, we have established the "Global Network for Environment, Food and Agriculture (Global NEFA)" as an alumni association of ISS/ISF.

Objective

Based on the adopted "Tokyo Declaration" and "Action Plan", the organization aims to contribute to the sustainable development of the international society.

Membership

Membership is initially open to all past ISF members or ISS participants who agree to the objectives of the organization. Other interested persons can join the organization through a recommendation of members.

Activities

- Manage the website and mailing list
- Provide information related to employment and graduate study opportunities for students
- Organize study meetings, symposiums, and similar activities
- Promote information exchange
- Hold annual general meeting

November 25, 2005
Tokyo, Japan

Mission Statement of International Students Forum（ISF）

ISF is an international network of students which encourages cooperation, discussion and research to aid in the sustainable development of food, agriculture and environment into the future. ISF allows students to use their knowledge and expertise in their field of study to promote collective action, which will result in the unity of our global food system and our environment.

We have recognized that in order to implement the objectives of the ISF within our respective countries and area, we must consider the following plans of action:

1. The ISF joint communique and mission statement must be translated into the language of the participants' countries of origin.
2. A clear explanation of the objectives and mission of ISF must be placed online.
3. A pamphlet including the objectives and mission statement of ISF should be circulated to the members of ISF, in the language of the participant's countries of origin.
4. A newsletter should be delivered regularly to past and present ISS participants. This newsletter would include updates from alumni and the ISF.

We have recognized that in order to improve the current structure of the ISS, the following ideas must be implemented:

1. Establish the ISF in each partner university.
2. Support of the ISS student presenters must be maintained, both through the partner universities and ISF-Japan.
3. Create new partnerships with universities, in order to represent population distribution around the world.
4. Promote ISS earlier in the school year, in order to generate a new participant base.

Through the implementation of these suggestions, we believe that the promotion of the sustainability of food, agriculture and environment will be improved.

November 30, 2007
International Students Summit
Tokyo University of Agriculture, Japan

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Our grateful thanks go to all those who helped us put together “The 19th International Students Summit (ISS)”.

We are deeply obliged to the ISS presenters who have provided superb content in their areas of study.

We are also indebted to the ISS Advisors Committee and Tokyo NODAI Committee for Global Education（国際教育専門委員会）giving valuable academic guidance to the ISS presenters.

We would also particularly like to thank all Tokyo NODAI student groups who tirelessly supported behind the scenes: International Students Forum, General Chairpersons, Chairpersons, and Student Coordinators.

Lastly, we would like to express our sincere gratitude to the audience who have joined us today making this event a fruitful and enriching experience for all.

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