Mini-Summit: Food Safety, Policy and Sustainability

Background on the Mini-Summit

In 2015, the College of Agriculture and Natural Resources (AGNR) joined a U.S.-Asia consortium of universities who have committed to collaborate on food safety research. The Mini-Summit is an annual conference in which the consortium members present their research, identify areas for collaboration with member organizations and promote faculty and student exchange.

The University of Georgia, College of Agricultural and Environmental Sciences, in 2007 joined with Shanghai Academy of Agricultural Sciences (SAAS), and Shanghai Ocean University (SHOU; then known as Shanghai Fisheries University) to form the U.S.-Asia partnership. It has expanded to include Auburn University, National Taiwan Ocean University, Kagoshima University, Japan, and University of Maryland.

The Mini-Summit on Food Safety is held annually, alternating between member locations. It has been held in Shanghai, Georgia, and Taiwan. Food Safety is the main focus of research, but supporting increased agricultural trade between countries is also highlighted. In recent years, the Mini-Summit has added sessions on toxicology, seafood safety and marketing, and food processing, and environment and poultry production.

The 2017 Mini-Summit will be held in late October at the University of Maryland. Our proximity to USDA, FDA, and the wealth of our university resources, such as JIFSAN and the Department of Nutrition and Food Science, promises to make for a robust conference.
Ms. Surabhi Rani

The Dept. of Nutrition and Food Science PhD student, Ms. Surabhi Rani, won the poster contest at the 2016 Mini-Summit. Her poster was Assessing the role of farm hygiene as predictor of milk contamination by Mycobacterium avium subsp. paratuberculosis (MAP) in dairy farms.

The causal agent for Johne’s disease in dairy cows, Mycobacterium avium subsp. paratuberculosis (MAP), is suspected to be linked to Crohn’s disease in humans. MAP can be secreted by cows with milk or contaminate milk via contact with feces or farm equipment (external route). MAP is not totally killed by pasteurization and can find its way to people who drink tainted milk or raw milk. While hygiene measures limit the milk contamination, to-date the relative importance of different contamination routes associated with farm practices is poorly understood. Ms. Rani’s study analyzed a cross-sectional survey of 292 dairy farms in the Northeast U.S., and identified farm management practices and hygiene interventions that impact MAP contamination in bulk milk.
An AGNR faculty and extension team traveled to Rwanda in July 2016, at the request of the Rwanda Ministry of Agriculture and Animal Resources (MINAGRI), to conduct a needs assessment and to recommend solutions to many agricultural problems that plague the country. The team — Dr. Ray Weil (ENST), Dr. Margaret Udahogora (NFSC), Dave Myers (Principal Agent, UME), and Dr. Charles Schwartz (James A. Clark School of Engineering) met with government officials, and visited farms in several regions of the country.

Rwanda’s agriculture is mainly rain-fed and has limited access to seeds and agrichemicals. Fertile topsoil is washed away down the steep slopes covering much of the country. Smallholder farmers work 75% of farmland, but with less than a hectare of land, they are challenged to "feed themselves. Over a third of children under the age of 5 are malnourished.

The Rwanda government is focusing on increasing agricultural productivity amid these challenges. One of the major concerns of the July visit was to diagnose the problems with the steep terraced areas and try to figure out solutions to restore the productivity and health of the soils while still controlling the runoff from heavy rains.

Many of the steep slopes have been tamed into bench terraces, but while the terraces stem run-off, Dr. Ray Weil said they “came at a price of destroying the productivity of the soils.” Dr. Weil estimates that 5 years is needed to improve the soil health with amendments, no-till cultivation, and pivot irrigation.

The team has identified other challenges:

* Extension staff lack proper training
* Farmers rely mainly on rain water to produce food for only two seasons
* Crop diseases and pests, lack of crop diversification
* Livestock disease
* Lack of drought tolerant seeds, affordable inputs

The team has produced a concept paper with recommendations that address these challenges. Dr. Udahogora, who was born in Rwanda, has been facilitating the team’s contact with the Rwanda government and the University of Rwanda (UR). Most recently, UMD signed an agreement with the Rwanda Agriculture Board and UR to cooperate on joint research, faculty exchange and other activities.
Left: ENST professor Ray Weil demonstrating to a team of Rwandan agronomists how to test the pH and electrical conductivity of the “topsoil” left on newly constructed terrace. The terraces were designed to curb erosion and control rainwater while also receiving collected water as irrigation during the dry season. The soil pH was far too acidic for good growth of the watermelons as evidenced by the struggling stunted plants. (Photo by Dave Myers)

Above, left: UMD team and their Rwanda hosts. Left to right, front: Dr. Sirikare N. Sylvere, soil scientist, Rwanda Agriculture Board (“RAB”); Dr. Margaret Udahogoro, AGNR-NFSC; Rwanda Minister of Agriculture Dr. Geraldine Mukeshimana; Dave Myers (AGNR–UME). Middle Row, left to right: Dr. Francois Naramabuye, soil scientist, University of Rwanda; Dr. Ray Weil, AGNR-ENST; Dr. Charles Schwartz (UMD–James A. Clark School of Engineering); Back row, left to right: Dr. Pascal N. Rushemukaka, agri-environmental soil scientist, RAB; Dr. Christine Mukantwali, RAB; and Dr. Rene Gasore, plant breeder at RAB. Photo courtesy of Margaret Udahogoro.

Map, above, right: historiespeaks.org.uk
Left: women spreading manure on a wide bench terrace. (Photo by Dave Myers).

Cover photo by Charles Schwartz, UMD’s A. James Clark School of Engineering.
Dr. Nadine Sahyoun, a Professor in the Dept. of Nutrition and Food Science, spent 3 weeks at Kenya’s Machakos University College as part of a Farmer-to-Farmer assignment through Catholic Relief Services, Baltimore. She worked with one of the university deans in drafting a curriculum for the new Department of Nutrition, Food Science and Dietetics, which will open in August 2017.

Machakos University College, which is 40 miles from the capital of Nairobi, was founded in 1957 as a rural technical school and was upgraded in 2011 to a university. It is expanding from 5 to 7 schools, and adding a new Dept. of Food, Nutrition and Dietetics. It will admit its first students to the new department in September 2017.

Crafting a new curriculum required understanding the Kenyan government educational requirements for the new program, and determining the training needs of nutrition and dietetics professionals there. “I worked on the curricula with Dr. Esther Nduku, the Dean of the School of

Farmer-to-Farmer

Kenya
Hospitality and Tourism Management. She has a PhD in nutrition and is responsible for developing the Department of Food, Nutrition and Dietetics,” Nadine said.

**Educational Differences**

Among the major differences between a U.S. university education and Kenyan program, is that Kenyan students take fewer general education courses and launch right into their major. U.S. students, on the other hand, specialize at the graduate level. Kenyan students must complete 2 practicums for a B.S. degree.

Dr. Sahyoun recommended incorporating experiential learning and extension into the curriculum. She suggested that students could develop community programs, educational materials, training manuals and collect data for research and publication.

---

**Gauging Nutritional needs**

Nadine visited non-governmental relief organizations, hospitals and school. Because poverty and malnutrition is such a challenging issue in Kenya, many of the schools provide 2 meals a day. Zinc, iron and vitamin A are the main nutrient deficiencies in Kenya. The photo, left, was taken at a rural school.

Drought has greatly affected food production in Kenya, causing 1.3 million people to be food insecure. Unicef reports that “global acute malnutrition and severe acute malnutrition (SAM) caseloads have increased by 19% and 25%, respectively, since July 2016.”

Dr. Sahyoun said her Farmer-to-Farmer assignment was a “wonderful experience,” which allowed her to put her skills to great use and perhaps, one day, see the malnutrition numbers decline as a result.
UME Principal Agent Susan Schoenian’s 3 week study tour in Australia and New Zealand

The study tour is part of Susan’s 6-month sabbatical, which is focused on using technology to deliver extension education programs, and precision sheep and goat farming.

“Precision farming starts with electronic ID. With electronic ID (EID) you can automatically weigh and draft sheep,” and transfer the information to various programs for manipulation. EID facilitates the collection of data for quantitative genetic evaluation. Susan plans to train Maryland sheep and goat farmers to adopt some of this technology.

Australia is the world’s largest exporter of sheep as well as the top wool producer. New Zealand is ranked second in wool production. No small coincidence that Susan chose the countries for her study tour. She has been the UME Sheep and Goat Specialist for nearly 30 years.

A “just for fun” activity was attending the famous Agrodome farm show in Rotorua, NZ. The show had “19 different breeds of sheep, all rams, strutting their stuff. Actually they spent most of their time sleeping or trying to steal each other’s food.”
Hunger is not only a food shortage problem, Environmental Science & Technology's (ENST) adjunct professor, Dr. Prabhakar Tamboli says. Waste, post-harvest loss, and inefficient production are among the factors contributing to food insecurity. The cost of fertilizers, seeds and energy also affect production and price.

While we think of hunger and food insecurity as the result of shortages, it is not the only cause. Dr. Tamboli designed ENST 100 “International Crop Production - issues and challenges of the 21st century” to teach students how to look not just at food production, but other factors such as population, storage, the role of governments, and International donors like the World Bank and Food and Agriculture Organization (FAO). “Even if enough food is secured in a country, it is not accessible to people living below the poverty line,” he says.

Dr. Tamboli brings first hand knowledge to the class. He was a World Bank agronomist for nearly 20 years, traveling to the world’s poorest countries. He helped many countries in Africa and Asia improve their agricultural performance by designing and implementing projects. In addition, he was a Soil Fertility specialist at the FAO, the United Nations agency leading hunger and malnutrition relief programs. At the FAO, he conducted agronomic trials on important crops and developed fertilizer recommendations.

Dr. Tamboli has a passion for development agriculture and has traveled to over 30 countries. His experience in developing countries started in India, where he was born 88 years ago. He is from a modest background but his parents valued education. He wanted to become a doctor and help poor people and was admitted to medical college in Gwalior, India. But his family could not afford to pay the tuition, so instead, Dr. Tamboli worked at a part-time job and majored in chemistry and biology. He worked hard and was awarded a government merit scholarship for a Masters in Soil Science and Rockefeller Foundation Scholarship for Ph.D. in Agronomy at Iowa State University.

Dr. Tamboli hopes to inspire and motivate his students to learn and he believes a good teacher can ignite an interest in a student who may have been unaware of his talents or direction. His caring attitude and popularity with students has earned Dr. Tamboli the Excellence in Teaching award from the Dept. of Environmental Science.

Continued on page 10
In January 2017, Dr. Jonathan Moyle, Assistant Professor and UME Poultry Specialist, talked to a delegation from Yunnan Province, China, about the Delmarva poultry industry. Jenny Rhodes, Extension Educator in Queen Anne’s county, gave a presentation on farm bio-security.

ENST’s Dr. Tamboli, continued from page 9

and Technology (2010) and from the Maryland Chapter of Gamma, Sigma, Delta Honor Society of Agriculture (2008).

So this is Retirement?

Until a few years ago, Dr. Tamboli traveled to India each winter to lecture at universities and study India’s higher education and agricultural extension systems. In a 5-year period, he visited more than 15 agricultural campuses with the goal of examining the state of agricultural education in India. The result was a book he co-authored with Y. L. Nene, “Revitalizing Higher Agricultural Education in India: Journey Towards Excellence,” (2011) that examines many of the problems plaguing India’s agricultural universities, including low faculty pay, funding, and governance issues. He says that the Indian agricultural universities will not improve without giving full autonomy to the Vice Chancellors and integrating three functions of teaching/research/extension under one umbrella.

Dr. Tamboli also actively participated in developing AGNR’s International Training Program and establishing collaboration between University of Maryland and the State Agricultural Universities in India.

Dr. Tamboli has not run out of projects. He continues to collaborate on journal articles, mostly about India’s agricultural outlook, and he stays active in the large Indian community in the DC area.

He has, though, turned his attention to a personal project that is part memoir and part gift to his granddaughter. He is writing about 5 generations of Indian women in his family, from his grandmother, to his granddaughter. His grandmother was widowed and according to the local culture, was looked down on. She raised her children in poverty and was not able to rise out of it because of the constraints of her culture. She was married at age 7 and died at 50. Dr. Tamboli’s mother had 12 children and was illiterate, but because she was a married women, enjoyed the approval of society even though her family struggled financially. His wife, now deceased, earned a Master’s degree, and his daughter is a medical doctor. His granddaughter is in college and has independence and a bright economic future.

His hopes for the future? Dr. Tamboli says he encourages his students develop skills critical to learning the challenging issues of the 21st century and how they can address the issues.

Dr. Cheng-I Wei, director of International Programs in AGNR, below, delivered the keynote address at the International Agriculture Innovation Conference (IAIC) in Taichung, Taiwan, November 2016.
Dr. Rohan Tikekar’s Mini-Summit presentation focused on UV light, photosensitizers used in fresh produce wash water, and the production of free radicals. UV light is cost effective technology that kills food-borne pathogens, and compared to chemical sanitizers, has little downside. However, UV light is unable to penetrate solid food, reach the pits or the rough surface of food, limiting its use with rough surfaced produce.

Dr. Tikekar’s research looks at the free radicals produced by the photosensitzers and whether they act synergistically with the UV to enhance microbial inactivation rate. The objectives of his research are: (1) Investigate the chemical nature of free radicals generated from UV exposure of fructose, gallic acid and other food grade photosensitzers and determine the factors that impact their rate of generation, (2) Investigate the efficacy of proposed approach in inactivating bacteria and viruses in liquid medium, produce surface and internalized within produce using novel imaging based approaches and (3) identify the impact of proposed technology on quality of fresh produce. Successful development of this novel technology will lead to a cost effective method for improved sanitation of fresh produce with extended shelf-life.

Global Classrooms Initiative
Pre-proposal application deadline: February 15, 2017

The Global Classrooms Initiative provides financial support to faculty to develop innovative, project-based courses that bring together UMD students and students from partner universities around the world using various digital technologies. These exciting new courses aim to provide our students with international experiences that mirror the kind of work they will encounter throughout their lives: cross cultural, project-based and virtual.

Call for Proposals link
Pre-Proposal Preview information

To start your application process, please:

Submit your contact information (link is external). You will receive an email including your personalized link to the online pre-proposal form.

Schedule an appointment (link is external) with Dr. Raluca Nahorniac in the Office of International Affairs. This appointment/discussion can take place in person, via phone or videoconferencing.

For more information on the Global Classrooms Initiative, please contact Dr. Raluca Nahorniac (link sends e-mail) in the Office of International Affairs.
Environmental Science and Policy (ENSP) student Miranda Mlilo spent 3 weeks in Kenya in August 2016, where she met university environmental studies’ students and spoke at a local government meeting on a waste disposal site.

The trip came about when her mother, Dr. Nadine Sahyoun  (see article on page 6), participated in a Farmer-to-Farmer assignment at Machakos University College. Miranda saw this as an opportunity to gain an international perspective on environmental issues and to see how the community and government interact to solve problems. Miranda has not declared an ENSP concentration yet, but is interested in politics and policy.

Miranda was based at Machakos, where she and environmental studies’ students exchanged information on their studies, starting an environmental club, and ways to engage the community. Miranda is a member of the UMD Student Sustainability Committee (SSC) and used some SSC projects as examples of projects they could do. She suggested the Kenyan students start a recycling program and plant trees, projects that would have a broader appeal because they do not require a special skill. They could also serve to educate the community about conservation and health benefits.

She also was invited to speak at a meeting between students and a local government official. Dr. Julius Nzeve, the dean of the Machakos environmental sciences department, arranged the meeting and asked Miranda to speak about her experience in Kenya. The Machakos students talked about their visit to a local landfill where hazardous and non-hazardous waste is mixed together. They saw polluted water seeping from the site. Miranda said “this effects the community because farmers irrigate their farms with dirty water that has the potential to poison crops that are then distributed all over Machakos and Nairobi.”

During the meeting, several students told of the deaths of their animals due to the quality of the land the animals graze on. The loss greatly effects the families’ income and ability to support themselves. The Machakos students suggested the local government establish a sanitary landfill and asked for the surrounding water and soil to be tested. At the end of the meeting, Miranda shared her thoughts on the community working with the government to solve these issues. She said “people can only get so far without the proper aid. For example, the students showed interest in a recycling process, and the local government seemed to agree. That desire cannot be fulfilled without a proper recycling system set in place, and then a community outreach education on what it would entail.”
AGNR STUDY ABROAD
Aug. 2015 - Jan. 2017

New Zealand courses

Sustainable Ecosystems (3 credits) - (PLSC6912/ENSP6952) students travel throughout New Zealand's diverse ecosystems and learn how the government approaches sustainability, including energy production, ecological conservation programs (biodiversity), tourism, and low-impact urban design including storm-water management and architecture.

Sustainable Transformation and Adaptation: Culture and Earth (3 credits) - (LARC484/HDN484B) students receive instruction in the practice of field sketching and recording field notes throughout the course.

15 AGNR students traveled to NZ in 2015 and 2016.

46 AGNR Students
Participated in Study Abroad and semester long exchanges from Fall 2015-Spring 2017

AGNR Students on Semester Long Exchange, Fall 2015-Spring 2017

<table>
<thead>
<tr>
<th>Term</th>
<th>Student</th>
<th>Country</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2017</td>
<td>Hayley Benson</td>
<td>Tanzania, Sch. for Field Studies</td>
<td>ENSP</td>
</tr>
<tr>
<td>Spring 2017</td>
<td>Esther Cho</td>
<td>Costa Rica</td>
<td>ENSP</td>
</tr>
<tr>
<td>Spring 2017</td>
<td>Rachel Rha</td>
<td>Univ. of Edinburgh (UK)</td>
<td>ANSC</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>E. Sete</td>
<td>Tanzania, Sch. for Field Studies</td>
<td>ENSP</td>
</tr>
<tr>
<td>Spring 2017</td>
<td>Blake Yenick</td>
<td>Australia</td>
<td>ARSC</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>M. Wartman</td>
<td>New Zealand</td>
<td>ENSP</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>R. Berry</td>
<td>Univ. of Manchester (UK)</td>
<td>ARSC</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>R. Patterson</td>
<td>Univ. of Edinburgh (UK)</td>
<td>PLSA Plant</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>D. Stockpole</td>
<td>Univ. of Bristol (UK)</td>
<td>ENST</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>M. Wallick</td>
<td>Univ. College of Dublin</td>
<td>ANSC</td>
</tr>
<tr>
<td>Fall 2015</td>
<td>C. Hoover</td>
<td>Univ. College of Dublin</td>
<td>PLSA Hort</td>
</tr>
</tbody>
</table>
The 2017-18 academic year will mark AGNR’s 10th year of enrolling some of China’s top students in our college. The students are part of the 2+2 program that AGNR has with our partner universities in China.

AGNR has enrolled 131 students in the 2+2 program. Agricultural and Resource Economics (AREC) and Nutrition and Food Science (NFSC) are the two most popular majors, with many of the students earning top grades. About 90% go to graduate school, and many have been admitted to prominent graduate programs at UMD, Yale, Harvard, Columbia, and UPenn.

The Journey to the U.S. starts early
Their path to the U.S. — and UMD — is not simple, it starts as early as elementary school when many students begin English lessons and take weekend math classes.

Students study relentlessly for years to pass the national test known as the Gao Kao. If they score well, students may go to university. Others are offered vocational training.

- Students take a test during middle school which determines which high school they will get into. Getting into a “good high school” increases the possibility of getting into a “good university.”
- A typical high school schedule is 6 a.m.–7 pm, then more study at night.
- High school is not compulsory in China and students must pass a test in order to attend High School. Students pay a small tuition for high school and more for university, but a university education may cost $800-$2000/yr.
- The Gao Kao national test is like the SAT, except in China, the score is everything. The only way to get into a top Chinese university is to have a top score on the Gao Kao. Extracurricular achievements are considered, but scores are the biggest factor.
- China’s Gao Kao national college test is held once a year. Nearly 10 million students are tested, but universities have room for only 5 million new students. Thus, competition is steep. Students typically study well into the night — for years — in order to score well on the test. The goal is to attend a select university. It is commonly believed that companies hire graduates of the best universities.
Chinese students do not have the freedom to apply to universities the way U.S. students do.

Choosing a Major is a very complicated. Suppose you want to get into Peking University, which is known as “the Harvard of China.” Your chances of getting in increase with top scores and an unpopular major. For example, a student may wish to study Engineering, but since so many students select an engineering major, competition to get in is very fierce. However, if the student selects architecture, competition may still be keen but not as keen as engineering.

L to R: Dr. Cheng-I Wei (IPAN), Ziyi Li, Jim Hanson (AREC), and Bill Bowerman (ENST). Ziyi was a student in the 2+2 program, majoring in NFSC. She graduated in 2016 and is in grad school at the University of Hong Kong, Food Safety & Toxicology.

Cuiyin Wu is an assistant in the IPAN office. She was an AGNR 2+2 student and is now a graduate student in ENST. Ms. Wu is from Shenzhen, China, which is near Hong Kong.

“During my first year of high school, everyone studies Chinese, English, Math, Physics, Chemistry, Biology, History, Geography, and Politics. At the beginning of the next year, every student must choose to study liberal arts or science. Chinese, English and Math are mandatory for everyone. I chose science because I like Biology very much.

“I may have spent 60% of my time studying in middle school, but for high school is like 99%. We only have classes during weekdays but a lot of our classmates had tutors all weekend. High school is very intensive and serious. Our high school teacher told us, “If you didn’t score well in High School Entrance Exam, it’s OK because you can start over in high school. But if you screw up in College Entrance Exam, your life is over.” I didn’t have time to really think about what I want to study for college, but I just know that I need to get into the top university.

“Luckily, I got into CAU and attended the 2+2 program as an AREC major and was encouraged to go to graduate school.”

Ms. Wu, pictured above, at the Maryland State Fair, plans to complete her master’s program this year. She met her husband, Chensheng Wu, at UMD, he is a post-doc in engineering. They are expecting a baby in April.