Dr. Erik Cleveland, an Educator Known for His Gentle Heart is Transitioning to a New Journey

By Dr. Christopher Lu

After devoting more than thirty years to animal science education, a farm boy from Iowa who later planted himself in Hilo, Hawaii, Dr. Erik Cleveland is retiring from teaching at University of Hawaii at Hilo. Dr. Cleveland joined the faculty of College of Agriculture, Forestry and Natural Resources Management, University of Hawaii at Hilo in 1987, after serving as an swine specialist at University of Georgia Cooperative Extension for six years. With a doctoral degree in Animal Breeding and Genetics from University of Nebraska, Dr. Cleveland embarked an academic journey that has impacted many young minds. He integrated his research and extension experience into classroom and field teachings, as a true example of the land grant concept.

Dr. Cleveland demonstrates his versatility in teaching with a wide range of subjects such as Sheep and Goat Production...

Dean Mathews delivers Keynote Speech at the 2nd International Conference on Multidisciplinary Filipino Studies – Philippines

By Dr. Rodney Jubilado

Early morning of November 16, 2018, the 2nd International Conference on Multidisciplinary Filipino Studies started with the registration at 7:00 o’clock. While the registering participants were falling in line, a towering figure passed them by that created curiosity among them. It was the keynote speaker, Dr. Bruce W. Mathews, the Dean of the College of Agriculture, Forestry & Natural Resource Management (CAFNRM) of the University of Hawaii at Hilo. Some of the Filipino participants thought that a new friar or a priest was in town since the De La Salle University-Dasmariñas, the host university, belongs to the Catholic order of the Brothers of the Christian Schools also known as...
Dr. Cleveland continued...

Introduction to Animal Science, Beef Cattle Production, Swine Production, Animal Breeding & Genetics and Animal Science Internship. Earlier in his career, he also taught Reproduction in Farm Animals, Introduction to Agricultural Sciences, Anatomy & Physiology of Farm Animals and Animal Diseases & Parasites. One of his influences was to turn me into a reproductive physiologist, and perhaps one of the few, if not the only nutritionist in the nation to teach a reproduction course. Dr. Cleveland used to teach that course, as his specialty, before turning it over to me. Reproduction was my least comfortable subject, but I learned so much and came to appreciate the subject immensely. He is known by his students as a professor who is kind, gentle, and possessing an incomparable patience. Dr. Cleveland was voted by students as Teacher of the Year twice. He spent tremendous amounts of time preparing for his lectures. For the past few years, Dr. Cleveland was completely immersed in improving the presentations used for his lectures.

Dr. Cleveland was instrumental in developing the pre-veterinary curriculum for students specializing in Animal Science. Since its inception, the curriculum has attracted many students, at times becoming one of the largest specializations in the College in terms of enrollment. Many pre-vet students have been accepted by the best veterinary programs in the nation, and much credit goes to Dr. Cleveland for his nourishment and encouragement of these students.

Because of his background in animal breeding and genetics, Dr. Cleveland enjoyed finding ways to improve the quality of the UH Hilo livestock herds through selection of more suitable breeds and sires. He introduced several breeds of swine to the UH Hilo farm including Berkshire, Chester White, Duroc, Hampshire, Landrace, Yorkshire and the Nebraska Index Line. Recently he was also able to obtain a donation of South Poll semen, a relatively new breed with potential for the cattle industry in Hawaii, for our cattle herd.

Those who worked with Dr. Cleveland more closely will agree that he is perhaps one of the most humble, honest, and nicest colleagues one can dream of. It is an understatement that he will be missed. Dr. Cleveland served in the curriculum committee with Dr. Tsang for more than 20 years. The College is so used to depending upon a reliable individual such as Dr. Cleveland that the College will never be the same without his daily presence. I found myself with mixed emotions having to write a farewell message for a colleague with whom I had worked so closely. I should also mention that during my conversation with Dean Mathews, he had suggested the possibility for Dr. Cleveland to provide training in agriculture/animal science in a faith-based organization in a warmer climate in Florida after retirement. His thoughtful suggestion was caring and considerate. I am not the believer of retirement as a prolonged holiday. It is a beginning of new journey in life. As Dr. Cleveland is transitioning into this new journey, the College and University community pays tribute to an individual who has served so consistently.

1st CAFNRM Student Symposium. Story on page 5
Dr. Sharad Marahatta Joins CAFNRM

By Dr. Norman Arancon

The College of Agriculture Forestry and Natural Resource Management welcomes Dr. Sharad Marahatta as the newest addition to its faculty as an Assistant Professor of Tropical Cropping Systems. Sharad obtained his Bachelors and Masters of Science in Agriculture degrees from Tribhuvan University, Institute of Agriculture and Animal Sciences, Rampur, Chitwan, Nepal. He earned his doctorate from the UH Manoa, College of Agriculture and Human Resources (CTAHR), in the field of Tropical Plant Pathology. Prior to joining UH Manoa as a graduate assistant in 2008, from July 1991 to December 2007, he worked as an Assistant Agronomist and Technical Officer at Regional Agriculture Research Station, Nepalgunj, as a Plant Protection Officer at District Agriculture Development Offices in Nawalparasi, Kapilvastu and Siraha districts, as a Seed Pathologist at Seed Quality Control Centre, and as a Plant Quarantine Officer at National Plant Quarantine Program, Lalitpur, Nepal. After finishing his doctorate, he joined the faculty at Kauai Community College (KauaiCC) from August 2011 to July 2018, where he served as the Project Director for the USDA project, Campus Coordinator for Hawaii Statewide Research and Education Partnership (HSREP) / IDeA Network for Biomedical Research Excellence (INBRE) and Program Coordinator for Plant Biology and Tropical Agriculture (PBT) for KauaiCC. A well-published researcher and nematologist, Sharad authored 19 full text articles and 28 abstracts in peer-reviewed journals and 11 publications on conference proceedings have been published. He also presented 39 posters and delivered 18 oral presentations at various national and international conferences such as North American Colleges and Teachers of Agriculture (NACTA) conference, West Lafayette IA, Sustainability Summit, Honolulu, HI, Society of Nematologists meeting, Michigan, MI, International Nematology Congress, Cape Town, South Africa and International Epidemiology Workshop, Beijing, China. He is a regular reviewer for a number of scientific journals such as Applied Soil Ecology and Journal of Nematology. A well-liked professor in KauaiCC, together with his students established a research and demonstration area for breadfruit called Ulutopia where students experience a wide array of hands-on activities. He is excited to have joined CAFNRM and meet more students who are interested in agriculture. Since he joined CAFNRM in August 2018, he has involved his students in applied learning activities such as research. Some of his students joined the first CAFNRM student symposium last November and successfully presented their research in both oral and poster sessions and won awards. “I am impressed with the teaching and research facilities, such as the farm, that the college has and can’t wait to explore its full potential”, expressed Sharad.
Mathews continued…

the French Christian Brothers. Their curiosity did increase after listening intently to the keynote address, Eco – Efficient Agricultural Modernization: Paths Forward in Island SE Asia and Hawai‘i. Thereafter, Dr. Mathews graciously answered the questions from the participants throughout the 3-day conference. Numerous photoshoots and photo ops were done with Dr. Mathews occupying the center of their conference portraits. One participant exclaimed enthusiastically, “I had a photo with the keynote speaker.” Before the conference concluded on November 18, 2018, three universities have confirmed that they will be hosting the succeeding International Conference on Multidisciplinary Filipino Studies. They have requested that Dr. Bruce Mathews deliver the keynote addresses at the international conferences in Cebu City (2019), in Davao City (2020), and in Manila (2021). The second international conference was attended by around 150 participants including more than 50 paper presenters from various universities and countries. As expected, majority of them were from the Philippines.

Aside from the keynote speakers, the three plenary talks were delivered at the international conference. The first plenary talk was by Dr. Ederson delos Trino Tapia, who is an Associate Professor and the Dean of the College of Governance and Public Policy at the University of Makati, Philippines. He was also a Senior Lecturer in Political Science at the University of the Philippines. Dean Tápia pursued his International Master in Regional Integration (IMRI) at the Asia-Europe Institute, University of Malaya, Kuala Lumpur, Malaysia, graduating with distinction (‘Dengan Cemerlang’). He did his internship and Special Studies at the King’s College London at the University of London. Dr. Tapia’s plenary talk was Fostering Knowledge Creation and Phronetic Leadership in the Public Sector.

The second plenary speaker was Dr. Hanafi Hussin, who is the Dean of the Faculty of Arts and Social Sciences, University of Malaya, Kuala Lumpur, Malaysia. He is an Associate Professor at the Department of Southeast Asian Studies, Faculty of Arts and Sciences, University of Malaya and the editor-in-chief of JATI (Journal of Southeast Asian Studies), a multidisciplinary peer-reviewed journal published annually by the Department of Southeast Asian Studies, University of Malaya. His plenary talk was Traditional and Modern Ways of Seeking Happiness and Satisfaction among the Filipinos: Juxtaposing the Experiences of the Bajaus in Southern Philippines with those of the Filipinos of Luzon.

The third plenary speaker was Dr. Christian George Francisco, who holds the degree of Doctor of Philosophy in Filipino from the Philippine Normal University-Manila. He is the Dean of the College of Liberal Arts and Communication at De La Salle University-Dasmariñas since 2012 and professor at the Graduate Studies. He is a member of the Commission on Higher Education Technical Committee for Filipino and a former secretary of the National Committee on Language and Translation at the National Commission for Culture and the Arts. In his capacity as an administrator and a scholar, his international exposure reaches as far as the many countries in Asia and Europe and that of the United States of America. In this conference, he holds the distinction as the first Philippine-based co-convener of the international committee of ICMFS 2018. His plenary talk was On Language Revitalization Program: The Case of Chabacano Language in Cavite City.

This second international conference has made a twist in its format by introducing a featured speaker. A featured speaker is the one who has contributed with excellence in the field. This second international conference’s inaugural featured speaker was Dr. Shirley Dita, who is an Associate Professor at the Department of English and Applied Linguistics, De La Salle University, Manila, Philippines. Her research interests include corpus linguistics, syntax and sociolinguistics of English and Philippine languages. She has been the President of the Linguistic Society of the Philippines (2015-2018). Over the years, Dr. Shirley Dita has been involved in the corpus building and documentation of various Philippine languages. Her feature speech was The Pronominal System of Philippine Languages: Grammatical Features and Emerging Patterns.

The 2nd International Conference on Multidisciplinary Filipino Studies has three organizing chairs, namely, Dr. Norman Arancon, Professor of Horticulture at UH Hilo CAFNRM, Dr. Rodney C. Jubilado, the Humanities Division Chair & Coordinator of Filipino Studies Program at UH Hilo, and Dr. Christian George Francisco, the Dean of the College of Liberal Arts and Communication at De La Salle University-Dasmariñas. This conference bears testimony to the fact that agriculture is the basis of the Filipino culture.
The College of Agriculture, Forestry, and Natural Resource Management (CAFNRM) at the University of Hawaii at Hilo organized the First Student Symposium last November 30, 2018. The symposium was initiated by Dr. Norman Arancon who envisioned to enhance the students’ research knowledge and presentation skills and provide students an avenue to share their research and class projects within UH Hilo academic community.

The event showcased various research studies and projects that allowed students to understand the multi- and interdisciplinary nature of Agriculture as a field of study. Although the college has provided students with classes to make them well-rounded in Agriculture, the divergence of specializations in the final years of study results in students mainly taking courses in one area such as animal science, horticulture, aquaculture, etc. The symposium, therefore, is of utmost importance and served as a capstone event in sharing knowledge and experiences in various specializations within CAFNRM.

The symposium was held at UCB 127 from 11:30 – 12:15 p.m. During the opening, Dr. Bruce Mathews, Dean of CAFNRM, highlighted the importance of research in Agriculture. Similarly, Dr. Norman Arancon, who delivered a keynote address, emphasized the role of students and Professors in research and publication, particularly, in promoting studies related to sustainable Agriculture. The opening was followed by three parallel sessions that were chaired by three Professors, such as, Dr. Norman Arancon, Dr. Sharadchandra Marahatta, and Dr. Francisco Dumanig, together with four judges, Dr. Armando Garcia, Dr. Yiqing Li, Dr. Jesse Eiben, and Dr. Shivu Sung who were assigned in each session to choose two best presentations.
Symposium continued..

The closing and awarding ceremony was held at UCB 127. Awards were given to students who were selected first and second for oral and poster presentations. The winners for oral and poster presentations are as follows:

**Oral Presentation**

**Parallel Session 1: Research**

First: Emma Tiffan. Effects of Application Method and Application Time on Nematode Predation of Coffee Borer Beetle

Second: Heaven Tharp. Influence of Invertebrate Scavengers on the Fate and Transport of 137Cs within Food Webs

**Parallel Session 2: Research**

First: Wyzykowski, Leah. The Viability of Marine Energy in Hawaii


**Parallel Session 3: Projects**

First: Tai Salinger. Low Input Natural Farming

Second: Daniel Dunnom and Jesse Felts. Establishment of a Tropical Fruit Orchard in Hilo Hawaii

**Poster Presentation**

**Research**


Second: Miyake, Bradon R.I., Identifying and Challenging Transgenic Anthuriums against *Xanthomonas axonopodis pv. Dieffenbachiae*

Third: Stubbs, Alexis, Cheyenne Morrill and Samson Langinbelik. Effects of Vermicompost on Foliar Blight of Poinsettias

**Popular Choice**

Emma Tiffan. Effects of Application Method and Application Time on Nematode Predation of Coffee Borer Beetle

Ariana Dolan. Case Study: Pogo - A 22-year-old Appaloosa Gelding


The success of the First Student Symposium must be credited to the organizing committee members; Dr. Norman Arancon - Chair of the symposium, Dr. Lorna Tsutsumi - coordinator, and Dr. Lissa Tsutsumi - proceeding editor, who worked hard to make this event a reality. The said event was actively participated by many students from different CAFNRM classes and ENG 225: Writing for Sciences and Technology classes.
We are proud to recognize this year’s graduating class of the Fall 2018 Semester. Ten students are slated to receive their Bachelors of Science degree in Agriculture on December 15. Prior to their graduation a special ceremony are organized to recognize their achievement at the UH Hilo Farm Pavilion together with the members of the faculty and staff of CAFNRM. The following are the candidates for graduation:

1. Vincent Seneche Okimoto
2. Faatali Joseph Faiai
3. Jesse McCoy Felts
4. Byron Kirk Freitas, Jr
5. Shaun Rosales Gutierrez
6. Reid Mitsuhiro Hamasaki
7. Kyle Seiji Nagata
8. Kelly Christine Rawlins
9. Alexis Rene Stubbs
10. Thomas Dominque Marcellus
11. Jodie Chiemi Van Cleave

We wish them all good luck and success as they navigate through new chapter of their lives after college. CONGRATULATIONS!
Christopher Lu, Professor of Animal Sciences and International Goat Association President 2004-2008, delivered a keynote speech at the Summer Meeting of Chinese Association of Animal Science in June 2018, Tainan, Taiwan. The Meeting was held at Taiwan Livestock Research Institute, Taiwan. The topic of the presentation is “Global Trends of Animal Production and New Agricultural Policy in Taiwan”. Professor Lu discussed global trends in population growth, food production, food imbalance, as well as social and environmental costs associated with these trends. Water scarcity, soil degradation, ecosystem stress, biodiversity loss, decreasing forest cover, and high levels of greenhouse gas emissions are among the most severe environmental costs discussed. As a result of increases in global demand, meat, milk and egg consumptions increased dramatically during 1961-2014, concomitant with an increased in world livestock counts in the same period. Goat counts in particular increased from just over 200 millions to over 1 billion in the same period. Meat consumption in Asia, particularly in China, increased in a faster pace than Europe and North America.

Sales of organic milk increased while that of conventional milk decreased in the U.S. during 2012-2017. World egg consumption per person per year increased by 64% from 1980 to 2005, largely due to the increase in developing countries. Dr. Lu indicated that according to US EPA (2018), heat stress caused by heat wave can increase vulnerability to disease, reduce fertility, and reduce milk production, over time. Drought reduces the amount of quality forage available to grazing livestock and amount of grains to higher procuring animals. Climate change may increase the prevalence of parasites and diseases that affect livestock. As far as animal welfare is concerned, Dr. Lu pointed out that access to pasture is increasingly viewed as a way to alleviate the stress and to promote natural habitat of animals. Newer generations of consumers are increasingly sophisticated and willing to pay more such as organic products to promote environmental sustainability and animal welfare. Dr. Lu pointed out that welfare of farm animals is among the top three priorities that European consumers would like to know more about, right after safety and quality of foods, and effect of agriculture on environmental and climatic changes in 2011 Eurostat. Greenhouse gas emission by animals presents a serious challenge in the animal production sector. Dr. Lu reviewed a number of mitigations including use of high quality forages, increase the concentrate to forage ratio in the diet, protein supplementation of low quality forage, and inclusion of fat; CH4 inhibitors include ionophores, probiotics, acetogens, bacteriocins, archaenal viruses, organic acids, and plant extracts; vaccination against rumen methanogens; bacteriophages; homoacetogens; H2 utilizing acetogenic bacteria; and genetic selection for ruminants. In conclusion, Dr. Lu indicated that food, environment, climate change and economic success will be the key animal production sustainability. It is imperative to produce more with less and will take advanced breeding, improved practices and technology to make it possible. Attending to consumer preference and concern, increasing production efficiency, and a justified and fair return to producers can be the foci for future animal production and it is never too early to address environmental concern.
Students of Principles of Horticulture (HORT 262) class of Fall 2018 (left to right): Estreya L. Enquist, Tai L. Salinger, Kalikohaliaaloha C. Smith and Emily R. De Wulf with HORT 262 class grown poinsettia plants for sell, and university community, University of Hawaii at Hilo, Campus Center Plaza, November 29th, 2018 (photograph: Dr. Sharad P. Marahatta).

Kalikohaliaaloha C. Smith, a student of Principles of Horticulture (HORT 262) class of Fall 2018, with kai choy and poinsettia, College of Agriculture, Forestry and Natural resource Management farm, December 6th, 2018 (photograph Dr. Sharad P. Marahatta).

Students enrolled in Principles of Horticulture (HORT 262) class of Fall 2018 involved in poinsettia (Euphorbia pulcherrima) and food plants such as mustard cabbage (kai choy) (Brassica juncea) growing. Poinsettia and kai choy were grown in College of Agriculture, Forestry and Natural resource Management (CAFNRM) greenhouse and CAFNRM farm, respectively. Student grown poinsettia were sold to University of Hawai`i at Hilo community on November 29th, 2018. Moreover, student grown food crops were harvested on December 6th, 2018.

Faculty and Students of Obihiro Japan Visit College of Agriculture

By Dr. Sharad Marahatta

A team of faculty, researchers and students from Obihiro University of Agriculture and Veterinary Medicine (OUAVM), Hokkaido, Japan led by Dr. Masanori Koike, Professor of Insect Pathology, visited the University of Hawai‘i at Hilo (UH-Hilo), College of Agriculture, Forestry and Natural Resource Management (CAFNRM) on December 5-11, 2018. Dr. Koike and Dr. Bruce Mathews, Dean, CAFNRM, discussed on possible future coordinated this trip. During the trip, Dr. Koike and team met CAFNRM students, presented OUAVM students' research findings to CAFNRM students in Nursery Management (HORT 266) class (https://twitter.com/kanbi2010/status/107056733504240512), and observed CAFNRM apiary (https://twitter.com/kanbi2010/status/10719659612787697) and other farm facilities (https://twitter.com/kanbi2010/status/1070910099214917632). Moreover, OUAVM team got Hawaiian agriculture experience from the Hilo Farmers Market. Dr. Koike and CAFNRM faculty Dr. Sharad P. Marahatta are collaborating for research and undergraduate students' international agriculture exposure since 2016 (https://www.researchgate.net/publication/327172724_Collaboration_and_learning_in_Japan).

Dr. Bruce Mathews, Dean, College of Agriculture, Forestry and Natural Resource Management (CAFNRM), University of Hawai‘i at Hilo (left) and Dr. Masanori Koike, Professor of Insect Pathology, Obihiro University of Agriculture and Veterinary Medicine, Hokkaido, Japan (right), in front of CAFNRM, December 7th, 2018 (photograph: Dr. Sharad P. Marahatta).

Dr. Masanori Koike, Professor of Insect Pathology, Obihiro University of Agriculture and Veterinary Medicine (OUAVM), Hokkaido, Japan (first row, second from left) with students of OUAVM and College of Agriculture, Forestry and Natural Resource Management (CAFNRM), University of Hawai‘i at Hilo, CAFNRM, December 6th, 2018 (photograph: Dr. Sharad P. Marahatta).
On September 11th I attended the Food Summit 2018 meeting which was hosted at the Hilo Hawaiian Hotel by the Blue Zones Project – Hawaii and HMSA. The theme of the meeting was leaving a legacy of good health and building sustainable and resilient systems that will facilitate much greater food self-reliance for Hawaii’s future generations. Some of the things that we immediately heard were:

1) Hawaii’s residents spend about $4 Billion annually on food and that 85% or more is imported. While many think that the high degree of food importation to Hawaii was largely a post-World War II phenomena the challenges for diversified food crop production in the islands were already of significant concern for some agriculturalists and government officials by the early 1900s (Overfield 1986; 1990). In part, facilitating more local food production requires an assessment of what crops could be economically produced in Hawaii’s different regions.

2) ~60% of our food is directly or indirectly (via livestock products) is tied to corn, soybean, and wheat produced by industrial agriculture in North America’s breadbasket.

3) Overconsumption of these North American food products is bad for our health (diabetes, hypertension, obesity, etc.) and that their industrial, large-farm, production for export contributes to environmental degradation from Minnesota to the Gulf of Mexico.

4) Hawaii needs to produce much more of its own food for food security, food sovereignty, health of its people, etc. while embracing more of the indigenous knowledge.

5) Governmental policies and brutal economic realities have gutted small- and medium-scale agricultural infrastructure and that Hawaii and the USA are facing a food skills crisis in production, handling, and preparation.

In terms of environmental degradation caused by industrial agriculture I do wonder if Hawaii could conduct mechanized, annual staple food row cropping per unit land area any better than the Midwestern USA, particularly given our soil and environmental challenges. The reviews by El-Swaify (2000, 2002) provide considerable caution and we have not fully developed and economically/environmentally compared the requisite no-till, conservation tillage, crop rotation, and precision nutrient management practices. In contrast, major agroecological and big data/sensor based management advances have been made during the past few decades through applied research on the world’s breadbasket soils, mainly Mollisols and fertile Alfisols and Vertisols (Liu et al., 2012).

Some attendees were confident that state-of-the-art, highly-automated, sensor-controlled greenhouse systems will emerge and lead the way in Hawaii. While this could assist with Hawaii being more competitive in the production of certain horticultural food crops, it will do little for staple crop production which provides the foundation for food security. At this point financial investment is missing as well as the ideal agricultural technology workforce which effectively integrates the plant science disciplines and electronic skill sets. With precision management you need people who know what the data mean in relation to optimizing management. I have been to farms where people are using modern technology yet their nutrient and water management is far from ideal because they lack a solid understanding of plant physiology, soil/water chemistry, etc.

With respect to embracing more indigenous knowledge I agree with the assessment of Briggs (2005) that it is often an overly romanticized and decontextualized mantra. He appropriately cautions against the misguided notion of indigenous and pre-industrial knowledge as a panacea to the ills of local agriculture in the present. While much can and should be learned and respected from indigenous practices (Ladefoged et al., 2009; Vitousek et al., 2014; Lincoln and Vitousek, 2017) it always amazes me how many people naively seem to believe that pre-industrial, pre-colonial agriculture was essentially problem free and provided an Eden-like existence. Pre-European/Asian contact Native Hawaiian agriculture was undoubtedly vulnerable to famine (Currey, 1980). For the most part farmers, including the post-European/Asian contact Hawaiian farmers of centuries ago, are pragmatic, eclectic, and use knowledge that works form them if it makes money and is socio-culturally acceptable regardless if it is drawn locally or from some other source. Idealistic farmers who don’t adopt to change usually move on or find non-farm income sources to subsidize their operations.

I also found it interesting how many people love to talk about the evils of monocultures while failing to realize both nature (Pinus spp. forest, Spartina spp. marsh grassland, etc.) and the indigenous agriculture of the Asian-Pacific region (paddy taro and rice, sweet potato, etc.) have provided examples of long-term successful monocultures based on genetic diversity and multiple cultivars. Others seemed be only for small farms while neglecting the fact that the presence of medium and large farms often provides the economic stability needed for businesses in the agricultural input sector like fertilizer and feed businesses.
Last month I was informed about a popular agriculture supply business on Oahu closing its doors allegedly in a large part because Dow-DuPonte Agriculture was leaving to consolidate all of its Hawaii operations on Kauai. This means reduced options for small farmers in the area and most should know that supply businesses are often volume driven in terms of their selling price points.

While I was listening to the presentation by Dr. Maggi Adamek, Blue Zones Project’s national food policy expert I kept on thinking about the strong parallels that I had periodically heard and read about for island nations in the Caribbean and the fact that Hawaii largely discusses its similar food system challenges in isolation. Furthermore, when we seek external expertise it is usually from the continental USA rather than tropical island nations facing the same constraints as Hawaii. For an excellent review of the food security, food sovereignty, and production issues faced by Caribbean island nations the reader is referred to the review by Beckford (2012). For the parallels in Hawaii please see Mostafanezhad and Suryanata (2018). Some general conclusions and inferences that one can make from these papers are as follows:

1. **Agricultural policies/market distortions** since the 1970s, particularly in the Caribbean, to encourage greater food self-sufficiency and eating locally grown foods did not meet with great long-term success. Hawaii has been less aggressive in this regard which according to some prominent economists is a good thing as the result would likely have mirrored the outcomes in the Caribbean countries and could have violated US interstate commerce laws.

2. **Daunting competition from cheap food imports**, expensive agricultural production inputs and technologies that are mainly imported, labor challenges, lack of access to low-interest financing, lack of relevant applied and on-farm agricultural production systems research, lack of proper post-harvest handling/agroprocessing and storage, poor record keeping, and limited resilience in the face of devastating weather, environmental and market challenges, etc. forces many out of small-scale farming relatively quickly.

3. **Tourism** boomed over the past 50 years while local agriculture declined in a large part because small-scale agriculture is no longer economically competitive in many product sectors. Furthermore, the link between local agriculture and tourism has never been strongly supported.

4. **Agricultural researchers** need to be better linked with farmers and the community.

In terms of linking agricultural researchers with farmers, Hawaii should have never ended the Governor’s Agricultural Coordinating Committee (GACC) funding during the 1990s which used to facilitate applied research in partnership with farmers. Indeed, we have many challenges to address including better educating the general public about food, it’s production, and the ever prevalent marketing hype and misinformation. As I have long maintained, increasing local food production won’t be easy, particularly in the absence of effective incentives for farming and better funding for applied agricultural production technology and marketing research. In this regard I look forward to some novel ideas emerging from the Blue Zones Project – Hawaii.

References:


The Pacific Aquaculture and Coastal Resources Center (PACRC) welcomes two new employees. Katherine Stasser (Katie), as the newest technician to support the PACRC’s fish research program. She will assist with research to develop aquaculture methods for growing aholehole, moi and nabeta. These efforts are supported by new grants from NOAA ($272,622) and Sea Grant ($182,955). She will also support the coral reef fish breeding program supported by the $1.7 million gift from the Hawaii Community Foundation and the Eric Anderson and Roger Beck fund. She will assist in training the UHH students who work on the fish research and development efforts (currently 6 students).

Scott Dinning is the new PACRC Shellfish Hatchery manager, taking over from Jame Moore. Mr. Moore graduated from UHH and has provided exemplary service to the PACRC over the last three years. The PACRC Shellfish Hatchery manager is extremely important since the Manager leads the training for the 12-15 students receiving hands-on training in the hatchery every semester. The Manager also oversees research and development that supports the Hilo Bay Shellfish Farming Cooperative effort (supported by a Rural Development USDA grant for $25,000 and a Sea Grant grant for $149,972) and a host of other shellfish related initiatives.

The PACRC also congratulates its student research assistants who graduate in December: Marcellus Thomas, Andrea Ehlers, Marni Rem-McGeachy and Jaylen Millan. These students are part of the PACRC Aquaculture Student Workforce Training Program and are instrumental in the day-to-day operations and research at the Center. We are grateful for their service and wish them the best in their future careers.
Unmanned Aerial Systems (UAS) Application in Hawaii’s Agriculture
By Dr. Bruce Mathews

A new and increasingly used device for Hawaii’s agriculture is UAS which were initially commonly called drones. These devices are used to obtain overhead aerial imagery of farm fields and allow farmers and their professional advisors to gain timely overhead “birds eye” views of the variability in the production operation. Crops can be monitored for potential yield impacting problems throughout their production cycle and maps readily generated with the data collected so that the farmer can easily see the variability and take appropriate action. UAS have been used for monitoring crop nutrient deficiencies, disease/pest/storm damage, water stress, the condition of pastures and grazing livestock, and the targeted paint-ball type spraying of weeds. Most UAS used in Hawaii’s agriculture are used for real-time video scouting assessment of crops and livestock and making maps.

UAS come in two types: multi-rotors and fixed-wing. The multi-rotor helicopter type have the advantage of being able to take off and land vertically which helps when obstructions like trees are present. They are also more easily stabilized to fly straight and less jittery under windy conditions however their disadvantage is that they use a lot of power and hence have a shorter range per battery charge and smaller payload capacity.

UAS technology is rapidly changing with emerging apps for completely automated flights across fields from takeoff to landing. Specialized sensors and cameras are increasingly being mounted on UAS to provide greater information than the standard RGB (red-green-blue) cameras. NGB cameras are basically RGB cameras with special filters to replace selected color wavelengths and collect near infrared wavelengths that can be used to estimate vegetation types. Green wavelengths seem to work well to identify certain types of insect damage. Three dimensional models are used to estimate crop growth and potential yield. This being said UAS technology is increasingly being coupled with ground based sensors on robots to give the best assessments for orchard crops where the canopy obscures UAS views of fruits, nuts, and berries.

One of the key skill sets needed in UAS applications to agriculture is learning how to accurately transform image data into information meaningful to the farmer. Just like traditional quantitative soil and plant tissue testing, people must be cautious in how they analyze and interpret the data. Mistakes are often made in the modeling of the data and using inappropriate correction factors or failing to account for factors that impact the magnitude of selected sensor readings. Like most tools in agricultural management the real challenge lies in the correct analysis and interpretation of the data.

Producing high quality field maps from the assembled images acquired requires specialized software/hardware and often internet access. An assembled field map typically called an ortho-mosaic can then be used to construct a precise prescription application map for inputs such as fertilizer. Tractors equipped with GPS, computers, and variable rate fertilizer spreaders can be used to precision apply nutrients according to the mapped crop needs. Integration of collected data and applications over time into a geographic information system (GIS) can provide further insight into long term trends.

It’s hard to say what the next big development will be in terms of UAS and sensor technology applications in agriculture. Mini UAS are under consideration for greenhouse and small farmer applications but so are ground based robots. Regardless, industry leaders indicate that next generation agriculture will need people well versed in UAS, sensor technologies, robotics/automation, and data modeling and associated prescriptive interpretation.
SNAPSHOTS: This section features faculty and students of CAFNRM and their hands-on activities

Brennan R. Hozaki, a CAFNRM student, presenting his final project in Nursery Management (HORT 266) class, December 3rd, 2018. (photograph: Dr. Sharad P. Marahatta).

First prize owned poster at the first CAFNRM Symposium. Estreya L. Enquist (left), presenting her Principles of Horticulture (HORT 262) class project results (poster) to the symposium participants, November 30th, 2018. (photograph: Dr. Sharad P. Marahatta).
SNAPSHOTS: This section features faculty and students of CAFNRM and their hands-on activities

Students in Principles of Horticulture (HORT 262) class of Fall 2018 growing poinsettia plants in CAFNRM greenhouse. Photographs were taken at two (September 6th, 2018) (Top) and twelve (November 15th, 2018) (bottom) weeks after poinsettia transplanting (photograph: Dr. Sharad P. Marahatta).
SNAPSHOTS: This section features faculty and students of CAFNRM and their hands-on activities

CAFNRM faculty Dr. Sharad P. Marahatta (left) and Dr. Jesse Eiben (right) attending the Opihi Day at the University of Hawaii at Hilo, Library Lanai, November 13th, 2018 (photograph: event participant).

Students in Nursery Management (HORT 266) class of Fall 2018 (right) visiting Mahilani Farm. Derek Foly (left), Trail and Tour Manager at Mahilani Farm, giving a tour to HORT 266 class to the farm nursery, November 7th, 2018 (photograph: Dr. Sharad P. Marahatta).
SNAPSHOTS: This section features faculty and students of CAFNRM and their hands-on activities

Hort 352, Tropical Fruit Crop Production, students tasting cacao beans at Hawaiian Chocolate Factory. (Photo: Dr. Norman Arancon)

Dr. Francis Dumanig chairing a session of the 1st CAFNRM Student Symposium.
Photo: Charles Fernandez