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ORAL PRESENTATIONS

SESSION I

OS 1-1

AGROECOLOGY IN HIGHER EDUCATION: MULTIDIMENSIONAL VISION AS A RESILIENCE STRATEGY TO CLIMATE CHANGE

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The agro-export model faces several problems today, both globally and regionally, which is why there is an urgent need to promote a new agricultural paradigm that ensures sufficient healthy and accessible food for the growing world population. This change in agriculture will have to be made using the soil properly, with less oil, less water, nitrogen and other resources, in a context of socio-economic vulnerability and climate change. To understand the need to move to a new paradigm, it is essential to provide comprehensive training for professionals in the agricultural and related sciences, with new approaches, criteria and ways of understanding reality from an ethical and multidimensional perspective. That is why the study of real cases in university education through a holistic vision, participatory methodology and systemic analysis, generates in the students, new questions. At the department of Agricultural Sciences of Comahue National University, Patagonia, Argentina an educational study was conducted with a population of students studying Agro ecology in the years 2014-2015-2016. The students were divided into groups of four. Each group was assigned a regional productive unit (RPU) to carry out field work using the sustainability indicators technique. With the results obtained, each group proposed suitable management alternatives to increase sustainability in the RPU's. At the end of the work, students were able to define the problems of each productive unit, propose and discuss diverse hypotheses and expose different management alternatives taking into account the critical points detected in the agro ecosystems analysed. Students showed high levels of motivation, managed to interact with different actors of the territory and solved specific agronomic problems, based on agro ecology as an alternative response to industrial agriculture.

Keywords: Participatory methodology, Sustainability indicators, Agro ecology, Multidimensional thinking

OS 1-2

RESPONDING TO INDUSTRY NEEDS FOR EDUCATION AND TRAINING IN HORTICULTURE

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Building human resource capacity and leadership in horticulture is of fundamental importance to the ongoing success and growth of the industry in Australia. The horticultural workforce, however, is less engaged with formal training and education compared with the broader agricultural sector. This paper discusses the recent development and delivery of a Masterclass in Horticultural Business, a new national program requested by and tailor made for Australian business managers and entrepreneurs in horticulture. The program is led by the University of Tasmania



(Australia) and has been developed in collaboration with Wageningen Academy (Netherlands), Lincoln University (New Zealand) and Horticulture Innovation Australia for national delivery. First offered in 2017, the program has attracted a range of industry professionals in horticulture from across Australia. The design of the Masterclass necessitated online delivery of modules to foster innovative and creative thinking and engagement among students. Intensive face-to-face workshops and field visits are provided for students in parallel with Work Integrated Learning. Modules are designed to promote interaction of the participants with their staff or employers. In this way the students are applying learnings to their workplace, raising questions and stimulating discussions about Agribusiness. In their final assessment the participants present a business plan to their fellow students, academics and industry representatives. This is a lasting and high impact learning experience that consolidates the curriculum and ensure capacity building for industry. The high degree of industry engagement and endorsement as well as international collaboration in the design of the Masterclass is unique. Highlighted are the challenges and the benefits of this innovative approach to developing and delivering tailor-designed educational and training courses to build human resource capacity and leadership for the horticulture sector.

Keywords: Online teaching; Human resource Capacity; Masterclass; Business; Education

OS 1-3

PERIURBAN HORTICULTURE AS A TOOL FOR INTEGRATIVE EDUCATION IN HORTICULTURE

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Periurban horticulture includes all economic activities in periurban zones of urban areas. As such, it corresponds to various opportunities and constraints for horticulture. Due to this particular situation, periurban horticulture highlight in an intensive way all the challenges addressed to horticulture. It represents a valuable tool for education in horticulture as a way to integrate diverse disciplines (agronomy, economics, urbanism, land management...). Five cities in France were studied over 15 years in the framework of a teaching unit in periurban horticulture at master level. The analysis of students of the sustainable development of the periurban activities in an agroecology perspective will be presented. Lessons for horticulture education will be drawn.

Keywords: Vegetables, Urban horticulture, Horticulture system

OS 1-4

CROP MASTER ' A PRIVATE INDUSTRY INITIATIVE TO TRAIN HORTI EXTENSION WORKERS

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Fruit and Vegetable (F&V) crops spell variety in customer needs and requirement on and beyond the farm. In order to increase both food security and safety, Bayer took the initiative to develop and to disseminate knowledge and expertise on F&V crops. Since 2009, in cooperation with universities, Global Fruit and vegetables consultants, research institutions and the International Society for Horticulture Science network, Bayer developed various training modules covering agronomic requirements of horticultural crops – including crop-, canopy-, water- and nutrient management, pest,disease and resistance management, safe use and residue management. The crop Master activities were integrated into 3 strategic pillars: the Crop management program, the Agricultural Sustainability program and BayGAP (Foundation training on Good Agricultural Practices), addressing the specific needs of farmers, advisors, partners in the food value chain and governmental institutions. The Crop Master program focuses on the APAC, African and LATAM regions with 3 different levels (basic – advanced – master crop specialist) to ensure connection to the individual level of know-how in the region and country. The crop specialist training is



concluded with a master degree. The Crop Master training is designed along a combination of classroom, online and in-field trainings. The integrated concept of the Crop Master has been proven to be an effective model to transfer knowledge and expertise and to increase awareness, retention and impact. The acquired knowledge supports advisors and crop specialist to effectively define customized agronomic solutions to address the need of growers and value chain partners. The Crop Master examples will be discussed with life examples for apple, banana, mango, durian, grape, citrus, coffee, tomato and potato.

Keywords: Crop master, BayGAP, Customized agronomic solutions

OS 1-5

BAYER FORWARD FARMING

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The UN Sustainable Development Goals state that, by 2050, the world population is expected to grow by three billion – three billion more people that will need to depend on a reliable food supply. Therefore, today's food and agriculture system must continue to address the challenge of improving productivity sustainably while meeting the growing demand for a nutritious food supply. At Bayer, we believe that sustainable agriculture is the best way to overcome food production challenges and raise both productivity and environmental compatibility. Bayer ForwardFarming is a knowledge platform that demonstrates sustainable agriculture in practice. In partnership with independent farmers, the initiative creates opportunities for demonstration, dialogue and collaboration on farms around the world. Customized agronomic solutions, proactive stewardship measures, and partnerships are implemented to show how sustainability can be achieved in modern agriculture. ForwardFarms are independent farms that are representative of the region in which they are located. The farmers proactively seek improvements in sustainable agriculture practices, and the farms serve as a hub for exchange of ideas and insights that can be implemented locally, and globally. These farms benefit from partnerships with both the public and private sector to support their business, produce high-quality food, feed, and renewable raw materials, while at the same time preserving farmland and natural resources such as water, soil and biodiversity. The ForwardFarming initiative launched in 2011 expanded into an international network of farms. Five of the six established ForwardFarms in Europe include horticulture crops like grapes, pears, olives, cherries and potatoes. In 2017 several additional farms were added to the ForwardFarming network in Europe and the Americas, with more planned around the globe for 2018. By implementing applied sustainable agricultural practices and new technologies, hosting on-farm informative events and engaging in partnerships, the Bayer ForwardFarms serve as an example to demonstrate sustainable agriculture.

Keywords: Forward farming, Sustainable agriculture, Sustainable development goals

OTHER ORAL PRESENTATIONS

OS-6

SAVE AND GROW: CHANGING THE MINDSETS WITH EVIDENCE FROM HORTICULTURE CROPPING SYSTEMS (FRUITS, VEGETABLES, ROOTS AND TUBER CROPS)

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As the world population is projected to reach 9 billion by the year 2050, the present paradigm of intensive crop production cannot meet the challenges of the new millennium. In order to grow, agriculture must learn to save. The Food and Agriculture Organization (FAO)'s publication "Save and Grow: A policymaker's guide to the sustainable intensification of smallholder crop production" published in 2011 presented a new paradigm shift in agriculture. Meanwhile, horticultural crops are gaining more importance in nutrition improvement, provision of livelihood opportunities for marginalised farmers, as well as in the diversification of production systems for increased resilience to climate change effects. Horticultural cropping systems are also seen as an opportunity to create employment, market opportunities and income, empower women, protect and enrich agrobiodiversity and attract youth to engage in agriculture using modern information and communication technologies (ICT). As the health consequences become a key factor in food consumption choices globally, the role of vegetables and fruit in diets is already becoming increasingly significant. This also entails improvement of the quality, quantity and efficiency of horticultural production systems respectively. Recognizing that the principles set out in the original Save and Grow publication remain valid, this follow-up publication focuses on sustainability pathways in horticulture cropping systems. It demonstrates pedagogically how the Save and Grow principles can and do work with horticulture systems for smallholder farmers in the developing regions, and for commercial farmers all over the world. It highlights and explains the ecosystem approach to soil, crop, water, nutrient and pest management and farm operations as well as ways to reduce losses and waste. Horticulture systems cover an extremely wide range of ecosystems and crops, therefore relevant illustrative examples collected through the horticulture global community of practice and from numerous partners have been included for an easy understanding. It is a valuable reference for educators and trainers, policymakers and practitioners, providing tested good practices and innovative approaches of promoting sustainable intensification of horticulture cropping systems.

Keywords: Save and grow, Horticulture, Cropping systems, Sustainable agriculture, Agroecology, Sustainable intensification

OS-7

EFFECT OF CAPACITY BUILDING ON KNOWLEDGE OF FARMERS ABOUT IMPROVED CITRUS NURSERY PRACTICES IN NIHORT ADOPTED VILLAGES

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Citrus nursery practices are a way of shortening the gestation period of Citrus crops. It has been the practice of extension arm of the Institute to transfer this technology. This study was carried out to determine the effect of the capacity building on the knowledge level of respondents. The total population for the study was 60 which were arrived at through random selection of farmers in the two adopted villages and a village outside the adopted villages for comparison. Data was collected with structured interview guide and was analyzed using descriptive (frequencies, percentages, charts) and inferential statistics (chi-square and t-test). The result from the study showed that most of the farmers were male, had no formal education and were between the ages of 41-60 (58.3%, 53.3%, 40% respectively), majority were married (96.7%). The major constraint faced in citrus nursery practices was inadequate knowledge (48.3%). There was significant relationship between the sex, farming experience, and participation in capacity building ($P=0.50, 0.03, 0.00$ respectively) and the total knowledge score of the respondents. Also a significant difference (0.00) exists between the knowledge of farmers in the adopted villages when compared with Non-adopted villages ($P<0.05$). It was concluded that youth of NIHORT adopted villages should be more involved and better encouraged in horticultural production. Also the Institute should be more committed towards the development of the adopted villages through facilitation of other stakeholders.

Keywords: Budding, Capacity Building, Knowledge level, Horticultural farmers and Adopted villages



OS-8

EDUCATION PATHWAY FOR THE PROTECTED CROPPING INDUSTRY IN NEW SOUTH WALES, AUSTRALIA

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The Australian protected cropping industry is a rapidly developing sector and is valued at around \$1.8 billion at the farm gate per annum. It is the fastest growing food producing sector with an annual industry expansion of 4-6% per annum. A barrier to expansion of the industry is the high shortage of skilled workers, junior growers, middle-level greenhouse managers and senior growers. Also, a lack of appropriate teaching courses is a constraint on the industry, as there is a growing demand from the protected cropping industry for a trained and skilled workforce. Courses are needed on all levels: university courses for future high-level managers and senior growers, vocational courses for skilled workers and junior growers and masterclasses targeting short-term industry need for knowledge on high-tech farming. A targeted education pathway for the protected cropping industry is currently under development in the Australian state of New South Wales. The innovative aspects of this proposal are three-fold. The model proposes Australia's first, formal collaborative teaching pathway program in greenhouse horticulture involving a team consisting higher education providers, vocational education and training (VET) providers, industry groups and employers. There are existing pathways between VET providers (e.g., Western Sydney Institute TAFE, Tocal College) and higher Education providers (e.g., Western Sydney University, University of New England) in agriculture. However, these pathways are quite general with limited capacity due to the lack of industry involvement and lack of focus on greenhouse horticulture. The model in this proposal will encourage students into a targeted career pathway that has an industry-advised approach dedicated for greenhouse horticulture.

Keywords: Tertiary pathways; STEM; Education partnerships

OS-9

BRIDGING THE GAP BETWEEN RESEARCH AND PRACTICE

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Scientific research provides answers that if adequately communicated to the industry can benefit the farmer, the environment and the consumer. One example is presented where scientific research can be used to improve fertiliser management practice to reduce environmental pollution. The success of any research in improving practice depends on the need to take account of all the stakeholders in the process. For horticultural crops there is a need to ensure that quality as well as yield is maintained otherwise there is a tendency for farmers to over-fertilise. The process leading to more optimised fertiliser applications requires efficient two-way delivery of knowledge between the researcher and farmers on the ground. This process is complicated by the needs and agenda of a range of stakeholders which include the policy makers, the regulators, the market represented in the main by supermarkets, many non-governmental organisations and fertiliser companies. Additionally the funding required for effective and sustained communication is not always available. This paper attempts to understand why farmers fail to follow the best practices that are available and how with better knowledge transfer, such practices can help to benefit the farmer and society in a much wider context.

Keywords: Knowledge transfer, "Education Policy", Reward

