

# Engineering and Technology Innovation for Global Food Security

An ASABE Global Initiative Conference

24-27 October 2016 – Stellenbosch, South Africa

## PROGRAMME

### MONDAY, OCTOBER 24

- 16:30-18:00     Registration: Conference Centre  
Loading of presentations for Themes 1 & 2. Technician at registration table  
Mounting of posters in Simonsberg Rooms: Simons/Stellen/Helderberg
- 18:00-20:00     Conference Welcome Reception  
Location: Foyer

### TUESDAY, OCTOBER 25

- 8:30-10:00     **PLENARY SESSION**  
Opening Comments by Maynard Herron, ASABE President  
Location: Auditorium
- Comments by Mary Leigh Wolfe, ASABE President (2015-2016) – Session Moderator  
Welcome by Professor Hester Klopper, Vice Rector, Strategic Initiative and Internationalization  
Stellenbosch University  
Comments from SAIAE Prof. Jeff Smithers  
Comments by Dr. Tadeusz Juliszewski, President, CIGR  
Comments by Dr. Shadrack Moephuli, CEO, Agricultural Research Council  
Introduction of Ambassador by Eric Bost, Assistant Director, External Relations  
Borlaug Institute of International Agriculture  
Comments by Ambassador Patrick Gaspard
- Introduction of Plenary Speaker by Mary Leigh Wolfe  
**Keynote Presentation**  
“The Role of Emerging Technologies in Food Security – NEPAD’s Perspective”  
Professor Diran Makinde, Senior Advisor  
African Biosafety Network of Expertise (ABNE), NEPAD
- Questions and answers  
Closing comments by Maynard Herron, President, ASABE
- 10:00-10:30     **BREAK**  
Location: Foyer

Tuesday, October 25 – 10:30-12:30

## **THEME 1 – ENHANCEMENT OF FOOD AVAILABILITY THROUGH MECHANIZATION AND PRECISION AGRICULTURE**

Location: Auditorium

Moderator(s): Ganesh Bora, Mississippi State University - USA  
Dharmendra Saraswat, Purdue University - USA

Time	Title, Author, Institution, Country and Co-Authors
10:30-11:00	Invited Speaker: Role of mechanization and precision agriculture in food availability in context of smallholder farms John Schueller, University of Florida - USA
11:00-11:15	Profiling the contribution of agricultural engineering technologies to mechanization of smallholder agriculture in Uganda Joshua Wanyama, Makerere University - Uganda (Joshua Wanyama, Noble Banadda, Florence Kiyimba, Samuel Okurut, Ahamada Zziwa, Isa Kabenge, Charles Mutumba, Peter Tumutegyereize, Allan Komakech, Nicholas Kiggundu)
11:15-11:30	Farm machinery demand and power requirement for mechanizing small rice farming in Kampar region, Indonesia Ujang Paman, Riau Islamic University – Indonesia (Ujang Paman, Asrol, Saipul Bahri, Khairizal)
11:30-11:45	Strategies for enhancement of appropriate-scale mechanization for sustainable intensification Alan Hansen, University of Illinois at Urbana-Champaign - USA
11:45-12:00	Engineering solutions to ensure food security: an economic perspective Craig Gundersen, University of Illinois - USA (Kathy Baylis, Ben Crost, Craig Gundersen)
12:00-12:15	Post-harvest mechanization of millet cultivation helps alleviate drudgery and improve crop quality and yield Shrikalaa Kannan, McGill University - Canada (Shrikalaa Kannan, Samson Sotocinal, Valérie Orsat, Vijaya Raghavan)
12:15-12:30	Appropriate scale mechanization for biomass utilization for sustainable food production Indra Mani, CAR-Indian Agricultural Research Institute - India

### **12:30-13:30 LUNCH**

Location: Foyer

Tuesday, October 25 – 13:30-15:00

## **OPEN FORUMS**

*Open Forums will address questions related to the way forward and opportunities for global partnership.*

### **Group 1 Global Engagement and Active Partnerships to Address Grand Challenges**

Facilitator: Lalit Verma, University of Arkansas - USA  
Panelists: Claus Sorensen, EuroAg Eng President - Denmark  
Vijaya Raghavan, CSBE President - Canada  
Erik Schmidt, NCEA - Australia  
Yoshisuke Kishida, AMA - Japan  
Omar Trujillo, ACTA - Colombia  
Adewumi Babatunde, NIAE - Nigeria  
M.O. Faborde, West African Society of Agricultural Engineers  
Indra Mani, Indian Society of Agricultural Engineering  
Linus Opara, AfroAg Eng - South Africa  
Tadeusz Juliszewski, CIGR President - Poland  
Maynard Herron, ASABE President - USA

Location: Auditorium

An open forum to share locally relevant issues, challenges and opportunities from participating countries is proposed. The forum will consist of an overview of the ASABE Global Initiative and a few short presentations representing different continents/regions of the world, followed by a discussion period. The forum will bring together representatives engaged in engineering, technology, policy, economics, etc. of projects related to sustainable food, energy and water systems. Innovation, appropriate technology, implementation, funding, commercialization and policy matters will be covered. The goal is to share and react to regional challenges with proposed solutions and identifying future course of action.

## **Group 2 Policies and Innovations for Productive Sustainable Food Systems**

Facilitator: Ann Steensland, Global Harvest Initiative – USA  
Darrin Drollinger, ASABE – USA

Panelists: Andre Westerveld, Sub-Saharan Africa, Elanco Animal Health - South Africa  
Tony Esmeraldo, DuPont Pioneer - South Africa  
Stephanie Midgley, Western Cape Department of Agriculture - South Africa  
Mark Moore, AGCO Corporation - USA  
John George, Agricultural Engineering Associate – USA  
Andrew Bennett, Monsanto Company – South Africa  
Barbra Muzata, DuPont Pioneer

Location: Simonsberg Room

This Open Forum session will highlight technologies and strategies that increase the productivity of food systems in a way that is economically viable, socially responsible and environmentally sustainable. It will provide attendees with a deeper understanding of the policy context within which food systems operate and how these policies influence public and private sector investments in agricultural innovation and value chain development. This session will also include a presentation of Global Harvest Initiative's 2016 Global Agricultural Productivity Report® (GAP Report®) which focuses on five policy areas for productive sustainable food systems: investing in agricultural R&D and extension, embracing science-based and information technologies, enhancing private sector involvement in agriculture and infrastructure, fostering capacity for regional and global trade and cultivating partnerships for sustainable growth.

## **Group 3 Actors and Impacts of Global Postharvest Loss Prevention Initiatives**

Facilitator: Robert A. Easter, University of Illinois - USA

Panelists: Rafael Gavilance Flor, Rockefeller Foundation – Kenya  
Prasanta Kalita, University of Illinois at Urbana-Champaign – USA  
Dirk Maier, Iowa State University – USA

Location: Helderberg Room

This ADM Institute for the Prevention of Postharvest Loss sponsored forum will highlight global postharvest loss prevention initiatives currently undertaken by various public, private, and philanthropic organizations. The attendees will learn about the postharvest loss issues in different parts of the world and current initiatives being taken to curb those problems. They will also learn about actors and strategies various organizations are adopting to reduce global postharvest losses. Additionally, this session aims to highlight current and future opportunities and how to get involved to help smallholder farmers by reducing their losses, increasing their income, and enhancing their lives and livelihood.

15:00-15:30 BREAK  
Location: Foyer

Tuesday, October 25 – 15:30-17:30

## **THEME 2 – ENHANCEMENT OF FOOD AVAILABILITY THROUGH WATER MANAGEMENT**

Location: Auditorium

Moderator(s): Indrajeet Chaubey, Purdue University - USA  
Margaret Gitau, Purdue University - USA

Time Title, Author, Institution, Country and Co-Authors

15:30-16:00 Invited Speaker: Role of water management in food availability in context of smallholder farms  
Everisto Mapedza, International Water Management Institute (IWMI) - South Africa

16:00-16:15 Smallholder water management innovations for improving food security in Sub-Saharan Africa  
Joshua Wanyama, Makerere University - Uganda  
(Joshua Wanyama, Noble Banadda, Isaya Kisekka, Allan John Komakech, Nicholas Kiggundu, Ahamada Zziwa, Isa Kabenge, Charles Mutumba)

16:15-16:30 Improving 'on-farm' water management in Australia through the use of crop models  
Allan Peake, CSIRO Agriculture - Australia  
(Allan S. Peake, James R. Hunt, Zvi Hochman)

16:30-16:45 Agroclimate Mozambique: adapting agroclimate for climate smart agricultural management in Mozambique  
Clyde Fraise, Univ of Florida – USA  
(Clyde Fraise)

16:45-17:00 Forecasting water stress and yield trends  
Clyde Munster, Texas A&M University - USA  
(Clyde Munster, Rachel McDaniel, John Nielsen-Gammon)

17:00-17:15 Improving dry season irrigation in the eastern Gangetic plains  
Erik Schmidt, University of Southern Queensland - Australia  
(Erik Schmidt, Michael Scobie)

17:15-17:30 Sustainable water use under changing land use and climate variability for global food security: case study of Mkomazi river basin  
Oseni Amoo, Durban University of Technology - South Africa  
(O.T. Amoo, B. Dzwauro, A. Allopi)

Tuesday, October 25 – 18:00-21:00

## **DINNER**

18:00-21:00 BBQ Dinner  
Location: Simonsberg Rooms: Simons/Stellen/Helderberg

## **WEDNESDAY, OCTOBER 26**

Wednesday, October 26 – 8:30-10:30

### **THEME 3 – POSTHARVEST AND VALUE-ADDED PROCESSING FOR EFFICIENT FOOD UTILIZATION**

Location: Auditorium

Moderator(s): Sundaram Gunasekaran, University of Wisconsin - USA  
Vjaya Raghavan, McGill University - Canada

Time	Title, Author, Institution, Country and Co-Authors
8:30-9:00	Invited Speaker: Role of postharvest and value-added processing in food utilization in context of smallholder farms Ramabhau Tuma Patil, TIT Group Institutions - India
9:00-9:15	Postharvest storage technology for fruit and vegetables appropriate for use by Small Scale Farmers in South Africa Sipho Sibanda, Agricultural Research Council - South Africa (Sipho Sibanda, Tilahun Seyoum Workneh, Khuthadzo Mugodo)
9:15-9:30	Modern post-harvest storage technologies help reduce post-harvest losses of horticulture crops in India Vijaya Raghavan, McGill University - Canada (Shrikalaa Kannan, Darwin Lyew, Valérie Orsat, Vijaya Raghavan)
9:30-9:45	Engineering solutions in grain storage for global food security Lawrence O.Gumbe, Technical University of Kenya - Kenya
9:45-10:00	Application of CFD simulation in the design of improved solar fruit dryer Nicholas Kiggundu, Makerere University - Uganda (Cyrus Galyaki, Nicholas Kiggundu, Noble Banadda, John H. Muyonga, Joshua Wanyama)
10:00-10:15	Multipurpose solar dryer concept for small and medium farmholders Klein Ileleji, Purdue University - USA (Klein E. Ileleji, Ravindra Shrestha, Jesumayomikun "Mayo" Olasubulumi, David Latka, Mirlande Hector)
10:15-10:30	Biotechnology blocks the production of gossypol in cottonseed, capturing the value-added potential of this technology will require a reevaluation and modernization of cottonseed processing Thomas Wedegaertner, Cotton Incorporated - USA (Tom Wedegaertner, Greg Holt)
<b>10:30-11:00</b>	<b>BREAK</b> Location: Foyer

Wednesday, October 26 – 11:00-12:30

## OPEN FORUMS

Open Forums will address questions related to the way forward and opportunities for global partnership.

### Group 4 **Agricultural Engineering in Africa - Past, Present and Future**

Facilitator: Umezuruike Linus Opara, Stellenbosch University - South Africa

Panelists: Jeff Smithers, University of KwaZulu Natal – South Africa

Noble Banadda, Makerere University – Uganda

Michael Faborode, Obafemi Awolowo University – Nigeria

Margaret W. Gitau, Purdue University – USA

Gajendra Singh, Indian Agricultural Research Institute – India

Location: Auditorium

It is now widely recognised among African leadership, governments, development experts and the international community that the poor state of African agriculture remains the major Achilles' heel of the Continent's economic transformation and industrialisation. The majority of Africans still live in rural areas, remain poor, and depend on subsistence agriculture for livelihood. Put plainly, Africa and the majority of its people will remain poor and under-developed unless we radically and sufficiently change the way we practice agriculture to increase the production of food, feed and fibre, and process these raw materials into value-added products and services that are demanded and traded locally, regionally and globally. Rather than the current predominance of subsistence agriculture, the factors of agricultural production (land, labour, capital) must be transformed into Wealth through agribusiness, a process which creates gainful employment (waged labour) opportunities, on and off the farm. Success in this new agriculture for wealth creation requires significant improvements in factor productivity as well as total production, and reduction of pre- and postharvest losses. These improvements will be underpinned by the development and deployment of new skills (labour) and technological innovations across the value chain, including the protection of our increasingly fragile environment and eco-systems. More than ever before and exceeding the challenges faced by the rest of the world during their periods of agricultural revolution, the new African agriculture of the 21<sup>st</sup> century and beyond must be climate smart. The agricultural engineering discipline and related professions have key roles to play in realising successful transformation of African agriculture. But questions and doubts remain. (1) What is the state of agricultural engineering technologies and their application in African agriculture? (2) How well are current academic and research institutions and programmes aligned to meet the present and future needs of industry in terms of graduate attributes, skills, experiential learning, work readiness, and production of new knowledge and technological innovations? (3) What is the status of agricultural engineering professional societies and networks at country, regional and continental levels – what roles and impacts have they made and/or could potentially make towards Agenda 2063: the Africa We Want (and more directly, the African Agriculture We Want) and how could these bodies be strengthened for relevance and impact? Recently, the Pan African Society for Agricultural Engineering – AfroAgEng, was formed ([www.pasae.org.za](http://www.pasae.org.za)) as the continental umbrella of professionals interested in the promotion and advancement of agricultural engineering discipline, profession and practice in Africa. What lessons can we learn from the experiences and operation of similar continental and regional professional associations?

### Group 5 **Capacity Building for Mitigation of Climate Change by Use of Precision Agriculture in Developing Countries**

Facilitator: Ganesh Bora, Mississippi State University - USA

Panelists: Gajendra Singh, Indian Agricultural Research Institute – India

Dharmendra Saraswat, Purdue University, USA

Phong Nguyen, Vietnam Academy of Water Resources, Vietnam

Koffi Djaman, Africa Rice Center - Senegal

Location: Simonsberg Room

Policy makers along with scientist, academicians and progressive farmers in South and South-East Asia have substantial influence on development of modern agricultural methodologies. Precision Agriculture in the USA has greatly optimized the use and contributed in the reduction of use of chemicals and fertilizer with positive economic and environmental impact and increase in crop yield. This has resulted in reduction of GHG emissions and aided in mitigating climate change impacts. Similar technology with adaptive modifications/customization can be used in developing countries and the policy makers and professionals of these countries could be trained to influence the farmers for such adoption.

### Group 6 **The Potentials of Biogas Technology in Enhancing Energy and Food Security**

Facilitator(s): Taisha Venort, Purdue University - USA

Panelists: Isa Kabenge, Makerere University – Uganda

Nicholas Kiggundu, Makerere University – Uganda

Ji-Qin Ni, Purdue University - USA

Location: Stellenberg Room

The integration of biogas technology into rural livestock farming systems is becoming more common in Kenya, as the National Domestic Biogas Programme has facilitated the installation of over 10,000 biogas plants in the country since 2009. Historically, rural biogas plants installed in similar contexts in developing countries have had a short practical life span. A comprehensive understanding of the role of biogas technology in Integrated Food–Energy Systems (type II IFES) can assist actors and stakeholders in improving its applications for energy and agronomic use. This study sought to conduct a follow-up assessment on the operation of biogas plants in Nandi County, Kenya, towards gaining new understandings of success factors for type II IFES. A preliminary analysis was performed on a database obtained through the Netherlands Development Organization (SNV), to assess the operational status of 200 biogas plants. About 110 farm households with either operational (OP) or non-operational (NOP) biogas plants were randomly selected and visited. Data on farming systems and technology application were collected using a checklist questionnaire. Descriptive statistics and principle components analysis were used to investigate correlations between variables of application, and the operational status of the biogas plants. The preliminary results revealed a 1.2 ratio of OP/NOP. The most common 8 m<sup>3</sup> and 10 m<sup>3</sup> size fixed-dome plants are often unable to meet daily cooking requirements for traditional energy intensive meals (i.e., Ugali, Githeri) of most households. Though full substitution to biogas is a rare occurrence, partial substitution still contributes to reducing workload associated to cooking for women and elders, and retaining few small local forests. Farmers' experiences integrating the use of bio-slurry into farming practices show specific patterns of fertilizer application: Bio-slurry is mostly preferred for African indigenous vegetables and grass feeds, dried manure for fruits, and chemical fertilizers for common cash crops (i.e., tea: *Camellia sinensis*, and maize: *Zea mays*). Users' experiences also reveal that

poor farm structure and management, high cost of installation and repair, and the lack of skilled and reliable technicians, affect the viability of most biogas plants, which limit application and dissemination. This study suggests that higher OP/NOP ratio could be an indicator for longer practical life span of biogas plants in a region, a key factor for ensuring local energy security and long term food security. Experiences of long-lasting biogas and bio-slurry use can help better understand and guide future research avenues for biogas technology application in agriculture.

## **Group 7 Sustainable Agricultural Intensification for Improved Food and Nutritional Security**

Facilitator: Ajit Srivastava, Michigan State University – USA

Panelists: P.V.V. Prasad, Kansas State University – USA

Johann Strauss, Plant Sciences Western Cape Department of Agriculture

Alan Hansen, University of Illinois – USA

Manny Reyes, Kansas State University – USA

Mark Musumba, University of Florida and Columbia University - USA

Location: Helderberg Room

The grand challenge of increasing production of nutritious food to meet growing population requires a systems approach towards agriculture. Sustainable Intensification (SI) uses the farming systems approach and focuses on increasing food production on existing farmland per unit area per unit time. The concepts of SI improve resource use efficiency to enhance productivity of farms without any environmental or social impacts and assures provision of all the ecosystem services of a healthy environment. It is based on the philosophy that in order to grow, agriculture must learn to save ('Save and Grow' concept of FAO). SI will require efficient use of labour and access to appropriate scale mechanization tools for efficient management of land, soil, water, crops, weeds, nutrients and planting, harvesting and threshing equipment to minimise crop losses and human drudgery. SI not only takes into consideration components of biophysical sciences but also social sciences to measure impacts on multiple domains (productivity, economic, environment, human condition and social). Obtaining measureable impacts on farmers' fields will require participatory approaches, effective collaboration and knowledge sharing, enhanced human and institutional capacity and creation of an enabling environment by engaging all stakeholder and partners. Thus, SI is necessary for achieving food and nutritional security and improving resiliency of smallholder farmers.

## **12:30-13:30 LUNCH**

Location: Foyer

Wednesday, October 26 – 13:30-15:30

## **THEME 4 – FOOD DISTRIBUTION AND LOGISTICS FOR ACCESSIBILITY**

Location: Auditorium

Moderator(s): José Vicente Caixeta-Filho, University of Sao Paulo-ESALQ - Brazil

Luis Rodriguez, University of Illinois at Urbana-Champaign - USA

Time Title, Author, Institution, Country and Co-Authors

13:30-14:00 Invited Speaker: Effective food distribution and logistics from smallholder farms for increased food security

JGAJ (Jack) van der Vorst, University of Wageningen-UR - The Netherlands

14:00-14:15 Measuring losses in sugar supply chain: a Brazilian case study

Thiago Guilherme Péra, University of Sao Paulo - Brazil

(Thiago Guilherme Péra, Fernando Vinicius Da Rocha, Daniela Bacchi Bartholomeu, José Vicente Caixeta-Filho)

14:15-14:30 Fruit supply management chain practices and their effect on food availability and quality in Bogota City

Omar Trujillo, Universidad El Bosque - Colombia

(Trujillo Omar, Martinez Paloma)

14:30-14:45 The relationship between the transport infrastructure and the degree of accessibility to markets: the case of corn in Brazil

Daniela Bacchi Bartholomeu, University of Sao Paulo - Brazil

(Daniela Bacchi Bartholomeu, Samuel Da Silva Neto, Thiago Guilherme Péra, Fernando Vinicius Da Rocha, José Vicente Caixeta-Filho)

14:45-15:00 Assessment of silo materials handling equipment: A case study of some establishments in Oyo and Ogun states, Nigeria

Babatunde Adewumi, Federal University of Agriculture - Nigeria

(Babatunde A. Adewumi, Babatunde S. Ogunsina, Morufu A. Adeyemi)

15:00-15:15 Improving food security of smallholder farmers in the Western Highlands of Guatemala through reduction of post-harvest losses in maize

Carlos Campabadal, Kansas State University - USA

(C. Campabadal, A. Bianchini, L. Sabillón, R. Mendoza, A. Morales-Quiros)

15:15-15:30 A qualitative discussion about the utility of staple grain logistical platforms in Ghana, West Africa  
William Lanier, NeverIdle Farms Consulting (Ghana) and Flat Pack Silos Australia  
(W. Lanier, W. Salifu, D Parker)

15:30-16:00 BREAK  
Location: Simonsberg Rooms: Simon/Stellen/Helderberg

Wednesday, October 26 – 16:00-17:30

**16:00-17:30 POSTER SESSION**

Location: Simonsberg Rooms: Simon/Stellen/Helderberg

- | Poster # | Title, Author, Institution, Country and Co-Authors  |
|----------|---|
| 1        | Facilitating agricultural decision making through ICT applications<br>Dharmendra Saraswat, Purdue University - USA  |
| 2        | Design and testing of locally manufactured mobile multipurpose agricultural utility systems in Sub-Saharan Africa<br>John Lumkes, Purdue University - USA<br>(John Lumkes, Davis Wilson, Vincent Kitio, Noble Banadda, Jeremy Robison, Jordan Garrity)                                      |
| 3        | Millet and pulses: towards improved nutrition, sustainability and food security<br>Valérie Orsat, McGill University - Canada<br>(Valérie Orsat, Laurette Dubé, Vijaya Raghavan)   |
| 4        | Modernization of agricultural production through shared and multi-user pivots for small landholders in Africa<br>Guy Fipps, Texas A&M University - USA<br>(Guy Fipps, Seydour Traore)   |
| 5        | Design and testing of multigrain threshing machine for Sub-Saharan Africa<br>John Lumkes, Purdue University - USA<br>(John Lumkes, Davis Wilson)  |
| 6        | Smart automated irrigation systems<br>Erik Schmidt, University of Southern Queensland – Australia<br>(J. Foley, E. Schmidt, M. Gillies, A. McCarthy)  |
| 7        | Climate change and food production in US Midwestern watersheds<br>Indrajeet Chaubey, Purdue University - USA<br>(Indrajeet Chaubey, Nina Omani)   |
| 8        | Simulated crop water use response to nutrient management in aquacrop for commercial dryland maize production within Kwazulu-Natal, South Africa<br>Elizabeth Trybula, Purdue University - USA<br>(Elizabeth Trybula, Tafadzwanashe Mabhaudi, Guy Thibaud, Pauline Chivenge, Sylvie Brouder) |
| 9        | The cost of irrigating rice in the Sahel: energy and water productivity in Senegal River valley irrigation schemes<br>Mutsa Masiyandima, Africa Rice Center, Senegal Regional Office - Senegal<br>(M. Masiyandima, A. Sow, K. Nidaye)   |
| 10       | Development of a mixed mode passive solar dryer<br>Akindele Folarin Alonge, University of Uyo - Nigeria<br>(Akindele Folarin Alonge, Itohowo N. Ukonne)   |
| 11       | Drying characteristics and energy requirement of drying coupea leaves and jute mallow vegetables<br>Duncan Onyango Mbuge, University of Nairobi - Kenya<br>(G.P. Mutuli, D.O. Mbuge)  |
| 12       | Value-added products from maize wastes for enhancing revenue of small holder farmers<br>Noble Banadda, Makerere University - Uganda<br>(Nicholas Munu, Noble Banadda, Nicholas Kiggundu, Jeffrey Seay)  |
| 13       | Pyrolysis of blended and non-blended residues of pine and eucalyptus forestry woods<br>Ahamada Zziwa, Makerere University - Uganda<br>(Kizza Ronald, Banadda Noble, Zziwa Ahamada, Jeffrey Seay)  |

- 14 Conversion of pineapple waste into vermi-compost to enhance agricultural production  
Ahamada Zziwa, Makerere University - Uganda  
(Gilbert Miiito, Ahamada Zziwa, Allan John Komakech, Robert Kambu, Florence Kyazze, Nicholas Kiggundu)
- 15 Utilization of banana wastes for slow pyrolysis to yield bio-infrastructure products in Uganda  
Noble Banadda, Makerere University - Uganda  
(Godfrey Omulo, Noble Banadda, Isa Kanbenge, Jeffrey Seay)
- 16 Potential of organic waste for biogas generation from small-scale food processing units  
Isa Kabenge, Makerere University - Uganda  
(Resty Nabaterega, Nicholas Kiggundu, Noble Banadda, John H. Muyonga, Isa Kabenge, Peter Tumutegyereze)
- 17 Solar drying technology for preservation of fruit by South African farmers  
Khuthadzo Mugodo, Agricultural Research Council - South Africa  
(K. Mugodo, P. Magama, S. Sibanda)
- 18 Thermostability of cassava linamarase  
Nnedimma Nnebe, McGill University - Canada  
(Nnedimma Nnebe and Michael O. Ngadi)
- 19 Nutrient composition of six potato cultivars before and after french fry processing  
Nomali Ngobese, University of KwaZulu-Natal - South Africa  
(NZ Ngobese, Tilahun Seyoum Workneh, Buliyaminu Adegbemi Alimi, Samson Tesfay)
- 20 An overview of the Brazilian agro-logistics: challenges and opportunities  
José Vicente Caixeta-Filho, University of Sao Paulo - Brazil  
(José Vicente Caixeta-Filho, Marina Granato, Samuel Da Silva Neto)
- 21 Post-harvest losses in wheat supply chain: a Brazilian case study  
Fernando Vinicius Da Rocha, University of Sao Paulo - Brazil  
(Fernando Vinicius Da Rocha, Daniela Bacchi Bartholomeu, José Vicente Caixeta-Filho)
- 22 The determination of road freight prices in the Brazilian agro-logistics  
Thiago Guilherme Péra, University of Sao Paulo - Brazil  
(Thiago Guilherme Péra, Marina Granato, José Vicente Caixeta-Filho)
- 23 Advances and challenges in grain storage systems  
Volkan Kebeli, Global Industries, Inc. – USA  
(C. Campabadal, A. Bianchini, L. Sabillón, R. Mendoza, A. Morales-Quiros)
- 24 Non-invasive method for the estimation of the concentration in vitro of tachyzoites of toxoplasma gondii using radiofrequency  
Omar Trujillo, Universidad El Bosque - Colombia  
(Trujillo Omar, Juez-C Graciela)
- 25 When is it close enough? An evaluation of complexity trade-offs for modeling pesticide runoff risk with VFSMOD  
Rafael Muñoz-Carpena, Univ of Florida, USA  
(Rafael Muñoz-Carpena)
- 26 Energy aspects of the liquidation of the willow plantation  
Tadeusz Juliszewski, University of Agriculture in Cracow, Poland  
(Tadeusz Juliszewski, Pawel Tylek, Dariusz Kwasniewski)
- 27 Fumigation in sealed silos to control stored grain insect pests  
Sam Cook, Iowa State University, USA  
(Sam Cook, Dirk E. Maier)
- 28 Upgrading the nutritional quality of eleute (toasted maize meal) through enrichment with African yam bean (Sphenostylis Stenocarpa) using response surface methodology  
Atinuke Olamide Idowu, Mountain Top University - Nigeria

Wednesday, October 26 – 18:00-21:00

## **DINNER**

Location: Auditorium



## THURSDAY, OCTOBER 27

Thursday, October 27 – 8:30-10:30

### THEME 5 – CAPACITY BUILDING FOR FOOD SYSTEM STABILITY

Location: Auditorium

Moderator(s) Alan Hansen, University of Illinois at Urbana-Champaign - USA  
Omar Trujillo, Universidad El Bosque - Colombia

Time Title, Author, Institution, Country and Co-Authors

- 8:30-9:00 Invited Speaker: Role of capacity building in food system stability in context of smallholder farms  
Gajendra Singh, Indian Agricultural Research Institute - India
- 9:00-9:15 Surviving to thriving: empower poor smallholder farmers through technology-based solutions  
William Kisaalita, University of Georgia and Makerere University - USA and Uganda
- 9:15-9:30 Opportunities and challenges for the adoption of precision farming technologies in swine production  
Robert Easter, University of Illinois at Urbana-Champaign - USA  
(R.A. Easter, M. Ellis)
- 9:30-9:45 Towards biosystems engineering in Kenya  
Ayub Gitau, University of Nairobi - Kenya  
(A.N. Gitau, D.O. Mbuge, P.K. Kimani)
- 9:45 -10:00 Emerging innovations for the small scale beverage processing industry in Uganda  
Julia Kigozi, Makerere University - Uganda  
(Julia Kigozi, Alfred Ahumuza, Edison Sempira, Munu Nicholas, Paddy Ainebyona, Esther Nabututa, Micheal Kaduyu, Hussein Balimunsi, Ahamada Zziwa, John Muyonga)
- 10:00-10:15 The Cameroon agribusiness project: a project to improve food security in Africa with large scale sustainable agricultural production  
Marie Louise Nangoa, CAMAGRI S.A. - Cameroon
- 10:15 -10:30 Business incubator concept in the reduction of losses and product development for scaling-up purposes  
Vijaya Raghavan, McGill University - Canada  
(Vijaya Raghavan, Nachimuthu Varadaraju, Valérie Orsat, Malathi Ravindran)
- 10:30-10:45 BREAK  
Location: Foyer  
  
Removal of all posters

Thursday, October 27 – 10:45-12:45

### THEME 6 – SYSTEMS LEVEL PERFORMANCE FOR FOOD SYSTEM STABILITY

Location: Auditorium

Moderator(s); K.C. Das, University of Georgia - USA  
Ann Steensland, Global Harvest Initiative – USA

Time Title, Author, Institution, Country and Co-Authors

- 10:45-11:15 Invited Speaker: Role of systems level thinking in food system stability in the context of smallholder farms  
Stanford Blade, University of Alberta – Canada
- 11:15-11:30 Agriculture, energy and global food security  
Guangnan Chen, University of Southern Queensland - Australia  
(Guangnan Chen, Tek Maraseni, Jochen Bundschuh, Thomas Banhazi, Diogenes L. Antille, Les Bowtell)
- 11:30-11:45 Irrigation and water saving strategies to increase water productivity and nitrogen use efficiency in the paddy field  
Koffi Djaman, Africa Rice Center, Regional Sahel Station - Senegal  
(Koffi Djaman, Valere C. Mel, Raafat El Namaky, Babouccar Manneh, Saito Kazuki, Koichi Futakuchi)

- 11:45-12:00 Integrating agricultural biogas systems in Uganda  
Rebecca Larson, University of Wisconsin, USA  
(Rebecca Larson, Vianney Tumwesige)
- 12:00-12:15 Adapting linked livestock, household and sector models to explore policy impacts towards climate resilience in future scenarios  
Gregory Kiker, University of Florida - USA
- 12:15-12:30 Investing in local content development: a solution to food insecurity in Nigeria  
Sinemobong Essien, University of Uyo - Nigeria
- 12:30-12:45 Adaptation of precision agriculture to increase crop yield and mitigating climate change in developing countries  
Ganesh Bora, Mississippi State University - USA  
(Ganesh C. Bora, Deben Baruah, Monjurul Alam, Le Thi Chau Ha, Manzul Hazarika)

Thursday, October 27 – 12:45-13:30

### **CLOSING REMARKS**

Location: Auditorium

Moderator: Maynard Herron, ASABE President (2016-2017)

Brief reports from open forum facilitators

Future activities of ASABE Global Initiatives

Thursday, October 27 - 14:00 thru Friday, October 28 12:30

## **POST-CONFERENCE SYMPOSIUM FOR AGRICULTURAL AND BIOLOGICAL ENGINEERING (ABE) DEPARTMENT LEADERS**

Spier Wine Estate and Conference Venue

Location: Simonsberg Rooms:

The goal of the symposium is to explore options for, and to promote, the following among departments in different countries:

- Undergraduate student exchange
- Graduate student exchange
- Faculty development
- Research and Outreach program collaborations

This is an opportunity for ABE department leaders (Deans, Department Heads/Chairs) to learn about each other's departments and identify potential opportunities for exchange and collaboration. Participants will provide information about the present status, needs, and opportunities of ABE departments and share global experiences.

### **THURSDAY, OCTOBER 27**

- 14:00 Intent of Meeting and Introductions  
Professor Douglas Reinemann, University of Wisconsin
- 14:30 Welcome to Stellenbosch,  
Status and outlook for Food Security activities by ABE departments in Africa  
Professor Umezuruike Linus Opara, Stellenbosch University
- 15:15 Break  
Location: Foyer
- 15:45 The Role of Agricultural/Biological Engineers in Feeding The Future  
Professor, Ajit Srivastava, Global Center for Food Systems Innovation, Michigan State University
- 16:30 The Role of ASABE, CIGR and other professional societies in facilitating International ABE  
department collaborations  
Professor Mary Leigh Wolf, ASABE President  
Darrin Drollinger, ASABE  
Dr. Akindele Folarin Alonge, University of Uyo, Nigeria - Invited
- Executive Board Member, International Commission of Agric. & Biological Engineers (CIGR)
  - President. African Network Group of the (ASABE)
  - National Executive Committee Member, Nigerian Institution of Agricultural Engineers (NIAE)
- 17:30 Adjourn / Dinner

### **FRIDAY, OCTOBER 28**

- Location: Location: Simonsberg Rooms
- 8:30 Ag Eng at University of KwaZulu-Natal: experience with student exchange programs and the  
challenges we face  
Professor Jeff Smithers, University of KwaZulu-Natal
- 9:15 ISU Uganda Program with a focus on post-harvest loss prevention  
Professor Dirk Maier, Iowa State University
- 10:00 Break
- 10:30 USAID programs  
Dr. Rob Bertram, Chief Scientist, Bureau of Food Security, USAID - Invited
- 11:15 Developing collaborative project proposals and project budgets  
Professor and Chair Darrell Donahue, Michigan State University
- 12:00 Plan Next Step for coordinating international ABE department Collaborations
- 12:30 Adjourn