



**CIGR First Section 5<sup>th</sup> Interregional Conference on “CHALLENGES OF WATER MOBILIZATION AND SOIL CONSERVATION IN BETTER ADAPTING TO CLIMATE CHANGE”**

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**2<sup>nd</sup> Conference of the Pan African Society for Agricultural Engineering (PASAE - AfroAgEng) on “THE ROLE OF AGRICULTURAL ENGINEERING IN MEETING THE CHALLENGES OF GLOBAL FOOD SECURITY”**

**10 – 13 September 2019**

**Hassan II Institute of Agronomy and Veterinary Medicine (IAV), RABAT, Morocco**

Dear friends and colleagues,

This is an unprecedented time in the history of humankind on our fragile planet earth. While the challenge of ensuring food and nutrition security is not new, we are additionally faced with the difficulty of achieving this grand challenge through sustainable agriculture practices under climate change. With climate change and rising global temperature, rainfall has become more unpredictable and erratic, thereby making water security an increasing problem in many parts of the world. The food-water-agriculture nexus has become a major issue facing researchers, policy makers, business and the public. Agricultural and bio systems engineers have a critical role to play in addressing these wicked and interconnected existential challenges confronting humankind. We must assure food and nutrition security for nearly 10 billion people on earth by 2050 without compromising the health of the planet and survival of generations to come.

Historically, advancements in agricultural engineering have been recognized for contributing to averting the catastrophe of insufficient food during the Malthusian era. The mechanization of agriculture and application of related technologies during the last century has been credited for the successful boom in food production by bringing more land into production as well as increasing factor productivity. Today's agriculture, however, must produce more with less! Currently, agriculture accounts for over 70 percent of global fresh water utilization, and even higher in regions relying on irrigated food and fibre production.

With growing human population and rising urbanization, including developing regions such as Sub-Saharan Africa, the demand for quality, safe and nutritious food is forecast to rise by nearly 70 per cent by 2050 under current production and consumption patterns. The competition for agricultural land and fresh water is, therefore, expected to intensify. Agricultural engineers must, therefore, help define and promote new a sustainable agriculture and food system which assures food and nutrition security with less farm land, less water and less production inputs. We must also save the harvest through improved postharvest management practices and sustainable consumption. Beyond food availability, agriculture must also contribute towards addressing the broader socio-economic challenges facing Africa and the world at large, including soil and water conservation, climate change adaptation, youth unemployment, rising inequality and widespread poverty. Nowhere else are these complex problems more acute than in Africa, especially south of the Sahara. The solution calls for teamwork, collaboration, and partnerships, across discipline boundaries as well as through regional and global cooperation.

**AfroAgEng** – the Pan African Society for Agricultural Engineering was formed in 2012 during the VII International Technical Symposium of the CIGR (International Commission of Agricultural & Biosystems Engineering) held in Stellenbosch, South Africa. The goal of AfroAgEng is to advance the practice of agricultural engineering and promote the profession in Africa. Membership is open to all professionals within and outside Africa interested in the application of agricultural engineering principles and practice to the transformation of Africa agriculture towards as part of Agenda 2063 – the Africa We Want. The 1<sup>st</sup> International Conference of AfroAgEng was successfully held in Nairobi, Kenya, in March 2018, and was attended by participants from various countries on the Continent.

The 2<sup>nd</sup> AfroAgEng International Conference (scheduled from 10-13 September 2019 in Rabat, Morocco) on the Role of Agricultural Engineering in Tackling Global Food Security is part of the joint event organized by **CIGR**, AfroAgEng and **ANAFIDE**, and the 5th Inter Regional Conference on Water Mobilization and Soil Conservation for a Better Adaptation to Climate Change. This global partnership and collaboration represents the true spirit of the CIGR and its adhering bodies as part of our efforts in tackling these complex, multi-dimensional and truly global challenges facing humankind.

I am very excited about the themes of these joint conferences and I am happy to invite you and your colleagues to the historic and beautiful city of Rabat in 2019. Please join us.

Prof. Dr. Umezuruike Linus Opara F/IAgE, F/SAIAE, F/NIAE  
President, CIGR / AfroAgEng

### **Scope and Objectives of the 5<sup>th</sup> Interregional Conference**

Securing water and conserving soil resources for food under climate change is a concern not only in the arid and semi-arid zones but also for many other regions of the world. Climate change is one of the most serious and urgent issue for human society and global environment. It is to be recognized as an added stress on the increasingly complex and interlinked issues of rural, agricultural development and food security under demographic changes, overstretched environmental and natural resources. This is particularly true for Africa. During the last COP22 in Marrakech, the 3 A initiative (Adaptation of African Agriculture to CC) was launched.

Challenges to the climate change could be another driving force to improve water mobilization systems, irrigation and drainage schemes, soil conservation techniques, policy measures. They must be factored in all processes of planning, design, implementation, operation and maintenance. We need to understand processes and impacts of climate change, what we can predict and how we can sustainably adapt in climate change. This implies revisiting Design and Operation Criteria for hydraulic, irrigation and drainage facilities, land planning as well as approaches of management not only frequent floods and droughts but also extreme events. Improving water mobilization and soil conservation will play a key role in achieving the rural water and food security under impending climate change, especially in the developing countries.

Many researches have been carried out with useful outcomes in different regions of the world. The 5th inter regional will be an opportunity to identify, exchange about what adaption measures are to be developed urgently and implemented efficiently with the present available information including infrastructure and land improvement and institutional reorganization and management strategy for the extreme events. ANAFIDE, the Moroccan national CIGR committee welcomes you to take part in this conference and enjoy visits to historical and cultural sites during the technical visit and post conference tours.

### **Scope and Objectives of the 2<sup>nd</sup> Conference of the Pan African Society for Agricultural Engineering (PASAE - AfroAgEng)**

The environment and livelihood conditions in developing countries have been, in part, enabled by investment in agriculture. This investment generated great improvements in agricultural yield and efficiency, which reduced the cost to the consumer, and enabled investment to occur in areas far beyond agriculture. Similar growth and opportunities will face significant challenges, particularly while world populations grow at unprecedented rates and more food production is needed. In developing countries, the challenges are most dire; it is precisely in these regions where production increase is needed and the effects of climate change are expected to be the most severe. There is a critical need to identify new approaches for providing food security for the world of the future.

Engineering solutions will undoubtedly play an integral role in ensuring a secure food supply. At minimum, there is a need to further improve our efficiency. Worldwide it is estimated that one third of food is lost on average, although estimates have been reported to be as high as 50%. In developed countries, losses primarily occur at the retail outlet and with the consumer due to exceedingly high quality requirements, whereas in the developing countries, significant losses occur at the producer, storage, and transit stages. New engineering solutions in supply chain logistics will target key opportunities for reducing these losses, delivering these foods to consumers, and keeping costs low. During production, precision use of external inputs, like irrigation, fertilizer, and pesticides, can be managed more efficiently to minimize applications in areas where they are not necessary, while reducing cost, managing risk, and improving yield. Engineers will need to provide technology and practices to improve yields by growing crops in new environments,

including indoor and underutilized outdoor environments, with affordable cost and minimal environmental impact. The crops themselves can be reengineered to be tolerant to temperature and water stress or for reduced nutrient or pesticide requirements, improving yields, even in adverse conditions. The pressure to feed growing populations, or to turn a profit, can lead to pressure to take risks with the distribution and consumption of unsafe foods. New sensing and tracking technology will provide the capability to ensure that our food supply is not only sufficient in quantity, but also safe to consume.

The conference will offer an opportunity to cover many of the challenges and opportunities for engineers addressing food availability and security in the context of not only the developed and developing countries, but also in rural and urban settings, using physical and biological technologies, and many others.

The conference organizers hereby invite the submission of abstracts on the following topics:

#### **TOPICS OF THE 5<sup>TH</sup> INTER REGIONAL CONFERENCE**

##### **1. Water mobilization**

- 1.1. Geospatial technologies as tools for decision support
- 1.2. Techniques for implementation, management and maintenance of conventional and unconventional water mobilization infrastructures
- 1.3. Mechanisms for financing water mobilization infrastructures
- 1.4. Impacts of climate change on water resources and hydraulic structures.
- 1.5. Risk analysis models related to climate change: flood, flood, drought, erosion etc.

##### **2. Soil conservation**

- 2.1. Conservation agriculture in rainwater harvesting
- 2.2. Soil conservation constraints in irrigated
- 2.3. Conservatory techniques in forestry
- 2.4. Techniques for improving pastoral routes
- 2.5. Tools for planning, managing and monitoring soil quality

##### **3. Cross-cutting themes**

- 3.1. Impact of climate change on the conservation of water and soils
- 3.2. Development of adaptation approaches to climate change: design of rural infrastructures, hydraulic structures, watershed management, agricultural planning, etc.
- 3.3. Improving the effectiveness of water and soil monitoring systems, warning and response to extreme events
- 3.4. Public-private partnership for hydro-agricultural development projects and water resources management
- 3.5. Governance, regulation and community and transboundary management of water resources

#### **TOPICS OF THE 2<sup>nd</sup> CONFERENCE OF AfroAgEng**

1. Challenges of population growth and fluctuating demands, water shortages and temperature changes
2. Development of irrigation as a sustainable approach to increase food production
3. Increasing productivity while reducing environmental impacts, and maintaining food safety and quality assurance
4. Building environmentally aware watershed models, considering the balance of food, water, and energy usage in developing countries seeking to adapt to climate change
5. Provide infrastructure, logistics and institutions needed to reduce post-harvest losses
6. Applications of precision agriculture in rural communities
7. Engineering controlled environments for agriculture for a sustainable future
8. Quality assurance and food safety

Contributions are invited to address the above topics in one of the following fields:

- Energy conservation and sustainable energy
- Food processing, preservation and post-harvest losses
- Soil and water engineering, including irrigation, hydrology and water management
- Agricultural structures
- Agricultural machinery and mechanization

- Development and applications of precision agricultural technologies
- Environmental engineering

#### **PAPER SUBMISSION**

Abstracts should be submitted electronically, as a word file, to - [anafide.ma@gmail.com](mailto:anafide.ma@gmail.com) with a copy to [bartali.h@gmail.com](mailto:bartali.h@gmail.com). The abstract template and paper submission form can be downloaded from the conference website. - [www.5interreg-2ndpanafricconf.ma](http://www.5interreg-2ndpanafricconf.ma)

Deadlines dates for the submission and processing of the paper are provided hereunder:

- Submission of abstract: April 1<sup>st</sup>; 2019
- Notification of acceptance: April 30<sup>th</sup>, 2019
- Submission of full paper: July 1<sup>st</sup>, 2019
- Notification acceptance (oral/poster) of papers: August 1<sup>st</sup>, 2019

#### **CONFERENCE LANGUAGES**

During the conference, English and French will be used. Simultaneous translation will be provided during all sessions.