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NOTE

From:	Presidency
To:	Council
Subject:	Conference "Scientific Support to agriculture: Competitiveness, quality and Sustainability" (Athens, 23 April 2014) *- Information from the Presidency*

Delegations will find, in the Annex, a note from the Presidency to be dealt with under "Any other business" at the Council (Agriculture and Fisheries) on 16 June 2014.

Introduction

The High-level Conference 'Scientific Support to Agriculture: Competitiveness, Quality and Sustainability' was held on 23 April 2014 in Athens. The Conference was co-organised by the Greek Ministry of Rural Development and Food and the DG Joint Research Centre of the European Commission.

The conference brought together key government and EU Commission representatives, scientists from research institutes, civil society, the academia and the private sector. It provided the platform to discuss and to improve the science-based understanding of the challenges associated with the agricultural-environmental-climate system. This debate served as a basis for identifying options on how to tackle these challenges in the most efficient way.

The Conference was opened by the Greek Minister of Rural Development and Food, Mr. Athanassios Tsaftaris, followed by the Director of the DG JRC Institute for Environment and Sustainability, Ms. Maria Betti and the President of the Board of Directors of Centre for Research and Technology Hellas (CERTH), Mr. Athanassios Konstandopoulos.

The Conference was organised under the following thematic sessions and round-table discussion:

- Session I: The Future of European Agricultural System

- Session II: Climate Change and Resource Efficiency.

- Session III: Improving crop genetic resources for higher yield and sustainability.

- The round table discussion was focused on the plant-omics revolution (genomics, epigenomics, metagenomics) and its implications in plant breeding and cultivation.

Key messages

- **Agriculture is confronted with a difficult policy dilemma.**

On the one hand, agricultural productivity needs to be increased in order to ensure food security for a growing population, and a population with growing income and changing food tastes. On the other hand, biomass production needs to be increased in order to meet the ambitious goals set within the Bio-based Economy programme, to produce not only food and animal feed, but also energy and industrial products.

- **Both European and global agriculture face new, unprecedented challenges and solving these is high priority on the political agenda.**

The above mentioned challenges are further amplified due to the impact of climate change and because the general policy view that intensified food (and biomass) production must be undertaken in a sustainable manner.

Water scarcity and quality of water, soil erosion, fertiliser availability and price volatility put additional strains on agriculture.

- **The European Union provides policies and financing mechanisms to respond to these challenges.**

The CAP and its recent reform focus on addressing the economic, environmental and territorial challenges whereas Horizon 2020 builds on Research and Innovation to respond to societal challenges supporting excellent science and industrial leadership.

The successful integration of these two instruments paves the way for agricultural productivity and sustainability.

- **Scientific support and innovation are key determinants to increase productivity and reduce the environmental impact of agricultural systems. Yet, there is continuous demand for new tools and new clustering ideas.**

  Speakers underlined the important role of new plant breeding techniques which is more precise and better adapted to sustainable breeding, while respecting environmental and human concerns. They also underlined the need for the adoption of different pieces of legislation for fostering agricultural innovation.

  Experts discussed views on whether genomics, metagenomics and epigenomics could be the vessel for the next green revolution.

- **Future areas that need to be addressed:**
  - **How to achieve faster introduction of innovation into agriculture**
  - **How to engage all stakeholders into a fruitful partnership**
  - **How to promote a multidisciplinary approach and coordination at international level**
  - **How to enhance better understanding of the water-agriculture-environment nexus**

Outcome of Session I - The Future of European Agricultural System

Initially, the presentations focused on the current challenges on the demand and supply side as well as the role of the world markets and discussion evolved around the impact of the EU policies on EU agriculture.

The additional focus of the discussion was on technologies that may support sustainable farming. The presentations gave examples of optimal genetic resources that best fit a specific environment and help plants to reach their full yield potential, the re-establishment of locally-adapted varieties (biodiversity), the implementation of precision farming to efficiently support irrigation and fertilization practices and its linkage to Climate Smart Agriculture. Bottlenecks/obstacles to the adoption of sustainable technologies including cultural perception, lack of local technical expertise, infrastructure and institutional constraints, knowledge and technical gaps, high start-up costs (risk) have been discussed extensively and there was wide agreement on the need:

– to implement a multi actor approach and early involvement of farmers in policy formulation and implementation;
– to measure sustainability in agriculture and to strengthening the role of Farm Advisory Services of Member States;
– to enhance cost-benefit analysis, particularly in terms of the environmental impact and of an agricultural investment (considering the wider environmental footprint);
– to develop efficient distribution and marketing networks and strategies that are applicable to regional specificities, especially during periods of financial constrain.

Session II - Climate Change and Resource Efficiency

The second session focused on water scarcity, water quality and climate change impact to agriculture. It was underlined that irrigation has led to a decline in groundwater levels in many aquifers (underground layers of rock or other material that carry groundwater) and is partly responsible for the change in the hydrological regime of several European rivers. Intensive agriculture is also responsible for the degradation of the quality of surface and groundwater, for example as a result of contamination by pesticides and nitrates. Limited rainfall and shortages of water have an important impact on food availability and food security.

Several examples of best irrigation practices, recently implemented in Greece including an advisory system to assist farmers for irrigation scheduling have been presented.

Furthermore, innovative approaches for monitoring water quality were presented and predictions of drought were examined. Also, the work of the Joint Research Centre on Water-Agriculture-Energy-Ecosystems Nexus was discussed along with the use of climate change scenarios including temperature changes, in order to assess the likely impact upon agricultural production.

Main outcomes concentrate on the need to:

- strengthen synergies and coherence between water, agriculture, energy and nature conservation policies in order to deliver multiple benefits including opportunities for green economy and green jobs

- find the right combination of measures for the different sectors to fit context requirements at the catchment scale and address interdependencies and trade-offs

- facilitate joint building of assessment capacity and contribute to harmonization across macro-regions and trans-boundary watersheds (relying on knowledge deriving from national and international initiatives)

- continuous enhancing of capacity building for sustainable management of water resources, which requires an appropriate mix of competent personnel, technologically advanced devices and facilities, legal guidelines and administrative efficient and effective processes

- improve the understanding of the interaction of climate change with global agricultural production

Session III - Improving crop genetic resources for higher yield and sustainability

In this session the innovative nature of new plant breeding techniques and their importance on agriculture were explained. The development of new techniques in plant breeding does not necessarily lead to the replacement of older methods; the use of all available technologies is essential for plant breeding. Emphasis was placed on Plant Genetic Resources and landraces taking into consideration their importance for local society, breeding and for avoiding genetic degeneration. Participants confirmed that discussions on regulatory matters, associated with new plant breeding techniques are taking place in many countries.

Main outcomes concentrate on the need to:

- enhance interdisciplinary training and capacity building;
- strengthen the role of Public-Private Partnerships (PPPs);
- strengthen the role of expert groups that have been set up across countries to advice on classification of the new plant breeding techniques and products vis-à-vis the GMO legislations;
- minimise discrepancies in eventual regulatory status for certain new plant breeding techniques and products as these differences might translate into global trade issues.

Round Table: The plant – omics revolution (genomics, epigenomics, metagenomics) and its implications in plant breeding and cultivation

Finally, in this last session, the new technologies known as "Plant-omics" and its implications in plant breeding and cultivation were presented. The "Plant–omics" is a neologism used for the broad discipline of the analysis of biological information and complete biological datasets. 'Omics' approaches can be thought of as the tools and technologies that allow the analysis of the biological information that translate into the structure, function, and dynamics of an organism or a group of organisms.

Integration of knowledge from omics-based research is an emerging issue. The usefulness of '-omics' is growing day by day, giving us essential tools to understand the molecular systems that underlie various plant functions, to gain biological insights and promote translational research. Various types of –omics, like transcriptomics, metabolomics, bioinformatics, high-through-put DNA sequencing, have enabled analyses of regulatory networks in organisms.

Main outcomes concentrate on the need to:

- understand the plant genome organization and function and especially narrow the gap of knowledge that we have about the quantitative traits.

- find the missing link in plant phenomics that can be solved with high-throughput phenotyping platforms and in this sense a prototype, easy-to-deploy, and low cost phenotype collection system for growth chambers was presented.

- better understand plant evolution, domestication and breeding by harnessing the approaches to the study of adaptive genetic variation.

- develop genomics-based breeding platform, where estimating phenotypes of individuals, with molecular markers, can improve and speed up breeding for important traits, especially in perennial plants.

- highlight the role of human capital in science and how Europe invests in training.

- present novel solutions to capture the epigenetic changes of interest to plant breeding, like the Prognostic Field Phenotyping.