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**RESEARCH JOINT PROGRAMMING INITIATIVE ON AGRICULTURE, FOOD
SECURITY AND CLIMATE CHANGE: MOTIVATIONS AND STATE OF PLAY OF
RESEARCH AT EUROPEAN LEVEL**

Accompanying document to the

**COMMISSION RECOMMENDATION ON THE RESEARCH JOINT
PROGRAMMING INITIATIVE "AGRICULTURE, FOOD SECURITY AND
CLIMATE CHANGE"**

C(2010)2590 final

EXECUTIVE SUMMARY

The Commission proposes more strategic cooperation between EU Member States on research and development to address major societal challenges. One way to do this is a new 'joint programming' approach¹. Joint programming (JP) involves Member States engaging in defining, developing and implementing strategic research agendas. 'Agriculture, Food Security and Climate Change' (AFSCC) has been proposed for a joint programming initiative (JPI).

Climate change is one of the main challenges to agriculture in feeding the world's population, projected to be 9 billion by 2050. This will increase food demand by 50% by 2030, in a period when demand for biomass for non-food purposes is predicted to grow strongly. In addition to coping with higher temperatures, water shortages and unpredictable climate conditions, agriculture should also try to reduce emissions (roughly 14% of global greenhouse gases - GHG).

Research must continue contributing to improving food supply in a sustainable manner under these conditions. In addition, the knowledge must be translated into appropriate technologies and practices.

1. Towards Joint programming

In 2008 the Commission proposed a new approach called 'joint programming' (JP) for large-scale joint public research initiatives (JPI) at European level². This was one of the five policy initiatives following-up the Green Paper on "The European Research Area: New Perspectives"³ and an important process to realise the 2020 Vision for the European Research Area adopted by the Council in December 2008.⁴

Joint programming developed in the context of the Lisbon strategy, which recognised research and development as one of the key drivers to growth and jobs. It is the process by which Member States engage on a variable-geometry basis in defining, developing and implementing common strategic research agenda (SRA) based on a common vision of how to address major societal challenges that no Member State is capable of resolving alone.

Within CREST (the EU Committee for Scientific and Technical Research), the High-Level Group on Joint Programming (GPC) identified and substantiated various themes for JPIs, one of which was 'Agriculture, Food Security and Climate Change' (AFSCC).

The Standing Committee on Agricultural Research (SCAR) agreed to reflect on developing a roadmap for agricultural research at European level in the context of the new JP framework.

¹ The Joint programming approach is detailed in the Commission Staff Working Document "Putting Joint Programming in Research into Practice: Structuring Europe's Response to the Grand Challenges", SEC (2010)...

² COM (2008) 468 final, 15.7.2008

³ COM(2007)723 of 22.11.2007

⁴ Council conclusions of 2.12.2008, Definition of a "2020 Vision for the European Research Area", 16767/08

In parallel, the results of these reflections were highlighted in the Commission's Communication *'Towards a coherent strategy for a European Agricultural Research Agenda'*⁵.

2. Agriculture, food security and climate change: a new challenge for Europe and the world

A major issue for public research targeting AFSCC

It is increasingly evident that the sustainable management and use of biological resources is a major societal issue involving a wide range of inter-linked challenges, including climate change, environmental degradation, consumer demand, food security and global stability.

Agriculture and forestry are highly exposed to climate change since they directly depend on climatic conditions. Climate change can affect crop yields, livestock management and the location of production, with important consequences for farm income, land use and rural economies.

Agriculture and forestry face strongly increasing non-food demand for biomass driven by mitigation efforts in other sectors and by the need to switch to a low-carbon economy.

Global demand for food is expected to increase by 50% by 2030 and to double by 2050, due to population growth from 6 to 9 billion by 2050, urbanisation and increasing affluence in parts of the developing world. Food supply must increase sustainably to meet this demand.

However, global climate change is a major threat to food production and supply (as well as biodiversity), e.g. through changing patterns of rainfall, increasing incidence of extreme weather and changing distributions of diseases and their vectors. Global stocks of some staple foods have declined, and spikes in food prices (such as those seen during 2008) may become more frequent if rising demand cannot be consistently matched by supply.

The agricultural sector of tropical/sub-tropical countries, particularly in Sub-Saharan Africa, is extremely fragile and vulnerable to climate change. Any major food crisis in these regions will impact on Europe and it is therefore in its interest to work with these regions on preventive and adaptive measures.

A substantial research effort is needed

Much work is already conducted at EU, national and regional levels on AFSCC but it is only possible to focus on isolated parts of very complex issues. A major knowledge objective concerns the integration of many disciplines from climatology, to ecology, biology, agronomy, forestry and socio-economics, through plant, soil and animal sciences, that will be strongly connected to agro-ecological modelling.

The Commission's Communication *Europe 2020: A strategy for smart, sustainable and inclusive growth*⁶ stresses the need to establish a vision of structural and technological changes required to move to a low-carbon, resource-efficient and climate-resilient economy by 2050 which will allow the EU to achieve its emissions reduction and biodiversity targets; this includes disaster prevention and response, harnessing the contribution of cohesion, agricultural, rural development, and maritime policies to address climate change, in particular

⁵ COM(2008)862 final, 15.12.2008

⁶ COM(2010)2020, 3.3.2010

through adaptation measures based on more efficient use of resources, which will also contribute to improving global food security.

Actions at Member State level

Although the information on the state of research in Member States is fragmented and uneven, many countries have mandated specific funding agencies and research councils to implement national programmes in the relevant fields.

A preliminary description of the relevant national programmes/funding instruments for the countries already committed in the JPI, is provided by the JPI proposal together with the envisaged involvement of research performing organisations.

The committed countries welcomed the opportunity to complete such a description with the results of a survey of national research programmes in the field of adaptation to and mitigation of climate change recently carried out by 21 countries participating in a SCAR Collaborative Working Group on '*Climate change and agriculture*' coordinated by Spain⁷. This inventory contributes to the analysis of possible gaps, trends and needs, and possible priorities for future activities in the JPI.

Actions at European level

EU research policy

A significant body of pan-European collaborative research on adaptation and mitigation responses to climate change and global food security has been carried out under the EU Framework Programmes (FP), within the agriculture, fisheries and forestry sectors.

Within FP6 and by the end of 2010 under FP7 Theme '*Food, Agriculture and Fisheries, and Biotechnology*' (FAFB), around 100 projects will have been funded to the tune of €300m. These cover a wide range of approaches from mitigating climate change via carbon sequestration in soils, water and forests, to development of alternative energies, and reduced emissions from activities within the agriculture, forestry and related industrial sectors. The eradication of extreme poverty and hunger has also been addressed in research which contributes to food security and safety, access to water, reducing child mortality, disease control, environmental sustainability, and the reduction of biodiversity loss.

There is a heavy focus on the increased sustainability of primary production systems, including adaptation and mitigation scenarios for various livestock systems. In addition, a consistent framework is being sought for predicting vulnerability to climate change and finding ways to help develop public policy in Europe and globally through cooperation actions involving smallholder livestock farming in developing countries.

The scope of currently ongoing or planned activities includes the potential of plants to tolerate abiotic and biotic stresses, to use light more efficiently or, for biomass crops, to be grown on marginal lands thus using otherwise underutilised land.

Animal health, production and welfare issues arising from increased trade in animals and animal products and the rising demand for meat, which are directly influencing the ecology and evolution of infectious agents, their vectors and hosts, are also covered and coordination and cooperation at international level is encouraged.

⁷ INIA - National Institute for Agriculture and Food Research and Technology

Changes in water quantity and quality due to climate change are also expected to affect food availability, especially in arid and semi-arid areas. In this respect, research is being funded under the FP7 Theme '*Environment (including climate change)*' to improve understanding and modelling of climate changes related to the hydrological cycle and to evaluate adaptation and mitigation measures across multiple water-dependent sectors.

In FP7, a cluster involving three projects on climate change impacts on water resources and security issues was supported by the Themes '*Environment (including climate change)*' and '*Socio-economic Sciences and the Humanities*' (SSH)⁸. In SSH, an additional investment of €7m is planned for 2011 to address the economic, social and political conditions for satisfying the world's food needs.

At least 12 ERA-NETs are currently active in one or more areas of this JPI and there is a wide range of relevant national activities where Member States are already cooperating. In 2009 the total value of relevant national R&D support of the countries involved in the JPI totalled more than €1, 3 billion⁹.

Research cooperation with Developing countries

The FAFB theme supports RTD cooperation with the countries most affected by climate change, e.g. those in Africa involving scientific and technological fields such as food, agriculture, health, land, and water resources and their interaction with climate change. Also, the vulnerability of Latin America, Africa and Asia to droughts, floods and soil degradation caused by climate change has led to research projects which facilitate and accelerate knowledge transfer and bring together programme managers to identify strategic needs, bottlenecks, tools, methods and resources for a generic approach to sustainable agriculture.

There are also relevant, dedicated research cooperation activities (12 projects, EU contribution €17m) with developing countries under FP6 aiming to increase the use and productivity of tropical/sub-tropical crops and species important for the livelihoods of local populations.

The Commission has recently adopted a Communication for a renewed policy framework addressing food security challenges in developing countries in both rural and urban contexts, with the overall objective to reduce hunger and malnutrition, thereby accelerating efforts towards achieving the Millennium Development Goals¹⁰. EU action will give priority to those countries most off-track (e.g. in Africa) and will concentrate on strengthening the agricultural productivity of smallholder farmers and the resilience of rural communities.

The '*Food Facility*' (€1 billion, 2009-10) is a response to the food price crisis of 2008 and focuses on short- to medium-term recovery measures. An interim report on the implementation of the Food facility has been adopted on 12 March 2010.

The implementation of the *Food Security Thematic Programme* (FSTP) has been reviewed in 2009 and an updated strategy for 2011-2013 is under preparation. So far, a total of €220 million has been committed under the first strategic priority of the FSTP supporting the

⁸ 'Environment': Climate induced changes on the hydrology of Mediterranean basins (CLIMB); and Water availability and security in Southern Europe and the Mediterranean (WASSERMed); SSH: Climate change, hydro-conflicts and human resources (CLICO)

⁹ Source: NETWATCH and ERAWATCH Commission information platforms on transnational R&D programme collaboration and on EU research policies and systems

¹⁰ COM(2010)xxx, 31.03.2010

delivery of international public goods contributing to food security: research and technology, including an amount of €130m in support to the CGIAR¹¹. This includes the CGIAR *Challenge Programme on Climate Change, Agriculture and Food Security* investigating critical knowledge gaps on how to manage the trade-offs between food security, livelihood and environmental goals in a changing climate, to develop and evaluate alternative adaptation strategies and to assist policy makers, farmers and others to respond to climate change. Besides support to the CGIAR a global call for proposals of €23 million has been launched in the field of Agricultural Research for Development (*Global Programme on Agricultural Research for Development* – GPARD, still on-going). Finally, actions have been launched to support research and technology transfer in the field of food security at the regional level in Africa, Central America, Andean Countries and South and South East Asia.

The *Environment and Natural Resources Thematic Programme* (ENRTP; 545 M€ 2007-10) has close links with FP7 funded research activities (e.g. the implementation of the EU Water Initiative) and is the main funding source for the *Global Climate Change Alliance*, which has two pillars: i) deepening climate policy dialogue between the EU and the most climate vulnerable developing countries, in particular Least Developed Countries and Small Island Developing States, and ii) stepping up concrete support for these countries in the following priority areas: adaptation with focus on the agricultural sector, reducing emissions from deforestation and degradation, disaster risk reduction, fostering participation in the carbon market and mainstreaming climate in development strategies.

Experience with other coordination actions suggests that looking into possible forms of consultation and cooperation on this subject with scientifically advanced groupings at international level is an important part of solving global challenges.

This JPI could foster cooperation at international level. Interested non EU countries will be able to join the initiative at a later stage, once the common vision and strategic agenda have been formulated between the countries participating and in accordance with the rules on participation in the JPI based on specific international arrangements.

Main relevant policy initiatives

Common Agricultural Policy (CAP)

The CAP is increasingly designed to meet a wide range of objectives. Its progressive orientation since the 1992 reform, most recently reinforced by the Health Check, is marked by a gradual shift of financial support linked to production towards decoupled direct aid, by the strengthening of rural development policy, and progress in the integration of environmental considerations including climate change.

In April 2009, the Commission Staff Working Document (CSWD) *Adapting to climate change: the challenge for European agriculture and rural areas*¹² summarised the main impacts of climate change on EU agriculture, examined adaptation needs, described the implications for the CAP and explored possible approaches for future action. It aims to further engage Member States and the farming community in a debate and action on adaptation needs.

¹¹ Consultative Group on International Agricultural Research

¹² SEC(2009) 417 1.4.2009

In July 2009, the CSWD *The role of European agriculture in climate change mitigation*¹³ highlighted the need for research to address emission reduction options in the agricultural sector as well as their inter-relationship with other societal objectives.

The development of the CAP in the domain of food security and climate change relies on the analytical support of two major actions led by the European Joint Research Centre. The 'Support to Agricultural Trade and Market Policies' (AGRITRADE) action provides quantitative analysis relating to the CAP reform, commodity markets and trade liberalisation processes. The 'Crop Production Forecasts and Climate Change Impact' (AGRI4CAST) action provides accurate and timely forecasts of crop yields and production biomass (including biofuel crops).

EU innovation policy

One of the main objectives of the current EU innovation policy is to lower barriers to bring new products or services onto the market. The Commission, Member States and industry have worked together on regulation, public procurement, standardisation and supporting activities. Although the level of R&D investments across Europe is considered to be low, targeted research and innovation initiatives could boost productivity and hence the growth of the sector, while recognising that the relatively long period for returns on investments, as consumers need time to familiarise themselves with innovative products, creates obstacles for SMEs. The High Level Group on the Competitiveness of the Agri-Food Industry endorsed in March 2009 several recommendations related to research and innovation policy.

In December 2009, the European Institute of Innovation and Technology designated a 'Climate-KIC' as a Knowledge and Innovation Community with mitigation-adaptation potential as well as innovation and job creation opportunities. 'Climate-KIC' will initially focus on achieving excellence in four areas: assessing climate change and managing its drivers, transitioning to low-carbon resilient cities, adaptive water management and zero carbon production.

¹³ SEC(2009) 1093 final, 23.7.2009