



Brussels, 9 October 2008

Subject: External consultations on potential research topics for/with Africa in Biotechnologies, Agriculture and Food

This note summarises the result of the external consultations undergone by DGRTD (Dir E) in order to identify, for 2010 and beyond, potential research topics of mutual interest and benefit with Africa in the area of the FP7-FAFB Thematic.

CONSULTATIONS WITH AFRICAN STAKEHOLDERS

A workshop, co-organised by Dir E and DG AIDCO & DEV, has taken place in Brussels in April 2008 with African and European experts in order to identify priority research topics, and complementarities between the Food Security Thematic Programme (FSTP) and FP7-FAFB Thematic.

This workshop has been facilitated by the "Platform for African European Partnership in Agricultural Research for Development" (PAEPARD) which is currently supported under a SSA of the FP6 managed by Dir D. The coordinator of the INCONET in charge of Sub-Saharan-Africa –CAASNET– attended the meeting. Forty experts from Africa and Europe, coming from the academic, private, civil society sectors participated in this consultation.

The general objective of the workshop was to establish priority areas of cooperation to increase the impact of agricultural research and knowledge systems on:

- rural productivity,
- poverty reduction,
- food security and sustainable management of natural resources,

taking into account common challenges, such as those posed by climate change.

The emphasis was on multidimensional research approaches, on sustainable agricultural production systems and on research with positive impacts on the rural poor.

RESULT OF THE PAEPARD CONSULTATION

From current EU research, and development policies and contributions received from different sources (FAB Programme Committee, ERA-ARD, EIARD strategy, ...), the EC (DG DEV, RTD, RELEX, AIDCO) has developed in 2008 "Guidelines on Agricultural Research for Development" which identify Africa as a priority, and 10 broad priority areas of research in relation with MDGs:

1. Climate change: Adaptation and mitigation for small farmers in Sub-Saharan Africa
2. Globalisation and trade impact on developing countries
3. Bioenergy
4. Animal diseases and pandemics
5. Agricultural Innovation Systems
6. Environmental degradation & Natural resources management
7. Development policies
8. High value crops
9. Demography
10. Traditional knowledge

Based on these broad research areas, the African and European experts proposed 39 research topics.

POTENTIAL TOPICS ON/WITH AFRICA

Two broad topic areas could be of comment interest between Dir E, Dir I and JRC.

- (1) Water resources & management in relation with Climate Change
- (1) Environmental degradation & Natural resources management

For each of these broad topic areas, several potential topics are proposed (See table below). They could be included in the WP2010 either as Small Collaborative Projects or regrouped into Large Collaborative Projects, especially for the first two areas. The proposed topics are detailed in Annexe 1.

In addition a CSA is proposed to set up a network of NGOs involved in agricultural research in Africa.

Broad topics areas	Potential Topics (from the PAEPARD consultation)
Water resources & management in relation with Climate Change	<ul style="list-style-type: none"> • Use of weather and seasonal climate forecasts for food security in Sub-Saharan agriculture • Evaluation of climate-resilient crops to cope with climate variability and change • Improving crops for climates of the future
Environmental degradation &	<ul style="list-style-type: none"> • Integrated Approaches for Improvement of Soil Quality and Health in

Natural resources management	<p>pastoral and arable land use systems (indicator)</p> <ul style="list-style-type: none"> • Making Ecosystem Services Work in pastoral and arable lands use systems for food security
Other	<ul style="list-style-type: none"> • 2010: FAFB Call 2010 – Topic to set-up a NGOs network

Annexe 2 presents other major research initiatives related to these two topics from Member States and other international bodies, e.g. the Consultative Group for International Agricultural Research (See in annexe).

ANNEXE 1

1. WATER RESOURCES & MANAGEMENT IN RELATION WITH CLIMATE CHANGE

- **Use of weather and seasonal climate forecasts for food security in Sub-Saharan agriculture:**

Description:

Inter annual and inter seasonal climate variability are major factors influencing agricultural systems, food security and rural livelihoods. The impacts of climate variability and change are particularly important in SSA where the majority of the population is involved in agriculture. Local systems are already under pressure from recurrent climate risk (floods, drought, pests and diseases). For over a decade, international, regional and national centres have produced seasonal precipitation forecasts. In addition, the development of numerous weather models coupled with remote sensing makes weather predictions possible. However, climate and weather forecasts are limited in applicability because they are not integrated into management decision tools which provide a basis to guide agronomic decisions. The use of climate and weather outputs combined with local knowledge of crops and soils could lead to management interventions to improve yields and/or minimize economic risk.

This project will develop a decision support system (DSS) for small scale farmers in SSA by:

- ✓ Analysing weather and probabilistic climate forecasts across agro-ecological environments
- ✓ Interpreting forecasts at local scale for small-scale farmers
- ✓ Integrating local knowledge of crops and soils into weather and climate products
- ✓ Incorporating forecasts into a DSS for short and medium term management options including the potential for pest and disease monitoring and control
- ✓ Disseminating the DSS to potential end-users across SSA

Expected results:

The project will provide a decision tool to maximise production in favourable years and minimise risk in poor years. It will provide management and crop options for tactical and strategic decisions. It will link major research players (meteorological and agronomic services) the private sector, farmers groups, traders and the rural media

- **Evaluation of climate-resilient crops to cope with climate variability and change:**

Description:

Climate change predictions for Africa suggest high uncertainty and variability, especially in the amount and distribution of rainfall in space and time. Temperature increases and greater variability in water resources are expected to have significant impacts on the agricultural sector. These uncertainties require an evaluation of crops that are more resilient to abiotic stresses and climatic variability. In rainfed systems, farmers will require crops and cultivars that are better suited to climate variability than genotypes of most major species. However, crops that are cultivated in the most variable environments

are often those for which research is most limited, fragmentary and inaccessible both because it remains unpublished and/or exists as indigenous knowledge.

Using a selection of promising but neglected crops, this project will develop:

- ✓ A generic, user-friendly decision support system for evaluation, knowledge-sharing and management of climate-resilient crops
- ✓ A comprehensive assessment of genetic, physiological, production and marketing potential in and beyond current areas of cultivation
- ✓ A mechanistic model and mapping tool to define agroecological and yield potential on a global scale
- ✓ Assessment/multiplication of potentially useful germplasm for future breeding work
- ✓ A strategy for future improvement through breeding, marketing and/or promotion
- ✓ A mechanism for dissemination of information on each crop and a network of stakeholders across a value chain from production to end-use.

Expected results:

Crop species that are resilient to climate variability will be identified and promoted. A general methodology to identify best crops for different agro-ecological environments will impact on rural productivity, poverty reduction. Food security and income-generating opportunities will be enhanced for populations living in the most marginal and vulnerable environments to climate change.

- **Improving crops for climates of the future:**

Description:

Climate change involves complex interactions between temperature, water and elevated CO₂. Whilst future temperature and rainfall scenarios can be mimicked by selecting suitable field sites, their interactions with elevated CO₂ cannot. The effects of CO₂ require the use of controlled-environments (C-E) to support field and laboratory studies. Crops of the future must grow in climates of the future and any crop improvement programmes must take account of future climate scenarios.

This project will develop a crop improvement strategy for crops and climates of the future. Using two representative species (one C3 and one C4 crop) a comprehensive crop improvement programme will be established that:

- ✓ Develops new cultivars and crop products based on criteria identified by current and potential end-users and incorporates local knowledge on the cultivation, uses and preferences for potential varieties of these species
- ✓ Uses molecular and other breeding tools to characterise germplasm, identify suitable traits and link molecular information with phenotypic performance across a range of agroecological environments.
- ✓ Establishes a ‘value chain approach’ that links growers, users, processors, traders, breeders, seed producers and researchers
- ✓ -Links C-E and field research with models and mapping tools to identify actual and potential yields under various climate change scenarios

- ✓ Develops a generic framework for the improvement of numerous crop species that can best suit future climates

Expected results:

The project will provide a robust strategy for the improvement of crops not currently supported by the international agricultural network. By using a generic approach, principles established on the two candidate species can be used to accelerate crop improvement programmes in many other species. This will ensure cost- and time-effective use of limited resources and access of new products to current and potential end-users.

2. ENVIRONMENTAL DEGRADATION & NATURAL RESOURCES MANAGEMENT

- **Integrated Approaches for Improvement of Soil Quality and Health in pastoral and arable land use systems (indicator):**

Description

Land degradation is widespread in Africa and believed to be increasing leading to depletion of soil organic matter, nutrients, soil flora and fauna, deterioration of physical soil attributes (e.g. nutrient and water retention). The diminution of soil quality and health has resulted in reduced productivity. Soil is the basis of life and the role of soils has to be re-invigorated in research. The regenerative capacities of soils have to be re-vitalized for ensuring healthy and resilient environments.

The call will address:

- ✓ A strategy for comprehensive assessment of agro-ecosystem based on soil health and benefits while fully understanding the rationale of farmers
- ✓ Development of approaches and associated tools to conduct trade-off analyses to optimize the balance between land use systems
- ✓ A strategy for increasing soil-biodiversity for restoring productivity and health of soils by building up soil organic matter and improved crop rotations for the regeneration of efficient and effective beneficial local soil flora and fauna (mycorrhiza, free-living bacteria, earthworms, actinomycetes).
- ✓ Tools for monitoring land degradation taking into consideration indigenous knowledge to define thresholds for interventions.
- ✓ The role of land tenure, market, policy, institutional and socio-economic aspects that affect soil fertility improvement and incentives of farmers to invest in soils.

Expected results:

Increased soil-biodiversity of micro, meso and macro flora and fauna in soils, higher water, nutrient and carbon retention will lead to reduced leaching, run-off and soil loss, providing resilient environments and sustainable agricultural systems which higher independence from external inputs

Improved quality and health of soil will result in higher productivity and therefore increased incomes for different end-users.

The strategy will serve to improve both lands- low production traditional systems as well as polluted land under intensive use.

- **Making Ecosystem Services Work in pastoral and arable lands use systems for food security:**

Description

Africa's soils have undergone severe degradation undermining their capacity to contribute to ecosystem services. The benefits to maintenance of water and air quality, carbon storage, habitation of beneficial flora and fauna have diminished. Indigenous systems are breaking down resulting in depletion of soils and water resources, decrease in agro-biodiversity, increased incidence of pests and diseases further aggravating the problem of food insecurity.

The call will address:

-Strengthening farmers capacities to achieve food security in sustainable environments by maintaining and/or increasing agro-biodiversity while simultaneously adopting cropping patterns that improve yields and fully understanding the rationale of farmers

- ✓ Development of approaches, methods, tools appropriate for valuation of marketable and non-marketable ecosystem goods and services
- ✓ Tools for monitoring status of ES of natural resources and agricultural and pastoral production systems taking into consideration indigenous knowledge.
- ✓ Strengthening resilient agro-ecosystems and
- ✓ Linking them to socio-economic dynamics, ownership, property rights and indigenous knowledge
- ✓ A strategy for scaling-up/out integrated policy, markets, institutional and organizational options that create that create incentives for end-users to invest in sustainable NRM.

Expected results:

Increased agro-biodiversity and soil health will result in greater resilience of agro-ecosystems for improved food security and sovereignty.

Payment for ES will result in farmers realizing alternative sources of income and reduced poverty

Synergies between other ecosystem services (e.g. agro-biodiversity, clean water, fresh air, enhanced water, carbon and nutrient retention capacities) will enable the agro-ecosystem to withstand harmful effects of climate change, pest and disease.

ANNEXE 1

Priority ARD thematics from the EC ARD Guidelines and the PAEPARD Consultation	FP7 - FAFB		FP7-ENV	AUC-EC Lighthouse Projects	Some other European Initiatives	Some other international initiatives	Comment
	2009	Topics for 2010 and beyond from the PAEPARD Consultation	2009				
1. Climate change: Adaptation and mitigation for small farmers in Sub- Saharan Africa			<ul style="list-style-type: none"> Climate change (Sub-Saharan Africa) Impacts of climate and water on health (Low income countries) 	<ul style="list-style-type: none"> African Union Initiative on Climate Change (African Institute on Climate Change-AICC) 	<ul style="list-style-type: none"> Germany "Adaptation of African Agriculture to Climate Change - Risk and Benefit of Biomass with Respect to Socioeconomic and Ecological Conditions" UK: "Climate Change Adaptation in Africa" SCAR Working Group on climate change 	<ul style="list-style-type: none"> CGIAR Challenge Programme on Climate Change 	<ul style="list-style-type: none"> Many initiatives
+ Water resources & management (also in Priority 1 above)	<ul style="list-style-type: none"> Irrigation water saving solutions for (Mediterranean) agriculture* Water stress tolerance 	<ul style="list-style-type: none"> Use of weather and seasonal climate forecasts for food security in Sub-Saharan agriculture Evaluation of climate-resilient crops to cope with climate variability and change Improving crops for climates of the future 	<ul style="list-style-type: none"> Climate induced changes in water resources (MPC) 	<ul style="list-style-type: none"> Water and food security in the Nile basin 	<ul style="list-style-type: none"> European, Water Initiative 	<ul style="list-style-type: none"> CGIAR Challenge Programme: Water & Food 	<ul style="list-style-type: none"> Fewer initiatives 2010: <u>Coordinated call with ENV and JRC ?</u> 2010: <u>Coordinated call with FSTP Call from DG AIDCO/ DEV?</u>

2. Environmental degradation & Natural resources management	<ul style="list-style-type: none"> • Optimisation of methods to maintain animal biodiversity • Improving performance and quality of crops in the context of organic and low-input systems by breeding and management • Conservation agriculture in Developing Countries (opening topics for future calls 2011 and beyond) 	<ul style="list-style-type: none"> • Integrated Approaches for Improvement of Soil Quality and Health in pastoral and arable land use systems (indicator) • Making Ecosystem Services Work in pastoral and arable lands use systems for food security 	<ul style="list-style-type: none"> • Desertification and land degradation (Africa) 	<ul style="list-style-type: none"> • African Pole of Excellence on Desertification and Forestry 			<ul style="list-style-type: none"> • Less initiatives • Opening topics in the FAFB Call 2009 for future calls 2011 and beyond • <u>2010: Coordinated call with FP7 ENV and JRC ?</u> • <u>2010: Coordinated call with FSTP Call from DG AIDCO/DEV?</u> • 2011: –Coordinated call with FSTP from DG AIDCO/DEV on conservation agriculture?
Others	<ul style="list-style-type: none"> • ERA-ARD • Consolidate alliances with the Mediterranean in the field of aquaculture 	<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • Building Africa's Scientific and Institutional Capacity (BASIC) in Agriculture and natural Resource Management • Harnessing Biotechnology for the Advancement of African Agriculture 	<ul style="list-style-type: none"> • On going ERANET Mediterranean Countries 		<ul style="list-style-type: none"> • <u>2010: FAFB Call 2010 – Topic to set-up a NGOs network</u> • 2010: PAEPARD II could supported by FSTP of DGAIDCO/DEV, in particular WP across FP & FSTP projects