THEME 2: FOOD, AGRICULTURE AND BIOTECHNOLOGY

Objective:
Building a European *Knowledge Based Bio-Economy* [1] by bringing together science, industry and other stakeholders, to exploit new and emerging research opportunities that address social, environmental and economic challenges: the growing demand for safer, healthier, higher quality food and for sustainable use and production of renewable bio-resources; the increasing risk of epizootic and zoonotic diseases and food related disorders; threats to the sustainability and security of agricultural, aquaculture and fisheries production; and the increasing demand for high quality food, taking into account animal welfare and rural ***and coastal*** contexts and response to specific dietary needs of consumers.

I CONTEXT (1-2 pages)

Policy context
Innovations and advancement of knowledge in the sustainable management, production and use of biological resources (micro-organism, plants, animals), will provide the basis for new, sustainable, safe, eco-efficient and competitive products for agriculture, fisheries, feed, food, health, forest based and related industries**.** In line with the European strategy on life sciences and biotechnology[2] and the Lisbon objectives, this will help increase the competitiveness of European agriculture and biotechnology, seed and food companies, in particular high tech SMEs, while improving social welfare and well-being and reducing environmental footprints.
The research will also provide the knowledge base needed to support the Common Agricultural Policy and European Forest Strategy; agriculture and trade issues; safety aspects of GMOs; and the Common Fisheries Policy reform aiming to provide sustainable development of fishing and aquaculture.
Research into the safety of food and feed chains, diet-related diseases, food choices and the impact of food and nutrition on health will help to fight food-related disorders (e.g. obesity, allergies) and infectious diseases (e.g. transmissible spongiform encephalopathies, avian-flu), while making important contributions to the implementation of existing and the formulation of future policies and regulations in the area of public, animal and plant health and consumer protection.
Research into non-food applications of biological resources will support objectives of the Environmental Technology Action Plan (ETAP)[3] , as well as the biomass action plan[4] and the European biofuel strategy[5].

Approach
All three activities and all areas within these activities are open in the 2007 calls. In view of the wider scope of this theme as compared to priority 5 "Food quality and safety" of FP6, the

1 The term "bio-economy" includes all industries and economic sectors that produce, manage and otherwise exploit biological resources and related services, supply or consumer industries, such as agriculture, food, fisheries, forestry, etc.
2 http://ec.europa.eu/comm/biotechnology/introduction_en.html
3 http://ec.europa.eu/comm/environment/etap/
4 http://ec.europa.eu/energy/res/biomass_action_plan/index_en.htm
5 http://ec.europa.eu/agriculture/biomass/biofuel/index_en.htm

focus is on topics that a) cover new areas, as compared to FP6 or b) are a necessary continuation or follow-up of previously funded projects and/or c) are of high priority and European added value in terms of recent policy developments. The focus in these calls will be on small scale focused research actions, where needs in terms of competitiveness or policy support are more concrete and targeted and clear impacts can be achieved through shorter term projects, and on small preparatory actions (via coordination support actions- CSA), which will identify and lay the ground for priority actions in later calls[6]**.** Large scale integrating projects will be evaluated through two-step submission procedures, with the exception of the first call in 2007.
A large part of this theme provides research in support to policy, the topics of which have been identified in cooperation with the relevant policy directorates of the Commission, in response to recent policy developments.
Coordination of national research programmes in the current work programme will be limited to support new activities in strategically important areas, as identified by the Standing Committee for Agricultural Research (SCAR). Potential funding for continuation or widening of current ERA-NETS (ERA-NET plus) will be addressed in later work programmes.
The opinion and advice of a wide range of experts have been taken into account; either originating from expert workshops, studies, analysis of ongoing research, etc. In particular, the strategic research agenda of the relevant European Technology Platforms (Plants for the Future; Animal Breeding; Global Animal Health; Food for Life; Forestry, Biofuels and the Industrial Biotechnology section of the Sustainable Chemistry Platform) have been taken into account in defining the priorities for this work programme.

- SME relevant research

The work programme of this theme has been designed to attract industrial participants, in particular SMEs, and proposals involving such partners is expected in all relevant research topics that address competitiveness of European industries. At least 15% of the budget of the call is targeted at SME participation.

- International Cooperation

International cooperation with participants from third countries is supported and encouraged throughout all areas of this theme. Furthermore, a series of "Specific International Co-operation Actions" will be dedicated to international co-operation with partners from International Cooperation Partner Countries, to jointly address, on the basis of mutual benefit, problems of shared interest, or that third countries face or that have a global character. Firstly, co-operation with developing countries will be supported, taking into account their needs with a view to contribute to the UN Millennium Development Goals of eradicating extreme poverty and hunger and to ensure environmental sustainability. Secondly, Specific International Co-operation Actions will be also undertaken with major partner regions and countries - particularly those involved in bi-regional dialogues and bilateral S&T agreements as well as neighbourhood countries and emerging economies - on commonly agreed priorities. Thirdly, multilateral co-operation actions involving broad international consortia of industrialised, emerging and developing countries world-wide will be carried out to address either challenges requiring broad international efforts (such as the dimension and complexity of systems biology in plants and micro-organisms) or to address global challenges and EU international commitments (e.g. international standards for food quality and safety and drinking water, global spread of animal diseases, equitable use of biodiversity). The priorities

[6] As an indicative guide, small sized collaborative projects are projects up to a budget of €2.5m, large integrating projects up to €5m and coordination and support actions around €1m.

for actions have been identified in close cooperation with stakeholders from these regions and countries (Mediterranean, Russia, Balkan, etc.) through the organisation of major workshops.

- Cross-thematic approaches

This theme engages in research activities that are complementary or related to research in other themes of the Cooperation programme. This applies to research in the area of

1. Systems biology/bioinformatics, under theme 1 "Health"
2. Factors impacting health, under theme 1 "Health"
3. Biodiversity, under theme 6 "Environment". While theme 2 is concentrating on the exploration of biodiversity and the production of biological resources, the focus of theme 6 is on the conservation of biodiversity and natural resources.
4. Biofuels/bioenergy, under theme 5 "Energy". The focus of theme 2 is on novel biotechnology approaches and improved biotechnologies for the production of bioenergy/biofuels, whereas the focus of theme 5 is wider and also covers demonstration activities.
5. Biomaterials, under theme 4 "NMP". The focus of theme 2 is on novel biotechnology approaches and improved biotechnologies for the production of renewable biomaterials, whereas the focus of theme 4 is the application, upscaling and demonstration of these technologies.

In annex XX, topics proposed by different themes are listed for a number of selected, cross-cutting research areas.

- Dissemination actions

Strengthening the competitiveness of the European food and biotechnology sectors is an important objective of this priority theme, with particular attention being given to innovation aspects and broad participation of SMEs. Innovation-related aspects need to be clearly addressed and well-defined dissemination and exploitation plans presented, showing the optimal use of project results.

Participants are encouraged to involve all relevant stakeholders for example consumer and patient organisations, farmers, animal welfare organizations, ethicists, lawyers, and others in research projects from the very beginning of a new project and actively engage in public dialogue. It will provide at the European level a bottom-up approach to help the process of consensus forming around the development and use of new scientific and technological developments

Within this workprogramme, a number of topics address knowledge transfer and dissemination activities and activities aimed at engagement of the public.

- Participation of women and gender aspects in research

The pursuit of scientific knowledge and its use in service to society requires the talent, perspectives and insight that can only be assured by increasing diversity in science and technological workforce. Therefore, a 50% representation of women at all levels in research projects is encouraged.

Gender aspects in research have a particular relevance to this theme as risk factors, biological mechanisms, behaviour, causes, consequences, management and communication of food related disease and disorders may differ in men and women. Furthermore, the roles and responsibilities, as well as in the relationship to the resource base, which are relevant to sustainable development research (land management, agricultural and forest resources etc) and the perception of risk and benefits may have a gender dimension. Applicants should systematically address whether, and in what sense, sex and gender are relevant in the objectives and in the methodology of projects.

II CONTENT OF CALLS IN 2007

Activity 2.1: Sustainable production and management of biological resources from land, forest and aquatic environments

Area 2.1.1 Enabling Research

Enabling research on the key long term drivers of sustainable production and management of biological resources (micro-organisms, plants and animals) including the exploitation of biodiversity and of novel bioactive molecules within these biological systems. Research will include 'omics' technologies, such as genomics, proteomics, metabolomics, and converging technologies, and their integration within systems biology approaches, as well as the development of basic tools and technologies, including bioinformatics and relevant databases, and methodologies for identifying varieties within species groups.

COOP-2-1-1-01: Development of new tools and processes to support R&D in crop plants: molecular breeding **Call: KBBE-2007-1**

The project will develop new tools from technologies that support both research & development and the production of industrial prototypes for the breeding of crop plants using molecular tools. Proposals should pre-select and justify the choice of technologies to develop, which may include, among others, integrated phenotyping and genotyping, large-scale phenotyping with predictive value and predictive screening methods for desired genotypes, monitoring and diagnosis in complex systems – such as plants and plant-environment interactions – the development of both novel molecular tools for conventional breeding and also innovative transgene breeding methods.

Funding scheme: Small collaborative project

Expected impact: This project is expected to give the EU a competitive edge for the breeding of crop plants for sustainable and competitive agriculture.

COOP-2-1-1-02: Development of genetic systems for crop improvement through a systems biology approach **Call: KBBE-2007-1**

This project will delineate the molecular basis for genetic systems underpinning crop improvement and innovative agricultural practices. Proposals should pre-select and justify the choice of the basic biological process or processes to study in model species using a system biology approach, which may include, among others, heterosis, recombination, ploidy control, perenniality, parthenocarpy and apomixis. The study of these genetic systems will be complemented with an understanding of trait plasticity, including potential constraints, effects of gene dosage and the contribution of the genetic variation.

Funding scheme: Large collaborative project

Expected impact: This project is expected to give the EU a competitive edge in the efficient targeted delivery of desired outcomes in crop improvement programmes, domestication of new crops and industrial innovation.

COOP-2-1-1-03: Mining genomics information of farm animals to generate new information on the genetic basis of phenotypes important to sustainable agriculture. **Call: KBBE-2007-1**

This project will use functional and comparative genomics and/or in silico analysis to dissect the genetic basis of one or more specified traits. The outcome of the research will be

molecular diagnostic tools to assist in selective improvement of breeding stock of farmed animals.
Funding scheme: Small collaborative project
Expected impact: The project will support the development of competitiveness of animal production in terms of European policies on the sustainability of farming and on animal health and welfare.

COOP-2-1-1-04: Development of technologies and tools for the exploitation of livestock genome **Call: KBBE-2007-2A**
The project will deliver improved tools using a pre-selected group of technologies. With the generation of the chicken, cow and pig genome sequences, livestock production finds itself on the cusp of a new generation of technologies. However, to fully exploit the sequence information, a series of downstream tools needs to be developed. The purpose of this project is to assist in the exploitation of the available livestock genome sequences on a comparative basis by providing sequence and annotation data and developing tools.
Funding scheme: Large collaborative project
Expected impact: This project is expected to help ensure that the EU is positioned to take advantage of the genomics revolution and will primarily contribute to the long term competitiveness pf European livestock production. Given its fundamental role, it will also lead eventually to support the sustainability, in a broad sense, of animal production and support European policies in relation to animal health and production.

COOP-2-1-1-05: Using new technologies to identify (re-)emerging pathogens from wildlife reservoirs **Call: KBBE-2007-2A**
The purpose of this multidisciplinary collaborative research project is to develop generic approaches to wildlife surveillance by providing baseline data for disease control and intervention. It will do this through the use of novel screening assays, such as microarrays, to screen wildlife populations for the presence and distribution of infectious agents that cannot be isolated in culture and/or which are only distantly related to known infectious agents. Collaboration with third countries, including INCO target countries, is encouraged.
Funding scheme: Large collaborative project
Expected impact: Rapid identification, and therefore control, of emerging pathogens, with a concomitant reduction in animal and human morbidity.

COOP-2-1-1-06: Development of new tools and processes to support R&D in crop plants: gene technology breeding **Call: KBBE-2007-2B**
The project will develop new tools from technologies that support both research & development and the production of industrial prototypes for the breeding of crop plants using innovative gene technology breeding methods (transgenics/cisgenics/intragenics). Proposals should pre-select and justify the choice of technologies to develop, which may include, among others, controlled transgene integration on a chromosome, controlled and scalable - transient - gene expression systems using, for instance, synthetic transcription factors or designer chemicals, as well as artificial chromosomes.
Funding scheme: Small collaborative project
Expected impact: This project is expected to give the EU a competitive edge for the breeding of crop plants for sustainable and competitive agriculture.

COOP-2-1-1-07: New and converging technologies for Precision Livestock Farming in European animal production systems **Call: KBBE-2007-2B**

The purpose of this project is to develop the potential role and key target technologies in precision livestock farming (PLF) of relevance to European models of agriculture and European society. PLF could potentially produce new methods, exploiting, especially, information and communication technologies, for monitoring animal health and welfare and securing human health through electronic traceability processes, such as RFID. However, PLF also has societal and welfare issues related to intensification of farming systems which will need to be addressed from a European context.
Funding scheme: Small collaborative project
Expected impact: The project will define a sound basis for future developments in PLF in Europe, supporting the competitiveness of livestock farming within the context of EU policies on sustainability and animal welfare.

COOP-2-1-1-08: Optimising research to develop effective tools for controlling infectious animal diseases **Call: KBBE-2007-2B**
This project will take an integrated, rational and methodological approach in order to accelerate the process of research and development of tools against major infectious diseases, including zoonoses, for food animals; minor species; non-food animals and wildlife. The aim of the coordination action is to undertake three successive stages of preliminary assessments in order to best target areas of research. These are: the prioritisation of the infectious diseases; a gap analysis for the priority diseases; and an analysis of available and new technologies with an assessment of their value for the future development of tools. A "gated management" approach will be included.
Funding scheme: Coordination and support action
Expected impact: Improved control of diseases of major importance to the EU and the rest of the world through an integrated, coordinated and rational strategy optimising the targeting of research efforts, from fundamental research to development.

COOP-2-1-1-09: Genomics to develop improved approaches to the control of endemic infectious, or metabolic, farm animal diseases **Call: KBBE-2007-2B**
This project will develop improved methods of reducing the impact of animal diseases on economic and environmental sustainability and on animal welfare. The research will include approaches such as the molecular genetics of host pathogen interactions to better understand the variation of host resistance to, and/or tolerance of, animal disease. In doing so, it will take into account the impact of the disease on economic/environmental competitiveness and animal welfare.
Funding scheme: Small collaborative project
Expected impact: The project will support the development of competitiveness of animal production in terms of European policies on the sustainability of farming, on animal health and welfare and on food safety.

Area 2.1.2 Increased sustainability of all production systems; Plant health and crop protection

Increased sustainability and competitiveness, while decreasing environmental impacts, in agriculture, horticulture, forestry, fisheries and aquaculture through the development of new technologies, equipment, monitoring systems, novel plants and production systems, the improvement of the scientific and technical basis of fisheries management, and a better understanding of the interaction between different systems (agriculture and forestry; fisheries and aquaculture) across a whole ecosystem approach. Research into maintenance of autochthonous ecosystems, development of biocontrol agents, and microbiological dimension

of biodiversity and metagenomics will be undertaken. For land based biological resources, special emphasis will be placed on low input (e.g. pesticides and fertilisers), and organic production systems, improved management of resources and novel food and feeds, and novel plants (crops and trees) with respect to their composition, resistance to stress, ecological effect, nutrient and water use efficiency, and architecture. This will be supported through research into biosafety, co-existence and traceability of novel plants systems and products, and monitoring and assessment of impact of genetically modified crops on environment and human health as well as the possibility of their broader benefit for society. Plant health and crop protection will be improved through better understanding of ecology, biology of pests, diseases, weeds and other threats of phytosanitary relevance and support to controlling disease outbreaks and enhancing sustainable pest and weed management tools and techniques. For biological resources from aquatic environments, emphasis will be placed on essential biological functions, safe and environmentally friendly production systems and feeds of cultured species and on fisheries biology, dynamics of mixed fisheries, interactions between fisheries activities and the marine ecosystem and on fleet-based, regional and multi-annual management systems.

COOP-2-1-2-01: Improved indicators of the relationship between organic/low-input farming and biodiversity **Call: KBBE-2007-1**

This project will study the impact of organic farming and other low-input agricultural methods, using key indicators across a diversity of agro-ecosystems in a case-study approach. A strong cooperation between scientists and other stakeholders in both low-input farming systems and nature conservation is desirable. Targeted agricultural and ecological measures will be developed to maintain and improve biodiversity and these should be delivered for different ecotypes by means of specific recommendations to farmers and other key actors

Funding scheme: Coordination and support action

Expected impact: The project is expected to provide a quantified link between organic/low input production and the protection of biodiversity. It will also produce a series of recommendations to maintain biodiversity and the diversity of European farming systems.

COOP-2-1-2-02: Improving water stress tolerance in European annual food crops

Call: KBBE-2007-1

This project will translate the present knowledge of molecular and genetic processes involved in tolerance and adaptation to water stress, often obtained from model crops, into the development of European annual food crops better able to cope with drought. It will explore the existence of genetic diversity for water stress tolerance and it will work towards the improvement of plant tolerance to drought through molecular breeding and/or genetic engineering approaches.

Funding scheme: Small collaborative project

Expected impact: The project will allow the exploitation of marginal agricultural lands in Europe thus supporting their economic development. It will also contribute to stabilising yield in the event of water stress in areas not often affected by drought.

COOP-2-1-2-03: Genomics for cereal improvement for food and non-food uses

Call: KBBE-2007-1

This project will assemble the knowledge required, and use modern breeding techniques, including genetic engineering, to produce cereal crops (from the Triticeae tribe) with improved composition and characteristics that will satisfy the proven needs of consumers, processors and producers. In addition to developing new knowledge in the areas of genetics

and genomics, the project will build on existing resources inside and outside Europe. To assure dissemination and transfer of the results, industrial, farmers' and consumers' representatives should be included from inception. Participation in international genomics programmes and collaboration with INCO target countries is encouraged.
Funding scheme: Large collaborative project
Expected impact: The project will enable Europe to assume a clear leadership role in Triticeae genomics, thus producing a competitive advantage in the global market.

COOP-2-1-2-04: Development of Pest Risk Analysis based on new diagnostic methods
Call: KBBE-2007-1

This project will develop the science and provision of risk analysis and explore the potential for new techniques, refine existing tools and develop novel diagnostic methods and management approaches that can be applied to enhance existing PRA schemes. Research will focus on the development of novel and sustainable pest management strategies, with integrated technical support to policy development in the case of emergency situation/pest outbreaks. Key work will include: identifying and integrating key national and international datasets; exploring new techniques and refining existing tools; developing system approaches to pest risk management; and, developing new diagnostic methods and management strategies for pests which are subject to phytosanitary regulations and which are difficult to eradicate or contain.
Funding scheme: Small collaborative project
Expected impact: The project will develop sustainable, integrated plant health management strategies. Effective policy making and decision making by governments aimed at predicting and managing plant health risks, will be enhanced through the further development of more effective PRA based on new diagnostic methods and decision support systems.

COOP-2-1-2-05: Novel forest tree breeding **Call: KBBE-2007-1**

By focusing on improved/novel breeding strategies (e.g. resistance breeding, marker assistant breeding, genetically designing trees with enhanced physiological characteristics), this project will address increasing societal needs, such as the sustainable biomass production from forests as a replacement for fossil fuels and other petrochemical products, improved raw material quality and quantity for forest based products. Concomitantly, the project will need to reduce the vulnerability of trees towards the impact of biotic hazards, pests, diseases and improve adaptation to changing environmental conditions due to climate change.
Funding scheme: Large collaborative project
Expected impact: This project will help the European forest-based sector to adapt production strategies to the changing market and environmental conditions and consequently will strengthen its global competitiveness.

COOP-2-1-2-06: Developing new methods for valuing and marketing of non marketable forest goods and services **Call: KBBE-2007-1**

The project will develop new valuation methods to assess the socio-economic impact of a wide range of forest externalities and, additionally, develop new or improved marketing concepts and integrated production methods for non-wood forest products. These methods and concepts will address the changes in forestry production where goods, benefits and services such as clean water and air, recreation, hazard protection and prevention, landscape, etc. are becoming more important as a forest product but currently lack sufficient economic incentives to be viable.
Funding scheme: Small collaborative project

Expected impact: The project will help develop a viable income for forest owners, secure the future stability of European forests and contribute to a sustainable rural development by reducing the abandonment of forests as a result of the long-term stasis in prices for wood-based forestry products.

COOP-2-1-2-07: Microbial control for more sustainable aquaculture

Call: KBBE-2007-1

In the aquatic environment production is characterized by the phenomenon that feed and excretion products are present in the same matrix, namely water. Hence this environment is conducive to the proliferation of micro-organisms (beneficial, neutral, opportunistic pathogens and pathogens). In the past main attention has focused on pathogenic bacteria and their role in disease onset with little interest in their possible beneficial role through host-microbial interaction at different stages in the development and life history of the target animals: e.g. role in digestion, in non-specific and specific immune enhancement, in stress, in pathogenicity, in disease prevention, in macro and micro nutrient delivery. The project, through the availability of model systems and the use of advanced molecular and genomic tools, will gain better insights in the key biological processes which so far have been studied at an empirical level only. It is expected that microbial control could help to overcome bottlenecks in the life cycle of target species (enhanced survival, reduced stress, better growth) and to result in new insights in the recycling of nutrients (farming down the food chain under the form of microbial biomass = animal protein production) in the shortest and most efficient food web as compared to other alternatives in use today.
Funding scheme: Large collaborative project
Expected impact: A successful project will have major repercussions on improved sustainability of aquaculture (impact on the environment) and will result in an alleviation in animal protein needs in aquaculture feeds, both crucial issues in the European context but even more in the (sub)tropics where most of the farming is practiced

COOP-2-1-2-08: Coordination of Agricultural Research in the Mediterranean

Call: KBBE-2007-1

The countries of the Mediterranean basin face a number of similar problems in relation to agricultural, mainly as regards the use and management of natural resources, such as soil and water, crop protection and threats to the security and sustainability of agricultural production resulting from climate change. These issues need to be identified and addressed through a stronger scientific cooperation between the EU Members and other countries of the Mediterranean area.
Funding scheme: Coordination and support action / ERA-NET Coordination action
Expected impact: This ERA-NET coodination action is expected to help coordinate national research activities and identify common research programmes among the countries of the Mediterranean area, fight fragmentation and exploit synergies

COOP-2-1-2-09: Reducing the utilisation of mineral fertilisers by improving the efficiency of nutrient use in European crops **Call: KBBE-2007-2A**

Using genomics and metabolic tools, this project will further our understanding of the molecular genetic basis of nutrient use efficiency in crop plants. It will study the impact of environmental factors on nutrient use efficiency and identify genetic variation that affects such efficiency. It will design genetic markers for marker assisted breeding of cultivars with improved nutrient use, and explore alternative strategies for improvement of nutrient use efficiency based on genetic engineering. The project will also develop monitoring tools and

adapt agricultural practices to reduce the need for fertiliser in plant production systems and will construct models of uptake, storage and utilisation of fertilisers by crops.
Funding scheme: Large collaborative project
Expected impact: The project will reduce the environmental impact of crop production, leading to more efficient and sustainable farming.

COOP-2-1-2-10: Annual Food crops with improved tolerance to multiple abiotic stresses
Call: KBBE-2007-2B

This project will support the development of "climate proof" food crops that better utilize agricultural areas affected by erratic rainfalls, drought and other associated stresses in the Mediterranean region. The long-term aim will be the stabilisation of yield capacity in cultivars adapted to combinations of abiotic stresses. The work should be underpinned by a holistic approach integrating research on agricultural systems, husbandry practices and plant breeding technologies, and should also address socio-economic aspects, in order to ensure sustainability and field applicability of results in different pedo-climatic conditions encountered in the Mediterranean region.
Funding scheme: Small collaborative project / Specific International Cooperation Action: The project is expected to contribute to the EU neighborhood policy and other EU-MED initiatives and dialogues such as co-operation with countries signatories of S&T agreements with the EU (e.g. Egypt, Morocco and Tunisia). Minimum Number of Participants : 2 from different MS or AC and 2 from different Mediterranean ICPC.
Expected impact: The project will allow improved productivity and sustainable exploitation of agricultural lands in the Mediterranean region, thus supporting economic development in non European Mediterranean countries while ensuring mutual interest and mutual benefit with the EU. It will also help adaptation of agricultural practices to future needs and constraints.

COOP-2-1-2-11: Developing vaccines for the control of roundworm infestation in extensive ruminant production systems **Call: KBBE-2007-2B**

The project will deliver new targets for helminth vaccines, thus developing the use of modern vaccine technologies to control important roundworms of ruminants in extensive production systems. Large-scale extensive production, especially of ruminants has relied to a large extent on multiple treatments of broad action anthelmintics leading to increasing problems of multiple anthelmintic resistance. Development of new vaccine technologies, such as the production of effective sub-unit vaccines, will allow maintained, sustainable production and have the added benefit of reducing possible contamination of the human food chain with anthelmintic drugs. While being targeted at INCO regions, the project will be of relevance worldwide, including Europe.
Funding scheme: Small collaborative project
Expected impact: The project will stimulate the sustainable development of extensive ruminant production systems, reduce the risk of production becoming impossible in the face of drug resistance, and reduce the need for anthelmintics.

COOP-2-1-2-12: Improved agro-forestry systems for sustainable farming
Call: KBBE-2007-2B

The aim is the development, field-testing and demonstration of a range of appropriate agro-forestry practices and technologies adapted to different agro-ecological zones, farmers' typologies and local societal needs, particularly in the poorest countries. Since these practices and technologies should be specific to different geographic, climatic and social conditions, a preliminary phase might be necessary, together with the active involvement of beneficiaries and end-users, to study and analyse the main factors, including socio-economic factors, that

limit/hinder the adoption of agro-forestry. The project will combine traditional and new knowledge from European and non-European countries and will provide a strategic participatory approach for economically viable, ecology sound and socially accepted agro-forestry practices.
Funding scheme: Small collaborative / Specific International Co-operation Action: The project is expected to contribute to poverty alleviation and to the EU commitment towards the UN Millennium Development Goals. Minimum Number of Participants: 2 from different MS or AC and 2 from different ICPC, with a special focus on the poorest countries.
Expected impact: By promoting a better management of agro-forestry systems and a more sustainable exploitation of natural resources, the project will contribute to the reduction of deforestation and will increase the production potential of agricultural land.

COOP-2-1-2-13: Reducing the need for external inputs in high-value protected horticulture **Call: KBBE-2007-2B**
This project will improve the efficient use of inputs (plant protection products, nutrients and water) in high-value horticultural food crops in soil-less and closed-cycle cultivation systems. The project will integrate research on novel cultivation techniques and equipment with the development of "real-time" monitoring tools, and will include the application of advanced technologies, such as bioscience-based technologies, computer sciences, ICT, non-invasive sensory electronics, etc., to optimise the use of inputs and produce high-quality and safer vegetables.
Funding scheme: Small collaborative project
Expected impact: The project will increase market competitiveness of the European protected horticultural sector by reducing the running costs of systems/infrastructures and optimising the use and recycling of both the growth media and the external inputs.

Area 2.1.3 Optimised animal health production and welfare across agriculture, fisheries and aquaculture

Optimised animal health, production and welfare, across agriculture, fisheries and aquaculture, inter alia through the exploitation of genetic knowledge, new breeding methods, improved understanding of animal physiology and behaviour and the better understanding and control of pests, parasites and infectious animal diseases and other threats to the sustainability and security of food production, including zoonoses. The latter will also be addressed by developing tools for monitoring, prevention and control, by underpinning and applied research on vaccines and diagnostics, studying the ecology of known or emerging infectious agents and other threats, including malicious acts, and impacts of different farming systems and climate. New knowledge for the safe disposal of animal waste and improved management of by-products will also be developed.

COOP-2-1-3-01: Improving animal health, product quality and performance of organic and low-input livestock systems through breeding **Call: KBBE-2007-1**
In this project, different breeding concepts will be analysed for their success in achieving specific breeding aims (health condition, tolerance to stress, feeding behaviour, etc) needed for organic and low-input rearing of livestock. Prioritising farm-level research, indicators will be developed and tested in different breeding programmes in different macro-climatic regions. Thus, the project will assist in reducing the gap between the genetic potential of livestock and their site- and environment-specific performance. The work may address dairy, pig, small ruminant and/or poultry production, which, in addition to food production, may also be desirable for tourism, rural development and landscape management.
Funding scheme: Small collaborative project

Expected impact: The project will stimulate organic and "low-input" livestock production by enabling logical, regionally-adapted breeding strategies to be developed that are compatible with sustainable production, high product quality and organic principles.

COOP-2-1-3-02: Improving production through investigating the gut physiology of farm animals and its interaction with the gastro-intestinal microflora Call: KBBE-2007-1
The purpose of this project is to investigate gut physiology and its relationship to gut colonisation by normal and pathogenic microflora. The results will provide an understanding of the interactions of the gut and its contents. Many intensive farming systems have used antibacterial medicines as prophylactic treatments and growth promoters, especially in young animals. However, as such treatment is now banned in the EU there is considerable interest in finding alternative strategies. Such strategies would also be of interest to low input livestock production. The choice of alternatives, and their administration, needs to be based on a sound understanding of gut physiology and the interaction with bacterial colonisation, especially around the time of weaning.
Funding scheme: Small collaborative project
Expected impact: The project is expected to support the competitiveness of European livestock production within the context of European policies on sustainability, food and consumer safety and animal health and welfare.

COOP-2-1-3-03: From capture based to self-sustained aquaculture Call: KBBE-2007-1
This project will substantiate the current knowledge on the reproduction of capture based aquaculture species (e.g. bluefin tuna, eel) in captivity, and at the same time establish the knowledge-base required for a controlled egg and larval development, and for the development of suitable and environmentally performing feeds. In recent years a new aquaculture activity has developed directed at highly appreciated species for which the current level of production by commercial fisheries is not enough to meet consumers' demand and where the wild populations are facing serious fishing pressure. The development of a self-sustained aquaculture activity, independent from the supply of wild fish, is thus required both from an industrial and conservation perspective.
Funding scheme: Small collaborative project
Expected impact: Improved competitiveness and ensure sustainability of capture based aquaculture.

COOP-2-1-3-04: Neglected zoonoses in developing countries: integrated approach for the improvement of their control in animals Call: KBBE-2007-1
There is consolidated evidence and models which show the significant burden in terms of morbidity, mortality and economic costs which some zoonoses qualified by WHO as "neglected zoonoses" pose to developing countries in Africa, Latin America and Asia. Eradication and control programmes for some of them have been funded by major donors. However the diseases are still prevalent in many of the poorest countries in the world. The technological advances in diagnostics and vaccines open a window of possibilities to improve the control measures and hence bring a double benefit to both animal and public health and, by improving socio-economic conditions, would contribute to poverty alleviation. The diseases to be targeted are: anthrax, rabies, brucellosis, bovine TB, zoonotic trypanosomiasis, echinococcosis, cysticercosis and leishmaniasis. The programme would include 1) mapping research activities at global level, 2) improving or developing disease control tools where needed and appropriate for the conditions prevailing in affected countries 3) develop control and prevention strategies taking into account the sociological and cultural aspects related to

the diseases as well as the traditional knowledge. The attribution of a major role to women, both in the veterinary profession as well as in the populations concerned should be sought.
Funding scheme: Large collaborative project / Specific International Co-operation Action: It will contribute to the reduction of poverty and the Millenium Development Goals. Minimum number of participants: 4 from different MS or AC and 4 from different ICPC.
Expected impact: The project will contribute to the improvement of animal and human health and hence the livelihoods of the poorest communities. It will contribute to the reduction of poverty and the Millenium Development Goals. A major impact is expected by tackling these zoonoses as a group and by giving a major role to women. The strategies developed can be applicable to different parts of the world. The project will also provide technology transfer and training to affected countries.

COOP-2-1-3-05: Breeding tools for improved livestock products Call: KBBE-2007-1
The project will develop new, practical technologies to measure product quality and animal robustness and tools to measure the consequences of breeding for specific traits on other characteristics (e.g. robustness on product quality and vice versa). It will include statistical methodologies that can cope with a complex biological background. Genetic tools, based on genomic information, promise to improve selection for specific traits. However, this development is slow partially as a result of lack of data and partially as a result of lack of tools for processing data. In addition, the interaction of prioritised traits (such as added value of products) with those affecting the animal themselves (robustness) means that selection can rarely be aimed at a single characteristic.
Funding scheme: Small collaborative project
Expected impact: The project will support the competitiveness of the livestock breeding and production industries within the context of sustainable production and European policy on animal welfare.

COOP-2-1-3-06: Coordination of European research in the area of animal health, including emerging threats, infectious diseases and surveillance Call: KBBE-2007-1
Coordination of national research and surveillance activities at European level is important in figthing animal diseases, which are a significant threat to human health. Pooling different expertise in different Member States will allow to generate an integrated approach to research activities and the development of a common evidence base, which will help policy development and the identification of common research priorities.
Funding scheme: Coordination and support action / ERA-NET Coordination action
Expected impact: This ERA-NET coodination action is expected to help coordinate national research activities and identify common research programmes, fight fragmentation and exploit synergies

COOP-2-1-3-07: Improved epidemiological tools for food-borne zoonoses: application of geographical information for live animals and animal products Call: KBBE-2007-2A
The aim of this project is to enhance capacity and improve methodology for the surveillance of food-borne zoonoses. It will include the definition of the minimum agreed information to be collected. While the application of geographical information to infectious disease data is an increasingly used tool for epidemiological studies, the information currently available within the EU would be of higher value if it was linked to the geographical distribution of livestock, trade dynamics and control strategies in the member states. There is, therefore, a need to assess the value of European and national databases and to recommend how they can be integrated. Leading third countries, in particular the USA, should be part of the project.
Funding scheme: Network of Excellence

Expected impact: The project will deliver integrated geographical tools for disease surveillance and provide input for risk assessment.

COOP-2-1-3-08: Improved control of diseases within and between aquatic species
Call: KBBE-2007-2B

This project will clarify which additional species other than those commonly known to be susceptible, can transmit koi herpes virus and how this disease might spread by the movement of different commodities. As infectious diseases of aquacultured species hamper the development of the aquaculture industry, inhibit trade and expose wild populations to potential risks, this project will improve sustainable production through a better understanding of the mechanisms involved in disease transmission
Funding scheme: Small collaborative project
Expected impact: Improved sustainable production of aquaculture fish.

COOP-2-1-3-09: Biosafety measures for Campylobacter at primary production
Call: KBBE-2007-2B

The project will use case-control and experimental studies (longitudinal and/or cross-sectional) in order to understand the on-farm epidemiology of campylobacteriosis, in particular of the dynamics of spread of the organism at the farm level. It will examine sources and timing of infection, and identify ways to prevent, reduce or delay infection, taking into account the different production systems, in particular outdoor systems, across the EU. Estimation of the feasibility and efficiency of potential control measures should be included.
Funding scheme: Coordination and support action
Expected impact: The project will support the development of European policy on animal and on consumer health within the context of sustainable production.

Area 2.1.4 Socio-economic research and support to policies

Providing the tools needed by policy makers and other actors to support the implementation of relevant strategies, policies and legislation and in particular to support the building of the European Knowledge Based Bio-Economy (KBBE) and the needs of rural and coastal development. The Common Fisheries Policy will be supported through the development of adaptive approaches supportive to a whole ecosystem approach for the harvesting of marine resources. Research for all policies, including the Common Agricultural Policy, will include socio-economic studies~~,~~ and cost-benefit analysis, comparative investigations of different farming systems including multifunctional ones, cost-effective fisheries management systems, the rearing of non-food animals, interactions with forestry and studies to improve rural and coastal livelihoods.

COOP-2-1-4-01: Developing the KBBE **Call: KBBE-2007-1**

This project will assist in the development and application of new or improved existing models and indicators for supporting analysis, development and monitoring of the social and economic impact of the implementation of the Knowledge-Based Bio-Economy in Europe. Among others, the impact on the Common Fisheries and Agriculture policies should be addressed, and will include its impact on Europe's competitiveness at the global level.
Funding scheme: Coordination and support action
Expected impact: Measurement of the social and economic impact of the KBBE approach to European development

COOP-2-1-4-02: Enabling efficient transfer of technology in the knowledge-based bio-economy **Call: KBBE-2007-1**

The aim of this topic is to propose a coordinated effort aiming at raising awareness and carry out dissemination activities and advice among the research institutions and academia, in particular with regard to issues such as Good Laboratory Practice (GLP), the development of ideas to the proof of concept stage and Intellectual Property Rights (IPR). In addition, the project will develop and establish a Europe-wide system to identify innovation and enhance the transfer of knowledge to commercial companies for development and will establish criteria for the selection of innovative ideas and further development.

Funding scheme: Small collaborative project

Expected impact: Improved transfer of technology to commercial exploitation in the different fields of relevance to the KBBE.

COOP-2-1-4-03: GMO Co-existence and practical implications **Call: KBBE-2007-1**

Need to improve the GMO decision making procedure and to increase the transparency of the risk assessment process. The purity standards that apply to seeds need common labelling thresholds so that the final product can be identified at the end of the food production chain. Community guidelines for the development of practical and flexible co-existence measures for Member States and regions need to be made. Experience with Member State co-existence rules and measures should be communicated and examined to determine if common Community legislation is necessary and to obtain a common understanding of the science underlying co-existence measures including more field experience in commercial cultivation. More research is needed into the rules that apply in the case of accidental mixing and how much accidental GMO presence should be allowed in the final produce, and the implications for possible compensation and specific liability rules and how they affect the internal market and trade relations.

Funding scheme: Small collaborative project

Expected impact: Clearer guidelines and rules for consumers, policy makers, farmers and industry on the implications of GM co-existence measures.

COOP-2-1-4-04: Implementation of Leader **Call: KBBE-2007-1**

In the new Rural Development programming period (2007–2013) the Leader model will be continued and consolidated at EU level, with each programme containing a Leader axis. Research would focus on the administrative implementation of the Leader bottom up approach, making a comparative analysis of management and financial decision-making mechanisms in the EU 15.

Funding scheme: Coordination and support action

Expected impact: This research could facilitate the transfer of know-how between Member States and, in particular, provide policy options to new Member States which have less experience in the implementation of the Leader approach

COOP-2-1-4-05: Containment of Sharka virus **Call: KBBE-2007-1**

Sharka (Plum pox virus) is considered one of the most serious diseases of stone fruit. The virus affects all Prunus species, including plums, peaches, nectarines, apricots and almonds. Plum pox causes high yield losses and has resulted in large areas of tree removal in Europe, where it is well established. Central Europe and the Balkans are known as endemic centres of the disease. Epidemics result in large areas of stone-fruit cultivation being destroyed, with consequent economic losses as well as related social and environmental impacts. Research would look at new ways of controlling the spread of this virus, including early warning

systems, research networks, use of remote sensing and other techniques that would help contain the disease. The research should focus on two complementary aspects:
1) The spreading of contaminated seedling materials. Especially in view of the accession of Romania and Bulgaria to the EU, two major sources of potentially contagious seed material will enter the internal market. As it can be expected that these countries will offer seed material on the market at a highly competitive price, uncontrolled private imports of seed material into the main producing areas of the EU-25 could have a serious impact on orchards. Therefore, Romanian and Bulgarian partners should be involved in this project, in the form of an early-warning system. Finally, cooperation with Turkey (a major apricot producer) is also to be sought;
2) Establishing guidelines for cultivation methods to contain the disease. The problem of sharka is multiplied by the danger of epidemics, which lead to large areas of orchards having to be grubbed-up. Therefore, a set of guidelines should be developed as how to avoid epidemics of sharka, for example by placing restrictions on the size of mono-variety orchards, or planting orchards in unsuitable regions which make them vulnerable to the disease. This could also include the breeding of new – more stress and disease resistant- varieties.
Funding scheme: Small collaborative project
Expected impact: Risk management system for an important plant disease during the accession process.

COOP-2-1-4-06: Assessing the socio economic consequences and costs benefits of measures producing good animal welfare **Call: KBBE-2007-1**
This project will assess the benefits and costs to society, the livestock industry, and to the animal, of measures aimed at promoting animal welfare. It will include analysis of welfare standards in the EU and in third countries and implications on international trade and competitiveness. Typically, European consumers demand high levels of animal welfare in livestock production. Regulation to improve animal welfare, however, raises fears of unfair competition for imported livestock products. Despite this, some high welfare standards may not imply significant additional costs, and some may result in added value and increased economic benefits.
Funding scheme: Coordination and support action
Expected impact: The project will support the development of European policy on animal welfare and, in particular, the implementation of the Community Action Plan on the Protection and Welfare of Animals 2006-2010.

COOP-2-1-4-07: Establishment of an information platform on the protection and welfare of animals **Call: KBBE-2007-1**
This project will develop a forum for the interchange of information on animal welfare research by different stakeholders. It will identify best practices, disseminate information on such practices and develop information tools and communication strategies in the animal welfare field. It will also help identify and prioritise needs for animal welfare research of interest to Europe.
Funding scheme: Coordination and support action
Expected impact: The project will support the development of European policy on animal welfare and, in particular, the implementation of the Community Action Plan on the Protection and Welfare of Animals 2006-2010

COOP-2-1-4-08: Models for the extrapolation of MRLs from one species to another **Call: KBBE-2007-1**

This project should develop models that allow the extrapolation of maximum residue limits (MRL) from toxicological studies in one species another species. MRLs are an important tool in the strategy to protect public health from veterinary medicines in animal products. Currently, individual studies need to be established in all each species that a medicinal product is licensed for. Using data across species would improve the efficiency of licensing if such extrapolation could be carried out in a robust fashion.
Funding scheme: Coordination and support action
Expected impact: The project will support community policy on public and animal health.

COOP-2-1-4-09: Development of rational strategies for the eradication of bovine tuberculosis **Call: KBBE-2007-1**
Tuberculosis, caused by bacteria of the Mycobacterium tuberculosis complex, is present in many wild animal species in EU countries. The spread of the infection between wildlife and domestic animals and the role of some wild species acting as reservoirs of infection for livestock is well documented. Infected wildlife is a threat for the progress of the eradication campaigns, may have an impact on public health and on protected and endangered species. The project will deliver improved tools and develop strategies for the eradication of bovine tuberculosis in areas where the disease is present in both domestic and wildlife populations. It will include in particular 1) vaccination of bovine animals, wildlife and feral reservoirs, (2) control of populations to reach numbers compatible with animal welfare, (3) improved diagnostic tools for detection of infected animals, (4) strategies to limit the contact between domestic and wild species. The diversity of wild species (some statutorily protected) and farming systems should also be taken into account.
Funding scheme: Small collaborative project
Expected impact: Progress in the tuberculosis eradication campaigns in the EU affected countries. Improve animal health and reduce costs entailed by the measures. Reduce public health risks.

COOP-2-1-4-10: ASF transmission, characterisation of currently existing field viruses, diagnostic tests and validation with existing field viruses; host interaction and viral immune response in view of the development of a vaccine **Call: KBBE-2007-1**
African swine fever (ASF) is one of the most devastating diseases of swine. The EU has succeeded in its eradication except in Sardinia where it remains endemic. The impact on trade for the whole Italy has been adverse in particular for exports of pork meat products leading to unjustifiable import barriers by third countries. The situation of ASF in African countries has greatly increased reaching unprecedented levels. Currently ASF is widespread in more than 20 sub- Saharan countries. The cause is thought to be the increase of carrier animals. This is mainly due to a higher proportion of local resistant pigs than to the white pig. Local pigs do not suffer the disease but become carriers hence there is a greater viral circulation, representing a permanent threat and risk transmission for EU. In view of this new situation, research should be targeted to the following issues: risk analysis for the introduction of the virus into the EU; characterization of currently circulating field viruses in African countries and Sardinia; development and validation of sensitive diagnostic techniques, including pen-side test, with the existing field viruses; host-pathogen interaction and viral immune response in view of the development of a vaccine; development of new control strategies focused on the situation in Africa. The project should contain a component of training and technology transfer. Third countries participation should be encouraged.
Funding scheme: Small collaborative project

Expected impact: Improve tools and strategies for the prevention and control of African swine fever taking into consideration the latest situation of risk for Europe due to its widespread in Africa.

COOP-2-1-4-11: Emerging vector-borne diseases: West Nile fever, Rift Valley Fever and Crimean-Congo haemorrhagic fever **Call: KBBE-2007-1**

West Nile fever (WNF), Rift Valley Fever (RVF) and Crimean-Congo haemorrhagic fever (CCHF) are arthropode-borne diseases of different domestic and wild animals and can also affect humans. The geographical distribution of these diseases has expanded in the last decades. WNF outbreaks have already occurred in Europe and RVF and CCHF are present in neighbouring countries. The objective of the coordination action should to set up a network aiming at creating common knowledge on the diseases, sharing and exchanging data, expertise, experiences and scientific information via regular meetings; maintain and expand surveillance systems, disease occurrence, virus isolation, vaccine use. It will also focus on disease detection and control tools and ensure dissemination and training of personnel. Participation of relevant third countries, in particular those representing major threat for the EU as well as those more active in research, and international organisations should be sought.
Funding scheme: Small collaborative project
Expected impact: The creation in the EU of a network of expertise ready to act when in case of disease occurrence

COOP-2-1-4-12: Essential biological functions related to the most relevant stages of aquaculture fish life-history **Call: KBBE-2007-1**

This project will clarify the mechanisms of essential biological functions related to the most relevant stages of aquaculture fish life-history (larval development, growth, maturation, reproduction) at both a physiological and molecular level. Despite the recent developments in aquaculture, our knowledge base on basic life-requirements of farmed fish remains limited. The combined use of genomic tools with a better understanding of physiological and behavioral features throughout fish life-cycle will allow for a better insight on key biological processes, and help to overcome bottlenecks in the production cycle.
Funding scheme: Large collaborative project
Expected impact: Improved competitiveness of the EU aquaculture industry by establishing the knowledge base required for improved stress control, disease prevention and control, new breeding technologies, better environmental performance and diversification into new species.

COOP-2-1-4-13: Reduction of N excretion in ruminants **Call: KBBE-2007-1**

Reduction of N excretion in ruminants through improvement of dietary efficiency still requires research, due to the complexity of rumen metabolism. The objective of the project is to improve the knowledge of rumen and liver metabolism to improve N utilisation in high yielding cows. The research will address the following tasks: develop of rapid tools for measuring protein degradability and microbial synthesis, calibration of in vivo and in-sacco methods on the base of animal experiments; investigation of N metabolism in the rumen, understanding of aminoacids absorption in the intestine and metabolism of absorbed AA and their conversion to milk (splanchnic metabolism, gluconeogenese); harmonisation of protein evaluation system in Europe; development of reliable tools to assess N adequacy on animal and farm level.
Funding scheme: Large collaborative project
Expected impact: By improving the knowledge concerning the way in which nitrogen is metabolised by ruminants, the project will also contribute to the achievement of EU policy objectives in support of the implementation of the Nitrates Directive.

COOP-2-1-4-14: External costs of pesticides **Call: KBBE-2007-1**

Internalization of external costs of pesticides is an option considered by some Member States as a valid policy action to reduce their use and limit their negative impacts on humans and on the environment. Research is needed to assess the feasibility and benefits of such approach. The project should; (i) identify true external costs of pesticides, taking into account the impact on the operators, the environment and the consumers; (ii) develop options/criteria for an effective and realistic system of taxes/levies on pesticides; (iii) study the potential support of incentives to implement the substitution principle to pesticides (preferred use of plant protection products with lower risks to human health and the environment) and; (iv) study the possible implementation and feasibility of such a system.

Funding scheme: Small collaborative project

Expected impact: Contribute to the further development of market-based instruments to support the development and implementation of the Sustainable Use of Pesticides thematic strategy. In the preparation of the strategy, following detailed research and taking into due account the specificities of both pesticides' supply and demand, the Commission finally considered that knowledge and instruments were not yet ripe to allow taxation to be part of the TS. This research should contribute to fill in this knowledge gap.

COOP-2-1-4-15: The structure of fish populations and traceability of fish products

Call: KBBE-2007-2A

The project will improve the traceability of fish and fish products through understanding and mapping the structure of fish populations by investigating life history traits, genetic composition, physiological and morphological characteristics and other indicators of population sub-structure. Furthermore, sustaining the components of a population and understanding their function is important, partly to avoid over-exploitation of local fish populations, but also to avoid loss of genetic material in the stock and thereby reducing its potential for adapting to environmental changes. The ultimate objectives would be to obtain improved traceability of fish and fish products, to consider the management implications of the results and advice on actions, and to develop a methodology for monitoring potential changes in the population structure.

Funding scheme: Large collaborative project

Expected impact: Improved traceability of fish and fish products will benefit consumers and meet their demands and has potential for being used in fisheries control. The project will also be an important contribution to the ecosystem approach to fisheries management, which requires insight into the infrastructure of fish stocks and how they function, in particular the genetic aspect

COOP-2-1-4-16: Integration of Aquaculture in European coastal zones

Call: KBBE-2007-2B

This project will develop methods and tools to better integrate aquaculture in European coastal zones, leading to improved management of these areas. The potential development of costal areas is often hindered by competition for space between various users of coastal waters: small-scale fisheries, aquaculture, and tourism. Aquaculture should be integrated in strategies based on Integrated Coastal Zone Management which are best adapted to tackle multi-uses of the coastal areas.

Funding scheme: Small collaborative project

Expected impact: Support the new Maritime policy and spatial planning of costal areas.

COOP-2-1-4-17: Comparative analysis of factor markets for agriculture across the Member States **Call: KBBE-2007-2B**

This project would analyse the functioning of factor markets for agriculture in the EU-27, including Candidate Countries. The research will compare the different markets, their institutional framework and their impact on agricultural development and structural change, as well as their impact on rural economies, for the Member States and the EU as a whole. The research shall focus on land sale/lease, labour and capital markets. The research will include the impact of national and EU programmes on these markets.

Funding scheme: Small collaborative project

Expected impact: The project results will allow a better targeting of pillar 1 CAP measures and as a consequence improve the competitiveness of European agriculture.

COOP-2-1-4-18: Spatial analysis of area-based measures in rural development programmes **Call: KBBE-2007-2B**

A wide series of quantitative models exists for the analysis of agricultural market policies under pillar 1 of the CAP. There are fewer models for the analysis of the wide-ranging and more diverse policy measures under pillar 2. Given this diversity and the increasing need to assess the various policy choices under pillar 2 – current and future – such quantitative tools are urgently needed. With the development of GIS techniques, a vast amount of data is available today. At the same time cross-sectional econometrics has been further developed to analyse these new data sets by means of "spatial econometrics". For some rural development programmes –for example in southern Germany and Austria – the managing authorities have created GIS-based databases with a huge amount of data related to area-based measures. What is lacking is analysis in which these data sets are combined with other indicators at a high level of regional disaggregation. The availability of regionally-disaggregated data and advances in methodologies to analyse such data sets could be instrumental in developing new quantitative tools for the analysis of a wide range of rural development measures, in particular the area-based measures. Of these, agri-environmental measures feature most importantly in many rural development programmes of southern Germany and Austria, and could constitute a case study for such analysis. Given these advances in econometrics and data availability, the scope of the project would be to carry out case studies on agri-environmental measures in a number of EU regions. The main objective of the case studies would be to develop quantitative models based on spatial econometrics for the assessment of the various agri-environmental measures in the respective regions.

Funding scheme: Small collaborative project

Expected impact: The project results will allow a better targeting of CAP pillar 2 measures and as a consequence improve a more efficient delivery of public goods.

COOP-2-1-4-19: Enlargement network - Agro-economic policy analysis of the accession and the candidate states and the countries of Western Balkan **Call: KBBE-2007-2B**

In the view of the integration of new Member States as well as strengthening of the accession process for the remaining Candidate Countries, and the closer co-operation with other countries, notably of the Western Balkan, it is important to establish and combine insight and analyses of agricultural developments in the different countries. It would be important to include all relevant countries (i.e. Malta, the former Yugoslav Republic of Macedonia, Albania, Montenegro, and Kosovo).The area of expertise and analyses on the individual countries should cover:

• agricultural policies,
• agricultural markets and food chains,
• the competitiveness of agri-food products and farms including structural change,

• developments of trade and trade relations, as well as,
• developments of rural economies and regions including socio-economic conditions and rural labour markets.
Since the agricultural, economic and socio-economic conditions vary significantly between the countries a strong and a wide expertise needs to be established by individual countries as well as the capacity to achieve as well a regional and European perspective in the different analyses.
The project could be divided into three parts, one on creating a network (groups) of national experts that could be consulted for specific and ad hoc questions and the second part on the preparation of specific reports on relevant topics to be defined later and a third part related to agricultural and rural development statistics in candidate and pre-candidate countries and in the new Member States (with experience of implementation of CAP and rural development policy more than 3 years after enlargement).
Funding scheme: Coordination and support action
Expected impact: Better targeting of CAP measures and other support measures to stabilize the economy of sometimes fragile countries

COOP-2-1-4-20: Societal Benefits of Organic Farming Call: KBBE-2007-2B
Research under this task would aim to identify organic farming's multiple functions and seek to provide a detailed insight into the corresponding economic, environmental and social impacts of both the present level of organic farming and under scenarios for larger scale conversion into organic farming in Member States. The aim is to develop a common methodology to estimate the corresponding costs and benefits of organic farming, at the farm level, and for the entire economic system. Research is aimed at recommendations and strategies for policy makers to explore and optimise the regulatory framework of the CAP with respect to organic farming's multifunctional benefits. Furthermore the project will identify the contribution of organic farming to the European Bioeconomy.
Funding scheme: Small collaborative project
Expected impact: Better targeting of the regulatory framework for organic farming to increase societal benefits.

COOP-2-1-4-21: Costs of different standard setting and certification systems for organic food and farming Call: KBBE-2007-2B
Research should analyse the costs and thus the effectiveness of different standard setting procedures and certification systems as a basis for optimisation of the current EU certification system (Reg. EEC 2092/91). The task is to quantify for selected products all relevant expenditure and transaction cost for certification along the entire supply chain for the actors involved: farm, processing, wholesaling, retail and import level as well as the administration level and recognition of the various standards, logo's and trademarks by consumers in various regions of the EU. The project should conclude in recommendations to increase the effectiveness and the efficiency of organic certification for the EU Commission, national competent authorities and private actors in organic food and farming
Funding scheme: Small collaborative project
Expected impact: Efficient certification systems for organic farming at lower costs will increase the competitiveness of the European organic farming sector.

COOP-2-1-4-22: Drivers and limits of enhanced trade in agricultural and food products Call: KBBE-2007-2B
The research work should aim at a wide-ranging impact assessment of the liberalisation of agricultural and trade policies. It should take into account both multilateral and bilateral

agreements and changes in the direction of trade flows. Therefore a spatial model should be used. Special emphasis should be put on the EU's trade with its main partners. The product coverage should fit with the WTO definition of agricultural products, but appropriate disaggregating is needed to identify key changes in the composition of trade (bulk, intermediate, consumer-oriented, including a special focus on biofuels). In addition to assessing the impact of liberalisation on agricultural markets and the sector's income, a series of issues should be studied: degree of concentration and competition in trade (share of main exporting countries and of major trans-national companies, export monopolies), risk of dependence on a limited number of suppliers, consequences of sanitary or phytosanitary barriers and problems.
Funding scheme: Small collaborative project
Expected impact: Sound analysis to policy makers in order to underpin the trade negotiations.

COOP-2-1-4-23: Non-tariff barriers **Call: KBBE-2007-2B**
Comparative study on conditions for importing agricultural and food products into the EU and into the main competing players (in addition to those mentioned above, also Brazil, Argentina, Australia and New Zealand). The research should be underpinned by the creation of a database on non-tariff barriers for countries that are key markets for EU agri-food exports (especially US, Russia, Canada, Japan, China, India). The product coverage should be as wide as possible (e.g. WTO definition of agri-food products). Case studies are needed in the following sub-sectors: meat, dairy, fruit and vegetables. The research should take account of work developed by international organisations, especially the OECD
Funding scheme: Small collaborative project
Expected impact: Sound analysis to policy makers in order to underpin the trade negotiations.

COOP-2-1-4-24: Trade and agricultural policies - India **Call: KBBE-2007-2B**
India is a leading world agricultural producer and consumer. Depending on factors affecting demand and supply, its net trade position can quickly change and have a significant impact on world commodity markets. The research should provide a qualitative and quantitative analysis of future developments in Indian supply, demand and trade for the main agricultural commodities. The aim is to evaluate the impact that domestic structural changes and trade agreements (WTO, GSP) may have on the EU and Indian agricultural sectors as well as on world markets. Special emphasis should be put on agricultural trade with the EU, taking into account the outcome of the Doha Round and the Community's future GSP scheme for 2006 to 2015 . The work will provide a comparison with the agricultural trade prospects with other developed (in particular Quad) countries, including under their GSP schemes. Similarly, the project should examine prospects for regional trade, including with countries benefiting from the Everything But Arms agreement with the EU, and the likely consequences for the cumulation of origin under EU preferential agreements. The team should take into account (ongoing) work carried out on India by international organisations, especially the OECD and FAO.
Funding scheme: Small collaborative project
Expected impact: Sound analysis to policy makers in order to underpin the trade negotiations.

COOP-2-1-4-25: Policy and institutional aspects of sustainable agriculture and rural development in the Mediterranean partner countries **Call: KBBE-2007-2B**

Impact of (EU and national) agricultural, rural and environmental policies; impact of agri-food trade liberalisation on the Mediterranean partner countries: studies on structural changes, impact on rural populations, including employment, poverty and income distribution; commercial relations with major trade partners such as the EU; increasing competition on the export market with emerging economies; impact of consumers' changing demands, prospects for quality products; impact of norms and standards on trade; institutional and traditional management of access to resources (land, water, etc.)
Funding scheme: Small collaborative project
Expected impact: Developing policy options to reduce the risk of unwanted side-effects of trade liberalization with Mediterranean partner countries

COOP-2-1-4-26: Development of a new generation vaccine for FMD
Call: KBBE-2007-2B

The development of alternative vaccines which overcome the drawbacks of the current inactivated vaccine against foot-and-mouth (FMD) disease continues to be a priority. This disease is with difference one of the major constrains to resume exports and to facilitate trade for a long list of animal and animal products. The problem seems to be even worse for developing countries facing severe economic problems and unable to support a stamping-out policy, with the only solution but to use a vaccination policy. There is therefore a strong need to progress on FMD vaccination and make it compatible with international trade needs. Considerable advances have been made in several approaches for development of new vaccines in recent years which allow the DIVA strategy. The project will pursue these efforts to advance towards available products in the market. To this end, the involvement of industry will be of paramount importance. Participation of third countries should be sought.
Funding scheme: Small collaborative project
Expected impact: The development of vaccines which overcome the drawbacks of the current inactivated vaccine and also allow differentiation of vaccinated from infected animals will be a major step forward in the prevention and eradication programmes. The current EU foresees vaccination as one of the first line tools legislation Of particular importance will be its application in affected countries aiming at reducing the risk for EU while at the same time contributing to improve the livelihood of farmers contributing to the MDGs.

COOP-2-1-4-27: Assessing the pros & cons and monitoring the perception of GM animals **Call: KBBE-2007-2B**

The project will assess the European consumer perception on the use of genetic modification in animals, specifically including fish as well as terrestrial animals. It will focus on: scientific support for the production of transgenic animals and the pros and cons to the industry and the animals. It will also examine consumer perceptions of transgenic animals, in particular from the point of view of the use of food derived from them.
Funding scheme: Coordination and support action
Expected impact: The project will inform European policy formation on transgenic animals and will impact on the competitiveness of European animal production.

COOP-2-1-4-28: Improving the stakeholder dialogue towards a common vision and joint research priroities for the knowledge-based bio-economy **Call: KBBE-2007-2B**

In order to better take into account the views of consumers and civil society organisations in setting strategic European research agenda in a number of important areas of the knowledge-based bio-economy, a more structured interaction of these organisations among each other and with already existing stakeholders in the platforms (industry, science, farmers, etc.) is necessary, to take into account the interests of consumer and CSO when refining the strategic

research agenda and the wider impacts of a future knowledge-bases bio-economy on economy, consumers and environment. Workshop and discussion fora should be organised to bring together consumer and CS organisations with other stakeholders.
Funding scheme: Coordination and support action
Expected impact: Further development and fine-tuning of strategic research agenda to better take into account a broader view of different stakeholders. Anticipating and reacting to concerns of a wider basis of stakeholder, achieving a broader consensus and therefore achieving a more coherent implementation of the knowledge-based bio-economy..

Indicative topics for future calls

Potential year 3 topics:

Identification of key drivers of plant yield productivity and stability

Improvement of the tolerance and resistance of crop plants to pathogens and other biotic factors

Enhancing biodiversity in farming ecosystems

Transferring the N fixing ability of legumes to other crops

Investigate the effects of environmental changes on forest productivity

Developing sustainable forest plantations

Improving livestock breeding technologies

Improved understanding of ecology of food-borne zoonotic agents in livestock and development/improvement of livestock vaccines against food-borne pathogens

Porcine reproductive and respiratory syndrome (PRRS): transmission and Development of an improved or new vaccine

Development of a DNA based vaccine for foot-and-mouth

Improved epidemiological tools for food-borne zoonoses: sampling schemes and techniques at primary production

AGRI-SSP – Improving rural incomes

AGRI-SSP – Analysis of the CAP reform and Rural Development programme on organic farming

AGRI-SSP – Water content of poultry meat (small Collaborative project)

SANCO - Rift Valley fever: pathogenesis, epidemiology, diagnosis and vaccination

SANCO - African Horse Sickness: new generation vaccines and diagnosis

SANCO - Exploring the relationship between animal welfare and health and, by extension, the wider implications of improved animal welfare.

Potential year 4+ listing:

- Livestock biodiversity in European agriculture (animal systems)
- Non-infectious disease (animal systems)
- Whole animal physiology (animal systems)
- Genome sequencing and biodiversity (plant systems)

- Systems biology of basic biological processes (plant systems)
- Ecology, epidemiology, host-pathogen interaction, detection and control of water and food-borne viruses (zoonoses)
- Plant production and microbiological food safety
- Development of new tools and processes to support R&T in crop plants (plant systems)
- Development of environmentally friendly alternative practices for crop protection (plant systems)
- Identification of new, environmentally friendly weeding tools and practices (plant systems)
- Improving the interaction of crop plants with beneficial biotic factors (plant systems)
- Characterisation of pathogen and pest biodiversity, and their impact on crops (plant systems)
- Characterisation of the biodiversity of plant genetic resources in agriculture (plant systems)
- Plant food raw materials with improved nutritional composition, organoleptic characteristics and processing characteristics (plant systems)
- Plant raw materials for food products targeted at specific consumer groups and needs (plant systems)
- Production of safe, high quality, sufficient and sustainable feed (plant systems)
- Control of contaminants in animal feeds
- Control of carry over of medicines in animal feeds
- Information on impact of GMOs in animal feeds
- Disposal of animal wastes
- Genetics of camelids in south America

Activity 2.2: Fork to farm: Food, health and well being

Area 2.2.1 Consumers

Understanding consumer behaviour and consumer preferences as a major factor in the competitiveness of the food industry and the impact of food on the health, and well-being of the European citizen. The focus will be on consumer perception and attitudes towards food including traditional food, understanding societal trends, and identifying determinants of food choice and consumer access to food. The research will include the development of data bases on food and nutrition research.

COOP-2-2-1-01: Accessing social and behavioural sciences and the networking of food consumer science in Europe **Call: KBBE-2007-1**

The food consumer is critical to the food and agriculture industries in shaping demand and, particularly in this context, responding to new products (e.g. functional foods) and production methodologies (e.g. GMO safety). However, food consumer science is currently a rather poorly defined field involving a broad range of scientific disciplines from social anthropology, to economic sciences, from informatics to cognitive sciences, etc. There is therefore a need to develop new knowledge and new working methods in this field. The network should promote new knowledge through strengthening consumer science in Europe. Objectives of this topic will be the development of a critical mass (scientists, scientific disciplines, facilities, etc.), facilitation and promotion of data exchange, joint activities (protocols, metrics, collaborative studies, etc.) and comparability of research actions in the field of consumer science in food.

Funding scheme: Network of Excellence

Expected impact: New knowledge and new working methods in this field; Increased comprehension of societal problems through the development of a critical mass in consumer science in food; Better targeted public policies that address consumer needs.

COOP-2-2-1-02: Developing research tools for food consumer science in the Western Balkan Countries **Call: KBBE-2007-1**

The Western Balkan Countries (WBC) have little tradition in consumer science related to food, but are showing increasing interest in this field. Research should focus on developing research tools for food intake and consumer behaviour of the WBC populations, identification and characterisation of the health benefits and assessment of the risks to human health. Capacity building and support to consumer food science should be fostered through an integrated information exchange, technology transfer and education programme. This might include not only support and assistance to the research/education sector but also to consumer organisations in the area. Research should focus on a specific geographical area with homogeneous socio-cultural behaviour.

Funding scheme: Small collaborative project / Specific International Cooperation Action - Minimum Number of Participants:2 from different MS or AC (including Croatia) and 2 from the Western Balkan ICPC countries.

Expected impact: Determination of the dietary patterns of the WBC, determination of consumer behaviours (drivers and determinants); contribution to regional and European nutrition and health policies; contribution to stimulate dialogue between consumers and food producers, including industry, in WBC; contribution to consumer policy making.

COOP-2-2-1-03: Taste, cognitive perception and mood **Call: KBBE-2007-2B**

The link between food, emotion and mood change is well known (e.g. 'comfort foods', alcohol, ethnic and traditional foods), but the mechanisms by which the change in mood occurs or the triggers to select particular food at particular times are largely unknown. Investigation should be focused on developing cognitive and behavioural sciences to understand the process involved. Methods should be aimed at understanding the link between levels of neurotransmitters involved in the regulation of mood, food intake, and compulsive behaviours (e.g., serotonin and dopamine).
Funding scheme: Small collaborative project
Expected impact: Development of new knowledge in the fields of cognitive and behavioural sciences to understand the relationship between emotion and food plus the mechanisms of the change in mood or the triggers to select particular food. Impact on improving consumer policies.

COOP-2-2-1-04: Food labelling and consumer behaviour Call: KBBE-2007-2B
Labelling of food, the information derived/perceived by consumers and the way in which they react to such information are increasingly important. Behavioural and cognitive sciences will be required to determine what information is required and desired by the consumer, how that information might be presented and what behavioural consequences and changes in purchasing and consumption patterns this produces in the purchaser and the interaction/feedback from consumers. The inter-relationship between labelling information and the other influencing factors should be considered. Particular attention should be paid to advertising in relation to food targeted at children. Full account should be taken of European legislation on food labelling and health claims. The participation of agro-food SMEs would help to better identify their specific needs on labelling and target the research component in this area.
Funding scheme: Small collaborative project
Expected impact: Assessment of inter-relationship between labelling information and the 'attractiveness'; interpretation framework to apply information generated in order to influence consumer habits with respect to established food-related health issues; assessment and impact of European legislation on food labelling and health claims.

COOP-2-2-1-05: Assessment of intervention measures aimed at promoting healthy eating habits Call: KBBE-2007-2B
Research into the short and long term on consumer behaviour (purchasing patterns, consumption, changing attitudes to food groups, etc.) resulting from actions taken by public authorities to influence food consumption patterns and to promote health (specific food related initiatives and food as part of wider health promotion actions). Research should include assessment of efficacy, cost effectiveness, best practices, wider applicability and design of more effective measures. Consideration should also be given to the extent to which experience from the private sector in product launch/brand placing activities might make public sector actions more effective.
Funding scheme: Small collaborative project
Expected impact: Assessment of existing and design of novel measures to modify consumer behaviour. Impact on consumer policy making.

COOP-2-2-1-06: Risk perception and communication in the food chain and the role of the media Call: KBBE-2007-2B
Consumers receive a broad range of information about food (such as advice on nutrition and food safety) from a variety of sources that may be interpreted as being conflicting or confusing. New knowledge and methods are required to rebuild confidence in order to

provide effective communication. Research will help to avoid food crises and to provide reliable information to facilitate adoption of lifestyle and dietary patterns which may contribute to the rise in obesity, CVD, diabetes and other food-related disorders. Clarification of the effectiveness of different routes by which the public is informed about food issues, and a better understanding of the perception of targeted consumer groups not clustered by classical social parameters should be added. Furthermore, efforts should focus on the identification of the barriers to risk communication at the European level (issues of trust and behaviour, media and information source, lack of multidisciplinary approaches, etc.) and should help to identify efficient risk com¬mu¬nication model(s).
Funding scheme: Small collaborative project
Expected impact: Assessment of the effectiveness of different routes of informing the public about food issues; identification of different ways to effectively communicate messages on healthy dietary habits; identification of the barriers to risk communication at European level (issues of trust and behaviour, media and information source, lack of multidisciplinary approaches, etc.) and identification of efficient risk communication model(s).

COOP-2-2-1-07: Applying behavioural models for the prevention of obesity, with a particular focus on children **Call: KBBE-2007-2B**
Behavioural research on nutrition and physical activity has started to develop recently. More effective programmes to fight obesity will not be designed until there is a better understanding of why people eat the foods they eat or do (not) participate in physical activity. Strategies should be developed that are aimed at influencing behaviour, particularly of children, based on the assessment of existing behavioural models, the development of insights from their combination and the conduct of new behavioural research.
Funding scheme: Small collaborative project
Expected impact: Development of strategies aimed at influencing behaviour, particularly of children, based on the assessment of existing behavioural models, the development of insights from their combination and the conduct of new behavioural research.

Area 2.2.2 Nutrition

Understanding beneficial and harmful dietary factors as well as the specific needs and habits of population groups as a major controllable factor in the development and reduction of occurrence of diet-related diseases and disorders including obesity and allergies. This will involve the investigation of new dietary strategies, the development and application of nutrigenomics and systems biology, and the study of the interactions between nutrition, physiological and psychological functions. It could lead to reformulation of processed foods, and development of novel foods and ingredients, dietetic foods and foods with nutritional and health claims. The investigation of traditional, local, and seasonal foods and diets will also be important to highlight the impact of certain foods and diets on health, and to develop integrated food guidance.

COOP-2-2-2-01: Effect of diet on mental performance **Call: KBBE-2007-1**
Research needs to be conducted to improve the knowledge of the effect of diet on mental performance. The objective is to study the role, the mechanisms and the risks and benefits of specific nutrients to respond to specific needs and improve the mental performance of specific population groups, such as children. The research will include areas such as quantification of the nutrient effects of early programming on later cognitive and mental disorders, effects of food on mental illness (dementia, depression, anxiety, stress, etc.), effects of food on mental state and performance such as mood, activation, attention, sleep, motivation, effort, perception, memory, and intelligence.

Funding scheme: Large collaborative project
Expected impact: Increased knowledge of effects of diet in mental performance, sound scientific data to substantiate health claims and develop harmonised dietary recommendations for specific population groups.

COOP-2-2-2-02: Diet for patients in hospitals and at home: disease-related malnutrition
Call: KBBE-2007-1

The degree of malnutrition increases during hospital stay, contributing to the high prevalence of disease-related malnutrition in patients in the community. The aim is to study the interaction between diet and disease processes and between diet and therapies for wasting diseases such as infectious diseases, burns, immuno-deficiencies, or cancers, and those associated with interventions such as major surgery, transplants, or organ failures. The data obtained should allow the development of personalised nutrition recommendations, foods with nutrition and health claims, and foods intended for special medical purposes (FSMP) in order to help to improve health conditions, quality of life and clinical outcome for patients during their treatment in the hospital, during their recovery and at home. Dietary recommendation to improve patients' appetite and health will be established.
Funding scheme: Small collaborative project
Expected impact: Development of knowledge and strategies to prevent malnutrition of patients living in hospitals and at home. Development of functional foods and concepts of personalised nutrition to improve patients' appetite and health. Dietary recommendation to improve patients' appetite and health will be established.

COOP-2-2-2-03: Impact of diet on ageing **Call: KBBE-2007-1**

The objective of this topic is to address nutritional issues (such as nutrients of major concern, protein glycation, antioxidants…) that affect the ageing population in the hope of improving their health and quality of life. Specific issues/needs linked to the degree of dependency (nursing homes, patients at home) and the increasing malnutrition will be addressed. Inadequate dietary patterns leading to pathologies in the elderly will be further studied. Existing epidemiological data from different population groups (elderly with different diet) will be compared and new data will be provided in view of developing European dietary recommendation and nutritional policies for the elderly.
Funding scheme: Large collaborative project
Expected impact: Improve the knowledge of the impact of diet on the ageing process. Develop scientific knowledge to establish dietary recommendations for the elderly. New food will be designed to satisfy their nutritional needs, e.g. nutrient-dense, tasty, familiar foods, available in convenient, easy- to-open packaging, and reasonably priced.

COOP-2-2-2-04: Malnutrition in developing countries **Call: KBBE-2007-1**

This topic aims at fostering cooperation with International Cooperation Partner Countries, particularly taking into consideration the specific needs of the poorest countries (low-income and lower-middle-income Countries) with a view to improve the quality of diet and increase the nutritional value of food to alleviate malnutrition, in particular in children. Approaches could include the diversification of diet, better use of local food resources, improved food processing, conservation and preparation, as well as production and use of supplements, when appropriate, taking into full consideration traditional knowledge and local food habits. The aim of this topic is to develop food for the prevention of undernutrition during pregnancy and during the first years of life of children, instead of trying to reverse the effect of undernutrition at an older age.

Funding scheme: Small collaborative project / Specific International Cooperation Action - Minimum Number of Participants: 3 from different MS or AC and 3 from different ICPC (with a special focus on low-income and lower-middle-income countries).
Expected impact: Development of knowledge and strategies to prevent malnutrition during pregnancy and during the first years of life of children. The project is expected to contribute to the EU commitment towards the UN Millennium Development Goals.

COOP-2-2-2-05: Optical technologies for monitoring the human nutrition status and the onset of nutrition-related health problems **Call: KBBE-2007-1**
Recent advancements in the optics/photonics industries and current progress in the miniaturisation of electronic micro-systems create potentials for designing easily operated and portable sensor systems for monitoring the human nutrition status. Research should focus on non- and minimally-invasive sensor systems for monitoring the supply with beneficial food compounds, for detecting the exposure to dietary risk factors, and/or for diagnosing the early onset of nutrition disorders (via disease-related biomarkers). A close cooperation of nutrition experts with engineering disciplines and/or (bio)physics as well as the participation of high-technology SMEs are compulsory.
Funding scheme: Series of small collaborative project(s) / NEST activity
Expected impact: The quality of life and well being could be improved for millions of people suffering from nutrition-related disorders by providing them with devices for making routine measurements of their individual nutrition status, risks and needs. These developments will constitute an important technology innovation in nutrition research in general and into personalised nutrition.

COOP-2-2-2-06: Diet and its effect on the development of intestinal microflora and on the immune system through the entire life span **Call: KBBE-2007-2A**
Further research is needed to understand the complex interactions and mechanisms at molecular level within the gut microflora (bacteria-bacteria) and between the gut microflora and the intestinal immune system. This is important in all stages of life, from infancy through ageing, especially as modern lifestyle (stress, medications, imbalanced diet) can weaken the immune system. The objectives are twofold: 1) to describe the effects of diets on the development of the intestinal flora at the molecular level using cutting-edge 'omic' technologies, 2) to unravel the effects of the interaction between the gut microflora and the diet on the development and the functioning of the immune system; both risks and benefits of the approach will be considered. The work will focus on specific target groups (age, countries).
Funding scheme: Large collaborative project
Expected impact: Increase the knowledge of the relation between the immune system and other organ systems such as the endocrine system and the intestine in specific population groups.

COOP-2-2-2-07: Systems Biology and bioanalytical tools for nutrition research
Call: KBBE-2007-2A
The regulation of human metabolic pathways as well as the underlying control circuits of nutritional homeostasis are poorly understood, both at the cell and organism level, representing a bottleneck in health-related nutrition research. This can be addressed by the integration of high-throughput bioanalytical tools, in vivo/in vitro test models and computational systems biology tools. The main challenges facing tool development such as instrumentation, data acquisition and storage, standardisation, data analysis and interpretation including in silico modelling should be addressed. Relevant theoretical disciplines such as

biomathematics and systems engineering as well as private entities in the IT sector should be integrated at a high level.
Funding scheme: Large collaborative project
Expected impact: Better links between theoretical (dry-lab) and bioanalytical (wet-lab) research are expected to give new impulses for health-oriented nutrition research, The mathematical description of basic cybernetic principles in metabolite and energy control is a basic demand for the further development of nutrigenomics and personalised nutrition concepts.

COOP-2-2-2-08: Optimal cell function and nutrition **Call: KBBE-2007-2B**
Opportunities are now developing through the use of nanotechnology to deliver nutrients more efficiently at the cellular and sub-cellular level. The precise delivery of essential nutrients should improve cell functionality and whole organism vitality. Research will combine knowledge in three areas: cell nutrition; cell functionality; and nanotechnologies for nutrient delivery. It may make use of atomic tracing in metabolic pathways.
Funding scheme: Series of small collaborative project(s)
Expected impact: The targeted delivery of nutrients to their cellular and/or sub-cellular site of biological action will contribute to the formulation of health-promoting food ingredients. Nano-sized research tools might be developed to study (sub-)cellular nutrition phenomena.

COOP-2-2-2-09: Methodologies and tools to support the prevention of obesity in Mediterranean Partner Countries **Call: KBBE-2007-2B**
Obesity is becoming a serious issue in the Mediterranean Partner Countries (MPCs). There is the urgent need in the MPCs to understand the prevalence of diet-related chronic diseases and disorder, primarily obesity, in view of developing measures aimed at reducing their incidence in the near future. Research should focus on the development of standardised methodologies for the collection of data on the relation between food intake and health/disease conditions in the MPCs. The following step would be the involvement of MPCs in European epidemiological studies on the prevalence of obesity and its related co-morbidities, taking into account local dietary patterns.
Funding scheme: Coordination and support action / Specific International Cooperation Action - Minimum Number of Participants: 3 from different MS or AC and 3 from different ICPC (with a special focus on Mediterranean partner countries)
Expected impact: Development of methodologies and tools in MPCs to be involved in epidemiological studies on the impact of diet on health.

COOP-2-2-2-10: Linking with international databases on food composition and consumption **Call: KBBE-2007-2B**
The increasingly high offer of foods from outside Europe increases the demand from the food industry and consumers for more detailed information on the composition of foods from these countries. The purpose of this SSA is to bring together European national database compilers with new or existing database compilers from all over the world (national, Codex, FAO) by organising training workshops and laboratory-based courses.
Funding scheme: Coordination and support action / Specific International Cooperation Action - Minimum Number of Participants: 3 from different MS or AC and 3 from different ICPC
Expected impact: Stimulation of international cooperation; harmonisation of standards on the production, management and use of international food composition and consumption data.

Area 2.2.3 Food processing

Optimising innovation in the European food industry through the integration of advanced technologies into traditional food production including fermented food, tailored process technologies to enhance the functionality, quality and nutritional value of food including organoleptic aspects in food production including new foodstuffs. Development and demonstration of high-tech, eco-efficient processing and packaging systems, smart control applications and more efficient valorisation and management of by-products, wastes, water and energy. New research will also develop sustainable and novel technologies for animal feed, including safe feed processing formulations and for feed quality control.

COOP-2-2-3-01: Smart control for improved food and feed technologies

Call: KBBE-2007-1

The aim is to develop robust and reliable quality sensing systems, in combination with computer simulation programmes, for process design, monitoring and control, such as applications of Process Analytical Technology (PAT). They should gradually replace ex-post quality control systems taking into account product properties and quality as well as environmental constraints. Scientific trends in technologies will be adequately considered in order to improve the diversity of foods and feeds taking into account the industry and consumer needs. Collaboration of food technologists, sensor and IT specialists as well as industrial quality managers is needed. SMEs from the IT and sensor sector should be involved, in particular for the demonstration activities.

Funding scheme: Large collaborative project

Expected impact: More sustainable processes, performance improvement and reduced production costs supporting the competitiveness of European food, sensor and IT industries, in particular SMEs.

COOP-2-2-3-02: Assessment and improvement of existing food and feed technologies

Call: KBBE-2007-1

The food technology of today is based both on traditional, local and experience-based processes and on long-established, science-based processes. These classical technologies have not been analysed thoroughly. The aim is to (re)assess and to improve some selected key technologies in an exhaustive approach from industrial processing to catering and home preparation covering safety, nutritional, environmental and economical issues. Collaboration of food technologists, nutritionists, toxicologists, consumer scientists, and technology-applying companies is needed. Expected deliverables are clearly improved technologies as measured against specific indicators.

Funding scheme: Series of small collaborative project(s)

Expected impact: Innovation-driven increase of the competitiveness of food producers and food equipment manufacturers, increase of food safety, reinforcement of consumer trust in food.

COOP-2-2-3-03: Network for facilitating the implementation of high-tech processing at industrial scale

Call: KBBE-2007-1

The EU-based food research needs to valorise its research results by transferring them to the industry. Translating scientific results into cost-efficient commercial applications should strengthen the competitiveness of food industries in order to face the world-wide competition. The aims of the network are to develop and demonstrate the efficiency of new methods and tools for a better integration and transfer of new (bio-)technologies and research results to the European food industry, in particular SMEs. In order to reach a large audience and to provide

evidence of the efficiency of these methods, strong quantitative input from consumer sciences is needed. It is expected that quantifiable and verifiable evidence of the implementation in industry will be demonstrated. Participation of industries, SMEs and/or associations is mandatory.
Funding scheme: Network of Excellence "- Max 55 researchers
Expected impact: Innovation and technology transfer for the development and sustainability of the competitiveness of European food industries, in particular SMEs. Support to EU food safety policies. Encouragement of early adopters to test innovations.

COOP-2-2-3-04: Harmonising and integrating research on food technology, safety and nutrition through commonly shared food models Call: KBBE-2007-1
Food industry and the scientific community are lacking 'real complex food' models that can simultaneously help assess (risk, benefits, safety) and optimise the processes applied to foodstuffs as well as evaluate and improve the nutritional quality of real foods for the consumers. Expected deliverables are a number of real foods with complex micro- and macro-structure and composition to be used as validated models together with Standard Operating Procedures in food processing, food safety, food quality, and nutrition research. These tools will have to be developed, disseminated and used in common by researchers and other stakeholders (industry, authorities) in order to facilitate a standardised multidisciplinary approach to food research.
Funding scheme: Small collaborative project
Expected impact: New knowledge and development of common approaches for food research disciplines, increase of the sustainability and the competitiveness of the EU food research and EU food industries, with support to food safety policies. Standardisation in food models would strengthen multidisciplinary approaches and lead to broadly agreed results across disciplines. Such a topic could help reaching faster agreements for setting up scientific opinions.

COOP-2-2-3-05: New solutions for improving refrigeration technologies along the food chain Call: KBBE-2007-2A
Refrigerating technologies are among the most energy consuming technologies of the food chain. The aim is to study and demonstrate the added value of alternatives to the classical chilling and freezing technologies in terms of food quality enhancement, energy savings and environmental impact. Tasks foreseen are industry-driven demonstration activities and the first steps of technology transfer from postharvest treatment over packaging to retailer display cabinets. Among the expected results are a clear picture of the European refrigeration needs and advances and concrete food applications.
Funding scheme: Large collaborative project
Expected impact: Development and sustainability of cold chain processes supporting the competitiveness of European industries, in particular SMEs, with food safety as the primary aim. As refrigeration is the most energy-consuming technology, more environment-friendly approaches are needed (energy saving, green-house effect due to leaks of refrigerants and energy degradation), also in view of the Kyoto Protocol.

COOP-2-2-3-06: (Bio-)Technologies for the production of food additives, colorants, and flavours Call: KBBE-2007-2B
Food product innovation is closely related to the ability of the industry to produce new food additives in order to create new textures, flavours, and colours, and to increase safely the shelf life of processed foods. The aims of this topic are to investigate new biological sources for food additives and to develop alternative (bio-)processes to replace chemically synthesised

additives by natural ones. Prototypes of new food additives are expected; risk-benefit assessments, process optimisations and nutritional assessments have to be carried out; food (bio-)technologists, microbiologists, nutritionists and toxicologists have to cooperate.
Funding scheme: Series of small collaborative project(s)
Expected impact: Development and sustainable bioproduction of new and innovative food ingredients from biological sources, supporting the competitiveness of European industries, in particular SMEs, from the biotech and food technology area. Reinforcing consumer trust in food by replacing chemically synthesised additives by natural ones.

COOP-2-2-3-07: Nano-devices for quality assurance, food safety and product properties
Call: KBBE-2007-2B

The aim is to develop nano-devices to be used online, at-line and in situ for monitoring food quality, safety and product properties along the entire food chain. Developed instrumentation should be able to interact with IT tools in order to enhance quality control systems and determine parameters to correlate the quality and safety of the product. Activities also include the identification, development and/or implementation of smart nano-based tools for packaging and delivery systems for food preservation, safety, monitoring and control. Nano-devices should be considered to incorporate sensing, preservation, biocide, reporting and remote control properties. Hazard testing and risk analysis have to be performed as nano-technologies develop. Collaboration of food technologists, sensor specialists and industrial quality managers is needed; SMEs should be involved.
Funding scheme: Small collaborative project
Expected impact: Development of innovative process/product control systems based on robust and reliable sensor technologies compatible with food systems. Optimised ways to integrate the sensing, reporting and remote control of the quality, safety and properties within food products throughout the production process.

COOP-2-2-3-08: Observing and understanding the micro-structure of foods
Call: KBBE-2007-2B

The understanding, development and control of processes for new foods are hampered by the limits imposed by the investigation tools, both on a laboratory and industrial scale. This topic aims at helping fill this gap by a better understanding of the food micro-structure, the dynamics of the physical properties of food and the effects of processing on food quality thanks to the development of reliable, efficient and fast online and in-line techniques able to visualise and monitor the structure. As prototypes are expected among the results, economic aspects will have to be taken into account. Collaboration of food technologists, sensor and IT specialists is needed, and SMEs from the sensor sector should be involved.
Funding scheme: Small collaborative project
Expected impact: New knowledge for the development and sustainability of innovative processes and products supporting the competitiveness and the sustainability of European industries, in particular SMEs.

Area 2.2.4 Food quality and safety

Assuring chemical and microbiological safety and improving quality in the European food supply. This will include understanding the links between microbial ecology and food safety; developing methods and models addressing the integrity of the food supply chains; new detection methods, traceability and its further development, technologies and tools for risk assessment, including emerging risks, management, and communication, as well as enhancing the understanding of risk perception. This will also include science based methods for risk benchmarking in the field of food safety.

COOP-2-2-4-01: Innovative and safe packaging **Call: KBBE-2007-1**

The aim is to support the development and safety assessment of modern packaging solutions (active, intelligent, recycled, easy-to-use, organic, etc.) that will improve food quality by increasing shelf life, indicating food spoilage, and will be easy to use, re-use, and recycle. In support of the safety assessment of food contact materials, the project should develop biosafety assessment, assess the safety of non-intentionally added substances (coming from raw material or formed during processing), assess the safety of the use of novel technologies such as active packaging and nanotechnologies, and assess the risk versus the benefit of the use of recycled materials.

Funding scheme: Small collaborative project

Expected impact: Novel food packaging technologies and novel tools for risk-benefit assessment. Results would provide a basis for a risk management tool and address policy needs (SANCO).

COOP-2-2-4-02: Detecting chemical hazards in the food chain **Call: KBBE-2007-1**

The control of chemical hazards to ensure food safety requires the development of simplified, inexpensive control and detection methods. Research will focus on key potential hazards including crop protection agents, veterinary pharmaceuticals, persistent organic pollutants, perfluorinated compounds, heavy metals and biological toxins. The project will study both food and feed contaminants, including botanical impurities such as alkaloids.

Funding scheme: Large collaborative project

Expected impact: Improved toxicological exposure assessments for key potential hazards, new approaches to assessing the hazard posed by chemical risks, contribution to the development of validated predictive models for behaviour of relevant hazards in foods and feed. Addresses policy needs (SANCO).

COOP-2-2-4-03: New methods for the monitoring and control of food-borne viruses **Call: KBBE-2007-1**

New, emerging and re-emerging food-borne viruses of public health importance will be studied to reduce the incidence of food-borne viral diseases. The project will develop methods and technologies to prevent and control contamination of food and feed with these pathogens. The aim is to improve and apply risk assessment and risk modelling to enhance the understanding of the acquisition, maintenance and spread of food-borne viruses along the food chain using an integrated approach. Research should be relevant to international regulation and include the development and validation of science-based risk management procedures in both animals and humans: predictive models and modelling tools will have to interpret the impact of interventions at any point along the food chain.

Funding scheme: Large collaborative project

Expected impact: Methods to prevent and control contamination of food and feed with new and emerging viruses. Validated models to minimise risks from food-borne viruses based on improved understanding of viral epidemiology and predicting interactions between foods, the ecosystems and viruses. Addresses policy needs (SANCO).

COOP-2-2-4-04: Exposure to food additives, flavourings, and migrants coming from the packaging – Dietary intake models **Call: KBBE-2007-1**

The aim is to develop mechanisms for monitoring the actual levels in food and estimating the intake of food additives, flavourings and migrants coming from the packaging, including a harmonised methodology for the collection of accurate data. Dietary intake models should take into account high consumption, special groups of consumers and different age groups.

Funding scheme: Large collaborative project
Expected impact: Scientific basis for exposure based risk management tools in the area of food additives, flavourings, and packaging migrants. Addressing consumer policy (SANCO).

COOP-2-2-4-05: Food sampling strategies for risk analysis Call: KBBE-2007-2A
The aim is to improve and harmonise sampling techniques that can be incorporated in food safety assurance schemes. Methods and protocols for accurate and precise fit-for-purpose sampling strategies should be developed for specific situations, food products and risks (biological and chemical). The aspects related with sample preparation, protocols for end users along the food chain, costs and training for applying these techniques should be considered also.
Funding scheme: Large collaborative project
Expected impact: Improved and harmonised sampling techniques along the food chain that will support and improve food safety risk assessment and enhance fraud detection. Supports food safety policies (SANCO).

COOP-2-2-4-06: Improving risk-benefit assessment of exposure to biological and chemical components in food Call: KBBE-2007-2A
The aim is to develop and validate science-based models that can assess the risks and benefits associated with specific biological and chemical components of foods, as well as with the diet as a whole. The concept of finding 'common currencies' for risk-benefit assessment should be explored. This will require the production of epidemiological and analytical data (and the utilisation or mining of existing data sets) regarding the importance, levels and effects of these food components and potential hazardous compounds. Multidisciplinary cooperation is encouraged. The project should also ensure that the knowledge generated can be appropriately communicated to the relevant stakeholders.
Funding scheme: Large collaborative project
Expected impact: Generation of data concerning the risks and benefits of certain biological and chemical components of foods, production of models that can be integrated into quantitative risk assessment models.

COOP-2-2-4-07: Biocides and induced risks of antibiotic resistance in food pathogens Call: KBBE-2007-2B
In contrast to antibiotic resistance by various mechanisms, the resistance against the family of biocide molecules (including disinfectants, antiseptics, preservatives, and sterilants) has been studied and characterised much less. Selection and dissemination of biocide resistant pathogens is a very important point for combating the dissemination of nosocomial diseases and food-borne pathogens. Biocides and antibiotics may share some common behaviours and properties in their respective activity and in the resistance mechanisms developed by bacteria. Some studies have indicated the risks of using antibacterial household products without any restriction. Additional research is required to determine whether the increased use of biocides is associated with a future increase of antibiotic resistance in food pathogens.
Funding scheme: Small collaborative project
Expected impact: At this time it is impossible to say whether biocides contribute to the development of biocide resistant bacteria with an impact on human health. This project will indicate whether domestic and industrial biocide use represents a risk for human health and hence measures need to be taken.

COOP-2-2-4-08: Models of exposure to chemicals intentionally added to the food chain Call: KBBE-2007-2B

Research in this area should focus on chemicals present in food through intentional addition to the food or raw material somewhere along the food chain. Examples of such are pesticides, additives, processing aids, residues of veterinary medicines, etc. The aim should be to investigate models and strategies for the assessment of risks arising from cumulative and aggregate exposure to chemicals with a similar mode of action (e.g. organo-phosphorus pesticides), suspected additive/synergistic effects, or complex mixtures.
Funding scheme: Small collaborative project
Expected impact: Scientific basis for exposure-based risk management tools in the area of intentionally added chemicals in the food chain. Large impact on consumer protection and addressing policy need (SANCO).

Area 2.2.5 Environmental impacts and total food chain

Protecting both human health and the environment through a better understanding of the environmental impacts on and of food/feed chains. This will involve study of food contaminants and health outcomes, monitoring of environmental effects, developing enhanced tools and methods for the assessment and management of impacts of food and feed chains on the environment. Assuring quality and the integrity of the food chain requires new models for commodity chain analysis and total food chain management concepts, including consumer aspects.

COOP-2-2-5-01: Sustainability of the food chain **Call: KBBE-2007-1**
Sustainable food production requires an environmentally, ethically and economically sound approach to the food chain. Firstly, life cycle assessment research should be extended to a 'system analysis' in order to identify parameters affecting the sustainability of food supply systems and will enable the development of pilot models to be used for identification of more sustainable production systems. Secondly technological solutions to increase sustainability may be developed in particular for production, processing, packaging and transportation. Thirdly, research will be supported to find ways to detect food fraud and to enhance consumer trust in the integrity of claims made about sustainability characteristics of foods (i.e. food qualities not related to safety, but rather to extrinsic process attributes, e.g. environmental sustainability, ethical characteristics).
Funding scheme: Network of Excellence
Expected impact: Systems analysis of the food supply systems will provide data required to improve the sustainability of food chains. Technologies to be developed to aid implementation of sustainability strategies. Help to the consumer in choosing sustainably produced foodstuffs.

COOP-2-2-5-02: Post Market Monitoring of GM food and feed **Call: KBBE-2007-1**
Short- and long-term effects of GMOs on human and animal health that are unforeseen during the pre-market safety assessment need to be monitored. This monitoring should include the possible differentiation of the types of Post Market Monitoring according to the objectives, type of GMOs and the level of exposure. It should develop appropriate techniques for such monitoring and analysis of their possible limits.
Funding scheme: Small collaborative project
Expected impact: Improved knowledge of GMO effects on human and animal health after authorisation. Improved techniques for post market monitoring of GMOs. Support to policy need of EFSA, SANCO, and ENV.

COOP-2-2-5-03: Development and application of computational biology as a complementary tool to in vivo and/or in vitro trials **Call: KBBE-2007-1**

Computational biology, as both an enabling and an enabled technology, also covers bio-simulations and the term 'in silico' is added to in vivo and in vitro to describe experimental conditions. The aim is to define and/or simulate macromolecular interactions and cellular metabolism 'in silico'. Research activities will include the development and application of data-analytical and theoretical methods, mathematical modelling and computational simulation techniques to the study of biological and behavioural systems. Predictive tools allowing the development of novel risk-benefit assessment procedures need to be further developed. This multidisciplinary research will require the standardisation of experimental protocols, which will lead to improved reproducibility, increased sensitivity and unified means for comparing data obtained from different sets.

Funding scheme: Coordination and support action

Expected impact: It is hoped that bioinformatics will lead to a movement away from in vivo and in vitro experimentation towards 'in silico' analysis, thereby reducing costs, time scales for product development, and minimising the need for animal testing. Development of new theoretical frameworks for complex biological systems.

COOP-2-2-5-04: Reduce contamination by mycotoxins in the food and feed chain
Call: KBBE-2007-2A

The research should focus on reducing the mycotoxin contamination of the food and feed chain by novel methodologies, improved handling procedures and information and education strategies. The project will involve relevant International Cooperation Partner Countries according to the Rules for Participation. The principle of mutual interest and shared benefits will underpin this international cooperation with Third Countries.

Funding scheme: Large collaborative project / Specific International Cooperation Action - Minimum Number of Participants: 3 from different MS or AC and 3 from different ICPC

Expected impact: Novel methodologies, improved handling procedures and information and education strategies reducing the risk for human mycotoxicoses.

COOP-2-2-5-05: Food Chain Management **Call: KBBE-2007-2B**

The European food industry incorporates a wide range of actors and is thus fragmented. Research will facilitate the integration of these different actors at different levels in the food chain, mainly by supporting the development of information exchange systems to enhance the efficiency, quality and safety of the food chain. These may include the development of an information and communication infrastructure to support standardised tracking, tracing and quality assurance at the European level; the support of communication networks within food chains focussed on enhancing chain efficiency, quality and safety; models for risk calculation in food chains. Attention should be paid to the integration of small producers in these systems.

Funding scheme: Coordination and support action

Expected impact: Support to the vertical and horizontal integration of all levels of food chain management activity, integration of small producers.

COOP-2-2-5-06: Assessment of impacts of scenarios affecting food chain management
Call: KBBE-2007-2B

Globalisation, climate change, competition for resource use (energy, food and environmental protection), use of novel foods, developments in food customs, population, demographics and market forces will all affect the competitiveness of the European food sector. The establishment of an expert group involving all stakeholders that can support food chain

management research to respond to and propose preferred scenarios will be the objective of this project.
Funding scheme: Coordination and support action
Expected impact: Horizon scanning for the consequences of multi-factorial changes affecting the European agri-food chain and proposals for research to enable sustainability of food production.

COOP-2-2-5-07: Assessment of impacts from climate change on food

Call: KBBE-2007-2B

Climate change has an impact on food safety by affecting the ecology of food and water borne infectious disease pathogens. There is therefore an urgent need to evaluate the effect of climate change on these hazards. On the basis of an evaluation of the current state-of-the-art in this field, specific research actions can be proposed for the future. The focus will be on the prevention of resultant diseases and the reduction of the impact on society, human health and animals destined for human consumption. Threats resulting from climate change may either be direct (such as heat waves and flooding), or indirect (novel pathogens may emerge, existing pathogens may appear in non-classical locations, host and vectors may change or be affected, etc.). Appropriate international stakeholders should be included.
Funding scheme: Coordination and support action
Expected impact: Anticipation of novel food safety risks resulting from climate change and proposals for specific research actions.

COOP-2-2-5-08: Converging technologies and their potential for the food area

Call: KBBE-2007-2B

The 'converging technologies' (Nanotechnology, Neuro- and Cognitive sciences, Informatics) offer significant potential for the food industry. This potential might be more easily realised if methods and results from existing studies were brought together under an integrating platform. The aim is to explore and understand both the power and the limitations of converging technologies in food, agriculture and biotechnology, through multi- and cross-disciplinary research, and to better understand the role of food for the health and well-being of consumers. Consideration should also be given to factors such as harmonisation of data and ethical issues.
Funding scheme: Small collaborative project
Expected impact: To explore and understand both the power and limitations of converging technologies in the food sector. To develop a new framework for the collection, assessment, sharing, and visualisation of biological knowledge from very large and unrelated sources.

Indicative topics for future calls

- Consumers
  - Consumer behaviour and attitudes of food meals prepared at home
  - Development of methods for the industry to incorporate consumer science in product development
  - Linking food sensory analysis to instrumental data
  - The food consumer of 2030
  - Interaction of social, behavioural and sensory factors and their impact on food choice
  - Consumer attitudes towards nanotechnology in food
  - Use and abuse of alcohol: consumer behaviour in the adolescent population

- Nutrition

- Prevention of nutrition-related diseases and disorders (obesity, cardiovascular diseases, food allergy)
- Nutrition and allergic disease: role of calorie intake, lipid consumption, micronutrient intake, exogenous sex hormones including phytoestrogens, and chemicals (from food additives to contaminants such as pesticides)
- Strategies for mitigating the effects of the environment on the expression of allergic disease in an increasingly allergic population.
- Mapping of food in Europe
- Therapeutic diets with a high content of nutrients and bioactive substances: risks and benefits
- Dental diseases: Research into foods, drinks and confectionary that are stimulatory to saliva secretion while being non-erosive and non-cariogenic
- Concepts of personalised nutrition
- Global network to develop harmonised and validated testing of omega-3 and other beneficial micronutrients from fish around the world (small CP – Specific International Cooperation Action)
- Development of a harmonised and compatible European database for nutrition research (NoE)
- Functional genomics and polymorphism (CP)
- Improve and promote Mediterranean traditional agro-food products in the context of new demands of modern life styles and of globalisation of trade and markets (CP - Specific International Cooperation Action)
- Food and sleep

- Processing
  - Sustainable processing, water and energy savings
  - Bio-processing and improved downstream technologies for novel food ingredients
  - Sharing EU food technology research and development through international collaboration with International Cooperation Partner Countries (small CP – ICPC)
  - Nano-devices for quality assurance, food safety and product properties (small CP)
  - Micro- and nanoreactors in industrial processes (CP)
  - Food for extreme conditions (small CP)

- Quality and safety
  - Protecting animal and human health from prions in food, feed and the environment
  - Sources of man-made chemical contaminants
  - Mechanisms of toxicity of marine biotoxins
  - Risk assessment: to develop the generic scientific basis for approaches to dealing with the risks such as thresholds of toxicological concern
  - Risks of natural toxins in foods
  - Human exposure routes to brominated flame retardants
  - Emerging food risks world wide
  - Food-borne pathogens
  - Bio modelling of toxicity
  - Developing improved TSE inactivation methods
  - Bioimaging to explore health impacts of nutrients and contaminants
  - Risk benefit analysis of herbal supplements (small CP)
  - Providing a safe food supply by better monitoring and screening of hazards (small CP)
  - Risk assessment of pesticides exposure

- Development of models and risk assessment of residues in honey from the treatment of beehives (small CP – SSP)
- Biomarker indicators as tools in risk-benefit analysis of foods

- Environment/Food chain
  - Environmental factors and immune diseases
  - Risk communication
  - Validated, harmonised and predictive biomarkers for diet and health (large CP)
  - Nuclear receptors in health and disease (large CP)
  - Development of validated methods of detection and reference materials for policy implementation (CA)

Activity 2.3 Life Sciences and Biotechnology for sustainable non-food products and processes

Area 2.3.1 Improved raw materials and biomass

Strengthening the knowledge base and developing advanced technologies for terrestrial or marine biomass production for applications in industrial processes and in energy production. This will include plant, animal and microbial genomics and metabolomics to improve the productivity and composition of raw materials and biomass feedstocks for optimised conversion to high added value products including biological resources utilisable in pharmaceutical industry and medicine, while exploiting natural or enhanced terrestrial and aquatic organisms as novel sources. This will fully incorporate life cycle analysis of biomass production practices, transportation, and storage and market deployment of bio-products.

COOP-2-3-1-01: BIOMASS SUPPLY - Identification of optimal terrestrial and aquatic biomass and waste for Bioproducts **Call: KBBE-2007-1**

After 30 years of EU research in this sector we already have extensive knowledge about the potential of terrestrial and aquatic biomass resources in Europe along with industrial and agricultural wastes and by-products for use as raw materials for added value bioproducts. There is however a need to quantify the potential and identify the best sources of European biological feedstocks for industry with respect to their availability and cost in the light of recent and projected policy changes with respect to sustainability, climate change, and alternative energy sources. Identification of the optimum Life Cycle Assessment, economic and environmental impact schemes must be included in the study.

Funding scheme: Coordination and support action

Expected impact: EU sanctioned guidelines for farmers and policy makers as to the best biomass sources to cultivate according to region, climate, policy, life cycle assessment, processing, access, etc.

COOP-2-3-1-02: PLANT CELL WALLS - Understanding Plant Cell Walls for optimizing Biomass potential **Call: KBBE-2007-1**

Plant Cell Walls characterise the major biomass resource on the planet. They are composed of high energy polymers as well as complex mixtures of additional polysaccharides, proteins and small molecules. In principle, biorefining can convert these cell walls into sugars and other renewable feedstocks for industrial biotechnology. They have however naturally evolved to resist breakdown from mechanical and microbial forces so unlocking the components in these biomaterials represents a massive scientific and technical challenge. Multidisciplinary integrated research is called for which addresses the chemistry of cell wall polymers, particularly the lignins, microcrystalline cellulose, hemicelluloses and pectins; the cell biology of the wall in order to structural organization; bioprocessing of the raw material, to design novel and more efficient fractionation systems; enzyme biochemistry and technologies of hydrolases involved in cell wall degradation; genomics, proteomics and metabolomic analysis of cell wall biosynthesis and metabolism to devise new plant breeding strategies for the production of raw materials enhanced for biorefining including microarray technologies. This will require the involvement of plant biochemists, protein engineers and associated expertise in chemical processing and engineering. Funding of such an action provides an opportunity to apply new post genomic knowledge for the exploitation of the cell wall. It

allows for strong EU/US collaboration, while addressing long term objectives of the biofuel directives, and CAP reform.
Funding scheme: Large collaborative project
Expected impact: Demonstration of EU-US collaboration in tackling a fundamental technical bottleneck in the development of biomass potential. Essential generic knowledge for the exploitation of plant material in the production of industrial products, including food.

COOP-2-3-1-03: ENERGY PLANTS - Novel plants for energy production
Call: KBBE-2007-1

Plants capture solar energy and store it in various forms including starch, oils, and cell wall constituents such as fibres. Each of these represents a major renewable energy source. Crops which are grown specifically for the production of renewable energy offer new opportunities for sustainable agricultural systems. Where this involves marginal land, new economic potential can be realised. Our current knowledge of dedicated energy crops is limited, both in relation to optimisation of existing crop species specifically for energy production, as well as in relation to the discovery and domestication of new energy crops. Realising the potential of this area will necessitate the application of post-genomic technologies to facilitate gene discovery and fast-track breeding as well as developing greater knowledge of supply chain issues including life cycle analysis and environmental impact. Research performed here provides the opportunity to apply post-genomic knowledge in the production of improved "energy crops" along with the agronomic and rural implications for their introduction.
Funding scheme: Small collaborative project
Expected impact: Market driven, hardy viable and profitable energy crops with enhanced traits derived from conventional and biotechnological breeding techniques which exploitat the post genomic knowledge base.

COOP-2-3-1-04: GREEN OIL - Plants providing oils of the future Call: KBBE-2007-1

Petroleum is a finite resource that provides essential fuels and raw materials for society and industry. Alternative sources of energy and industrial feedstocks are currently being sought and the seed oils of plants, structurally similar to long chain petroleum hydrocarbons, represent excellent renewable resources for oleochemical production. Multidisciplinary concerted, integrated research is thus sought to establish the knowledge base and molecular tools required for optimizing the production of industrially important oils in high-yielding crops. To realise the potential in this area, a new platform of understanding is urgently required in order to allow the rational development of designer oil products at sufficient yields to make them commercially viable. This necessitates the molecular genetic dissection of the overall biochemical process leading to oil production in target oil-producing species. This could facilitate the rapid domestication of under-utilised species as new industrial crops, the improvement of existing oil crops and the development of novel oil crops through gene transfer methods. The full range of applications from specialist use to biodiesel production will be investigated. Research performed here provides an opportunity to apply new genomic knowledge in the development of vegetable oils for industrial use, along with the agronomic and rural implications for their introduction. Funding of such an action provides an opportunity to apply new post genomic knowledge for the exploitation of the cell wall. It allows for strong EU/US collaboration, while addressing long term objectives of the biofuel directives, CAP reform and sustainablility. This will generate the scientific basis for the domestic production of industrial raw materials that are typically derived from imported petroleum. Industrial oils would be produced in non-food crops, but the knowledge generated will have important implications for oils entering the food chain. Private companies will play a key role in identifying desired oil traits as well as developing end-products from plant-

derived materials. This close interaction between private companies and scientists provides a unique opportunity to develop the technology platforms that will underpin a robust, bio-based economy.
Funding scheme: Large collaborative project
Expected impact: Market driven, hardy viable and profitable oil seed crops with enhanced traits derived from conventional and biotechnological breeding techniques which exploit the post genomic knowledge base.

COOP-2-3-1-05: GREEN FACTORY – The expression and accumulation of valuable industrial compounds in plants **Call: KBBE-2007-2A**
Plants have widespread non-food/feed applications. They can act as cheap, renewable 'factories' for the production of chemicals, recombinant proteins and industrial raw materials of value to a wide range of non-food industrial sectors. In addition, environmentally friendly bio-based 'green' products are a massive emerging opportunity, in terms of their social, environmental and economic potential. The objective is to understand and subsequently optimise the use of plants as "Green Factories". The scope encompasses natural plant compounds such as primary and secondary metabolites and recombinant products expressed in transgenic plants. Research will focus on: new transfection technologies; development of rapid expression systems; identification and manipulation of metabolic pathways; elucidation and modification of protein targeting; protein folding and assembly; protein storage and breakdown; the influence of external factors such as growing conditions.
Funding scheme: Large collaborative project
Expected impact: Fundamental knowledge concerning plant metabolic pathways for the production of useful commodities which can be exploited for consumer (?) or industrial use. Closely tied with other topics this represents part of the huge impact "the plant factory" will have on society in the coming years.

COOP-2-3-1-06: PLANT NATURAL PRODUCTS - Realising the potential of plant natural products for human and animal health **Call: KBBE-2007-2B**
Land and aquatic plants have evolved an immense ability to synthesise complex metabolites representing a vast resource of chemical diversity. The impact of these metabolites on health can be through a nutritional or health-care route. Examples range from phytosterols and polyunsaturated fatty acids to feedstocks for pharmaceuticals. Establishing robust molecular based screens to identify bioactive compounds and validate their efficacy in appropriate models will be essential for the advancement of this field. This necessitates multidisciplinary approaches involving expertise in phytochemistry, molecular biology, medicine and nutrition. The identification of targets, such as new anti-inflammatory agents, anti-cancer agents, anti-dementia agents is essential. The combination of modern molecular approaches building on existing knowledge accumulated over the millennia on plant natural products offers major opportunities for novel health care treatments.
Funding scheme: Small collaborative project
Expected impact: A study of the most viable plant metabolites available for human health purposes which can be readily cultivated and extracted at volumes and purities of maximum impacts.

COOP-2-3-1-07: NONFOOD SUPPLY - Harvesting storage and transport of raw material **Call: KBBE-2007-2B**
The characteristics and quality of biomass feedstocks greatly influences the design, choice, and performance of conversion technologies as well as the requirements for feedstock storage, product handling, and subsequent waste disposal. Biomass feedstock that is variably sized and

high in moisture or contaminants such as ash which can reduce efficiencies, increase costs, and lower capacity. Thus harvesting and storage handling are significant costs and a technical barrier to commercialization. The objective is to find ways to improve raw material consistency, increase yields, and decrease unit production cost in the different downstream and upstream processing steps of harvesting, storage, transport, and ultimate conversion while ultimately consolidating the supply chain. Similarly an integrated approach towards transporting feedstocks for either storage or conversion purposes has to be seriously addressed with respect to final unit costs and environmental sustainability. This is seen as an important link in the integrated chain for the development of non-food products.
Funding scheme: Coordination and support action
Expected impact: Improved production systems which deal with the essential elements of biomass harvest, storage, transport, and supply.

COOP-2-3-1-08: SWEET SORGHUM - Alternative energy crops for biofuel production in semi-arid and temperate regions **Call: KBBE-2007-2B**
A promising alternative for bioethanol production is sweet sorghum, a "food-fuel-energy-industrial crop" which ranks fifth among the world's grain crops, requires low water/fertilisers input, has a high yield of grains (starch) /sugars /lignocellulosics for integrated multi-purpose processing and grows well in marginal lands, in semi-arid and temperate regions, including Africa, Latin America and Europe. A limiting factor is the lack of varieties adapted to different growth conditions, including colder climate. Research should address the optimisation and amplification of sweet sorghum breeding, including genetic improvement and/or selection of varieties adapted to colder climates, with optimised yields and sugar contents. Other alternative crops with a high potential for sustainable energy production - such as oil-crops, C4 grasses, CAM (Crassulacean acid metabolism) plants - should also be further explored and developed for biofuel production in arid and semi-arid lands. International co-operation with third countries leading in biofuel production and energy crops (such as Brazil) will be an essential added value.
Funding scheme: Small collaborative project Specific International Cooperation Action - Minimum Number of Participants: 2 from different MS or AC and 2 from different ICPC, including from Latin America, and particularly Brazil.
Expected impact: great market potential, as sweet sorghum is a potentially cheap feedstock for ethanol, also in the EU. Important environmental benefits (low water input) and good perspectives for the development of rural areas. The project is expected to contribute to international co-operation with third countries signatories of S&T agreements with the EU and leading in biofuel development and/or energy crops production, such as countries from Latin America and Africa (e.g. Brazil, Argentina, Chile, Egypt)

Area 2.3.2 Bioprocesses

Addressing the application of industrial biotechnologies within whole crop and forest biomass chains to realise the full potential of the bio-refinery approach (e.g. green chemicals), including socioeconomic, agronomic, and ecological and consumer aspects. This will be enhanced by an increased understanding and control of plant and microbial metabolism at the cellular and sub-cellular level, and how this is integrated into whole system performance in the production of high value commodities deploying bio-processes with increased yield, quality and purity of conversion products, including biocatalytic process design.

COOP-2-3-2-01: LIGNOCELLULOSIC ENZYMES - Development of cellulases for lignocellulosic biomass pre-treatment **Call: KBBE-2007-1**

The use of lignocellulosic biomass could offer significant advantages compared to the current use of sugar or starch as the main substrate for fermentation processes. Such biomass feedstock would primarily be produced on the basis of either waste products from agriculture (straw), forestry (thinning wood, residuals) or wood-based industries (saw dust, 'black liquor' from pulp and paper industry) or from specific energy crops such as short rotation forestry or other cellulosic material. However, for hydrolysing such lignocellulosic biomass into fermentable sugars, efficient enzyme mixtures of cellulases and other hydrolytic enzymes are required that are not yet available and presently form a formidable bottle-neck for the further development of the bio-based economy in Europe.
Funding scheme: Small collaborative project
Expected impact: Expanded knowledge base on metabolic pathways and mechanisms for the complete breakdown of lignocellulosic material in either waste or dedicated forestry/plant based feedstock streams.

COOP-2-3-2-02: LIPID ENZYMES - Development of enzymes for lipid modification and activation **Call: KBBE-2007-1**
Most of the processes in industrial biotechnology start with readily available carbohydrates feedstocks such as sugar or glucose. Lipids on the other hand are rarely used as a feedstock in industrial biotechnology because they are water insoluble and only a few fermentation systems have been studied. Furthermore in the case of lipid modification only a few enzymes such as conventional lipases are used in practice. Consequently, the oleochemical industry relies more on the use of conventional chemistry than on biotechnology for its processes. There is an urgent need for the development of enzymes and fermentation systems that can readily use this vegetable oil feedstock and turn it into useful products.
Funding scheme: Small collaborative project
Expected impact: Knowledge of metabolic pathways and enzyme systems which can readily utilise diverse lipid feedstocks in the production of industrial products.

COOP-2-3-2-03: MICROBIAL STRESS IN CONTAINMENT - Study of microbial stress for more robust industrial micro-organisms **Call: KBBE-2007-1**
The use of industrial microbial production strains for the conversion of renewable resources into a wide range of useful substances is an essential cornerstone of the bio-based economy. Metabolic engineering for the improvement of micro-organisms typically leads to improvements of yield and expression but with a loss of reliability when compared to wild type strains. The study of microbial stress is a particularly important aspect of microbial physiology as industrial micro-organisms typically need to function under conditions of high substrate or product concentration, low pH, high concentration of toxic substances, etc, for which individual solutions must be found. The rapid inhibition induced by different microbial stresses limits their usefulness in industrial fermentation situations.
Funding scheme: Coordination and support action
Expected impact: A better understanding of how wild type and engineered micro-organisms can cope with growth phase related stress will be presented.

COOP-2-3-2-04: BETTER MICROBES - Metabolic engineering and modelling
Call: KBBE-2007-1
Metabolic engineering of micro-organisms is an essential cornerstone for the bio-based economy. Industrial micro-organisms are increasingly used for the fermentative production of useful metabolites from renewable resources. In the near future, many chemical building blocks will be derived from renewable resources in this way. Metabolic engineering is currently used to improve microbial metabolism for these purposes, leading to so-called

"designer bugs". Present metabolic engineering typically goes through a long trial and error process as predictive and reliable models of microbial metabolism are generally lacking. Consequently, the development of useful industrial strains takes several years and this is currently a substantial bottle-neck in the development of industrial biotechnology in Europe.
Funding scheme: Coordination and support action
Expected impact: Predictive metabolic models will be developed along with increased knowledge of metabolic pathways to identify ideal strains.

COOP-2-3-2-05: DESIGNER ENZYMES - Improved biocatalysts for bioprocesses
Call: KBBE-2007-1

Enzymes are increasingly used as efficient biocatalysts to perform a wide range of chemical reactions. Research is needed on how enzymes can be successfully engineered through directed evolution in the laboratory involving rational design over a short timescale. In order to fully harness the power of directed evolution for better catalysts, a sustained effort is needed to develop high-throughput screening methods specifically directed towards enzymes. There is a general need in industrial biotechnology for generic platform technologies and methods for fast and accurate enzyme activity determination and generic methods to improve enzymes are urgently needed.
Funding scheme: Large collaborative project
Expected impact: Enzyme dedicated High-Throughput screening techniques, improved enzyme systems, purer products.

COOP-2-3-2-06: BIO-INFORMATICS - Microbial genomics and bio-informatics
Call: KBBE-2007-2A

A rapid progress has been made in the techniques and equipment of DNA sequencing, enabling relatively fast mapping of microbial genomes. The vast amount of information generated in this way has to be stored, organised, indexed, and analysed. This need has resulted in the development of the new field of bio-informatics at the intersection of biology and information science. The data on candidate genes is of no use until it has been successfully mined and translated into actual knowledge. The gap between data generation and its analysis and successful exploitation is becoming wider. There is a real need for new methods to analyse this data faster.
Funding scheme: Large collaborative project
Expected impact: A better knowledge of their genetics would improve the understanding of the activities of micro-organisms. With good genome mapping, the identification of desirable.

COOP-2-3-2-07: BIOREFINERY - Biotechnology for the conversion of biomass and waste into value-added products **Call: KBBE-2007-2A**

After having identified and defined European biorefineries the ways to best achieve the integration of agricultural production, forestry, chemical biology industries towards the conversion of biomass and waste into a range of value-added products within integrated biorefineries for the production of food, chemicals and energy from a single feedstock will be demonstrated. The main area of research is to find the best ways to apply the integrated chain and whole crop approach, and to apply all necessary technologies to improve the product base with a special emphasis on industrial biotechnology.
Funding scheme: Large collaborative project
Expected impact: Demonstration of working biorefinery with a processing/marketing link between agriculture and industry developing modified products in close cooperation with agriculture, the processing industry and end users.

COOP-2-3-2-08: NOVEL ENZYMES – The search for novel enzymes and micro-organisms for different bioprocesses **Call: KBBE-2007-2A**

As the limits of enzymes are their price and availability, finding the most appropriate micro-organisms and enzymes are key points for the economic viability of new bioprocesses and bioproducts. So the search for novel enzymes and micro-organisms from specific or extreme environments (extremophiles) whether by direct isolation or by metagenomics to create an expanding range of biological catalysts for industrial use and the development of robust fermentation microbes to simplify and improve the effectiveness of the fermentation process should be included.

Funding scheme: Large collaborative project

Expected impact: European companies already produce 70% of the world's industrial enzymes, and have a well-established research base but the impact here will be the discovery and development of micro-organisms and enzymes for specific applications, thus increasing t heir competitiveness and production diversity.

COOP-2-3-2-09: INDUSTRIAL ENZYMES - Rational design of biocatalysts and enzyme systems with requested properties **Call: KBBE-2007-2B**

There is a general need in industrial biocatalysis for rational enzyme design technologies and methods for fast and quantitative evaluation of biocatalysts. Development of rational molecular modelling and design methods to produce a next generation of highly efficient biocatalysts with expanded range of substrates, improved enantioselectivity and enhanced catalytic activity for industrially important conversions. Development of environmentally friendly industrial biocatalytic processes, via for instance the specific ability of biocatalysts to operate in aqueous medium. Optimization of multienzyme complexes for consecutive chemical reactions leading to valuable end-products, via clean and efficient technologies. Development of quantitative parameters which adequately describe efficiency of a biocatalytic technology in high-throughput screening methods specifically directed towards designer enzymes. Rational design of enzymes for better catalysis will address selected areas of chemical technology requiring improved enzymes, such as fine organic synthesis, biotransformations, biomass conversion and food industry.

Funding scheme: Small collaborative project Specific International Cooperation Action - Minimum Number of Participants: 2 from different MS or AC and 2 from different federal units (provinces, oblasts, republics, territories, districts, federal cities) from Russia

Expected impact: Improved enzymes, effective biocatalysts' evaluation systems, more productive biocatalytic technologies, purer products. The project is expected to contribute to the "EU-Russia Common Space for Education and Research" and to the S&T bilateral agreement between the EU and the Russian Federation, on the basis of mutual interest and shared benefits.

COOP-2-3-2-10: BAGASSES – Improved chemical and enzymatic treatments of bagasses from energy crops, for increased bio-fuels production yields

Call: KBBE-2007-2B

Bagasses fibres are abundant and cheap raw materials for biofuel production; however, bottlenecks remain in various steps of the processing technology (e.g. lignin removal, instability of humid bagasses /trashes). Improved treatement of bagasses, particularly from major/promising biofuel producing crops, could lead to a significant increase in biofuel production. Development of combined chemical and enzymatic treatment technologies to reduce/avoid energy consumption for removing lignin from natural fibres (e.g. sugar cane and sweet sorghum), with concomitant production of high value chemical components. New technologies for stabilisation of humid biomass, bagasses and trashes, such as pelletization of

humid biomass residues, to reduce important losses and noxious emissions. New management techniques to eliminate the burning of crop residues in a variety of agricultural production conditions. Development of new technologies to convert cellulose and hemiceluloses into ethanol. Innovative bioethanol distillation and dehydration technologies. Possible adaptation of existing processing technologies of lignocellulosic (pellets) biomass to obtain, in a longer term, new low-pollution energy sources such as bio-hydrogen. International co-operation with third countries leading in the biofuel production area will be an important aspect.
Funding scheme: Small collaborative project Specific International Cooperation Action - Minimum Number of Participants: 2 from different MS or AC and 2 from different ICPC from the ACP group or Latin America, including Brazil.
Expected impact: Development of biofuels with improved yields, reduced energy inputs and reduced production costs, with collateral decrease of environmental pollution.. The project is expected to contribute to, and benefit from international co-operation with ICPC playing a major role in this area and having S&T agreements with the EU (e.g. countries from Latin America or ACP countries).

Area 2.3.3 Products based on renewables

Using or developing, biotechnologies for novel and improved high quality, high added value and renewable forest-based products and processes will be used or developed to increase sustainability of wood and wood production, including timber, renewable materials and bioenergy stocks.

COOP-2-3-3-01: FOREST PRODUCTS - New forest based products and processes
Call: KBBE-2007-1

The forest is our most ancient source of renewable and sustainable material. The exploration of forest based products for including novel tree species and sustainable processes which improve properties and processing facilities will be sought along with the production of high added value products made of wood based fibers with high durability and usability. Meeting consumer demand for new products by replacement of "unsustainable products" with wood as well as energy saving processing, and replacement of hazardous components (glues, painting, and preservatives) with environmentally friendly biobased products will be investigated.
Funding scheme: Large collaborative project
Expected impact: Diversification of the forest industries and opportunity to apply post-genomic knowledge in the production of derived forest products.

COOP-2-3-3-02: BIO-VET-PHARMING -Plant made recombinant pharmaceuticals for animals **Call: KBBE-2007-1**

The production of recombinant veterinary pharmaceuticals in plants can potentially address many of the difficulties and challenges posed by existing methods of production. The potential combination of low cost coupled with highly scalable manufacturing capability is particularly important for many veterinary products and will enable the development of new applications that are currently not achievable with fermenter-based technologies. Some application areas that can benefit most from a plant-derived production system include: Veterinary products that are required in very large quantities, such as sub-unit vaccines or monoclonal antibodies. Veterinary medicines that are specifically designed for production in plants, such as recombinant immune complexes, etc. Our growing understanding of protein production in plants has led to the ability to engineer molecules with enhanced immunological properties. Research should focus on: Identification of animal diseases where plant derived

pharmaceuticals can solve existing problems, novel molecular engineering and expression technologies for molecular farming.
Funding scheme: Network of Excellence
Expected impact: The production of new pharmaceuticals derived from plant expression systems, and applying post genomic knowledge.

COOP-2-3-3-03: BIOPOLYMERS - Biological Polymers from plants
Call: KBBE-2007-1

The realisation of the finite nature of our petroleum reserve, the increase in cost of this resource, and the environmental issues linked with plastics and petroleum has brought a new impetus to the use of renewable resources for the production of industrial materials. This flagship topic aims at studying the various challenges involved in the successful demonstration and scale up of useful biopolymer expression in agricultural plants. These include, but are not limited to, the synthesis of polymers with plastics and elastomeric properties such as polyhydroxyalkanoates and rubbers, starch-based plastics, as well as fibres and adhesives based on proteins or poly-amino acids. The scientific challenges include realising cost-effective production of high-performance biopolymers from agricultural plants through a multidisciplinary approach; finding ways to express microbial polymers such as polyhydroxyalkanoates, and proteins such as silk and adhesin in plants in sufficient concentrations without compromising the agronomic qualities of the plant; defining modifications of starch that can be implemented in planta leading to better starch-based biopolymers; developing European alternatives for natural rubber production; investigating protein co-products such as zein from corn and soybean meal as potential bioplastic raw material including their modification in planta. Economic assessments, environmental impact and life cycle analyses will be examined to identify the respective strength and weaknesses of the various production, use and disposal scenarios. These challenges will combine molecular genetic and genomic technologies and involve a multidisciplinary approach with material scientists, chemists, physicists and plant scientists etc. Research should focus upon, biobased plastics (polymers) made from renewable feedstocks, advanced polymers with new and more complex functional properties, and "bio-inspired" materials where biological systems or production methods have stimulated the development of complex structured products.
Funding scheme: Large collaborative project
Expected impact: Profound understanding of how plant and microbial metabolic pathways can be geared towards biopolymer production.

COOP-2-3-3-04: BIOETHANOL AND BEYOND - Novel enzymes and microorganisms for biomass conversion to bioethanol **Call: KBBE-2007-2A**

After the release of carbohydrates (typically glucose and pentose sugars) following hydrolysis of the biomass feedstock their fermentation into ethanol can take place. The micro-organisms used for fermentation of sugar streams must be able to fully convert the carbohydrates into ethanol, be robust, and tolerant of the toxic compounds formed during the pre-treatment process. They must be able to withstand the stress of high ethanol and substrate concentrations, low pH, etc. At present no such strains are available and significant challenges still lie ahead to develop such robust micro-organisms and enzymes including those from thermophilic sources. Developing such strains requires a multidisciplinary approach involving metabolic engineering for new pathways and enzymes to expand the substrate usage spectrum of the micro-organism; engineering micro-organisms for better stress response to industrial conditions such as ethanol tolerance, and for higher productivity. Current processes are based on starch and sugar crops. To be competitive however the EU needs to develop tailor-made processes to convert the specific EU biomass available such as forest feedstocks , agricultural

wastes and by-products into ethanol. In this respect the development of optimal enzymes and robust fermentation systems (e.g. thermophilic microorganisms and enzymes) capable of converting cellulose directly and fermenting it into ethanol or other higher alcohols, making these technologies cost effective will also be supported. In addition, in view of the technological advancement and the needs in renewable energy and materials the potential should be examined in novel enzymes and microorganisms for future potential in valuable biotechnological products.
Funding scheme: Large collaborative project
Expected impact: Expansion of the enzymatic and microbial diversity not only for the production of cheap fuel but for the production of new valuable biotechnological products

COOP-2-3-3-05: BIO-CHEMICALS - Biofermentation for fine and speciality chemicals
Call: KBBE-2007-2B

Fermentation engineering is at the heart of industrial biotechnology and has strong production skills and knowledge base in Europe. Fine- and specialty chemicals like vitamins, amino acids and antibiotics as well as active ingredients are obtained by means of the cultivation of micro-organisms. From a chemical point of view these products are usually distinguished by having several functional groups and frequently also chirality. Classical syntheses of these substances include several reaction steps using stoichiometric quantities of reagents and often deploy complex group chemistry, expensive noble metal/heavy metal catalysts and drastic reaction conditions. This topic, therefore, is extremely important and has to benefit from novel developments in molecular biology, genome research, microbiology, biochemical engineering, process analyses, computer science and automatic control.
Time-to-market is a crucial factor in the success of new or improved products. In the highly competitive area of fine chemicals this criterion can be decisive. Therefore especially SMEs are invited to work together with researchers to use fermentation engineering for optimising the processing of fine and specialty chemicals in terms of costs and ecoefficiency.
Funding scheme: Small collaborative project(s)
Expected impact: Fine and speciality chemicals will be produced in a more efficient way. Projects here should aim to increase SME competitiveness and for this reason SME driven proposals are encouraged.

Area 2.3.4 Environmental biotechnologies; Use of waste and by-products

Addressing, the potential of biotechnology to detect, monitor, prevent, treat and remove pollution. Maximising the economic value of waste and by-products through new and potentially energy-saving bio-processes, alone or in combination with plant systems and/or chemical catalysts.

COOP-2-3-4-01: NON TECHNICAL BARRIERS - Technical, socio-economic, geographic and regulatory aspects of non-food crop systems in particular towards co-existence and safety of agri-food chains **Call: KBBE-2007-1**

Analysis of parameters can contribute to establishing a non-food crop system alongside food crop systems. This could include territorial allocation of non-food areas, ways to ensure co-existence with food crops and the safety of food chain. Parameters can be technical (rotation, yield, raw material characters, distance field/plant etc.), socio-economical (plants in the area, cost of a specific material etc.) and regulatory (co-existence; safety measures when using crops for both food and non-food). How far is the EU behind its competitors in developing a bioeconomy. Should involve all players along the chain.

Funding scheme: Coordination and support action
Expected impact: Answers as to whether a bio-economy is a viable option in Europe.

COOP-2-3-4-02: SYNTHETIC BIOLOGY FOR THE ENVIRONMENT - The use of Synthetic Biology for the solution of environmental problems Call: KBBE-2007-1
Use of the Synthetic Biology approaches to engineer complex systems and redesigning biological components for the reduction of wastes and the elimination of industrial pollution. This effort should be based on databases containing all available information on microbial routes for total or partial catabolism of recalcitrant compounds, along with their corresponding regulation.
Funding scheme: Coordination and support action
Expected impact: Synthetic biology significantly expands the scope of metabolic engineering so that in theory just about any compound can be made from renewable resources through fermentation. With an enhanced knowledge of microbial metabolism, metabolic engineering and production systems, it will become possible to create completely new pathways to bio-produce new molecules that are not synthesized as such in nature.

COOP-2-3-4-03: BETTER MICROBES FOR THE ENVIRONMENT - Microbial gene expression under condition of stress Call: KBBE-2007-1
The aim is to understand how microbial population dynamics and gene expression are connected to multiple environmental stresses. The questions at stake are: (i) understanding the control of expression of catabolic genes in their natural environment and how bacteria evolve the ability to respond transcriptionally and post-transcriptionally to novel environmental signals (for instance, xenobiotic compounds); (ii) how such a response is integrated in the global regulatory network of single cells and influence the signals and behaviours of microbial communities.
Funding scheme: Large collaborative project
Expected impact: Expanding our knowledge of responding bacteria to stress and especially the catabolic pathways can contribute to knowledge based use of biotechnology for solving environmental problems.

COOP-2-3-4-04: ANIMAL BY-PRODUCTS - Novel methods of treatment of animal by-products for the production of substances with biologically valuable functional properties Call: KBBE-2007-1
By-products of animal processing industry represent an increasing volume of biomass, whose potential is underutilized. Development of efficient biotechnological methods for the treatment of non-valuable meat- and poultry processing intermediates, for the production of proteins and other biologically valuable substances with specific functional properties to be used as raw material for other industrial uses. Optimization of new enzymes (e.g. collagenase, keratinase, peptidase) and multienzyme blends for rational design of functional properties of the target products. Application of the newly obtained products with programmed functional properties (e.g. high food and feed value, high water retention, optimal amino acid composition, low allergenicity, etc.) for alimentary animal-feeding, pharmaceutical industry and other uses. Establishing modern and efficient technological methods for biofuel (biodiesel, biogas) production from animal by-products. Development of a technology platform for multi-purpose processing of industrial by-products, to be adapted in different industrial sectors.
Funding scheme: Small collaborative project / Specific International Cooperation Action - Minimum Number of Participants:2 from different MS or AC and 2 from different federal units (provinces, oblasts, republics, territories, districts, federal cities) from Russia

Expected impact: Processing of industrial animal by-products for generating added value compounds and for energy production. Increased industrial capacity and profitability in EU countries and emerging economies such as Russia. Lowering pressure of industrial waste on the environment. The project is expected to contribute to the "EU-Russia Common Space for Education and Research" and to the S&T bilateral agreement between the EU and the Russian Federation, on the basis of mutual interest and shared benefits.

COOP-2-3-4-05: USEFUL WASTE - Novel biotechnology approaches for utilizing wastes, including aquaculture wastes, to make high added value products

Call: KBBE-2007-2A

Our ability to exploit agricultural, industrial and municipal and aquaculture wastes for use as raw materials for bioproducts requires the application of new technologies to arrive at novel and economically viable solutions. For example, the full armoury of genomics techniques may be brought to bear on optimising the microbial or enzymatic processing of recalcitrant or toxic wastes with clear environmental benefits. In addition, value may be added to waste by using enzymes and microorganisms for the production of valuable bioproducts such as fine chemicals, biofuels and biomaterials. Emphasis should be placed on local solutions to local problems which may include small scale operations. This is a very fragmented research field, and waste could be an important feedstock resource in Europe to produce a wide range of products. A network of excellence could pull together the players of the diverse waste resources with a view towards adopting common approaches and supply lines.
Funding scheme: Large collaborative project
Expected impact: A coordinated European programme for the biological utilisation of organic waste streams (excluding municipal waste) making a wide range of market driven food and non-food derivatives.

COOP-2-3-4-06: ACTIVITY MININING IN METAGENOMES – Exploring molecular microbial diversity in aquatic environment or the soil **Call: KBBE-2007-2A**

It is estimated that only 0.1-1% of microorganisms can be cultivated using different techniques. The microbial metagenome is the largest reservoir of genes that determine enzymatic reactions. The aim is to use microbial metagenomic techniques to determine microbial enzymatic reactions of valuable chemical biotransformations, particularly in pathways for biodegradation of recalcitrant and xenobiotic molecules.
Funding scheme: Large collaborative project
Expected impact: In the process of biodegradation and biotransformation lies the unlimited power of microbial genetic diversity which needs to be unraveled and exploited with the new metagenomic technologies.

Indicative topics for future calls

Potential year 3 topics:

Sustainable utilization of Marine resources
Marine metagenomics (NEST)
Innovative approaches to down-stream processing
Good Manufacturing Practice methods for downstream processing of plant made compounds.
Fermentative production of bulk chemicals
Biotechnology for optimising biofuel production
Industrial Pollution - Biotechnological techniques for preventing pollution at source

Potential year 4+ topics:

Bioproducts from animal waste
Resins and fungi from forests for pharmaceutical and cosmetic use
Identification and development of innovative cocktails containing novel enzymes and micro-organisms which are tailored to convert EU biomass (e.g. wheat straw, grasses, woodchips, sugar beet pulp) into fermentable substrates
New materials (e.g. nano-composite materials)
Bioprocesses scale up

III IMPLEMENTATION OF CALLS

Call title: KBBE-2007-1

- Call identifier: *COOP-KBBE-2007-1*
- Date of publication: [early 2007]
- Closure date: DC1 (likely May 2007) at 17.00 hrs (Brussels local time)

- Topics called:

Activity/ Area	Topics called	Funding Schemes
Activity 2.1 Sustainable production and management of biological resources from land, forest and aquatic environments		
2.1.1	*COOP-2-1-1-01: Development of new tools and processes to support R&D in crop plants: molecular breeding*	*Small collaborative project*
2.1.1	*COOP-2-1-1-02: Development of genetic systems for crop improvement through a systems biology approach*	*Large collaborative project*
2.1.1	*COOP-2-1-1-03: Mining genomics information of farm animals to generate new information on the genetic basis of phenotypes important to sustainable agriculture.*	*Small collaborative project*
2.1.2	*COOP-2-1-2-01: Improved indicators of the relationship between organic/low-input farming and biodiversity*	*Coordination and support action*
2.1.2	*COOP-2-1-2-02: Improving water stress tolerance in European annual food crops*	*Small collaborative project*
2.1.2	*COOP-2-1-2-03: Genomics for cereal improvement for food and non-food uses*	*Large collaborative project*
2.1.2	*COOP-2-1-2-04: Development of Pest Risk Analysis based on new diagnostic methods*	*Small collaborative project*
2.1.2	*COOP-2-1-2-05: Novel forest tree breeding*	*Large collaborative project*
2.1.2	*COOP-2-1-2-06: Developing new methods for valuing and marketing of non marketable forest goods and services*	*Small collaborative project*
2.1.2	*COOP-2-1-2-07: Microbial control for more sustainable aquaculture*	*Large collaborative project*

2.1.2	*COOP-2-1-2-08: Coordination of Agricultural Research in the Mediterranean*	*Coordination and support action*
2.1.3	*COOP-2-1-3-01: Improving animal health, product quality and performance of organic and low-input livestock systems through breeding*	*Small collaborative project*
2.1.3	*COOP-2-1-3-02: Improving production through investigating the gut physiology of farm animals and its interaction with the gastro-intestinal microflora*	*Small collaborative project*
2.1.3	*COOP-2-1-3-03: From capture based to self-sustained aquaculture*	*Small collaborative project*
2.1.3	*COOP-2-1-3-04: Neglected zoonoses in developing countries: integrated approach for the improvement of their control in animals*	*Large collaborative project*
2.1.3	*COOP-2-1-3-05: Breeding tools for improved livestock products*	*Small collaborative project*
2.1.3	*COOP-2-1-3-06: Coordination of European research in the area of animal health, including emerging threats, infectious diseases and surveillance*	*Coordination and support action*
2.1.4	*COOP-2-1-4-01: Developing the KBBE*	*Coordination and support action*
2.1.4	*COOP-2-1-4-02: Enabling efficient transfer of technology in the knowledge-based bio-economy*	*Small collaborative project*
2.1.4	*COOP-2-1-4-03: GMO Co-existence and practical implications*	*Small collaborative project*
2.1.4	*COOP-2-1-4-04: Implementation of Leader*	*Coordination and support action*
2.1.4	*COOP-2-1-4-05: Containment of Sharka virus*	*Small collaborative project*
2.1.4	*COOP-2-1-4-06: Assessing the socio economic consequences and costs benefits of measures producing good animal welfare*	*Coordination and support action*
2.1.4	*COOP-2-1-4-07: Establishment of an information platform on the protection and welfare of animals*	*Coordination and support action*
2.1.4	*COOP-2-1-4-08: Models for the extrapolation of MRLs from one species to another*	*Coordination and support action*
2.1.4	*COOP-2-1-4-09: Development of rational strategies for the eradication of bovine tuberculosis*	*Small collaborative project*

2.1.4	*COOP-2-1-4-10: ASF transmission, characterisation of currently existing field viruses, diagnostic tests and validation with existing field viruses; host interaction and viral immune response in view of the development of a vaccine*	*Small collaborative project*
2.1.4	*COOP-2-1-4-11: Emerging vector-borne diseases: West Nile fever, Rift Valley Fever and Crimean-Congo haemorrhagic fever*	*Small collaborative project*
2.1.4	*COOP-2-1-4-12: Essential biological functions related to the most relevant stages of aquaculture fish life-history*	*Large collaborative project*
2.1.4	*COOP-2-1-4-13: Reduction of N excretion in ruminants*	*Large collaborative project*
2.1.4	*COOP-2-1-4-14: External costs of pesticides*	*Small collaborative project*
Activity 2.2: Fork to farm: Food, health and well being		
2.2.1	*COOP-2-2-1-01: Accessing social and behavioural sciences and the networking of food consumer science in Europe*	*Network of Excellence*
2.2.1	*COOP-2-2-1-02: Developing research tools for food consumer science in the Western Balkan Countries*	*Small collaborative project*
2.2.2	*COOP-2-2-2-01: Effect of diet on mental performance*	*Large collaborative project*
2.2.2	*COOP-2-2-2-02: Diet for patients in hospitals and at home: disease-related malnutrition*	*Small collaborative project*
2.2.2	*COOP-2-2-2-03: Impact of diet on ageing*	*Large collaborative project*
2.2.2	*COOP-2-2-2-04: Malnutrition in developing countries*	*Small collaborative project*
2.2.2	*COOP-2-2-2-05: Optical technologies for monitoring the human nutrition status and the onset of nutrition-related health problems*	*Series of small collaborative project(s)*
2.2.3	*COOP-2-2-3-01: Smart control for improved food and feed technologies*	*Large collaborative project*
2.2.3	*COOP-2-2-3-02: Assessment and improvement of existing food and feed technologies*	*Series of small collaborative project(s)*
2.2.3	*COOP-2-2-3-03: Network for facilitating the implementation of high-tech processing at industrial scale*	*Network of Excellence*

2.2.3	*COOP-2-2-3-04: Harmonising and integrating research on food technology, safety and nutrition through commonly shared food models*	*Small collaborative project*
2.2.4	*COOP-2-2-4-01: Innovative and safe packaging*	*Small collaborative project*
2.2.4	*COOP-2-2-4-02: Detecting chemical hazards in the food chain*	*Large collaborative project*
2.2.4	*COOP-2-2-4-03: New methods for the monitoring and control of food-borne viruses*	*Large collaborative project*
2.2.4	*COOP-2-2-4-04: Exposure to food additives, flavourings, and migrants coming from the packaging – Dietary intake models*	*Large collaborative project*
2.2.5	*COOP-2-2-5-01: Sustainability of the food chain*	*Network of Excellence*
2.2.5	*COOP-2-2-5-02: Post Market Monitoring of GM food and feed*	*Small collaborative project*
2.2.5	*COOP-2-2-5-03: Development and application of computational biology as a complementary tool to in vivo and/or in vitro trials*	*Coordination and support action*
Activity 2.3 Life Sciences and Biotechnology for sustainable non-food products and processes		
2.3.1	*COOP-2-3-1-01: BIOMASS SUPPLY - Identification of optimal terrestrial and aquatic biomass and waste for Bioproducts*	*Coordination and support action*
2.3.1	*COOP-2-3-1-02: PLANT CELL WALLS - Understanding Plant Cell Walls for optimizing Biomass potential*	*Large collaborative project*
2.3.1	*COOP-2-3-1-03: ENERGY PLANTS - Novel plants for energy production*	*Small collaborative project*
2.3.1	*COOP-2-3-1-04: GREEN OIL - Plants providing oils of the future*	*Large collaborative project*
2.3.2	*COOP-2-3-2-01: LIGNOCELLULOSIC ENZYMES - Development of cellulases for lignocellulosic biomass pre-treatment*	*Small collaborative project*
2.3.2	*COOP-2-3-2-02: LIPID ENZYMES - Development of enzymes for lipid modification and activation*	*Small collaborative project*
2.3.2	*COOP-2-3-2-03: MICROBIAL STRESS IN CONTAINMENT - Study of microbial stress for more robust fermentation micro-organisms*	*Coordination and support action*
2.3.2	*COOP-2-3-2-04: BETTER MICROBES*	*Coordination and support*

	- Metabolic engineering and modelling	*action*
2.3.2	*COOP-2-3-2-05: DESIGNER ENZYMES - Improved biocatalysts for bioprocesses*	*Large collaborative project*
2.3.3	*COOP-2-3-3-01: FOREST PRODUCTS - New forest based products and processes*	*Large collaborative project*
2.3.3	*COOP-2-3-3-02: BIO-VET-PHARMING -Plant made recombinant pharmaceuticals for animals*	*Network of Excellence*
2.3.3	*COOP-2-3-3-03: BIOPOLYMERS - Biological Polymers from plants*	*Large collaborative project*
2.3.4	*COOP-2-3-4-01: NON TECHNICAL BARRIERS - Technical, socio-economic, geographic and regulatory aspects of non-food crop systems in particular towards co-existence and safety of agri-food chains*	*Coordination and support action*
2.3.4	*COOP-2-3-4-02: SYNTHETIC BIOLOGY FOR THE ENVIRONMENT - The use of Synthetic Biology for the solution of environmental problems*	*Coordination and support action*
2.3.4	*COOP-2-3-4-03: BETTER MICROBES FOR THE ENVIRONMENT - Microbial gene expression under condition of stress*	*Large collaborative project*
2.3.4	*COOP-2-3-4-04: ANIMAL BY-PRODUCTS - Novel methods of treatment of animal by-products for the production of substances with biologically valuable functional properties*	*Small collaborative project*

- Evaluation procedure:

— the evaluation shall follow a single stage procedure,
— proposals will not be evaluated anonymously,
— the evaluation process may involve ‘remote’ evaluation of proposals.

- Indicative evaluation and contractual timetable:

— evaluation results: two months after the relevant closure date mentioned above
— contract signature: six months after the relevant closure date mentioned above.

- **Indicative budget: €195 m, broken down as follows:**

Activity	**EUR million**
Activity 2.1: Sustainable production and management of biological resources from land, forest and aquatic environments	*75*

Activity 2.2: Fork to farm: Food, health and well being	*70*
Activity 2.3: Life Sciences and Biotechnology for sustainable non-food products and processes	*50*
TOTAL	***195***
Of which specific international cooperation actions	*15*
Of which ERA-NET	*2*

- Consortia agreements: Participants in large-scale collaborative research projects and Networks of Excellence are required to conclude a consortium agreement

- Particular requirements for participation, evaluation and implementation:

The selected topics may be open only for the call indicated, and it is envisaged that up to one project will be funded for each topic, unless otherwise indicated. There may be competition between proposals submitted on different topics and proposals submitted on the same topic. This may result in some topics not being supported.

(to be added: For specific international cooperation actions, the eligible countries/ regions (if appropriate)

IV INDICATIVE PRIORITIES FOR FUTURE CALLS

Priorities for the calls covering the 2008 budget can be found in the 2007-08 bi-annual work programme.

Call title: KBBE-2007-2A

- Call identifier: *COOP-KBBE-2007-2A*
- Date of publication: DP2A (likely June 2007)
- Closure date: DC2A (likely October 2007) at 17.00 hrs (Brussels local time).
  For those proposals passing the first stage evaluation, there will be a deadline for full proposals of DCFinal2A (early 2008 – same as DC2B) at 17.00 hrs (Brussels local time).
- Topics called:

Activity/ Area	Topics called	Funding Schemes
Activity 2.1 Sustainable production and management of biological resources from land, forest and aquatic environments		
2.1.1	*COOP-2-1-1-04: Development of technologies and tools for the exploitation of livestock genome*	*Large collaborative project*
2.1.1	*COOP-2-1-1-05: Using new technologies to identify (re-)emerging pathogens from wildlife reservoirs*	*Large collaborative project*
2.1.2	*COOP-2-1-2-09: Reducing the utilisation of mineral fertilisers by improving the efficiency of nutrient use in European crops*	*Large collaborative project*
2.1.3	*COOP-2-1-3-07: Improved epidemiological tools for food-borne zoonoses: application of geographical information for live animals and animal products*	*Network of Excellence*
2.1.4	*COOP-2-1-4-14: The structure of fish populations and traceability of fish products*	*Large collaborative project*
Activity 2.2: Fork to farm: Food, health and well being		
2.2.2	*COOP-2-2-2-06: Diet and its effect on the development of intestinal microflora and on the immune system through the entire life span*	*Large collaborative project*
2.2.2	*COOP-2-2-2-07: Systems Biology and bioanalytical tools for nutrition research*	*Large collaborative project*
2.2.3	*COOP-2-2-3-05: New solutions for improving refrigeration technologies along the food chain*	*Large collaborative project*
2.2.4	*COOP-2-2-4-05: Food sampling strategies for risk analysis*	*Large collaborative project*
2.2.4	*COOP-2-2-4-06: Improving risk-benefit assessment of exposure to*	*Large collaborative*

	biological and chemical components in food	*project*
2.2.5	*COOP-2-2-5-04: Reduce contamination by mycotoxins in the food and feed chain*	*Large collaborative project*
Activity 2.3 Life Sciences and Biotechnology for sustainable non-food products and processes		
2.3.1	*COOP-2-3-1-05: GREEN FACTORY – The expression and accumulation of valuable industrial compounds in plants*	*Large collaborative project*
2.3.2	*COOP-2-3-2-06: BIO-INFORMATICS - Microbial genomics and bio-informatics*	*Large collaborative project*
2.3.2	*COOP-2-3-2-07: BIOREFINERY - Biotechnology for the conversion of biomass and waste into value-added products*	*Large collaborative project*
2.3.2	*COOP-2-3-2-08: NOVEL ENZYMES – The search for novel enzymes and micro-organisms for different bioprocesses*	*Large collaborative project*
2.3.3	*COOP-2-3-3-04: BIOETHANOL AND BEYOND - Novel enzymes and microorganisms for biomass conversion to bioethanol*	*Large collaborative project*
2.3.4	*COOP-2-3-4-05: USEFUL WASTE - Novel biotechnology approaches for utilizing wastes, including aquaculture wastes, to make high added value products*	*Large collaborative project*
2.3.4	*COOP-2-3-4-06: ACTIVITY MININING IN METAGENOMES – Exploring molecular microbial diversity in aquatic environment or the soil*	*Large collaborative project*

- Evaluation procedure:

  The evaluation shall follow a two stage procedure, the second stage of which will include a remote evaluation.
  • For the first stage, proposals should consist of no more than 20 pages using a minimum of a 12 point font
  • For proposals which pass the first stage, coordinators will be asked to submit a full proposal by the given deadline "DCFinal2A"
  • Proposals will not be evaluated anonymously.

- Indicative evaluation and contractual timetable:

Evaluation results: Results from the first stage will be available in (DC2A+3 months) and final results are estimated to be available within some 4 months after the "DCFinal2A" date.

Contract signature: It is estimated that the first contracts related to this call will come into force before the end of 2008.

- **Indicative budget of €90m, broken down as follows:**

Activity	**EUR million**
Activity 2.1: Sustainable production and management of biological resources from land, forest and aquatic environments	*25*
Activity 2.2: Fork to farm: Food, health and well being	*30*
Activity 2.3: Life Sciences and Biotechnology for sustainable non-food products and processes	*35*
TOTAL	***90***
Of which specific international cooperation actions	*5*

- Consortia agreements: Participants in large-scale collaborative research projects and Networks of Excellence are required to conclude a consortium agreement
- Particular requirements for participation, evaluation and implementation:

The selected topics may be open only for the call indicated, and it is envisaged that up to one project will be funded for each topic, unless otherwise indicated. There may be competition between proposals submitted on different topics and proposals submitted on the same topic. This may result in some topics not being supported.

Evaluation of proposals for large collaborative research projects and Networks of Excellence will take place in a 2-stage procedure. Details can be found within the call (see section XX) and in the documents "Guidelines on proposal evaluation and selection procedures"* and the relevant Guide for Proposers*. In brief, first stage proposals will be concise suggestions of no more than 20 pages of text (excluding the 'A' forms). These will be evaluated by external panels and scored against a limited number of criteria, namely "Relevance" for both integrated projects and networks of excellence, "S&T excellence" and "Potential impact" for collaborative research projects and "Degree of integration and the joint programme of activities" for networks of excellence. All proposals passing the minimum thresholds will be invited to submit full proposals for evaluation at the second stage. Only proposals passing the first stage of evaluation for these instruments will be accepted for the second stage. Note that, for topics involving these instruments, following the second stage evaluation up to one proposal will be funded per topic.

IV INDICATIVE PRIORITIES FOR FUTURE CALLS

(Should be in workprogramme, under areas or activities, not in call text)

Call title: KBBE-2007-2B

- Call identifier: *COOP-KBBE-2007-2B*
- Date of publication: DP2B (likely June 2007, together with call 2A – alternatively early 2008)
- Closure date: DC2B (early 2008, together with 2nd stage of call 2A) at 17.00 hrs (Brussels local time).

- Topics called:

Activity/ Area	Topics called	Funding Schemes
Activity 2.1 Sustainable production and management of biological resources from land, forest and aquatic environments		
2.1.1	*COOP-2-1-1-06: Development of new tools and processes to support R&D in crop plants: gene technology breeding*	*Small collaborative project*
2.1.1	*COOP-2-1-1-07: New and converging technologies for Precision Livestock Farming in European animal production systems*	*Small collaborative project*
2.1.1	*COOP-2-1-1-08: Optimising research to develop effective tools for controlling infectious animal diseases*	*Coordination and support action*
2.1.1	*COOP-2-1-1-09: Genomics to develop improved approaches to the control of endemic infectious, or metabolic, farm animal diseases*	*Small collaborative project*
2.1.2	*COOP-2-1-2-10: Annual Food crops with improved tolerance to multiple abiotic stresses*	*Small collaborative project*
2.1.2	*COOP-2-1-2-11: Developing vaccines for the control of roundworm infestation in extensive ruminant production systems*	*Small collaborative project*
2.1.2	*COOP-2-1-2-12: Improved agro-forestry systems for sustainable farming*	*Small collaborative project*
2.1.2	*COOP-2-1-2-13: Reducing the need for external inputs in high-value protected horticulture*	*Small collaborative project*
2.1.3	*COOP-2-1-3-08: Improved control of diseases within and between aquatic species*	*Small collaborative project*
2.1.3	*COOP-2-1-3-09: Biosafety measures for Campylobacter at primary production*	*Coordination and support action*
2.1.4	*COOP-2-1-4-16: Integration of*	*Small collaborative*

	Aquaculture in European coastal zones	*project*
2.1.4	*COOP-2-1-4-17: Comparative analysis of factor markets for agriculture across the Member States*	*Small collaborative project*
2.1.4	*COOP-2-1-4-18: Spatial analysis of area-based measures in rural development programmes*	*Small collaborative project*
2.1.4	*COOP-2-1-4-19: Enlargement network - Agro-economic policy analysis of the accession and the candidate states and the countries of Western Balkan*	*Coordination and support action*
2.1.4	*COOP-2-1-4-20: Societal Benefits of Organic Farming*	*Small collaborative project*
2.1.4	*COOP-2-1-4-21: Costs of different standard setting and certification systems for organic food and farming*	*Small collaborative project*
2.1.4	*COOP-2-1-4-22: Drivers and limits of enhanced trade in agricultural and food products*	*Small collaborative project*
2.1.4	*COOP-2-1-4-23: Non-tariff barriers*	*Small collaborative project*
2.1.4	*COOP-2-1-4-24: Trade and agricultural policies - India*	*Small collaborative project*
2.1.4	*COOP-2-1-4-25: Policy and institutional aspects of sustainable agriculture and rural development in the Mediterranean partner countries*	*Small collaborative project*
2.1.4	*COOP-2-1-4-26: Development of a new generation vaccine for FMD*	*Small collaborative project*
2.1.4	*COOP-2-1-4-27: Assessing the pros & cons and monitoring the perception of GM animals*	*Coordination and support action*
2.1.4	*COOP-2-1-4-28: Improving the stakeholder dialogue towards a common vision and joint research priroities for the knowledge-based bio-economy*	*Coordination and support action*
Activity 2.2: Fork to farm: Food, health and well being		
2.2.1	*COOP-2-2-1-03: Taste, cognitive perception and mood*	*Small collaborative project*
2.2.1	*COOP-2-2-1-04: Food labelling and consumer behaviour*	*Small collaborative project*
2.2.1	*COOP-2-2-1-05: Assessment of intervention measures aimed at promoting healthy eating habits*	*Small collaborative project*
2.2.1	*COOP-2-2-1-06: Risk perception and*	*Small collaborative*

	communication in the food chain and the role of the media	*project*
2.2.1	*COOP-2-2-1-07: Applying behavioural models for the prevention of obesity, with a particular focus on children*	*Small collaborative project*
2.2.2	*COOP-2-2-2-08: Optimal cell function and nutrition*	*Series of small collaborative project(s)*
2.2.2	*COOP-2-2-2-09: Methodologies and tools to support the prevention of obesity in Mediterranean Partner Countries*	*Coordination and support action*
2.2.2	*COOP-2-2-2-10: Linking with international databases on food composition and consumption*	*Coordination and support action*
2.2.3	*COOP-2-2-3-06: (Bio-)Technologies for the production of food additives, colorants, and flavours*	*Series of small collaborative project(s)*
2.2.3	*COOP-2-2-3-07: Nano-devices for quality assurance, food safety and product properties*	*Small collaborative project*
2.2.3	*COOP-2-2-3-08: Observing and understanding the micro-structure of foods*	*Small collaborative project*
2.2.4	*COOP-2-2-4-07: Biocides and induced risks of antibiotic resistance in food pathogens*	*Small collaborative project*
2.2.4	*COOP-2-2-4-08: Models of exposure to chemicals intentionally added to the food chain*	*Small collaborative project*
2.2.5	*COOP-2-2-5-05: Food Chain Management*	*Coordination and support action*
2.2.5	*COOP-2-2-5-06: Assessment of impacts of scenarios affecting food chain management*	*Coordination and support action*
2.2.5	*COOP-2-2-5-07: Assessment of impacts from climate change on food*	*Coordination and support action*
2.2.5	*COOP-2-2-5-08: Converging technologies and their potential for the food area*	*Small collaborative project*
Activity 2.3 Life Sciences and Biotechnology for sustainable non-food products and processes		
2.3.1	*COOP-2-3-1-06: PLANT NATURAL PRODUCTS - Realising the potential of plant natural products for human and animal health*	*Small collaborative project*
2.3.1	*COOP-2-3-1-07: NONFOOD SUPPLY - Harvesting storage and transport of raw material*	*Coordination and support action*

2.3.1	*COOP-2-3-1-08: SWEET SORGHUM - Alternative energy crops for biofuel production in semi-arid and temperate regions*	*Small collaborative project*
2.3.2	*COOP-2-3-2-09: INDUSTRIAL ENZYMES - Rational design of biocatalysts and enzyme systems with requested properties*	*Small collaborative project*
2.3.2	*COOP-2-3-2-10: BAGASSES – Improved chemical and enzymatic treatments of bagasses from energy crops, for increased bio-fuels production yields*	*Small collaborative project*
2.3.3	*COOP-2-3-3-05: BIO-CHEMICALS - Biofermentation for fine and speciality chemicals*	*Series of small collaborative project(s)*

- Evaluation procedure:

— the evaluation shall follow a single stage procedure,
— proposals will not be evaluated anonymously,
— the evaluation process may involve 'remote' evaluation of proposals.

- Indicative evaluation and contractual timetable:

— evaluation results: two months after the relevant closure date mentioned above
— contract signature: six months after the relevant closure date mentioned above.

- **Indicative budget of €110m, broken down as follows:**

Activity	**EUR million**
Activity 2.1: Sustainable production and management of biological resources from land, forest and aquatic environments	*50*
Activity 2.2: Fork to farm: Food, health and well being	*40*
Activity 2.3: Life Sciences and Biotechnology for sustainable non-food products and processes	*20*
TOTAL	***110***
Of which specific international cooperation actions	*12*

- Consortia agreements: N/A
- Particular requirements for participation, evaluation and implementation:

The selected topics may be open only for the call indicated, and it is envisaged that up to one project will be funded for each topic, unless otherwise indicated. There may be competition between proposals submitted on different topics and proposals submitted on the same topic. This may result in some topics not being supported.

IV INDICATIVE PRIORITIES FOR FUTURE CALLS

(Should be in workprogramme, under areas or activities, not in call text)

ANNEX: Summary of requirements for the Cooperation Work Programme

The *Financial Regulation* (implementing rules), states that:
- the annual work programme for grants shall specify the basic act, the objectives, the schedule of calls for proposals with the indicative amount and the results expected; and
- calls for proposals shall specify: the objectives; the eligibility, selection and award criteria; the arrangements for Community financing; the arrangements and final date for submission of proposals and the possible start-up date for actions and the for closure of the award procedure.

The Commission's proposal for the *7th framework programme* (Annex III) states that the work programme will mention, when appropriate, the type of funding scheme for different types of activities, the categories of participants that can benefit, and the types of activities to be funded. Where difference funding schemes can be used, the work programme may specify the funding scheme to be used for the topic.

According to the Commission's proposal for the *Cooperation Specific Programme*, the following will be included in the Cooperation Work Programme.
1. Greater detail on scientific and technological priorities
2. Funding scheme to be used for topics in calls for proposals
3. Timetable for implementation
4. Criteria for proposals under the funding schemes are evaluated and projects selected
5. Organisations that receive subscriptions, or support actions for specific legal entities
6. Consideration of ethical, social, legal and wider cultural aspects, as well as socio-economic impacts of S&T development and foresight, where relevant.
7. Pluridisciplinarity will be encouraged by joint cross-thematic approaches
8. Strategic research agendas of Technology Platforms to be reflected in WP
9. Implementation of "emerging needs" and "unforeseen policy needs" under each theme
10. Dissemination of knowledge and transfer of results, including to policy makers, supported in all themes
11. Areas of particular interest to SMEs will be identified
12. Health – highlight priorities on child health and the health of the ageing population
13. Security - Particular requirements and criteria for international co-operation.
14. RSSF – annual amount for grant to EIB.

According to the Commission's proposal for *the Rules of Participation*, the following shall be established in the work programmes (WP):

1. Identification of INCO countries
2. Any specific conditions for participation of international organisations and legal entities established in third countries (if appropriate)
3. Additional conditions regarding the minimum number of participants (if appropriate)
4. Requirements for calls for proposals (for all)
5. Identification of beneficiaries (if appropriate)
6. Principles for evaluation, and the selection and award criteria (for all) - specific criteria or further details on the application of the criteria can be established (if appropriate)
7. Criteria for the selection of third parties when grant agreement requiring participants to carry out activities that benefit third parties (for the WP touching upon RSFF)
8. Provision for funding of international organisations legal entities from 3rd countries outside Associated or INCO countries (in the appropriate WP)
9. Provision for means of funding NoE if lump sums are not to be used (if appropriate)
10. Maximum number of participants and, where appropriate, the maximum number of researchers that may be used as the basis for the calculation of the maximum lump sum, if a lump sum for NoE is to be used (if appropriate)
11. Veto right of the commission for the use of the RSFF (in the WP dealing with RSFF)