EN

ANNEX 12

HORIZON 2020

WORK PROGRAMME 2016 – 2017

9. Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy

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Introduction

In the overall European context of setting the economy on a sustainable growth path, Europe must adapt its systems to find alternatives to our fossil-based economies by unlocking the potentials of the available bio-resources in the different bioeconomy and blue-economy sectors in a sustainable way, which is accepted by the citizens. At the same time, Europe must continue to address resource efficiency in light of the increasing pressure on global food systems to meet demand from population and income growth. Europe has to turn these challenges into real actions, bringing together the nexus among the primary sector, nutrition and health, and the nexus among food, water and energy. Many of the challenges are of global nature, requiring global solutions in cooperation with important international cooperation partners. Innovative approaches to knowledge exchange such as foreseen in the European Innovation Partnership "Agricultural Productivity and Sustainability" are of utmost importance to foster the implementation of solutions. The final objective is to explore and develop win-win solutions, to overcome the trade-offs among the primary sector, nutrition and health, and environmental sustainability.

The framework to achieve these goals is set by the EU Bioeconomy Strategy, the EU Common Agricultural Policy (CAP), the EU Integrated Maritime Policy and the EU Common Fisheries Policy (CFP). These are further complemented by the EU environmental, industrial, health, food safety, forestry, social and energy policies and initiatives.

In line with the 'Political Guidelines for the next European Commission', investments in Societal Challenge 2 for the 2016-2017 programming period **focus on resilient value chains for food and bio-based products, identifying, mitigating and adapting to the risks of climate change and of natural disasters, better managing possible future shortages in food and energy, fostering rural innovation, demonstrating and sustainably exploiting the potentials of the seas, oceans and inland waters, with broad societal engagement**.
These activities will **create new jobs in rural, urban, coastal and offshore areas** and they will allow a further **shift away from fossil-based economies** through identifying **sustainable, environment- and climate-smart innovative solutions, ready for demonstration or commercialisation**. They will bring the EU one more step forward in the implementation of its strategies and policies.

The 2016-2017 Work Programme for Societal Challenge 2 aims at achieving these objectives through four calls: the *Focus Area Sustainable Food Security – Resilient and resource-efficient value chains*, the *Focus Area Blue Growth - Demonstrating an ocean of opportunities*, the *Call for a Rural Renaissance - Fostering innovation and business opportunities* and the *Call for Bio-based innovation for sustainable goods and services – Supporting the development of a European Bioeconomy*. As for the 2014-2015 Work Programme for Societal Challenge 2, these activities are complemented by the Joint Technology Initiative on Bio-based Industries (JTI BBI). Finally, several horizontal activities on valorising research outcomes, engaging with society, strengthening the European Research Area as well as projects targeting SMEs will be promoted.

Concerning international cooperation, *Blue Growth* will supported the implementation of the Blue Med initiative on marine and maritime research and innovation activities in the Mediterranean area, while *Sustainable Food Security* will support actions aimed at cooperation with China and Africa. International cooperation will be continued with countries that have shown interest or have a strong Bioeconomy strategy themselves.

The establishment of European Innovation Partnerships (EIPs) represents a new approach under the Europe 2020 Strategy to speed up innovation through co-operation, and by linking existing instruments and policies. The agricultural European Innovation Partnership[1] (EIP-AGRI) aims to foster a competitive and sustainable agriculture and forestry sector that "achieves more from less". Innovation may be technological, but also non-technological, organisational or social. Innovation may be based on new but also on traditional practices in a new geographical or environmental context. The new idea can be a new product, practice, service, production process or a new way of organising things, etc. and turns into an innovation only if it is widely adopted and proves its usefulness in practice. Becoming mainstream will not only depend on the solidity of a creative idea, but also on the willingness of the sector to take it up, cost-effectiveness, market possibilities, perceptions, etc. One can only determine afterwards whether a new idea has led to a real innovation. In short, innovation is: "**an idea put into practice with success**". Therefore it is important to have end-users and practitioners involved, not as a study-object, but in view of using their entrepreneurial skills and practical knowledge for developing the solution or opportunity and creating co-ownership.

The EIP – AGRI mainly aims at supporting innovation following the interactive innovation approach. The **interactive innovation model** relies on co-operation, sharing of knowledge and effective intermediation. It fosters the development of research into practical applications and the creation of new ideas thanks to interaction between actors. In the interactive innovation model, building blocks for innovation are expected to come from science, but also from practice and intermediaries, such as farmers, advisors, businesses, NGOs, etc. in a bottom-up process. Key for interactive innovation is to include existing (sometimes tacit) knowledge into scientific work. Innovation generated with an interactive approach tends to deliver solutions that are well adapted to circumstances and easier to implement since the participatory process is favourable to speeding up the acceptance and dissemination of the new ideas.

The interactive innovation approach is implemented in this Societal Challenge through "multi-actor" project topics. With a view to complementarity, multi-actor projects may connect with EIP Operational Groups funded under the rural development programmes (RDPs), which are also multi-actor and project based, but work within a RD programming area (region or Member State).

The **topics flagged with the multi-actor approach**[2] should meet all of the following requirements:

The multi-actor approach aims at more demand-driven innovation through the genuine and sufficient involvement of various actors (end-users such as farmers/farmers' groups, fishers/fisher's groups, advisors, enterprises, etc.) all along the project: from the participation in the planning of work and experiments, their execution up until the dissemination of results and a possible demonstration phase. The adequate choice of key actors with complementary types of knowledge (scientific and practical) should be reflected in the consortium and in the description of the project concept, and result in a broad implementation of project results. The multi-actor approach is more than a strong dissemination requirement or than what a broad

1 http://ec.europa.eu/eip/agriculture/

[2] See topics SFS-x, RR-x, ….

stakeholders' board can deliver: it should be illustrated in the project proposal with sufficient quantity and quality of knowledge exchange activities and a clear role for the different actors in the work. This should generate innovative solutions that are more likely to be applied thanks to cross-fertilisation of ideas between actors, co-creation and generation of co-ownership for eventual results. A multi-actor project proposal needs to demonstrate how the project proposal's objectives and planning are targeted to needs / problems and opportunities of end-users, and its complementarity with existing research and best practices. The project should result in some practical knowledge which is easily understandable and accessible, and substantial in qualitative and quantitative terms. As a minimum, this material should feed into the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability' for broad dissemination as 'practice abstracts' in the common EIP format for practitioners[3]. Facilitation/mediation between the different types of actors and involvement of relevant interactive innovation groups operating in the EIP context, such as EIP Operational Groups funded under Rural Development Programmes, are strongly recommended.

The multi-actor approach is also underpinning the concept of Responsible Research and Innovation (RRI), aiming about bringing on board a wide diversity of stakeholders or actors (researchers, industry, policy makers, civil society organisations, farmers, fishermen, teachers, citizens etc.) to participate in and deliberate on matters of science, research, technology, innovation and their impacts. Responsible Research and Innovation includes multi-actor and/or citizen engagement processes fostering the cross-fertilisation of ideas and knowledge, the co-creation of innovative solutions, and the co-ownership/co-responsibility of outcomes. Whether the focus is on multi-actor involvement or on citizen engagement, all approaches should be reflected in the methodological description of project proposals: i) the types of actors/stakeholders to be engaged, ii) the type of engagement process sought (e.g.face-to-face and/or on-line, consultative, deliberative, participatory research/co-creation, citizen science, etc.), iii) if relevant the desired geographical coverage/EU dimension and need for a multilingual approach, iv) the objective(s) of the engagement process, and v) the policy relevance of its outcomes. A multi-actor approach should be accompanied with the necessary resources and expertise so that it may generate impact and innovative solutions.

Furthermore, inputs from the Social Sciences and Humanities will be relevant to tackle the complex challenges addressed in the 2016-2017 Work Programme for Societal Challenge 2. Such inputs are therefore also requested explicitly in a number of call topics.

[3] ***The EIP common format for "practice abstracts" is available on website xxxx***

Call for Sustainable Food Security – Resilient and resource-efficient value chains

H2020-SFS-2016/2017

There are major systemic risks to the supply and quality of food and animal feed, from both terrestrial and aquatic origin. These have direct impacts on the daily access to sufficient, safe and nutritious food[4], on health and well-being of citizens as well as on the environment. Related risks arise from climate change, natural hazards, energy and resource scarcity, inappropriate agricultural and fishing practices, marine and terrestrial pollution, plant and animal diseases, unsustainable manufacturing technologies, food waste, population growth, demographic changes and unsustainable dietary patterns. There is consensus about the urgent need to put in place adaptive measures to better understand and limit risks and environmental impacts, better cope with fluctuating conditions and seize opportunities for new ways of production, processing and consumption. Research and innovation play a critical role in ensuring the food and nutritional security of EU citizens and globally.

Compared to the 2014-2015 Work Programme, the SFS Focus Area is increasing its emphasis on resilience in primary production and in the related food and feed industries. It is also giving more visibility to sustainable and healthy consumption and lifestyles and has been aligned to contribute to the new Commission's agenda and supporting relevant EU policies[5].

Within this focus area, four sub-areas have been identified:

- More resilient and resource efficient value chains
- Environment-smart and climate-smart primary production
- A competitive food industry
- Healthy and safe foods and diets for all

This Focus Area has particular relevance for international cooperation, as the EU has leading expertise in sustainable food production and the access and use of resources of truly transnational concerns. In terms of international cooperation, it will reinforce the role of the EU as a strong global actor, in particular in the Mediterranean region, Africa, China and South-East Asian countries (on aquaculture).

Corresponding to these four sub-areas, proposals are invited against the following topics:

[4] Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." (World Food Summit 1996)

[5] Actions in the Focus Area will support the EU approach towards food security; the Europe 2020 Resource-efficient Europe Flagship; the EU Biodiversity Strategy to 2020, the EU Soil Thematic Strategy and other elements of the EU Environmental Policy; the European Innovation Partnership "Agricultural productivity and sustainability"; the post-2015 Development Cooperation Agenda; The Common Fisheries Policy; the Common Agricultural Policy and the EU Health and Consumer Policy.

More resilient and resource efficient value chains

SFS - 1. [2016]: Dealing with multiple and combined stresses: approaches to improve water and nutrient use efficiency in crop production

Specific Challenge: Water and nutrients are main determinants of plant growth and crop productivity. Against scenarios of increased variability and scarcity of these inputs mutual improvements in water use efficiency (WUE) and nutrient use efficiency (NUE) are of particular importance for both plant breeding and crop management. Equally, issues of yield stability under variable levels of water and nutrient supply need to be given increased attention.

Scope: Proposals will set the scene to better understand and manage highly dynamic processes of combined abiotic variations and their effects on crops. Activities will establish specifically how combined water and nutrient stresses act plants taking into account complex interactions between plants/roots, soils and below ground biodiversity. Knowledge on these basic processes shall be related to overall system resource use efficiency in crops based on a solid understanding of the interplay between crop genetics, crop management and the environment. Findings will be applied to develop and test strategies and tools for soil, water, crop management. Furthermore, they will serve to identify (combinations of) above and below ground traits associated with improved plant performance under restricted water and nutrient availability and help to develop crop breeding strategies and tools. .

A 'multi-actor approach'[6] will be pursued to ensure that knowledge and needs from various sectors including farming are brought together. The topic is open to all types of crop production and farming systems (e.g. arable; horticulture, grassland, fruit trees, agro-forestry) and should benefit both conventional and organic agriculture in various pedo-climatic conditions.

The Commission considers that proposals requesting a contribution from the EU of up to 6 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Activities will enhance our capacity to deal with multiple abiotic stresses in cropping systems. More specifically project outputs will serve to

- unveil how different combinations of water and nutrient stresses interact and impact on crops, in particular on agriculturally important traits
- increase the range of crop management strategies and tools at farm level to better respond to variable levels of water and nutrient supply

[6] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

- support breeding strategies and tools to develop crops with increased adaptability to water and nutrient stresses;
- identify combinations of genotypes and management practices suited to increase water and nutrient use efficiency of crops.

On a more general and long-term level outputs and results will help to increase resilience of crop production against more variable environments and ultimately secure productivity. They will also contribute to reducing nutrient losses in agricultural systems, thereby also reducing environmental impact of agricultural activities in particular with regard to water quality.

Type of action: RIA

SFS - 2. [2016] Teaming up for good: Associations and mixtures as drivers of productivity and resilience in cropping systems

Specific Challenge: Diversity is recognised as a key element for adaptation of crops to more variable environments (including climate and management). In this context increasing attention is given to associations/mixtures of species and to their potential for stabilising yields and reducing losses caused by plant diseases and abiotic stresses. Crop mixtures for example have shown good potential for managing disease and insect outbreaks or for controlling weeds. Specific crops with pest repellent properties are used in combination with crops which are more susceptible to these pests. Associations of annual and perennial crops have shown particular resilience against abiotic stresses such as drought. There is a need to better understand synergistic plant/crop interactions and how these can be used more systematically in breeding and management practices.

Scope: Activities will help to further unravel the mechanisms (e.g. biological, ecological, biochemical, physical) underlying beneficial plant interactions in cropping systems. This will include looking at the dynamics between plants and their biotic and abiotic environments, for example with regard to resource competition and facilitation (e.g. nutrients, water and light), pest and disease restriction/control or weed suppression. This knowledge - addressing various types of associations, agronomic systems and pedo-climatic zones in Europe - will feed into strategies and tools for breeding and crop management taking into account the corresponding changes in agronomic and breeding practices. Activities should fall under the concept of 'multi-actor approach'[7] and ensure that scientific, farming, agronomic and breeding expertise is adequately considered throughout the work with due attention given to participatory and demonstration activities: The topic is open to all types of crop production and farming systems (e.g. arable; horticulture, grassland, fruit trees, agro-forestry), the diversity of pedo-climatic conditions in Europe and shall benefit both conventional and organic agriculture. International cooperation is encouraged.
Selected projects will closely liaise with complementary activities funded in response to topic RUR-6 on crop diversification systems under the Rural Renaissance call.

The Commission considers that proposals requesting a contribution from the EU of up to 5 million euros would allow this specific challenge to be addressed appropriately.

[7] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Activities will support adoption of productive and resilient agricultural systems which capitalise on the benefits of high levels of plant species diversity. This overall goal will be achieved by
- scientifically supported and field tested evidence on the mechanisms underpinning beneficial crop associations
- increasing awareness and knowledge of farmers and breeders on benefits of "plant teams"
- promoting diversity rich crop management practices
- increasing availability of plant varieties suited for implementation of crop associations and mixtures

On the longer term results will support yield stability and diversification in the primary sector, increase resilience against market and environmental fluctuations and support more healthy diets.

Type of action: RIA

SFS - 3. [2016] Testing and breeding for sustainability and resilience in crops

Specific Challenge: Increasing resource use efficiency, reducing dependency on external inputs and coping with increased climatic variability are major challenges in agriculture. Breeding activities need to consider more systematically traits and trait combinations which contribute to a more sustainable and resilient performance of crops grown in a range of environments and agro-ecological conditions. Criteria, testing methods and trials for registration of new varieties need to further evolve to better capture the "sustainability profile" of new varieties.

Scope: Activities will help to identify crop "sustainability traits" or combinations of traits and develop methodologies and tools to integrate sustainability criteria into testing, evaluation and registration of new varieties. Availability of more reliable/robust testing methods responsive to diverse agro-ecological conditions will contribute to more harmonised approaches in European plant variety registration. This will benefit introduction of plant properties that meet new challenges and demands while also taking into account economic returns of growers.

The Commission considers that proposals requesting a contribution from the EU of up to 5 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Type of action: RIA

SFS - 4. [2017] New partnerships and tools to enhance European capacities for in-situ conservation

Specific Challenge: In-situ conservation (including on-farm) is an important complement to ex situ conservation efforts and particularly relevant to tackle Crop Wild Relatives and landraces. Other than the more static conservation of genetic material in gene banks, in-situ conservation is a means to capture evolutionary adaptation of plants exposed to changing environmental and management conditions, thereby providing a reservoir of valuable traits for adaptation of crops, also to climatic changes. To be effective, in-situ conservation strategies require complex multi-actor approaches and need to be embedded into overall strategies for Plant Genetic Resources.

Scope: Activities will help to build (a) network(s) of in-situ conservation sites (including on-farms and on-gardens) and stakeholders. New partnerships between the conservation, farming, gardening and breeding sectors as well as the wider public will allow building longer term capacities to manage genetic resources in more dynamic and participatory ways and to support their use in breeding, farming and the food chain. Cooperation between conservation stakeholders will allow to improve knowledge on the wealth of available resources as well as access to this genetic reservoir. It will also support demonstration of in-situ genetic resources to the wider public. Exchanges with the breeding sector will provide openings for identification of promising traits from landraces and CWR and increase their use in breeding. Activities will furthermore contribute to developing and showcasing strategies for in-situ conservation and to better linking ex-situ and in-situ conservation efforts. While targeting in particular European capacities, projects are encouraged to draw on good examples from outside Europe. Work is expected to benefit from contribution of social sciences and fall under the concept of 'multi-actor approach'[8]

The Commission considers that proposals requesting a contribution from the EU of up to 2 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Activities will significantly strengthen European capacities for conservation, management and use of in-situ genetic resources. They will contribute to
- increasing knowledge on the status and characteristics of in-situ genetic resources in Europe
- establishing more durable partnerships between in-situ conservation stakeholders leading amongst others to more dynamic transfer of plant material or of good practice regarding conservation and management issues
- building a solid framework for national and European in-situ conservation strategies
- diminishing the divide between in-situ and ex-situ conservation efforts
- increased awareness of the wider public as regards the wealth and importance of genetic resources for agriculture and consumers
- increased use of genetic material from in-situ sources in breeding activities and in the food chain

On the longer term outputs will support competitiveness of the farming and breeding sectors, trigger product innovation and foster healthy diets through provision of more diverse food.

Type of action: CSA

[8] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

SFS - 5. [2016]: Robotics Advances for Precision Farming

Specific Challenge

Many challenges face the economic sustainability of farming; not only productivity and cost-effectiveness but also increasing labour shortage. Precision agricultural methods help address these issues, by, for example, subdividing farm acreage into many sub-plots - in some cases right down to the individual plant or tree. Precision farming automation will increase farm productivity, reduce manual labour for laborious tasks and help to make farm holdings more sustainable. Many modern farmers already use high tech solutions, for example digitally-controlled farm implements, even unmanned aerial vehicles. There are partially and fully automatic devices for most aspects of agricultural functions from grafting to seeding and planting, from harvesting to sorting, packaging and boxing and regarding livestock management. But current systems still have significant drawbacks, in particular in the level of flexibility, efficiency and robustness they offer, as well as high operator cost and capital investment.

Precision farming using robotics technology holds a key to more resource-efficient and environmental-friendly agricultural production, applied to existing systems on a 1:1 scale where appropriate (the scale may differ according to the specific agricultural application). Roboticised precision farming not only promises to increase yields by optimising growth and harvesting processes, but will potentially also lead to lower fertilizer and pesticide usage through more targeted interventions. Robots can also gather operational data on a broader basis than human-operated devices. However there is currently insufficient cross-over between emerging generic advances in field robotics and the more specific, adapted needs of the modern farming community.

This action aims to address this problem by combining R&D&I in robotics technologies with R&D&I in agriculture, taking as a promising priority case the agricultural domain of precision farming. The strategic objective should be to make agricultural robotics more adaptable, efficient and robust and to make their usage more affordable.

Scope:

Research and Innovation Actions will focus on the design, development and testing of robotics systems for precision farming. Such systems will include autonomous or semi-autonomous farm vehicles or sophisticated sensors and intervention mechanisms. The actions will prioritise technologies for selective harvesting, more targeted weed reduction or environment friendly fertilization, and / or livestock management, based on better planning and targeted intervention, using sensors (local and aerial, even maybe earth observation satellite). This will also allow tagging of agricultural produce or livestock for better traceability and subsequent big data processing, optimizing the whole agricultural process.

Expected Impact

- Significant increase in farm productivity compared with non-robotic solutions, with an increase in environment-friendly processes (e.g. less water use, toxic substance use and less soil compaction)
- Increase in safety, reliability and manageability of agricultural technology, reducing excessive human burden for laborious tasks

Type of Instruments

RIA Actions – Precision-farming proposals are expected to require 2-4 M€ each; nonetheless, this does not preclude submission and selection of proposals requesting other amounts. The Commission considers at least one proposal adequate to address this sub-topic appropriately.

RIA Actions – EUR 7 million (from LEIT-ICT budget)

SFS - 6. [2016]: Weeding - Strategies, tools and technologies for sustainable weed management

Specific challenge: The use of herbicides represents more than one third of the use of pesticides in Europe and, with fungicides, they are the most sold pesticides in Europe[9]. Within the objective of the Sustainable Use of Pesticides Directive to "reduce the risks and impacts of pesticide use on human health and the environment and promote the use of Integrated Pest Management and of alternative approaches or techniques such as non-chemical alternatives to pesticides", weed management occupies a central position in farmed ecosystems. To limit or to avoid the use of herbicides and to manage herbicide resistance, alternatives are necessary. Approaches ranging from prevention strategies including crop diversification and biological control to precision farming and automated selective mechanical engineering (e.g. weeding robots), etc could be developed in an integrated approach. The acceptance of farmers to adopt new weed management strategies is a particular challenge due to their risk tolerance and perceptions of weeds and weed seed bank impact year after year in the farming systems.

Scope: Proposals should find innovative and effective strategies to improve the weed management. Different systems will be considered: arable crops and horticulture (i.e. vegetables and fruit production including perennial crops). Coverage of both conventional and organic sectors is expected. Development and validation of novel and innovative strategies, tools and technologies in order to manage weeds are expected. Experiments and analysis of practices should be complemented by activities promoting participatory approaches, where farmers are directly involved in the implementation of these new practices. Labour constraints but also risk management for the farmers will be considered regarding the balance between the agro-ecological approaches developed and the economic constraints on the farm. Cross-cutting issues such as soil management and energy use efficiency will be taken into account. Synergies and trade-offs with and between the different environmental issues (e.g. water quality, climate change, biodiversity) will be analysed and the consequences of novel weed management strategies, tools and technologies for these ecosystem services and wider biodiversity also needs to be considered. Transdisciplinary research, including input from social sciences and humanities, are necessary to engage farmers in avoiding herbicides. Proposals should fall under the concept of 'multi-actor approach'[10] including also the machine industry.

[9] EUROSTAT : http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_consumption_of_pesticides#Further_Eurostat_information

[10] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

The Commission considers that proposals requesting a contribution from the EU up to EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Transfer of scientific knowledge regarding weed control to the farming community, e.g. availability of new IWM strategies and decision tools
- More efficient and feasible weed control techniques, both for organic and conventional farming.
- Reduction of the impact on environmental issues: improvement of ground and surface water quality, conservation of biodiversity and wildlife, including in-field and in the soils, climate change.
- Strengthening trans-disciplinary research and empower multi-actor approach for long-lasting implementation of the results obtained.
- Scientific support to relevant EU policies[11].

Type of action: Research and Innovation Action

SFS - 7. [2016/2017]: Organic Breeding – Increasing the competitiveness of the organic breeding and farming sectors

Specific Challenge: Availability of organic seeds and varieties is an economic and technical challenge for organic producers. The current EU regulation requires that seed and propagation material used in organic farming be organically produced. However, it is estimated that more than 95% of organic production is based on crop varieties that were bred for the conventional high-input sector and in consequence lack important traits required under organic and low-input production conditions. As a consequence, a system of derogations is in place to deal with the lack of organic seeds on the market. Significant seed multiplication and breeding efforts are needed to increase availability of organic seeds thereby not only meeting legislative requirements but in particular improving performance of the sector through varieties which are better suited to the specific conditions of organic farming.

Scope: Proposals will set up a range of measures to increase availability of organic seeds as well as embark into breeding of varieties which are suited for organic farming. They will help gaining a detailed view on the current situation in EU Member States as regards availability and registration of seeds, on-going breeding programmes, as well as opportunities and constraints to organic breeding and seed market development. Solutions shall be proposed in response to the identified gaps and bottlenecks. Work will allow to identify relevant (combinations of) traits and test existing varieties for organic production along with the development and testing of organic breeding approaches. Proposals shall develop and set into motion a comprehensive breeding strategy for the sector as a result of partnerships between the breeding, farming and research sectors, thereby falling under the concept of multi-actor approach. Demonstration, testing and training activities shall be given particular attention and the specific needs of the organic sector in new Member States need to be adequately considered. The topic is open to all types of crop production and farming systems (e.g. arable;

[11] Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides

horticulture incl. aromatic and herbs, fruit trees, grasslands) in various geographic and pedo-climatic and conditions.

The Commission considers that proposals requesting a contribution from the EU of up to 5 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Activities will significantly contribute to increased availability and quality of seeds for organic farming, thereby moving towards the regulatory 100% organic seed target. They will contribute to:
- increased transparency in the EU organic seed market, improving access to and exchange of high quality seeds for the organic farming sector
- more harmonised registration approaches for organic seed in the EU
- efficient seed multiplication methods and breeding approaches
- availability of tools and resources for pre-breeding and breeding
- implementing requirements of EU regulation for the organic sector

On the medium to longer term activities will help to increase competitiveness of the organic breeding and farming sectors in Europe and beyond. They will foster low-input agriculture, sustainability of farming practices and quality of products which meet consumer expectations. Conventional systems will also benefit from varieties which are better adapted to lower resources input and more resilient to variable environmental conditions.

Type of action: RIA

SFS - 8. [2017]: Organic Inputs – Contentious inputs in organic farming

Specific Challenge: Despite having stricter standards and limitations with regard to the use of external input, organic agriculture still makes use of a number of products allowed by the EU organic regulation that are only accepted due to a lack of economically and technically viable alternatives. Some of these inputs are not without concerns or not fully in line with the organic principles. The most controversial of these is the use of copper as a plant protection product. However, there is also an urgent need for alternatives to the use of mineral oils (for plant protection), to manure from non-organic farms, to synthetic vitamins and provitamins used in animal production etc. Efforts are needed to progress in the development of alternatives to such contentious inputs.

Scope: Projects should provide a comprehensive overview of the actual use and need for external inputs in various types of organic plant and animal farming systems. Furthermore, work shall identify and develop alternatives to contentious inputs (including use of resistant varieties and strengthening of preventive methods in farm management) and analyse the socio-economic conditions required for successful adoption in practice. The products and management practices developed should be tested in different pedo-climatic and farming conditions in Europe. Work shall propose strategies for a reduction or a gradual phasing out of contentious inputs without compromising competitiveness of the organic sector. Proposals must make a credible argument for acceptance of these alternatives in any subsequent regulatory acceptance stage. Activities shall allow for a wide geographic coverage within Europe, Associated Countries and relevant Third Countries. Work shall take into account

results and conclusions from previously funded research project in the area. Proposals should fall under the concept of 'multi-actor approach'[12].

The Commission considers that proposals requesting a contribution from the EU up to EUR 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Lower environmental impact of organic and low-input farming systems.
- Widely accessible and cost efficient alternatives to replace contentious inputs in organic farming. Better knowledge of alternatives will also allow a reduction of inputs in conventional agriculture.
- Enhanced organic production, quality and stability.
- Fair, reliable and implementable rules on the use of inputs in organic production.
- Scientific support to relevant EU policies.

Type of action: Research and Innovation Action

SFS - 9. [2016] Spot on critical outbreak of pests: The case of Xylella *fastidiosa*

Specific challenge: Xylella *fastidiosa* - a regulated harmful organism in the EU – has been detected in Italy where it is causing severe damage in particular to olive trees. There is growing concern over its potential to spread and establish throughout Europe and affect a significant number and range of host species (about 300). The consequences of such a scenario are considered major leading to significant yield losses and costly control measures not just in olive trees but also in other economically important crops such as vineyard, citrus, stone fruits and almond. A recent EFSA scientific opinion has confirmed the significant threat to plant health and European agriculture posed by the pest, amongst others because of high levels of genetic plasticity of X. *fastidiosa* and the fact that hosts can be infected without showing X. *fastidiosa* infection signs.

Scope: Proposals will set up a comprehensive package of actions to improve prevention, early detection and control of X. *fastidiosa* in their hosts and vectors. They shall increase knowledge on the biology of the vector, on host range, host pathogen and host plant interactions as well as on epidemiology taking into account both the Apulian strain of *X. fastidiosa* as well as other strains which could represent a serious risk in the EU. Prevention measures should consider both introduction of X. *fastidiosa* within European regions and from Third countries into the EU. Practical guidelines and solutions shall be developed to early detect, control outbreak and prevent spread of the disease. Attention shall be given to developing integrated measures for crop and disease management in conventional and organic farming systems when eradication is not feasible anymore. Work shall support the development of regional specific risk assessment and eradication plans. International collaboration is encouraged with partners from Third Countries affected by the pest. Activities should fall under the concept of 'multi-actor approach'[13] and ensure solid collaboration

[12] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

[13] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

between research, plant health authorities and farming sector stakeholders. Activities shall take into account on-going and/or recent work, e.g. funded under the EUPHRESCO ERA-NET.

The Commission considers that proposals requesting a contribution from the EU of up to 5 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact**:** Results of the work will enhance significantly the capacity of farmers and plant health authorities to manage the disease and prevent economic losses in crops. Activities and information gained will help to
- detail knowledge on Xylella *fastidiosa* along with its hosts and vectors
- develop methods and tools for early detection, treatment and where possible eradication
- establish effective risk assessment and prevention mechanisms
- strengthen capacity of regional, national and European plant health authorities to manage important pests and diseases

On a longer term, results of the work will help to ensure that Europeans agriculture remains productive and delivers quality products that meet expectations of consumers and the food chain.

Type of action: RIA

SFS - 10. [2017] Research and approaches for newly emerging diseases in plants and terrestrial livestock

Specific challenge: Trade and movement of goods and people have facilitated the transfer and spread of plant and animal diseases. Intensification and changes in agricultural practices as well as climatic variations are further expected to increase their prevalence. Emerging diseases in plants or terrestrial livestock can be substantial and have significant effects on agricultural productivity, trade and public health. Appropriate and rapid responses by decision makers need to be informed by scientific evidence, addressing as much as possible all components of disease management in particular with regard to epidemiology (e.g. source, transmissibility, susceptible species), host-pathogen interactions, diagnostics, means of prevention and control, as well as risk management.

Scope: Proposals will contribute to finding adequate responses to emerging diseases in plants (work on Xylella *fastidiosa* is excluded under this call topic) and newly emerging diseases in terrestrial animals. They will target one or more pests and diseases (either regulated or non-regulated invasive or native) currently threatening EU agriculture and causing significant economic losses. The choice of target species should consider the potential threat posed by the pest/disease in terms of development and spread as well as potential impact on agriculture production, public health, or trade. Proposals should increase our knowledge on the biology of the pest as well as development and spread of the disease, also in view developing risk assessment and containment strategies. Work shall bring about knowledge and tools for integrated pest/disease management taking into account changes in agriculture practices, appropriate means of prevention, control and where possible eradication taking into account environmental sustainability of proposed solutions. International collaboration is encouraged with countries affected by the same pests/disease. The proposal should follow a 'multi-actor

approach'[14] and be based on active participation of stakeholders from research, plant health authorities as well as the farming and business sectors. Proposals should involve partners from non-EU regions particularly affected by the targeted pests and disease(s) . As regards livestock, proposals should contribute as appropriate to the objectives of the STAR-IDAZ international research consortium (see SFS-7 [2016]). Proposals should also work as appropriate in cooperation with further STAR-IDAZ related initiatives and other funded projects in this field such as the project selected under SFS-9 [2016] *(HPI topic)*.

Individual proposals are supposed to tackle either plant or animal diseases. Funding will allow for the support of at least one plant and one animal disease related project.

The Commission considers that proposals requesting a contribution from the EU of up to 5 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:
Knowledge and solutions generated by this action should contribute to:

- Improving management of infectious diseases in plants or terrestrial livestock by the farming sector
- Developing tools for prevention, detection and diagnosis, ideally applicable in a broad manner to plant and animal pests and diseases;
- Decrease economic losses by the farming sector
- Improve food quality and food safety
- Support EU plant and animal health polices

On the longer-term project outputs will help the agricultural sector to remain productive and contributing to food security.

Type of action: Research and innovation action

SFS - 11. [2016] Challenges for disease management: Perennial crops in the tropics and sub-tropics

Specific Challenge**:** Favourable conditions for disease development in the tropics and sub-tropics hit perennial crops particularly hard, especially where these are grown in uniform plantings. Overall, losses are thought to be 50 to 100% higher in tropical than in temperate regions and estimates of the proportion losses in the tropics caused by diseases range from 30% to 50%. Effects of increased climatic variations are expected to further increase the occurrence of pests and diseases as well resistance against crop protection measures, thereby affecting production of many economically important crops.

Scope: Proposals will develop an integrated approach to management of important pests and diseases of perennial tropical and sub-tropical crops. Activities will address gaps in our knowledge on the disease cycle including climatic and cultural factors that influence the

[14] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

cycle.. They will further develop more effective, durable and sustainable management options which are based on a holistic view of agro-ecosystems as well as on a better understanding of how climatic changes may alter the current scenario of plant diseases and their management. Proposed solutions shall capitalise on advances in information technologies e.g; in view of improving forecasting, monitoring and information on biotic threats. Proposals shall adopt a 'multi-actor approach'[15] based on genuine collaborations between producers (including small farmers), researchers, advisory services and the commercial sector. Dissemination and demonstration of findings and outputs shall be given particular attention. The integration of social and economic sciences will support uptake of new methods and tools in plant disease management. International collaboration with Third Countries is essential to meet the requirements of the topic.

The Commission considers that proposals requesting a contribution from the EU of up to 4 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Project outputs will result in increased uptake of multifaceted and integrated disease management approaches. These will benefit production of important perennial crops in tropical and sub-tropical regions within and outside Europe by

- delivering applicable knowledge on the biology of pests and diseases and the diseases cycle
- increasing the set of measures and tools available to farmers to deal with important pests and diseases, reduce yield losses and promote vigorous crops
- enhancing capacity of the farming sector to apply/adopt more complex cultural practices in line with integrated pest and disease management principles
- reducing reliance on critical pesticides in farming practices
- improving capacity of plant health authorities and advisory services to prevent diseases
- trigger innovations with regard to product, technologies and services in support of plant health and plant protection

On the longer term projects will help securing/increasing productivity of important perennials in tropical and subtropical regions. They will thereby strengthen the contribution of the agricultural sector to rural economies and overall economic development.

Type of action: RIA

SFS - 12. [2016]: Support for international research on animal health

Specific Challenge: Animal diseases can cause serious social, economic and environmental damage and in some cases also threaten human health. An increasing number of the major disease problems or threats faced by the livestock industry and zoonoses are of a global nature.

[15] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

Improved coordination of and international collaboration on research activities is needed to expedite the development of improved prevention and control methods, ensure the sustainability of the livestock industries and protect human health.

Scope: This global initiative will consolidate and deepen the international collaboration on research in the area of animal health and in particular infectious animal diseases, including zoonoses and parasites. It will build on the existing activities of STAR-IDAZ global network of research programme owners and funding organisations by bringing together researchers and organisations investing in animal disease research (funding bodies) in order to achieve specific targets relating to the prevention and control of priority animal diseases and zoonoses. The action will provide organisational support to the implementation of the global infectious diseases of animals and zoonoses consortium (STAR-IDAZ) goals, in close collaboration with the European Commission, research funding agencies from Member States and from other third countries involved through the formation of a scientific secretariat. It will assist the Consortium executive committee, and the establishment and running of working groups on priority diseases and issues and organising research gap analysis meetings. It will support information exchange among members of the participating organisations at all levels. It will communicate progress of Consortium research, including collecting and disseminating pertinent information and results to the researchers funded by the Consortium members.

The Commission considers that proposals requesting a contribution from the EU up to EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- The project should contribute to the overall goals of the global infectious diseases of animals and zoonoses consortium (STAR-IDAZ). It will support cooperation in the consortium, including meetings, internal and external communication, shared data, research results and common databases.
- It will help mobilise and coordinate the global research effort to address the existing and emerging disease challenges and so hasten the delivery of new or improved control tools or strategies.
- It will support an increased focus of effort through research gap analysis, prioritisation, and alignment of research programmes and coordination of research activities which over a five year period will result in new or improved disease control tools, including vaccines, diagnostics, therapeutics and/or critical underpinning scientific information relating to the control of specific target diseases.
- Through providing support for the activities of STAR-IDAZ, it will contribute to the improvement of animal health internationally, to a decreased risk to human health from animal infections and related threats, while improving efficiency of livestock production, global food security and competitiveness of livestock of livestock production

Type of action: CSA

SFS - 13. [2016]: Validation of diagnostic tools for animal and crop health

Specific Challenge: The simple and swift detection, accurate identification and proper quantification of pathogens and other factors of concern for plant and animal health, including

zoonotic agents, and correlates of infection (e.g; host-response biomarkers) and/or immunity in a fast and reliable way are critical components in the monitoring and control of their introduction or spread. These tools are essential to avoid or reduce related economic costs, trade disruptions or even sometimes human health risks. These methods are used not only by Competent Authorities, but also by private laboratories or directly by veterinarians at the point of care, practitioners, business operators.
In the last years, most of the research efforts have been put in the development of high throughput, generic, quick and cheap methods. A number of these methods have been validated intra-laboratory or through limited ring trials. In order for these methods to be used beyond research laboratories, additional work often needs to be performed to further test the methods such as further ring tests, development of reference materials, harmonisation or even adaptation for their implementation in field conditions (sampling methods, multi-targeting; pen-side tests, mobile analysis).

Scope: The project aims primarily at harmonising and validating (including ring trials) existing and new developed protocols for the detection and quantification of pathogens and other factors of concern for health of plants and terrestrial animals, and correlates of infection/immunity. A good justification on the choice of protocols to be validated should be given. Research is built on existing results, but where necessary final further development of the promising protocols can be pursued aiming at bringing close to market end products, including swift, portable tools for field testing. Where generic methods are tackled or preferred (e.g. based on next generation sequencing technologies) cooperation amongst stakeholders is encouraged to ensure use of the technologies for a broader spectrum of organisms. Connections with EU Reference Laboratories, European/International bodies for standardisation (e.g. CEN, ISO) and International Reference bodies (e.g. OIE, WHO Collaborating Centres and/or Reference Laboratories) should be ensured. The project should ensure appropriate dissemination to relevant stakeholders to facilitate uptake of results.

The Commission considers that proposals requesting a contribution from the EU up to EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Individual proposals are supposed to tackle either plants or animals. Funding will allow for the support of at least one plant and one animal disease related project.

Expected impact: Validated protocols for the detection and quantification of pathogens and correlates. Support to Plant and Animal Health policies by providing validated protocols to be used by Competent Authorities, Reference Laboratories. End-products brought to the market, such as swift, portable tools for field testing by veterinarians, practitioners, business operators.

Type of action: Innovation Action

SFS - 14. -[2016]: Understanding Host-Pathogen Interactions

Specific Challenge: Disease emergence and spread are the result of a number of factors linked to the infectious agent, the host, possible vectors and the environment. The virulence of the pathogen and immunological status and the genetics of the host(s) have a critical role for the infection to develop, remain, spread or disappear and for the animal to circumvent, become sick, a carrier or recover from the diseases. The biological interplay between pathogen,

vectors and host(s), possibly taking into account other microbiota, is essential to understand the dynamics of infections/diseases and to develop control and prevention strategies. There is a growing body of evidence about the capacity of infectious agents to evolve and circumvent the host immunological reaction or treatments and profit from environmental niches, which represent a real challenge. Although modern tools have helped track pathogens more easily, a lot still needs to be done on the host reaction and how this knowledge can be used to develop control and prevention strategies, in particular vaccines or diagnostics and the related opportunity to increase biosecurity status of livestock important both for sustainable livestock production and its safe trade.

Scope: Proposals should focus on fundamental research on host-pathogen interaction in important diseases of terrestrial livestock, where there is a clear lack of knowledge about the epidemiology and/or reasons for failing to develop more effective control strategies, vaccines or other compounds increasing the host's natural defense/immunity and diagnostics. The proposal should address either an epizootic disease like potentially pandemic animal influenza (scope A) or endemic/production diseases (scope B). The research performed is to improve knowledge on the triangle pathogen, host, environment/possible vectors and their interaction, in order to contribute to the understanding of the dynamics of the disease and support improved or new diagnostic and prevention and control tools, such as vaccines.

The Commission considers that proposals requesting a contribution from the EU up to EUR 5.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Up to one project will be financed in scope A and in scope B respectively.

Expected impact: The project should contribute to the understanding of the dynamics of the disease covered both on the pathogen, the host and the environment sides. The project should strengthen the evidence base for prevention and control strategies, including diagnostic, therapeutic and other policy strategies.
Type of action: RIA

SFS - 15. [2017]: Breeding livestock for resilience and efficiency

Specific Challenge: While increasing focus is placed on the efficiency of animal production, animal production systems also need to be resilient, at both animal and system level. Resilience needs to incorporate not only animal health but also animal welfare. These systems may make use of local, multipurpose breeds and/or highly productive breeds. The genetic variation within breeds could also be used more effectively. At the animal level, enhancing the animals' ability to overcome emerging diseases, nutritional or environmental challenges will help them stay healthy and productive through greater adaptation to their living conditions, i.e. increase their resilience. Progress here will be a key factor in improving the resilience traits simultaneous with other traits important for a sustainable livestock sector. The challenge for livestock breeding is to address both the need for efficiency and for resilience at animal level and to manage trade offs. To accelerate progress on these issues an important need is to develop improved tools to speed up the identification and exploitation of important genomic and phenotypic characteristics of resilience and efficiency, and tools to measure those traits.

Scope: The research will target efficiency related traits (e.g. in particular GHG emissions/Feed intake complex) as well as resilience related traits (e.g. robustness, feed diversity; thermoregulation; gut health; fertility; longevity, bone and joint health), the possible

relations between them (synergies; trade-offs) to address balanced breeding goals in an agro-ecological approach. Research activities should at least assess and exploit the potential of none main stream genetic resources (other breeds and crossbreed). The proposal should address either cattle for beef production and link with other EU initiatives in the cattle dairy sector (scope A) or small ruminants and/or monogastrics (scope B). Research should include tools/systems/statistical methodology for measuring phenotypes and assess feasibility of schemes for improving targeted livestock. Coverage of both conventional and organic sectors is expected. Proposals shall fall under a 'multi-actor approach'[16]. The project should ensure appropriate dissemination to the breeding sector and other relevant stakeholders to facilitate uptake of results.

The Commission considers that proposals requesting a contribution from the EU up to EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Up to one project will be financed in scope A and in scope B respectively.

Expected impact: the project should generate tools able to link accurately genomics data from farm animals to efficiency and resilience related traits in order to help get the full benefits from the growing amount of genomics data extensively generated recently. It will translate genomic information to facilitate predictive biology of efficiency and resilience related traits and will test these new concepts in genomic selection.

Type of action: RIA

SFS - 16. [2017]: Bee health and sustainable pollination

Challenge: Bees (including managed and wild bees, social and solitary bees) are subject to numerous pressures in the modern world: exposure to cocktails of agrochemicals, various pathogens, lack of abundance and diversity of feed, flowers, etc., even possibly climate change. Stressors do not necessarily act in isolation either but often in combination. Such interactions are not addressed currently by regulations, beekeeping or agricultural practices. Even studying these interactions poses a major challenge due to the difficulty of testing and controlling them in natural conditions. Indeed there are gaps in our understanding on the underlying mechanisms behind these interactions and their interpretation in the observed trends and the need to understand the natural biology of colony health against the stress factors and their interactions. Previous EU projects have been (and some still are) trying to shed some light on specific elements. The European Food Safety Authority and the EU Reference Laboratory for bee health is also active in addressing more focused issues on the development of a holistic risk assessment of multiple stressors in bees. Nevertheless no significant breakthrough took place so far in our understanding or in our ability to understand and therefore mitigate the stressors of bee health (at least not without the alleged detriment of other sectors) and to ensure sustainable bee keeping and/or providing adequate pollination services in the EU. The project should ensure appropriate dissemination to the breeding sector and other relevant stakeholders to facilitate uptake of results.

[16] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

Scope: wide scope research building on and synthesise knowledge from previous EU projects as well as on national research and existing networks, EFSA and EURL initiatives. The project should provide answers to the most critical gaps in achieving sustainable bee keeping and/or providing pollination services by them in the EU, including socio-economic factors, and provide mitigation measures for the most critical gaps/stressors/threats. It should work on the basis of a complete mapping of our understanding of the situation, especially as regards recent research. It should eventually provide model systems for sustainable apiculture is several characteristic EU settings of beekeeping and better understanding of their contribution to sustainable pollination for major dependent crops in EU (with or without domestic honeybees).

Expected impact: review of the most critical gaps in achieving sustainable bee keeping and/or providing pollination services by them in the EU. Contribution to the development of mitigation measures for the most critical gaps/stressors/threats. Provision of model systems for sustainable apiculture.

Type of action**:** *TBC*

SFS - 17. [2017]: Innovations in plant protection

Challenge: Pesticides are a crucial input in agriculture to combat plant pests and diseases as well as secure quality and yield in plant production. At the same time, concerns are mounting over the effects of plant protection products on the environment, non-target organisms and human health. Consumers and the food chain alike are increasingly demanding food products, which are residue-low/free and produced in more sustainable manners. This is in particular the case for fruit and vegetables, which are often consumed fresh without prior processing.

Policies and regulation in Member States and EU-wide strive to reduce reliance on pesticides for crop protection through the design and implementation of more integrated approaches and restrictions to the use of several active substances currently used in pesticides. Escalation in levels of evolved resistance is putting further strains on the availability and use of plant protection products. Significant efforts are required to develop alternatives to current products for disease and pest control. Similarly, it is necessary to better understand genetic, evolutionary and agronomic drivers for the evolution of pesticide resistance in view of developing more durable and environmentally sustainable plant protection strategies.

Scope: Activities will foster the development and testing of new products, tools and strategies for integrated pest and disease management to reduce the use of pesticides in the vegetable and fruit sectors (including herbs and medical plants). Work will seek to optimize current cultural practices in view of increasing resilience of fruit and vegetable crops against biotic stresses. It will also tackle the development and testing of novel, more sustainable products and tools for their application taking due account of the potential of nature-based compounds for disease prevention and control. In doing so, work shall increase knowledge on the molecular mechanisms of resistance and help understand how evolution and spread of resistance leads to control failures across farming systems. Projects should follow the 'multi-actor approach'[17] bringing together contributions from a wide range of stakeholders including

[17] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

from research, farming, advisory services, industry as well as consumers and civil society. Projects should also seek for contributions from social and economic sciences to consider the broader economic, social, behavioural and environmental issues associated with the adoption of novel pest management strategies.

The Commission considers that proposals requesting a contribution from the EU of up to 5 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Proposed activities will broaden the armoury of tools available for integrated pest management in the fruit and vegetable sectors. They will help to
- reduce reliance on plant production products
- introduce novel products with increased specificity and improved environmental performance
- decrease residue concentrations in fruit and vegetables
- increase food safety and contribute to consumer health
- support innovations in the plant protection area

On the longer-term results will contribute to decreasing occurrence of pesticide residues in terrestrial and aquatic ecosystems as well as in the food chain. They will also strengthen the European fruit and vegetable sectors through continued support to productivity and product quality, the latter contributing to consumer trust and increased fruit and vegetable consumption. Results will lead to product innovations and support competitiveness of European industries including SMEs.

Type of action:-RIA

Framework Partnership Agreement

SFS - 18. [2016] Framework Partnership Agreement supporting Joint Actions towards Public-Public Partnerships in the Bioeconomy[18]

Specific challenge: Agriculture, forestry, the agri-food sector and the non-food value chains are integral parts of the European economy and society. They are subject to multiple pressures from external drivers, which include rising food, feed, fuel and fibre demand, globalisation, environmental changes and public health aspects, and are constrained by planetary boundaries such as land and water limits. With the expected increase in global population and changes to the environment, demand for animal food products and competition for natural resources, agriculture, forestry and their value chains will need to become more efficient, and sustainable.

Over 90% of the research that takes place in Europe is still funded through the national programmes so it is vital that support for the trans-border coordination of national and regional research programmes be sustained under Horizon 2020 to continue the significant

[18] This topic is connected to the Other Action 'Specific Grant Agreements (SGAs) for ERA-NET Cofund actions supporting Joint Actions towards Public-Public Partnerships in the bioeconomy'

progress already made. This will be central to maximising the leverage, synergies, efficiency gains and structural improvements needed to underpin the European Research Area and continue Europe's highly successful approach and the positive momentum in the Bioeconomy area while at the same time ensuring the sensible rationalisation of activities needed. This means that fit for purpose and rationally organised coordination mechanisms and appropriate financial support will be needed in Horizon 2020.

Scope:

The purpose of this call is to create a Framework Partnership Agreement (FPA) to strengthen and simplify cooperation between the European Commission and Member States' programme managers and programme owners in the field of relevance of Societal Challenge 2. This will allow Member States to develop and implement a long-term action plan addressing the specific challenge with a set of ERA-NET Cofund actions. It is expected that the proposal submitted to this call will provide a broad coverage of countries and their different programme managers and owners.

The Commission will subsequently invite submission of proposals for Specific Grant Agreements under this Framework Partnership Agreement as grants to identified beneficiaries.

Expected impact: The simplification of ERA-NET Cofund actions is an important milestone in stepping up long-term collaboration with and between Member States. In the specific context of Societal Challenge 2, the following benefits are expected:

- establishment of long-term and more strategic collaboration among programme managers and owners, with structural impacts between Member States in areas of common interest within the scope of the Societal Challenge 2;
- increased involvement of programme managers and owners in jointly addressing sustainability challenges, inter alia through ERA-NET Co-fund actions, thereby improving the synergy at European and global levels between JPIs and ERA-NETs within a common strategic frame;
- simplification of ERA-NET administrative arrangements: proposal submission, evaluation and grant preparation;
- substantial reduction the time between identifying research areas and the launch of co-funded calls in those areas.

Type of Action: Framework Partnership Agreement (for ERA-NET Cofund actions).

The Framework Partnership Agreement will cover the remaining duration of Horizon 2020. Proposals submitted to this call should include a maximum number of organisations that intend to participate in future ERA-NET Cofund actions. Later changes to the legal entities participating can only be made through amendments to the Framework Partnership Agreement.

Additional information:

Participants in the Framework Partnership Agreement for ERA-NET Cofund actions are not required to conclude a consortium agreement.

For the evaluation of Framework Partnership Agreement proposals for ERA-NET Cofund actions, only the following aspects will be considered:

Excellence:

- Clarity and pertinence of the objectives;

- Level of ambition in the collaboration of the participants in the proposed FPA to pool national resources and coordinate their national/regional research programmes.

Impact:

- The extent to which the outcomes of the Partnership will contribute to the expected impacts of relevant topics mentioned in the work programme;
- Contribution to establishing and strengthening a durable cooperation between the European Commission, the partners, and their national/regional research programmes.

Implementation:

- Extent to which the consortium brings together the necessary resources and expertise.

SFS - 19. [2016] ERANET COFUND: Public-Public Partnerships in the bioeconomy

Specific challenge: Agriculture, forestry and the agri-food sector are integral parts of the European economy and society. They are subject to multiple pressures from external drivers, which include rising food, feed, fuel and fibre demand, globalisation, environmental changes and public health aspects, and are constrained by planetary boundaries such as land and water limits. With the expected increase in global population, demand for animal food products and competition for natural resources, agriculture and forestry will need to become more efficient, and sustainable.

Scope: Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing a joint call for proposals resulting in grants to third parties with EU co-funding in this area. Proposers are encouraged to include other joint activities including additional joint calls without EU co-funding.

Thematic focusing of these calls should be commensurate with the funds available, so as to ensure a reasonable rate of success in the call. The ERA-NETs should seek synergies with other relevant European and international research and innovation initiatives affecting sustainability and resilience of agriculture and food systems, in particular the FACCE and HDHL Joint Programming Initiatives. In line with the objectives of the EU strategy for international cooperation in research and innovation, proposals are encouraged to consider international cooperation, and the ERA-NETs should be open to participation by third countries national programmes.

The proposals should also aim at implementing other joint activities including additional joint calls without EU co-funding.

Proposals should address one of the following issues (A) to (C) and should clearly indicate to which one they refer.

A. Organic farming and food production

Objectives: In recent years the organic market in the EU, driven by steadily increasing demand, has developed significantly (19.7 billion euro with a 9% growth rate in 2011). While demand for organic products tends to exceed production, during the last decade, the number of organic producers as well as the surface under organic production have grown at a fast pace. Each year, 500.000 hectares of agricultural land convert to organic in the Union. In the period 2000-2012, the total organic area has increased by 6.7% yearly on average, to reach an estimated 9.6 million ha, which is 5.4% of the total utilised agricultural area in the EU. Organic aquaculture production is also growing fast, following the introduction of EU rules in 2009. The overall objective is to improve jobs and growth in the organic sector through improved organic farming and food chains, by consolidating the financing for transnational

research and innovation activities. Specifically, projects developed under the proposed co-fund action will: i) improve the production potential under organic regulations; ii) improve sustainability of agricultural production; 3) increase animal welfare and resource efficiency; and iv) link-up to innovation needs of EIP operational groups. This proposal is a follow-up of CORE Organic I (FP6) and CORE Organic 2 (FP7). On a policy development level, the proposal is in line with the EC Communication on the Action Plan for Organic Production in the European Union, the existing regulations of the organic sector and the Commission proposal for new regulation for organic production (COM(2014) 180 final) by increasing the innovative capacity of the sector if certain exemptions phase out.

Impacts: development of more sustainable agricultural production systems, food processing and food value chains and fulfilment of the growing demand for organic products on behalf of an increasing consumer market, support to CAP and organic farming regulations and other relevant policy areas, e.g. health and trade and jobs.

B. [2016] Sustainable food production and consumption

Objectives: Achieving a sustainable food supply, incorporating new food processing technologies and backed by consumer acceptance, is a top innovation priority for the food industry and civil society organizations. A SUSFOOD ("SUStainable FOOD production and consumption") ERANET cofund will seek to increase collaboration and coordination between national research activities on the sustainability of food production and consumption, with a main focus on the food supply chain beyond the farm gate. The FP7 experience has shown continued potential to organize and implement calls for proposals on this theme with excellent chances for a first-rate of return for the money invested by the EC National consultations, held in 16 European countries, show a common will to continue efforts to maintain food sustainability high on the research and innovation agenda and determination to financially back this view. Proposals should consider and may build on previous EU funded activities in this field.

Impacts: Innovation in food processing technologies; Redesign input, waste and side flow strategies to increase resource efficiency and provide added value in food products and processing, manufacture etc.; Interdisciplinary research approach to innovation of food products and use of new raw materials for food products; Harmonisation of the methods and metrics for integrated assessment of sustainability of food products and food patterns; Connection between stakeholders and food systems; Understanding consumer behaviour and food choices; Integration of information systems for personalized and sustainable choices.

C. A knowledge platform for the intestinal microbiome

Objectives: For many years it has been known that the intestinal microbiome composition and function affect the conversion and availability of some dietary components. Evidence on the complex host-diet-microbiota interactions is increasing, highlighting the need of considering these interconnections as a triad that will define the success of dietary interventions and European policies. Importantly, there is accumulating evidence that the intestinal microbiome affects both gut and systemic health. Specifically, diet-related variations in the gut microbiota have been linked to a variety of non-communicable chronic diseases, including obesity, type 2 diabetes, cancer, autoimmune, brain and cardiovascular diseases.

Gut microbiota analysis and modulation therefore is a new and rapidly developing research area. However, the causal relationship between diet, gut microbiota and health in humans is still poorly understood. These studies may provide novel strategies for health promotion and disease prevention, development of healthy ingredients and foods bearing health claims as

well as probiotics and prebiotics based on functional analysis of genomic and metagenomic data. There is a need for joint research activities in the area of intestinal microbiome for sharing and integrating existing data, investigating the cause-effect relationship between changes in microbiota composition and diseases, including the possible role of human genetics, identifying the main dietary components leading to functional changes in gut microbial composition, as well as standardising methods and study designs to analyse and understand the human diet-gut microbiota interaction.

Impacts: This ERA-NET Cofund should generate new knowledge to support health maintenance, prevention strategies and/or new treatments. Unveiling human diet-gut microbiota interaction in health and disease is required, as necessary knowledge base for intervention studies aimed at promoting health and/or preventing the onset/development of non-communicable chronic disease through diet-dependent modulation of the intestinal microbiota.

The Commission considers that proposals requesting a contribution from the EU of an indicative amount of EUR 6 million for each of (A) to (C) respectively would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact for the ERA-NET Cofund:

- improve coordination and reduce the overlap between national and EU funding in relevant fields of research;
- achieve a critical mass and ensure better use of limited resources in fields of mutual interests;
- share good practices in implementing research programmes;
- promote transnational collaboration and new knowledge generation and innovation;
- mobilise SMEs, when appropriate, in the transnational projects to enhance innovation.
- provide mapping of on-going research activities (where relevant);
- establish a network of research activities carried out at national and regional level, including a mutual opening of national and regional research programmes (where relevant).

Type of action: ERA-NET Cofund

SFS - 20. [2017]: Towards a science-based regionalisation of the Common Fisheries Policy

Specific Challenge: The new CFP envisages a regionalised ecosystem-based approach relying on detailed decisions proposed jointly by Member States under the umbrella of common principles and benchmarks set up in EU legislation. This will require making choices of appropriate management units (fisheries, fishing gears, sea basins, fish stocks, stock assemblages, target fleets, geographical units, etc) and devising innovative combinations of management instruments and new governance mechanisms adapted to the new situation. Possible social and economic imbalances driven by the adaptation of both the fishing industry and fisheries managers to the new situation should also be addressed. The implementation of this new approach to fisheries management is already a serious challenge for fisheries in

European Atlantic waters. For Mediterranean fisheries, the challenge of regionalisation is exacerbated by the specific legal situation (narrow bands of Union waters with larger areas outside national jurisdictions), generally poorer state of fish stocks (or lack of knowledge thereof), narrower continental shelves and large artisanal fishing fleet.

Scope: Future management approaches must take much closer account of the specificities of the regional ecosystems, of regional fisheries practices and of interests in the context of an ecosystem-based approach, without disregarding the likely interconnections with large marine ecosystems. Projects should therefore, on a regional basis, identify potential biological, technical, economic, administrative, social and societal factors that stand in the way of achieving the fisheries management objectives of the Common Fisheries Policy through regionalisation instituted by Article 18 of the new CFP (Regulation (EU) No 1380/2013). Research projects should also develop and propose means to resolve or circumvent the blocking factors that have been identified, especially in the Mediterranean.

The Commission considers that proposals requesting a contribution from the EU between EUR 4 and 5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: With the objective of enhancing the regional implementation of the Common Fisheries Policy and progressing towards the objective for maximum sustainable yield, proposals will have to:

- Improve the knowledge basis (biological, economic, technical, social) for regionalised management decisions taking into account appropriate aspects when dealing with Mediterranean fisheries.
- Enhance growth in coastal communities by ensuring that marine biological resources are optimally managed.
- Improve social and societal acceptance of fisheries management measures.
- Enhance regional implementation of the Common Fisheries Policy and progress towards the objective for maximum sustainable yield, ensuring that conservation measures are agreed at the regional level.

Type of action: Research and Innovation Action

SFS - 21. [2016-2017]: Advancing basic biological knowledge and improving management tools for commercially important fish and other seafood species

Specific Challenge: The continued need to manage European fisheries, the global rise in seafood demand and the need to maximize fish production sustainably call for more efficient fisheries management that depends on solid science. Knowledge of the biology and ecology of several fish and other seafood species is far from complete for stocks fished in European seas and in particular for fisheries in multi-species situations. In some areas outside EU waters where EU fleets are fishing, even more important knowledge gaps may exist. The relevant stocks may include species in international waters or in the waters of third countries with which the EU has established sustainable fisheries partnership agreements. For species fished outside EU waters, research needs often extend beyond knowledge on biological characteristics and include research on management tools and appropriate stock assessment models.

Scope: Proposals should focus on an identified number of fisheries of importance for the fishing fleets of several EU countries. The proposals should review existing knowledge, and perform multidisciplinary research to contribute to closing important knowledge gaps with

significant impact on the management of species and that currently hamper advice. Research results should be immediately applicable in providing a more solid knowledge base and advice to fisheries management.

Proposals should cover one of the following geographical scopes:
1 [2016] Knowledge basis and management tools for resilient and resource-efficient fisheries in waters covered by Regional Fisheries Management Organisations other than the North-East Atlantic Fisheries Commission (NEAFC) and the General Fisheries Commission for the Mediterranean (GFCM)
2 [2017] Strengthening the knowledge basis for resilient and resource-efficient fisheries in EU waters and in waters covered by NEAFC and GFCM.

For 1, the Commission considers that proposals requesting a contribution from the EU between EUR 4 and 5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.
For 2, the Commission considers that proposals requesting a contribution from the EU between EUR 4 and 5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: With the aim of improving fisheries management in the context of the Common Fisheries Policy, including outside EU waters, proposals will have to:

- Increase the knowledge base and provide tools for more efficient management of fish stocks of EU interest, both inside and outside EU waters.
- Increase the long-term profitability of the EU fleet and jobs sustained in the fishing sector.
- Improve food security in Europe with a visible, predictable and sustainable provision of seafood from all areas where EU vessels are operating.
- Contribute to the objectives of the Common Fisheries Policy, the Marine Strategy Framework Directive and the Biodiversity Strategy and in particular to adjusting fishing exploitation to levels that ensure the maximum sustainable yield.

Type of action: Research and Innovation Action

SFS - 22. [2017]: Smart fisheries technologies for an efficient, compliant and environmentally friendly fishing sector

Specific Challenge: Resource efficiency in the fishing sector and its improvement has many dimensions – the extraction, the scientific assessment of fish stocks, the monitoring for scientific or surveillance purposes, to mention the most important ones. While promising new technologies are being developed in several fields (information technology, new detection, monitoring and surveillance techniques, new materials, aerospace, etc.) the pace of their introduction in the fishing sector is far from optimal. It is suspected that fishing, control and data collection perform under par, may lack accuracy, and are unnecessarily expensive. The extracting sector could largely benefit by improving cost-efficiency and compliance, and limiting environmental impact by catching-up with technological progress. The monitoring, surveillance and also resources knowledge and assessments could similarly be improved by using modern technologies, including for instance unmanned vehicles or drone-like devices. The challenge lies in the identification of the possibilities and means to improve the uptake of high technology throughout the fisheries value chain, and possibilities to enhance resource

efficiency to fishing operations and the activities surrounding them (monitoring, data, knowledge).

Scope: The proposals should explore possibilities to increase the use of innovative technologies in all fisheries-related activities, including the extractive sector, the collection of data and information and the monitoring of compliance with the rules, for the Common Fisheries Policy. The proposals should review relevant promising technological progresses in different fields and asses their innovative potential and their applicability in the fishing sector with the aim to avoid unnecessary fish mortality, mortality of other marine resources or ecosystem damage, to improve energy efficiency, and to contribute to improved overall economic efficiency. They should include, where appropriate, sea trials testing the performance of new technologies, their ecological and economic effectiveness and their social acceptability. Expected results should be directly applicable in important fisheries in all European seas.

The Commission considers that proposals requesting a contribution from the EU between EUR 3 and 4 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: With the aim of improving resource-efficiency in the fishing sector, proposals will have to:

- Identify existing technologies and their potential for use in the fishing sector, and bring them to a readiness level that can be applied by the fishing sector across the EU.
- Improve performance of fishing vessels in terms of resource efficiency, including effective use for data collection and fish stock assessment, and reduce the cost of marine monitoring.
- Improve economic efficiency and profitability, avoiding increased unwarranted fishing pressure and not undermining sustainable resource use.
- Involve the fishing sector in collecting the evidence base for the implementation of marine policies.
- Improve compliance and reduce illegal, unreported and unregulated fisheries.

Type of action: Innovation Action

SFS - 23. [2016]: Improving technical performance of the Mediterranean aquaculture

Specific Challenge: Mediterranean aquaculture is contributing to food security, employment and trade in the region. An improved technical performance together with a shift from production-oriented growth to market-oriented and consumer responsive approach is needed to further enhance its competitiveness.

Scope: Proposals should aim at integrating and improving the technical viability of the current production systems of Mediterranean aquaculture, including biological and operational aspects, with new and cost-effective innovative technologies and practices to ensure sustainability and growth of the sector. In particular proposals should aim at substantially improving current key performance indicators (KPI) of the principal Mediterranean species - growth rates, mortality and feed efficiency. In addition proposals should develop tools for marker-assisted selection. Proposals should also look into Mediterranean aquaculture market development, as to develop strategic marketing plans for promotion, product development and commercialisation of Mediterranean aquaculture production in new and existing markets.

The Commission considers that proposals requesting a contribution from the EU between EUR 3 and 4 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: To improve the competitiveness of EU Mediterranean aquaculture production, proposals will have to:

- Consolidate Mediterranean aquaculture key species at commercial scale by means of sustainable fish farming and valuable seafood products.
- Devise solid marketing plans for local and regional productions which will boost jobs and trade in the region.
- Develop a "code of conduct/good practices" and harmonised standards at the Mediterranean level to promote responsible aquaculture practices in the region.
- Improve image of aquaculture production systems and products supported by market-oriented production and consumer responsive approach.
- Increase consumer awareness for Mediterranean aquaculture products of high quality and safety that certify freshness, traceability, animal welfare and sustainability of the systems.
- Support the implementation of the EU Common Fisheries Policy.

Type of action: Research and Innovation Action

SFS - 24. [2016]: Reinforcing international cooperation on sustainable aquaculture production with countries from South-East Asia

Specific challenge: With 90 % of all world aquaculture production in Asia, and Europe importing close to 70 % of its seafood (in particular from South-East Asia[19]), both regions have interests to cooperate in developing sustainable solutions since within the next decade production has to nearly double to meet the increasing seafood market demands. A sustainable aquaculture production is a major challenge for global seafood security and safety. In order to provide greater benefits for the EU and South-East Asian countries and to make future aquaculture sustainable, more efforts are needed in technology innovation, resource efficiency, reduced environmental impact, harmonised standards and marketing.

Scope: Proposals should launch a multi-stakeholder platform to reinforce international cooperation between Europe and South-East Asian countries on food security and safety with specific emphasis on sustainable aquaculture production. The multi-stakeholder platform should support structuring new networks and partnerships between industrial players aiming to enhance business opportunities and the up-take of innovations in promising aquaculture domains. Participants of the platform should also contribute to the development of common standards for appropriate environmental planning/zoning, increased food safety and improved farming governance. Additionally, a particular focus should be put on reinforcing capacity building through alignment of European training programmes, including through industrial apprenticeship opportunities and networking with South-East Asian partners.

The Commission considers that proposals requesting a contribution from the EU of EUR 2 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

[19] South-East Asian countries include Indonesia, Thailand, Malaysia, Singapore, Philippines, Vietnam, Myanmar, Brunei, Cambodia, Laos.

Expected impacts: To contribute to the creation of a long-term partnership between Europe and South-East Asian countries on sustainable aquaculture and to reinforce science diplomacy between both regions for mutual benefit, proposals will have to:

- Contribute to common standard setting and legislation, particularly around ecosystem-based farming.
- Facilitate the creation of business opportunities for industrial partnerships between Europe and South Asian countries.
- Reduce risk for animal and human health and thus increase EU consumer's confidence in seafood products.
- Consolidate EU – South-East Asian education and training networks.

Type of action: Coordination and Support Action

SFS - 25. [2016] SCAR Support Action[20]

Specific challenge: For the past ten years the standing committee on agricultural research (SCAR) has helped to develop and consolidate the European Research Area (ERA) across many bioeconomy sectors bedsides agriculture. This has been achieved through a dedicated core of National representatives who despite limited resources and increasing responsibilities and diversification have made SCAR such an important ERA input. There is still however plenty to do related to improving the alignment and interoperability of national research programmes; to better support the work of the different strategic and collaborative working groups, ERANETS, and JPIs; to supporting the widened scope of SCAR into fisheries, forestry biomass and food; to stimulating and maintaining the interest of relevant countries not yet fully involved; to improving the organisation communication and dissemination of SCAR deliverables and initiatives.

Scope: To help assist in the workings of SCAR a support action is proposed which will help modernise and improve current SCAR communication tools, help smaller countries to attend and participate in the growing diversity of SCAR, will support for organising, for input of external expertise and for reporting in strategic and collaborative working groups, and help to structure the reporting facilities of the various ERA instruments.

Expected impact:

- A stronger representation of all member states within the strategic working groups, or other key SCAR networks.
- Increased visibility through a more professional dissemination and organisation of SCAR deliverables.
- A more structured approach to the workings of the diverse SCAR activities.

Type of action: Coordination and support action *(TBC)*

[20] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to REA and will be implemented by the Commission services.

Environment-smart and climate-smart primary production

SFS - 26. [2016]: Legumes - Transition paths to sustainable legume-based farming systems and agri-feed and food chains.

Specific challenge: Leguminous plants – thanks to their nitrogen-fixing properties – are recognized to contribute to increase soil fertility and have a positive impact on the environment. Additionally, legumes are a critical source of plant-based proteins and amino acids for people around the globe, as well as for the livestock sector. On both issues, EU has developed strong dependencies. On one hand, the EU27 nitrogen fertilizers consumption is about 10 million tons per year with an import share of 20-26% over the last 4 seasons. Taking into account that the production of nitrogen fertilisers is highly dependent to natural gas, overall, the EU imported 62% of its energy needs in gas in 2006-2010. On the other hand, the EU imported 70% (42 million tonnes in 2009) of the raw materials rich in plant proteins consumed. Compared to other main agricultural regions in the world, the area dedicated to legume crops within the EU remains relatively low and even decreased during the last decades. Regarding the potential of eco-systems services delivered by legumes, needs to include legumes in farming systems and sustainable agro-food and feed chains have been identified for agronomic, environmental as well as economic reasons.

Scope: Taking into account the diversity of legume species available (e.g. pulses, soya, forage legumes, …) and the pedo-climatic conditions over Europe, representative farm networks will be developed integrating legumes in their cropping systems and grassland. Based on these case studies and existing data, the match between legumes production potentials in cropping systems and feed needs for the main livestock systems and also developing food markets will be investigated at the European level highlighting complementarities between different regions or within regions. Based on existing data and targeted new experiments the impact of the potential development of legumes on other productions as well as the delivery of eco-system services (e.g. climate change mitigation and adaptation, reduction of pesticides and fertilizers pollution) will be assessed from regional levels to EU and global level. Path dependency and lock-ins regarding the non-development of legumes in the EU will be analysed at different levels (e.g. farm, advisory, cooperatives, feed industry, food-chain, supply chains, institutions, policies and trade agreements). Local value chains as well as more industrial European-scale value chains will be analysed. Coverage of both conventional and organic sectors is expected. Transition paths towards sustainable legume-based farming systems and agri-feed and food chains will be developed tackling the conflicts identified for the different actors. Transdisciplinary research and multi-actor approaches, including input from social sciences and humanities, are necessary to engage actors in developing the production and use of legumes including market aspects. Proposals should fall under the concept of 'multi-actor approach'[21].

The Commission considers that proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Development of sustainable legume-based cropping systems and agri-food chains.

[21] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

- Increasing the competitiveness of legume crops from farm to feed and food chains
- Lower environmental impacts (e.g. climate change GHG emissions and water pollution).
- Integrated scientific support to relevant EU policies (CAP, WFD, CC objectives,…).
- Strengthening trans-disciplinary research and empower multi-actor approach for long-lasting implementation of the results obtained.

Type of action: Research and Innovation Action

SFS - 27. [2017]: Permanent grassland – farming systems and policies

Specific Challenge: Permanent grasslands are clearly identified as important for the delivery of a wide range of ecosystem services (e.g. climate change, biodiversity, water quality, floods and erosion control…). Closely related to the competiveness of ruminant-based farming systems, the maintenance of permanent grassland is at stake especially in areas where intensified farming systems or practices are feasible but also in remote areas and high-mountain areas where grasslands face risks of land abandonment. They can be natural, semi-natural or agriculturally-improved; long-term grasslands provide more ecosystem goods and services than short-term grasslands. The continuity and permanence of the grassland is necessary to ensure the provision of public goods. There is an urgent need to recognize and add value to the multiple ecological functions of grasslands. In order to achieve this challenge, there is a significant need for generation of a wide range of data to characterise and benchmark sustainable farming systems based on permanent grassland taking into consideration the various socio-economic and pedo-climatic conditions in Europe.

Scope: Proposals should explore integrated approaches for permanent grassland management which are cost effective, environmentally sound and easily manageable. Synergies and trade-offs between productivity and continuity of the delivery of ecosystem services will be analysed in different contexts of intensification of livestock systems. Proposals should explore approaches to clearly establish levels of biomass and public goods outputs combined with methods of utilisation of permanent grassland.

Activities will include the collection of relevant bio-physical and socio-economic data which are necessary to monitor, benchmark and analyse the performance of these farming systems in a variety of dimensions. Differences in grass output, botanical composition and diversity, grazing season length, ratio of grazing to cutting level of grassland production intensity, carbon storage etc. will be investigated. Proposed networks will be stratified so as to reflect relevant European pedo-climatic and socio-economic conditions. Attention will be paid to experimental stations, experimental farms and commercial farms. The use of instrumented farm platforms to compare grasslands management in terms of productivity, nutrient use and economics on a Life Cycle Analysis scale is vital to truly determine the value of permanent grasslands as food and public goods providers. Farm network activities need to look at both production of references and detection of innovative approaches. Proposal will develop decision tools at farm level and databases to benchmark outputs for permanent grassland management taking into account both, the biomass production for economic valorisation (for ruminant and/or innovative uses and markets) and the delivery of public goods to the rural and urban society. Health and welfare of the livestock will be taken into account. Coverage of both conventional and organic sectors and other pasture based farming systems is expected.

Based on the farm network output, different grassland policies will be evaluated regarding especially the public goods they are targeting. Taking into consideration the importance and the diversity of grasslands in Europe, this analysis of grassland policies could also be

extended to relevant Third countries. Innovative approaches to grassland management that increase productivity while at the same time enhance provisioning of targeted ecosystem services should be proposed at the appropriate territorial scale; restoration and creation of grasslands will also be considered. Agri-environmental indicators on grasslands and grassland-based systems could be developed as basis for a better recognition of ecosystem goods and services that grasslands can provide. Proposals shall use transdisciplinary research methods and should fall under the concept of multi-actor approach[22].

The Commission considers that proposals requesting a contribution from the EU up to EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Duration of the project should take into consideration the coordination and implementation of farm networks.

Expected impacts:

- Benchmarking of grassland outputs based on local and regional site conditions across Europe.
- Availability of tools at farm level to manage permanent grasslands coping with all dimensions of sustainability (environmental, economic and social).
- Improved policy instruments towards the delivery of identified public goods by permanent grasslands and formulation of appropriate incentives to reduce conflicts between productivity objectives in primary production and the delivery of public goods
- Integrated scientific support to relevant EU policies (e.g. CAP, WFD, sustainable use of pesticides …).

Type of action: Research and Innovation Action.

SFS - 28. [2017]: Functional Biodiversity – Productivity gains through functional biodiversity – effective crop pollinators and pest predators interplay

Specific challenge: Biodiversity and various ecosystems provide many different services to agricultural production, not all of which are properly known. Using these services in a smart way enables agriculture to become more sustainable and allows for reduction of chemical inputs. To develop agricultural systems maximising services from ecosystems, a knowledge leap is necessary which can be supported by various scientific areas from developing farming practices to modern technologies,. The sustained delivery of these ecosystem services by semi-natural habitats (e.g. landscape features, buffer strips, …) strongly depends on their botanical composition and spatial configuration. Beyond the field and farm level, collaboration between farmers and other actors is also required at landscape level. There is a significant need for generation of a wide range of data to characterise and benchmark sustainable farming systems under various socio-economic and pedo-climatic conditions in Europe, as well as for finding effective ways to encourage farmers to use these practices.

Scope: Proposals will explore the functional role of biodiversity in the delivery of ecosystem services, in particular the spatial and temporal interactions between plants/animals as natural enemies of pests and pollinators, etc. There is a need to integrate the understanding of factors and mechanisms which govern the delivery of these ecosystem services, including agricultural

[22] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

management and landscape characteristic. Proposals will study and test approaches to increase the performance of ecosystem services by targeted promotion of pollinators and natural enemies of pests such as parasitoids and predators through habitat provision and management (e.g. by means of deploying pollinator friendly practices and crops, developing specific plant mixture which attract and enhance particular groups of natural enemies, etc.). Prototypes of sustainable agro-ecology systems, including organic systems, at various scales from farm level to landscape/territorial level will be developed. Pastoral, arable and horticultural systems will be taken into account as well as potential interactions and collaborations between those sectors at landscape level. Cost effectiveness of these services will be compared to other agricultural practices (e.g. use of agrochemicals) including an evaluation of the production stability and the risk management for the farmers. Synergies and trade-offs between pollination, natural control of pests, and other ecosystem services to agricultural production will be investigated as well as with environmental objectives.

Proposals should fall under the concept of 'multi-actor approach'[23] and organise adequate involvement of the farming sector in proposed activities in view of generating cross-fertilisation and co-ownership.

Proposals should establish a farm-level observatory and knowledge exchange network on biological control and pollinator services linking with the European Innovation Partnership with a focus on innovative system solutions for short and long-term needs. Activities will target farming systems with a clear aim at coping with all dimensions of sustainability (environmental, economic and social). Activities will include the collection of relevant bio-physical and socio-economic data which are necessary to monitor, benchmark and analyse the performance of these farming systems in a variety of dimensions. Proposed networks will be stratified so as to reflect relevant European pedo-climatic and socio-economic conditions. Attention will be paid to experimental stations, experimental farms and include commercial farms. Activities need to look at both production of references and at detection of innovative approaches. Duration of the projects should take into consideration the coordination and implementation of farm networks.

The Commission considers that proposals requesting a contribution from the EU up to EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Effective solutions for the delivery of biological control and pollination services.
- Improved overall sustainability and innovation capacity of the farming systems.
- Reduction of the impact on environmental issues: improvement of ground and surface water quality, conservation of biodiversity and wildlife.
- Strengthening trans-disciplinary research and empower multi-actor approach for long-lasting implementation of the results obtained.
- Enhance collaboration and knowledge exchange.

Type of action: Research and Innovation Action

[23] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

SFS - 29. [2017]: Socio-Eco-Economics – Socio economics in ecological approaches

Specific challenge: Ecological or ecosystem-based approaches have emerged as an alternative to farming practices based on chemical inputs. The farming systems implementing those approaches are often defined as "low-input"; actually, within the concept of eco-functional intensification, those systems are generally requiring more knowledge and labour per hectare rather than those based on chemical inputs. In order to deliver both agricultural products for the market and public goods for the society, it is necessary to understand better the socio-economic and policy factors that hinder or enhance the development of those systems by identifying the trends and drivers enabling the engagement of farmers, actor in the value chain, consumers, educators and policy makers.

Scope: Based on case studies and representative farm typologies, the proposals will compare identified production systems implementing ecological approaches with conventional farms covering the same sectors of production. A wide range of systems will be considered, such as organic and other low chemical input systems, systems implementing biological control, as well as diversified systems vs specialised systems, etc. Different sectors will be taken into account (e.g. arable crops, livestock, vegetables and fruits, vineyards, agro-forestry etc.). Mixed farming integrating crop and livestock systems and/or multipurpose breeds will be included. Different strategies will be compared, for instance pursuing economies of scale in the conventional systems versus economies of scope proposed for some ecological approaches. A sustainability assessment based on the Life Cycle Assessment methodology should be conducted. Economic performance and delivery of public goods will be evaluated through different indicators at farm, group of farms and territorial levels. Specific emphasis will be given to the analysis of the labour productivity regarding the amount and value of private & public goods produced. Incomes of the different systems will be analysed taking into account of market and public payments.

The Commission considers that proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Improved and integrated capacity and method to assess the sustainability of different agro-ecological approaches.
- Increases in productivity, public goods delivery and job creation through improved agro-ecological approaches and market and policy incentives.
- Strengthening trans-disciplinary research and integrated scientific support to relevant EU policies and priorities (CAP, WFD, CC objectives, jobs…).

Type of action: Research and Innovation Action.

SFS - 30. [2017]: Closing loops at farm and regional levels to mitigate GHG emissions and environmental contamination: focus on carbon, nitrogen and phosphorus cycling in agro ecosystems

Specific Challenge: Carbon, nitrogen and phosphorus losses and increasing concentrations in receiving waters or through greenhouse gases (GHG) in the atmosphere are environmental issues of major concern. Agriculture – despite also being large carbon sinks – contribute significantly, directly and indirectly, to these emissions, e.g. through land use change, soil C losses, animal production and fertilizer use. Mitigation solutions need to be based on a

thorough understanding of the cycling of carbon (C) and nutrients (nitrogen (N), phosphorus (P)) at various levels to result in lower emissions and environmental contaminations and include options/possibilities for carbon sequestrations. An integrated approach of factors and mechanisms which govern those cycles is needed ranging from agricultural management to consumption patterns.

Scope: Proposals will provide a comprehensive analysis of C, N and P flows and cycling on-farms and within landscapes taking into account different types of production systems and impacts of land use intensification. Work shall consider trade-offs and synergies between the different impacts of C and N cycles (on climate, water, air, soil) as well as with farm productivity and agricultural goods quality issues. Proposals will seek for efficiencies and loops including at the interfaces between plants (e.g. N-fixing trees and crops, forest/arable land) and between plants and animal production (e.g. fertiliser/manure or protein/feed, grasslands/ruminants,…). Cattle management and breeding strategies and techniques to detect more efficient animals regarding GHG emissions will also be investigated. Activities shall develop and test agricultural practices and organisations at farm and regional levels that reduce GHG and nutrients intensity in primary production taking due account of soil regenerative measures as drivers of carbon storage and nutrient efficiency. Proposals will study and test innovative approaches to close C, N and P loops. Prototypes of sustainable agro-ecology systems, including organic systems, at various scales from farm level to landscape/territorial level will be developed. Proposals will also tackle consumption patterns and establish how demand-side interventions (e.g. on diets, waste reduction and waste management, consumer behaviour) can be paired with efforts to lower emissions and optimise C/N ratios in primary production. This will include looking at international trade in relation to EU supply with energy and proteins as well as land use changes and carbon sequestration in soils. International collaboration shall be envisaged as appropriate. Proposals should fall under the concept of 'multi-actor approach'[24]

The Commission considers that proposals requesting a contribution from the EU up to EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Effective solutions for C, N and P efficient agro ecosystems.
- Improved overall sustainability and innovation capacity of the farming systems.
- Reduction of the impact on environmental issues: reducing GHG emissions, improvement of ground and surface water quality...
- Integrated scientific support to relevant EU policies (e.g. CAP, WFD, sustainable use of pesticides, CC objectives …).
- Strengthening trans-disciplinary research for long-lasting implementation of the results obtained.

Type of action: Research and Innovation Action

[24] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

SFS - 31. [2016] – Farming for tomorrow: developing an enabling environment for resilient and sustainable agricultural systems

Specific challenge: the European farming sector is facing constant economic, environmental and social challenges in rapidly changing economic and policy environments. It is increasingly affected by factors external to farming which make it more vulnerable to external shocks. As a consequence, it has undergone considerable changes in the last decades: farm sizes have steadily increased as well as investment levels so as to maintain farming income. In some sectors (e.g. livestock), production tends to concentrate in specialised regions potentially increasing pressure on the environment. Risks in agriculture have increased in the last decades resulting from the suppression of price policies, globalisation and a more frequent occurrence of extreme weather events, in a changing and more variable climate, and pest and disease outbreaks/epidemic diseases, among others. These aspects, among others, have a strong bearing on the demography of farmers and the attractiveness of the sector. Generation renewal in agriculture plays a crucial role in maintaining viable food production and contributing to the sustainability of the sector and rural areas. It is therefore necessary to analyse thoroughly the above mentioned aspects to understand the sector's dynamics in the long term and develop an adequate enabling environment.

Scope: activities should provide a thorough investigation of the socio-economics of farming demographics so as to allow long-term projections and modelling and to measure the impacts of relevant policies and their possible improvement so as to facilitate entry in the sector. The impact of consumer preferences on the farming sector is also to be taken into account. Investigations will cover a wide range of sub-sectors (including both commodity and value added products). Investigations will also aim at understanding farmers' risk management strategies and behaviours towards adoption and use of risk management tools, their behaviours in market crisis situations, the conditions and availability of information necessary for effective management of risks at farm level and the role of policy tools. Research will extend to strategies at meso / macro-levels to cope with risks associated to an increased occurrence of extreme weather events.

The Commission considers that proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: the project's results are expected to:

- Improve the delivery of the policy framework to agricultural activity and thus fostering its sustainability.
- Provide better tools to agriculture to deal with risk management
- Improve resilience of the agricultural sector to cope with risks

Type of action: RIA

SFS - 32. [2017]: Promoting and supporting eco-intensification of aquaculture production systems: inland (including fresh water), coastal zone and offshore.

Specific Challenge: Aquaculture is an attractive and important component of coastal and rural livelihoods in situations where increasing population pressures, environmental degradation or loss of access limits catches from wild fisheries. Aquaculture development aims at supporting and facilitating a sustainable economy by business development and diversification. Sustainable intensification of aquaculture has been identified as the major challenge ahead to meet global seafood security needs for future generations. The eco-intensification of aquaculture production is achieved sustainably only through balancing its demands on water, land and feed resources to boost productivity of the systems.

Scope: Proposals should support aquaculture productions and communities with cost-effective innovative solutions and technologies to ensure sustainable offshore, coastal and inland development and growth. Proposals should look at enhancing integrated aquaculture activities (species and systems) in a sustainable way, by implementing new/emerging technologies and innovation in monitoring and management systems, focusing on sound economic reduction of operational costs for innovative aquaculture production systems.

The Commission considers that proposals requesting a contribution from the EU between EUR 4 and 5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: To contribute to the eco-intensification of European aquaculture, proposals should:

- Bring to the market new and cost effective commercial applications to assist aquaculture producers in their activity.
- Secure EU markets by increasing the offer of high quality fish and seafood products from a continue supply of EU aquaculture products that meet EU consumers' demands and contributes to reduce the dependency of EU imports of fish and seafood products from international markets.
- Improve the sustainability of the aquaculture industry by optimising production systems and its profitability.
- Consolidate eco-efficient aquaculture practices to ensure access to high-value niche markets.

Type of action: Research and Innovation Action

A competitive food industry

SFS - 33. [2016]: Understanding agro-food value chain and network dynamics

Specific challenge*:* Agro-food chains play a key role in the EU economy and society: ensuring food and nutrition security, contributing to global and local economy, providing jobs and having a significant impact on environment. A proper functioning and sustainability of agro-food value chains depends on the viability of each and every one of its links. Therefore there is a need to understand metrics and dynamics at each level and especially within and across the agro-food value chains and their capacity to foster sustainability and resilience of the agro-food system, thus contributing to sustainable food and nutrition security. Economic

theories on the interaction of value chain partners and the implications on private and social welfare are present for some time, backed-up by case-studies with a predominantly qualitative nature. The challenge however remains to provide quantitative and model-based underpinning of economic behaviour in the food chain. The use of unfair contractual practices within the chain, having a detrimental effect on the economic sustainability of the chain itself, remains a 'black box' regarding the possibility to identify them, analyse and quantify their impact. Information asymmetries can put the ability of proper price setting and the bargaining power at risk, thus overall endangering agricultural revenue margins and the farmer's willingness/capacity to invest and add value. How resilience, adaptive capacity and sustainability of agro-food chains fit into the existing theories and how they can be analysed in a dynamic setting also remains a challenge. Without properly capturing the dynamic strategic behaviour of value chain agents and their interaction, the economic, social and environmental impacts cannot be assessed.

Scope: A holistic approach, supported by new advances in theory, modelling and data gathering, is needed to capture and understand the dynamics and interactions in food systems (from farmer's input providers to consumers), as well as underlying drivers of their development having an influence on the sustainability of value chains and their performance. An analysis is needed to map a large diversity of chains (short and local food chains included as well as global value chains) across EU and different sectors to give a thorough insight in upstream and downstream chain flows as well as in interactions between chains. A special attention is required on the chain organisation, price transmission, information exchange, behaviour of the chain members, cost structure (freight included), organisation of logistics, institutional and organisational arrangements, marketing standards, balance of power, unfair trading practices, risk and added value repartition along the entire food chain. Internal and external drivers influencing these issues should also be investigated. Proposals should map the policies targeted at different chain levels (including consumption and internal market) which will allow identifying interactions (coherence/divergence) between them and understanding their impact on chain performance in terms of resilience, integrity and sustainability. Changes in demand (global and local) as well as emerging food dietary and consumption patterns should be explored and how they are impacting organisation of agro-food chains and its adaptability and sustainability is to be addressed as well as vice versa. A foresight exercise should contribute to formulation of potential future scenarios,. To assess and improve resilience and sustainability, issues above should also be analysed in a dynamic framework next to the static one. Finally, research should unravel the link between the complexity and diversity of the food system and its efficiency, resilience and sustainability.

The Commission considers that proposals requesting a contribution from the EU up to EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: the project's results are expected to:

- Provide a sustainability assessment (across economic, environmental and social dimension) of agro-food chains and their contribution to jobs and growth in both territorial and EU perspectives.
- Improve capacity for modelling sustainability and resilience of agro-food chains
- Enhance capacity to assess the functioning of value chains, upstream and downstream chain flows as well as of price transmission along the chain.
- Improve knowledge on organisation of agro-food chains and its underlying drivers

- Increase capacity to map the occurrence of unfair practices in the food chain and developed methodology to assess their impact (economic, environmental, social etc.)
- Provide visibility on the evolution of value added in agro-food value chains and its distribution at each level
- Increase understanding of consumers demand and consumption patterns impacting the organisation of agro-food chains (and vice versa), its sustainability and resilience.
- Improve capacity of related policies and agro-food chain stakeholders to improve sustainability and resilience of agro-food chains

Type of action: RIA

SFS - 34. [2017]: Innovative agro-food chains: unlocking the competitiveness and sustainability potential

Specific challenge: Sustainability of agro-food systems are challenged by various interrelated challenges, such as changing socio-economic and political context, scarcity of natural resources and climate change. These challenges cannot be met by any individual action in the chain, but require a multi-stakeholder actions and coordination of initiatives along the value chain. A new holistic, systemic approach for design of processes within the agro-food chains is needed to unlock the full potential of agro-food chains which will deliver across economic, social and environmental sustainability dimensions.

Scope: Research should give an in-depth insight into linkages and interactions between agro-food value chain stakeholders, including understanding their perception and behaviour towards sustainability and cooperation potentially resulting in design of new processes leading to new business models and better performing value chains. A holistic approach to improve mutual understanding and collaboration between value chain stakeholders (identifying incentives and barriers as well as strategies and tools (e.g. technologies) to overcome them) is to be explored, consequently leading to creation of favourable conditions for cooperation and innovation within the value chains. A concept of social innovation and ways to measure it throughout the value chain should be explored with this respect, including the engagement of society. A plethora of policies influencing food production and consumption should be explored and their implications on creating favourable overall conditions for cooperation and innovation along the food chain. Proposals should fall under the concept of 'multi-actor approach[25].

The Commission considers that proposals requesting a contribution from the EU up to EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: the project's results are expected to:

- Enhance capacity of agro-food chains to design new processes leading to new business models and more sustainable and better performing value chains.

[25] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

- Enhance innovation potential of the European agro-food chains to adapt to changes and increase its competitiveness and sustainability
- Strengthen farmers' position in the value chains through innovative approaches that enhance transparency, information flow and management capacity.
- Limit the negative impacts of agro-food chains on environment, climate and health.

Type of action: RIA

SFS - 35. [2016] Innovative solutions for sustainable food packaging

Specific Challenge: Over recent decades much research has been carried out regarding innovative food packaging technologies and solutions (active, intelligent, recyclable, easy-to-use, organic, antibacterial, etc.) including research aimed at decreasing the environmental footprint of packaging material, reducing food waste by increasing the shelf-life of food and providing indications of food spoilage, improving product design and optimising process efficiency, reducing the need for chemical preservatives while maintaining the nutritional and sensorial properties of food. In spite of progress made much remains to be done to overcome the barriers to market uptake of many promising technologies.

Scope: Proposals should clearly address the problems associated with scaling-up and commercialisation of eco-innovative solutions to packaging in a business world that is moving from a linear to a circular economy. Activities may comprise prototyping, testing, demonstrating and piloting in a (near to) operational environment, as well as experimental production, all with a view to paving the way for subsequent market replication. Proposals may, if needed, include limited R&D activities. In cases where there are clear market failures or socio-economic, cultural and behavioural barriers to uptake, proposals could comprise activities such as validating the benefits for the users/buyers, validating technical and economic performance at system level, validating standards, as well as activities to prepare market uptake, ensure consumer acceptance and optimal access to and dissemination of results. Participation of all relevant actors in the food production and supply chain is encouraged. Demonstration activities will require the involvement of packaging and food processing companies, retailers and civil society to fill the gap between developed concepts and their practical implementation.

Expected impact: In view of supporting the transition from a linear to a circular economy, proposals should show how some, or all, of the following impacts will be achieved:

- Wider and faster deployment of innovative packaging solutions resulting from greater industry and consumer acceptance, optimising innovation and higher visibility of innovative solutions and overcoming of barriers to market uptake.
- Improved competitiveness as well as opportunities for growth, diversification and job creation for the EU food and packaging sector in general and SMEs in particular.
- Support to the transition from a linear to a circular economy.
- Reduction of waste and its negative impacts on the environment.

Type of action: IA

SFS - 36. [2017] Natural foods with clean labels

Specific challenge: A growing body of evidence suggests that a diet consisting of minimally processed foods has considerable health benefits. Although no common or regulatory definition exists, these types of foods are often described as "natural foods" with "clean labels", due to their limited use of processing technologies, added flavourings and preserving agents. Organic food is one of the examples regulating production processes according to these criteria. However, the further and sustainable market uptake of such foods in the organic and/or non-organic markets requires research about the contributions and interactions of all the steps from production to processing contributing to the quality of end-products and innovation across the whole value chain, ranging from product reformulation, process adjustment or introduction of new process technologies, packaging or other preservation solutions taking into account nutritional value, food quality and safety, food waste prevention, and consumer aspects such as convenience, price, and availability, as well as preference.

Scope: To increase our understanding of the impact of production processes with the aim of adjusting existing processes and product composition and/or investigating new, eco-friendly technologies, ensuring a long(er) shelf life without affecting the health benefits. A fork to farm research approach, taking into account all steps in the food production process such as post-harvest handling, processing, packaging, storage etc. needs to be adapted to the demand for natural food (including seafood) with clean labels through innovative production processes and new technologies or by the adjustment of traditional processes and product compositions. To contribute to food processing solutions in line with organic and/or non-organic food processing rules and regulations with special focus on environmental and health impacts. To investigate the effect of this process adaptation on food waste, safety, quality and (environmental and resource) sustainability of the whole value chain. To evaluate marketable applications based on industry constraints and consumer preferences and acceptance as well as analyse the effectiveness and constraints of food labels. (Standards and regulatory measures are to be taken into account). To clearly disseminate, communicate and exploit the project results to targeted audiences (NOT the 'general public').

Expected impact: Proposals should show how some, or all, of the following impacts will be achieved:

- Improve the EU sustainable food security;
- Stimulate the market uptake (with a specific focus on SMEs) of new, healthy and sustainable 'natural foods' without added flavourings and preserving agents, and no (or a limited amount of) common allergens;
- Strengthen the EU economy and manufacturing in the EU by providing close-to-market solutions for the organic and/or non-organic subsectors;
- Disseminate the results to EU food and food ingredient stakeholders, especially to food-related SMEs.
- Provide science-based policy inputs on health, novel applications, and the definition of clean labels and natural foods.

Type of action: IA

Healthy and safe foods and diets for all

SFS - 37. [2017]: Co-fund on "One Health" (zoonoses – emerging threats)

Specific Challenge: Infectious diseases naturally transmitted from animals to man, termed zoonoses, constitute major public health risks. In the past years, a number of emerging human disease problems were due to zoonoses and anti-microbial resistance is recognised as a global health threat. Such zoonotic diseases, especially when food-borne, have significant social and financial impacts in Europe and need to be addressed by all those actors across the whole farm to fork food chain. Coherence in research is needed to better understand processes triggering and propagating emerging diseases, their routing in the food/feed human – animal – environment triangle, their impact on public health and to improve the means to control these diseases with a One Health perspective, i.e. involving a synergy of human, veterinary and food, and where relevant environment, research communities . Actions need to be undertaken at a European level to identify and characterize risks in the field of food and feed safety, by developing a capacity to collect and analyse information, by supporting research on state-of-the-art tools for reference and surveillance, taking into account harmonisation of existing and new diagnostic tests. Action needs to be undertaken at the EU level, in due time, rapidely, to identify the causative agent. There is a need and added value in integrating further and aligning the national research programmes in the area and further support related policy activities, including forecasting activities for emerging threats. This needs to be done in coordination with related European initiatives, bodies and project and to take into account relevant international bodies.

Scope: The overall objective is to create a European joint programme to deal with zoonotic diseases with a main emphasis on zoonotic microbial intoxication, including natural toxins and the risks associated with domestic and wild life animal reservoirs and their exposure routes towards human infection, including those posed by possible illegal imports of animal products, in order to improve preparedness against future One Health risks. Related emerging threats such as antimicrobial resistance will be addressed. The aim is to build a sustainable frame for an integrated community of research groups including Reference laboratories and existing zoonoses networks of institutes in the domains of life sciences, medicine, veterinary medicine, animal sciences and environmental sciences, including joint programming and execution of research and other joint integrative activities such as education and training including access to strains collections, biobanks, experimental facilities and databases, including also harmonisation, standardisation, proficiency tests, training, short-term missions, workshops and summer schools. All the agents involved including viruses, bacteria, parasites and nucleotide sequences/genetic material conferring antimicrobial resistance are within the scope of the action. State-of-the-art technologies taking into account genomics research and modern tools including biotechnological and epidemiological advances will be employed taking also into account harmonisation of diagnostic tests. An appropriate governance structure should be established to ensure effective implementation of the joint programme. Legal entities participating in the action have to be nominated by Member States or Associated countries and have research funding and/or management responsibilities in the domain of zoonoses, in particular on the microbiological safety along the food chain. Coherence of research activities with public health and animal health policies will be sought. Special attention should be paid to ensuring the broadest possible participation of research entities, in particular smaller ones, commensurate with their available competencies. The acquired knowledge should provide support to informed decision taking and policy making in the domain The activities will need to be coordinated with European research related projects

(e.g. EFFORT[26], COMPARE[27]), initiatives (e.g. JPI AMR[28], GloPID-R, International Research on animal health-see SFS-xx) and entities (e.g. EU reference laboratories, EFSA, ECDC) and taking into account relevant international reference bodies such as OIE, WHO, Codex Alimentarius.

Expect impact: The project will lead to significant long term alignment of research strategies and activities at national and EU level, thus reducing unnecessary duplication of research activities in the domain of zoonoses. It will foster lasting interdisciplinary collaboration domains of life sciences, medicine, veterinary medicine, animal sciences and environmental sciences. It will advance the understanding of the risks associated with zoonoses, their origin and pathways towards human infections. It will support risk management in the domain of zoonoses.

Type of action: European Joint programme Cofund

Rate of co-financing: the contribution will be limited to a maximum of 50% of the total eligible costs of the action.

Indicative budget: €35mio

The Commission considers that proposals requesting a contribution from the EU up to EUR 35 million would allow this specific challenge to be addressed appropriately.

SFS - 38. [2016] Encouraging healthy and sustainable dietary choices and healthy lifestyles at early ages and measuring their impacts on health

Specific challenge: There is a need for an integrated EU approach to help reducing impacts on health due to poor nutrition, overweight and obesity. Exercising healthy eating is both an opportunity and a challenge for today's society. While consumer choice has never been as broad as it currently is, and access to information on the benefit of healthy diets and healthy lifestyles is easily available, consumer attitudes often result in the selection of unbalanced diets and unhealthy lifestyles. Starting from an early age, diet and lifestyle have strong impacts on health throughout the life span and we are seeing increasing rates in obesity and Type 2 diabetes in children and adolescents. Determinants of food choice are multiple, and their individual contribution and synergies are not yet well understood. Encouraging healthy consumer choices through tools such as food education programmes in schools at early ages has been explored in recent times and preliminary results show potential for increased 'healthy choices'.

Scope: With a focus on food and nutrition, tools will be developed and tested for driving sustainable healthy consumer choices and lifestyles at an early age, such as food education programmes in schools. These will be linked with the monitoring of biometric and diet-related disease trends, core measures of sustainability and cost-benefit analysis of the interventions.

[26] http://www.effort-against-amr.eu/

[27] http://www.compare-project.org/

[28] http://www.jpiamr.eu/

All these aspects should be combined in order to provide a sound basis for considerations on the development and implementation of robust policies on food education programmes in the EU, informing policy makers, educators and parents. Transdisciplinary research and multi-actor approaches, with input from natural sciences, social sciences and humanities including behavioural sciences, industrial and market actors, is needed. Engagement with schools and industry should be sought in order to work on real life challenges and to encourage formal and informal science education, with the student as the epicentre of activities. Tools and programmes will consider a range of geographical, socio-economic, behavioural, gender related and cultural factors, and will identify specific societal risk groups. Proposals should reflect on, and wherever possible build on, existing actions and programmes, including considerations on available platforms, networks and education communities.

Expected impact: With the objective of providing evidence-based support for innovative EU policies on health and nutrition, and sustainable food security, proposals should show how the following impacts will be achieved:

- Availability of efficient and sustainable ready-to-use models of tools and/or programmes for guiding consumer choice of at early ages of healthy diets and healthy lifestyles.
- Providing a robust scientific assessment of the public health impact of such tools and/or programmes, including biometric data on impact in trends of diet-related diseases.
- Encouraging choices for healthy diets and healthy lifestyles from an early age.
- Strengthening interdisciplinary research and implement a multi-actor approach to ensure long-lasting implementation of the results obtained.

Type of action: RIA

SFS - 39. [2017] The impact of consumer practices in biological and chemical food safety: risks and mitigation strategies

Specific challenge: In the EU and worldwide food safety policy is constantly reviewed in the light of new scientific evidence. Food safety legislation in the farm-to-retail food chain has achieved significant advances in consumer protection. Examples of this include controlling the occurrence of certain food-borne pathogens at farm and retail level via microbiological targets and criteria, or of contaminants and other harmful chemicals via the establishment of maximum residue limits and levels. The retail-to-fork part of the food chain, in the private consumer setting, cannot be legislated but may benefit from policy initiatives based on scientific evidence. In-retail and post-retail consumer behavioural and logistical attitudes towards food handling and preparation can substantially contribute to the risk of exposure to certain food-borne hazards, in particular to those which may not be easily or sufficiently controlled earlier in the food chain or that arise as a result of consumer practices. Scientific data on the impact of consumer practices on those risks and strategies and innovative tools that would easily empower consumers in the management of food safety risks, and considering food sustainability aspects, will help to reduce exposure to those hazards. This will result in enhanced, consumer driven, food safety. In return, the number of food-borne diseases and exposure to undesirable chemicals should be reduced, while enhancing the sustainability of the food chain and contributing to a holistic approach in a farm-to-fork food safety framework.

Scope: Coverage of biological and chemical hazards where consumer intervention can be significant in reducing exposure to food-borne hazards and/or food safety risks. By employing state-of-the-art technologies and methodologies, experimental and field characterisation of the fate of relevant food-borne hazards and their related risks due to the impact of in-retail and post-retail consumer practices, including due to consumer's behavioural or logistical aspects and when manipulating the environment where food is transported, stored and handled prior to and during its preparation for private consumption. Appropriate identification and consideration of different consumer risk-groups, taking into account gender, socio-economic backgrounds and culture-based food handling practices found in the European Union. Development, validation and implementation of novel and innovative strategies, programmes and technologies in order to empower consumers in the mitigation of biological and chemical risks from food-borne hazards. Transdisciplinary research and multi-actor approaches, including input from social sciences and humanities, are necessary to engage consumers at large.

Expected impact: In order to reduce food-borne diseases and exposure to undesirable chemicals, enhancing the sustainability of the food chain and contributing to a holistic approach in a farm-to-fork food safety framework, proposals should show how the following impacts will be achieved:

- Scientific characterisation of the contribution of in-retail and post-retail private consumer practices up to the point of consumption to exposure to food-borne hazards and their related risks.
- Empower consumers for the mitigation of risks arising from food-borne hazards with appropriate evidence-based information and validated innovate technologies that enhance consumer-driven food safety.
- Stimulate the market uptake of novel approaches to address food safety.
- Contribute to the reduction in the number of food-borne diseases and/or intoxications and exposure to chemical hazards, especially in those where the role of the consumer is a significant contributor.
- Dissemination to and engagement with relevant EU consumer associations and food industry sectors.
- Implications for strategic food safety policy towards addressing and supporting the role of the consumer in food safety.
- Strengthening trans-disciplinary research and empower multi-actor approaches for long-lasting implementation of the results obtained.

Type of action: RIA

SFS - 40. [2016] Impulsivity and compulsivity and the link to nutrition, lifestyle and the socio-economic environment

Specific challenge: Impulsivity (including hyperactivity, attention deficit, unplanned reactions, aggressiveness and other antisocial behaviours) and compulsivity disorders (including addictive behaviour) lead to individuals no longer being able to integrate into their social environment. As such, these disorders are a growing threat to individuals, families and societies as a whole. Antisocial and addictive behaviour can have an important negative impact, e.g. in schools and at the workplace, in families, homes for the elderly as well as in

prisons, in the sports stadium and on the street. Many aspects influencing such often uncontrolled behaviours are still not understood as the risk and protective factors or the distribution of risks between inherited factors and nutritional habits as well as its impact on the gut-microbiota-brain axis gained in young age. Recent studies have suggested that a change in diet and lifestyle can result in a significant reduction in impulsive, compulsive, aggressive or antisocial behaviour.

Scope: The project shall deliver new insights into the influence of diet, including sugar, fat and protein content and metabolism, vitamin and mineral balance, amino-acids and food additives, and their impact on the gut-microbiota-brain axis as well as the influence of the lifestyle, the socio-economic environment and variations in food culture on these behavioural disorders, in various population groups (including children, teenagers and the elderly) and propose solutions to this challenge. The gender dimension of these behavioural disorders must be taken into account and gender differences must be clearly investigated. An innovative research approach in support of this area requires the inclusion of many players from different disciplines. Pharmaceutical treatment of behavioural disorders is not foreseen in this call.

Expected impact: In order to find ways to improve impulsive, compulsive, aggressive or antisocial behaviour through a change in diet and lifestyles, proposals should show how some, or all, of the following impacts will be achieved:

- Deliver an impact in terms of social innovation and public health through filling knowledge gaps in the understanding of the influences of nutrition, lifestyle and the socio-economic environment and their complex interdependencies on the occurrence of impulsivity and compulsivity disorders.
- Deliver a list of remedial actions for this challenge that can be used by policy makers, politicians, practitioners, stakeholder groups, employers and concerned families or individuals.

Type of action: RIA

SFS - 41. [2017] How to tackle the obesity epidemic?

Specific challenge: Obesity is now a critical global issue, requiring a comprehensive intervention strategy rolled out at scale. More than 2.1 billion people – nearly 30 per cent of the global population – are overweight or obese. Obesity is responsible for about 5 percent of all deaths a year worldwide, and its global economic impact amounts to roughly € 1.7 trillion annually. If its prevalence continues on its current trajectory, almost half of the world's adult population will be overweight or obese by 2030.

Obesity is a gateway to many other chronic diseases such as type 2 diabetes, cardiovascular and heart diseases and cancers as well as a multitude of adverse social and psychological conditions affecting quality of life, mental health, physical, and health care costs as well as the efficiency of the workforce. Weight stigma may contribute to reduced employment opportunities and decreased access to preventive health cares and insurances. A wide range of factors interacting at various different levels (e.g. biological, demographic, psychological, behavioural, socio-cultural, environmental and governmental levels) are known to be associated to obesity. To address the complex on-going obesity epidemic challenge, experts from different disciplines need to work together with new ways of thinking to solve this societal challenge and use their combined knowledge to provide the most innovative research ideas. There is a need to broaden the view on obesity by looking at the various national initiatives (such as motivational programmes with dietary and lifestyle incentives), assessing

existing and performing new dietary and lifestyle interventions, and analysing the influence of deliberate manipulations of the environment on food choice, daily diet and physical activity. The potential of choice architecture, behaviour change, and various forms of policy development and regulation should be critically evaluated.

Scope: Within the context of improving public health and sustainable economic growth, the aim is to reduce effectively the prevalence of obesity and its comorbidities by improving strategies/approaches for prevention with healthier lifestyle and sustainable dietary behaviour. This requires a multidisciplinary approach that brings together academics, policy makers and the relevant industries. A multidisciplinary approach combining for example genetic/epigenetic and other bio-molecular approaches, microbiome, gut-brain signalling, physiological, nutritional, physical activity, behavioural, educational, environmental, architectural, socio-economic, psychological, cultural and other relevant expertise is necessary to better understand the complex interaction between these factors influencing obesity in individuals and populations. Alternative approaches and/or tools to study key components of energy balance and to assess the severity of obesity and its comorbidities and healthiness that go beyond the BMI, could be relevant. Building on existing research, holistic and innovative dietary and lifestyle intervention studies are needed in order to clearly demonstrate the effects of the different factors. The gender dimension shall be taken into account. In line with the strategy for EU international cooperation in research and innovation, international cooperation is encouraged, in particular with the US, Australia, New Zealand and Canada.

Expected impact: In the framework of tackling the obesity epidemic, proposals should show how some, or all, of the following impacts will be achieved:

- Generate a better understanding of the factors influencing the obesity epidemic.
- Contribute to reduce the obesity epidemic, improve public health and develop a healthier and sustainable behaviour. Transfer of knowledge to target groups in developing of new dietary and lifestyle tools that empower citizens to be active and engaged in lifelong strategies.
- Support to the development of the European Research Area.

Type of action: RIA

SFS - 42. [2017] Sweeteners and sweetness enhancers

Specific challenge: Over the last decades, sweeteners and sweetness (flavour) enhancers (S&SE) have become key ingredients in food produced, consumed and exported to and from the EU. Because of their diversity (natural *vs*. artificial, geographical origin, processing, caloric content, etc.), S&SE are used in different foodstuffs, dosages and food processes. However, information is lacking about new and emerging S&SEs throughout the agri-food chain, e.g. their potential use in single or multiple food (ingredient) production chains, traceability, their production and/or processing (cost) efficiency, safety and quality risk/benefit assessments (single or combined use), allergenicity and their sustainability (e.g. environmental footprint). The interaction of all these factors influences the role of S&SE in a healthy diet and the fight against obesity. In addition, the toxicological impact of high doses, combined effects and the prolonged use of new S&SE are still unknown and further clarification of the health-related aspects of S&SE needs to be further investigated, taking into account environmental sustainability.

Scope: Focus on health, obesity and safety aspects (including combined/prolonged use, metabolic effects and gut brain signalling, neurobehaviour, and effect on the microbiota). Explore the sustainability of the whole value chain (ingredient sourcing, production / processing, market opportunities of new and emerging S&SE). Investigate consumer perceptions and preferences with proper consideration given to their underlying physiological, psychological and socio-economic drivers. Disseminate to health stakeholders as well as the food industry, including SMEs.

Expected impact: With the objective of combating obesity while improving sustainable food security in the EU, proposals should show how some, or all, of the following impacts will be achieved:

- Combat obesity while improving sustainable food security in the EU;
- Stimulate market uptake (with a specific focus on SMEs) of new, healthy and sustainable S&SEs;
- Strengthen the EU economy with a move towards more sustainable and future-oriented business practices;
- Dissemination to EU food and food ingredient stakeholders, especially to food-related SMEs;
- Science-based policy inputs on health, environmental and food safety issues.

Type of action: RIA

Support to the Implementation of the EU-Africa Partnership on Food and Nutrition Security and Sustainable Agriculture

The establishment of a structured partnership EU – African Union will be supported by several actions. They are launched in support of the EU-Africa High Level Policy Dialogue on science, technology and innovation and the implementation of the jointly funded EU-Africa Research and Innovation Partnership focusing on food and nutrition security and sustainable agriculture (decision endorsed by the EU-Africa Summit 2014) taking into account the draft roadmap that is being developed jointly towards this aim. The draft roadmap can be found on: insert website. Contributions from a stakeholder consultation have been taken into account.

As part of the approach are an ERANET Cofund action, a research and innovation action on linking actors in innovation, a research and innovation action on earth observation services for monitoring agricultural production and opportunities in research infrastructure collaboration. See topics SFS-43 to SFS-45 and the infrastructure topic.

SFS - 43. [2016]: EU-Africa Research and Innovation partnership on food and nutrition security and sustainable agriculture

Specific Challenge: Access to food continues to be a global challenge, with 805 million people going hungry (global hunger index 2014), and the prevalence of undernourishment in Africa is the highest ever with 226 million people, or 21.2% (FAO food security indicators 2013). It is projected that the global population will increase from 7 billion to more than 9 billion by 2050. The majority of this growth is expected to occur in Africa. Food availability needs to increase in a situation of climate change with agricultural production systems under threat of extreme weather events and threatened natural resources, particularly water, soil and

biodiversity. Post-harvest losses of food crops from the field to the consumer have to be reduced. Increasing the quantity of food produced will not be a sufficient answer in itself as food security is an issue not only of food availability but also of access to food, affordability, stability of food supply and the quality of that supply, beyond its basic calorific value. Hence there is a need to harness science and farmer's knowledge to sustain an innovation process.

Scope: Proposals should pool the necessary financial resources from the participating national or international research programmes with a view to implementing a joint call for proposals resulting in grants to third parties with EU co-funding. To achieve these objectives, a long-term research and innovation partnership would lead to a joint and coordinated effort of African and European actors in an innovation system along the lines of three broad thematic areas:

Sustainable intensification: Both Europe and Africa are challenged to produce food in a sustainable manner. They therefore share a common interest in research on sustainable intensification. Research and innovation actions are needed to both improve the production of food/fibre/biomass and of services (social, economic and environmental) and to reduce the environmental impact and the depletion of natural resources. Ecological intensification approaches such as conservation agriculture, integrated pest management, organic agriculture, which optimise the use of ecosystem services to produce quality food in a competitive manner, include breeding of crops and animals, nutrient management and research on institutional innovations.

Agriculture and food systems for nutrition: Agriculture and food systems need improvements to reduce waste and lead to better diets. Aquaculture and coastal fisheries would be part of the approach. Both under nutrition and obesity are associated with micronutrient deficiency, which affects two billion people worldwide whose food intake is low in minerals and vitamins. Research and innovations actions would address improved low waste food value chains to deliver more nutritionally rich food to consumers, including better rural – urban linkages. A better understanding of consumer behaviour with respect to healthy diets could inform better regulation and the education and incentive system.

Improvement of agricultural markets and trade: Agriculture remains a principal mean of economic growth for many African countries and the development of markets and trade will play an important role in future jobs and growth, specifically in rural areas. Europe represents a major market for African agriculture. Research into improved global value chains would benefit both, small farmers and consumers and extend the market opportunities of organic, fair-trade or other quality label production.

The joint call should be implemented in cooperation of EU and African countries and include other national or international funders such as foundations, public and non-governmental agencies or international research programmes (CGIAR research programmes).

Expected impact:

- Effective trans-national, European-African research networking and better coordination and synergies among national, international and EU research programmes.
- Building a long-term research and innovation partnership, connecting research and innovation networks to local multistakeholder research and innovation processes.

Type of Action: ERANET Cofund

SFS - 44. [2016] Achieving food and nutrition security in Africa: the role of innovation

Specific challenge: Scientific cooperation with Africa regarding agriculture is critical to achieve food and nutrition security. For the preparation of the EU-Africa partnership on food and nutrition security and sustainable agriculture (FNSSA), it is considered necessary to investigate how to support innovation processes allowing the generated knowledge to be mobilised and to generate impact. Moreover, a critical part of innovation systems, extension and advisory services (EAS), have seen profound changes in the last decades in Africa: they have been privatised and decentralised, the thematic content and the objectives of their missions have also evolved. Various EAS coexist, with uneven delivery.

Scope: Proposals will review the various approaches towards innovation promoted and implemented by past and recent activities dealing with the subject in Africa or in other regions in the world with the objective to provide a strategy to foster innovation and impact of Africa-EU partnership on food and nutrition security and sustainable agriculture. This strategy will include elements related to the linkages with farmers' organisations and the means ensuring empowerment of the farmers, the role of civil society organisations, the role of advisory services and other intermediaries. It will develop relevant set-ups for the implementation of results of the EU-Africa partnership. In line with the objectives of the EU strategy for international cooperation in research and innovation and in particular with the implementation of the EU-Africa dialogue, proposals are encouraged to ensure commitment and participation of a variety of concerned partners established in the EU and in Africa[29]. Proposals will also carry out mappings of national EASs in African countries, elaborating typologies of EAS. Delivery of the various systems and the capacity of the EAS to establish proper links between researchers (private and public) and users will be assessed. Particular attention will be paid to orientations given through governance mechanisms (particularly in terms of farmers' involvement in orientation and programming) and funding. Proposals will be expected to establish relevant links with other projects involved in the preparation of the FNSSA partnership. Proposals should fall under the concept of 'multi-actor approach' [30].

The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts:

- Delivery of relevant activities, schemes, approaches to foster innovation in agriculture in Africa and to foster impact of the EU-Africa partnership on food and nutrition security and sustainable agriculture.
- Recommendations for relevant policies (agricultural and relevant AKIS policies, international cooperation policies). In particular recommendations regarding EAS.
- Improved implementation of research and innovation results in the farming sector in Africa.

[29] This is without prejudice to the general rules on the funding of legal entities from third countries, as set in part XX of the annex to the work programme.

[30] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

Type of action: Research and Innovation Action

SFS - 45. [2017] Earth observation services for the monitoring of agricultural production in Africa

Specific challenge: The Fourth EU-Africa Summit of 2-3 April 2014 agreed on a roadmap for 2014-2017[31] including actions specifically targeted at delivering Earth observation services in priority domains for Africa such as food security. This topic aims to contribute to this roadmap by providing food supply prediction and agricultural risk assessment for Africa. These kinds of prediction remain very challenging tasks, requiring a lot of information on environmental and weather conditions, climate change, crops and livestock. This information is usually derived from both remote and in-situ Earth observation systems. The challenge is therefore to make agricultural production in Africa more predictable by using Earth observation assets, including – but not limited to – those made available through the Global Earth Observation System of Systems (GEOSS) and Copernicus programmes.

Scope: The action should lead to substantially increasing the use of Earth observing capabilities and supporting application systems to produce timely, objective, reliable, and transparent crop and livestock production predictions at the national and regional level for the African continent. It should support the GEOGLAM[32] and AfriGEOSS[33] initiatives and relevant aspects of the EU's development policy. Moreover, it should design and develop methods to assess/monitor agricultural production in Africa, taking into account its main drivers and the longer term impacts of its dynamics. Building on the outcomes of existing EU projects stimulating innovation for global agricultural monitoring – such as SIGMA[34] –, the research and innovation activities should cover as a minimum all the following domains: crop and livestock identification and crop and livestock area estimation, crop and livestock condition and stress, yield prediction and forecasting, crop cover mapping, and the impact of extreme events on food production.

The action should foster participatory approaches to collecting relevant information and data, taking advantage of the growing number of mobile communication devices owned by African citizens. There should be an emphasis on 'consensus of evidence approaches', integrating data from multiple sources including Earth observations, crop models, weather forecast, climate predictions and projections, surveys and ground observations to reach evidence-based assessments using repeatable and scientifically sound methods.

Large proof-of-concept actions, showing the capacity to deliver food supply prediction and agriculture risk assessment beyond the current state-of-the art at regional/pan-African level should be performed by the action. Proposals should contribute to supporting the implementation of an EU-Africa partnership on Food and Nutrition Security and Sustainable

[31] http://www.africa-eu-partnership.org/sites/default/files/documents/2014_04_01_4th_eu-africa_summit_roadmap_en.pdf

[32] http://www.geoglam-crop-monitor.org

[33] http://www.earthobservations.org/afrigeoss.php

[34] http://www.geoglam-sigma.info/

Agriculture and should include partners clearly representing the diversity of African countries.

The action should establish cooperation with institutions/networks engaged in the development of climate services in Africa and with agencies which have developed mapping and assessment tools used in humanitarian decision making.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Projects are expected to:

- move prediction of food supply and agricultural risk assessment at the level of the African continent beyond the current capability;
- improve decision making capacity regarding food supply and management in Africa;
- contribute to independent and neutral evaluation of agricultural production in Africa;
- strengthen collaboration between EU and African organisations in the domain of food prediction;
- increased involvement of citizens and stakeholders in food production and food supply chain management in Africa;
- provide a strong Earth observation building blocks for an EU-Africa Research and Innovation Partnership focusing on food and nutrition security and sustainable agriculture;
- improve participation of African organisations in GEO and Copernicus;
- foster cooperation with initiatives developing the Global Framework for Climate Services (GFCS) in African countries.

Type of action: Research and innovation actions

*) A topic of relevance for the EU-Africa Partnership in the call for Research Infrastructures:

Support to trans-disciplinary bilateral cooperation on research infrastructures with Africa

Support to trans-disciplinary bilateral cooperation on research infrastructures with Africa. The proposal will build on the past experience and achievements gained in the FP7 project PAERIP (Promoting African – European Research Infrastructure Partnerships), taking also into account the recommendations deriving from the structured dialogues that have been set up between the EU and Africa such as the High Level Policy Dialogue (HLPD) that has initially focused on food and nutrition security and sustainable agriculture. Proposals should allow to further landscape the research infrastructure dimension in Africa and identify domains in which cooperation between research infrastructures would be beneficial to consequently developing roadmaps for cooperation. The proposals should in particular:

- Identify and promote opportunities (access and data sharing) available to European scientists in these research infrastructures;
- Help developing better coordination and cooperation of European research infrastructures with their non-European counterparts, ensuring their global interoperability and reach, and pursuing international agreements on the reciprocal use, openness or co-financing of infrastructures;

Appropriate involvement of African participants is encouraged and will be taken into account during evaluation.

Budget: X MEUR

Implementation of the EU-China FAB Flagship initiative

EU-China FAB Flagship initiative will be implemented with topics SFS-46 to SFS-51.

SFS - 46. [2017] A joint plant breeding programme to decrease dependency of the EU and China on protein imports

Specific challenge: Legume crops are a critical source of plant-based proteins for people as well as for animals. However, research has been given little priority so far by the public as by the private sector. The EU and China are facing a similar challenge as both regions are protein-deficient and are increasingly dependent on protein imports both for food and animal feed purposes. In recent years (mainly due to its continuous growth of population and urbanisation), soybean imports of China have increased very fast, reaching 60 million tons in 2013 (corresponding to 60% of world market trade). This unique situation for a commodity will have important consequences on the equilibrium of the global market and might create price distortions in the near future if imports are going to increase, as indicated by most recent long-term projections. The EU and China have therefore a common interest to cooperate on long-term strategies to develop sustainable alternatives to protein imports with a view to decrease their dependency and contribute to stabilising world market.

Scope: Proposals will develop efficient long-term breeding strategies for increasing diversification, crop productivity and stability as well as protein quality of legume crops (both grain and forage legumes) for human and animal food. Opening the currently available genetic base for breeding purposes (characterisation) and exchanging novel genetic resources material between the EU and China by providing mutual access to gene banks through open databases will be explored. Proposals will have to test plant performance (phenotyping) of a wide range of species and varieties in several different geographical (climatic) and environmental situations both in the EU and China in a context of climate change to select the most suitable species and varieties in specific agro-ecological conditions. Resistance to a combination of biotic and abiotic stresses (including heat and drought stress tolerance) will be further analysed. Proposals will make use of the wide range of available and promising future technologies both in the EU and China as well as traditional breeding methods.

The Commission considers that EU partners in the proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Contributions for CN partners will come in addition and will be made available by China.

Expected impact:

- Decrease overall long-term dependency of European and Chinese agricultural systems to protein imports and therefore contribute to the stabilisation of world markets

- Enlarged range of available genetic resources of legume crops that could potentially be used in large breeding programmes
- Enhanced common methodologies, tools and technologies for the characterization and evaluation of new genetic resources
- Adapted new varieties to local conditions with a view to increase overall productivity and quality of legume crops
- Adapted new varieties to biotic and abiotic stresses in a context of climate change

Type of action: RIA (Research and Innovation Action)

SFS - 47. [2017] Increase overall transparency of processed agro-food products

Specific challenge: In recent years, the EU-China trade relations are growing very fast and the agricultural sector has become an important sector both for imports from and exports to China. However, many barriers to trade relations related to safety issues, standardisation and traceability (including fraud) in agro-food products still exist and are hampering trade predictability. In addition, there is a need to contribute to the prevention of major food safety crisis along the whole food chain, to meet consumers' expectations for international standards and ensure authenticity of high quality products such as Geographical Indications (GIs). Implementing food safety management systems along the food chain is a major aspect for creating better overall framework conditions for innovation and in particular increasing marketing and commercialisation of innovative products and of new technologies.

Scope: Proposals will help contributing to the development of food safety management systems in processed agro food products that will enhance overall transparency of the food chain. The complex issue of the supply chain for packaging (including the origin of raw material) will be the subject of dedicated attention. The traceability concept will also be subject to further analysis as its correct worldwide application is the milestone for preventing spreading of food safety risk during crisis and fully contributes to the overall GIs policy. Proposals should elaborate specific models, tools, technologies and testing methods based on risk analysis that will eventually be implemented by agro-food manufacturers and agro-food operators in Europe and China. Good practices guide supporting better food safety management systems should be delivered and demonstration and pilot activities will be implemented in key sectors. Exchange and convergence of best practices between the EU and China, training of experts and laboratory cooperation to ensure equal performances of laboratories to facilitate the harmonisation of food safety standards will be essential. Proposals are expected to elaborate feasibility studies to establish a sustainable EU-China joint laboratory that will aim at ensuring the respect of the limits established by the standards in accordance with harmonised testing procedures. Proposals will look at production sectors that might have the highest impacts both in terms of potential risks and commercial value such as wines and spirits, dairy products, processed meat and fruits and vegetables.

The Commission considers that EU partners in the proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Contributions for CN partners will come in addition and will be made available by China.

Expected impact:

- Contribute to develop a common EU-China vision of global food safety issues that will increase trade and improve trade predictability in key production
- Increase consumers' confidence in processed agro-food products exchanged between the EU and China and in domestic markets
- Increase the transparency of the food chain and self-responsibility of food manufacturers, in particular in processed agro-food products
- Reduce human health risks linked to food processing and packaging
- Improve the traceability tool along the food and feed chains
- Increase the cooperation between EU and China at technical and scientific levels

Type of action: RIA (Research and Innovation Action)

SFS - 48. [2016] Alternative production system to address anti-microbial usage, animal welfare and the impact on health

Specific challenge**:** Confined systems dominate in modern farm animal productions worldwide, in particular in monogastric species. These systems often constrain natural animal behavior, may result in health problems and product quality issues. To ensure a safe and maximal production, the overuse of anti-microbial drugs in farm animals is common, either for veterinary treatment, or for growth-promoting purposes in those countries where they are allowed. Drug residues may accumulate in animal products and the environment, lead to food quality issues and constitute a risk for consumers. Welfare and environmental friendly production systems may be able to improve animal's immunity and health conditions, reduce veterinary drug use, next to other measures such as good husbandry practices and biosecurity. EU has an increasingly active policy on improving animal welfare and on fighting against the threat of anti-microbial resistance. As China is facing high levels of veterinary drugs in increasingly intensive production systems, there is an interest to cooperate on strategies to develop more sustainable production systems.

Scope**:** focusing on monogastric species in confined intensive systems, the proposed research activities should assess the links between welfare and health of livestock, the determinants of these links,, the related use of anti-microbial drugs and the subsequent presence of residues in the products and their spread into the environment. They should address immunity and health, biosecurity measures, residue detection. The proposed activities should develop possible ways, including tools, methods and schemes, by which more welfare friendly production systems can help improve health and reduce the use veterinary drugs. The proposed activities should as much as possible measure the potential impact of the proposed measures, including the socio-economic aspects and the possibility to set up distinctive schemes (standard setting, management, policy, monitoring and verification components).

The Commission considers that EU partners in the proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Contributions for CN partners will come in addition and will be made available by China.

Expected impact:

- welfare friendly production systems (housing, equipment, technology) for farm animals to effectively improve its immunity & health and welfare;

- Reduced veterinary drug use at farm levels and reduced residue in animal products in order to improve food safety;
- Improved biosecurity at farm level;
- Contribution to develop common legislation and standard setting between the EU and China

Type of action**:** RIA (Research and Innovation Action)

SFS - 49. [2016] Soil water resources management in the EU and China and its impact on agro-ecosystem functions

Specific challenge: Soil is the largest terrestrial water reservoir and crop yield variability is a function of soil hydraulic properties and nutrient input and therefore plays an important role in food and environmental security. The lack of water to sustain crop production systems and other agro-ecosystem services is already a major issue in many Mediterranean areas of the EU and climatic predictions suggest that there will be increased variability and unreliability of precipitation in most areas of the EU. As China is facing similar problems in many parts of the country, there is a common interest to increase cooperation on this key issue to promote sustainable production systems in a changing environment. [The topic will build on the report prepared by the Sino-EU Panel on Land and Soil "Threats to the soil resources base of food security in China and Europe].

Scope: Proposals will assess this function by linking data and models obtained on long-term experiments and integrated them in a system approach by considering regional climate scenarios in Europe and China. Linkages between agricultural soil hydrology and threats will have to be systematically assessed and adaptation and mitigation methods provided, taking into account land use dynamics, economic context and social aspects of soil water management. Best case on-farm and water-shed practices adapted to local conditions will be developed for soil water management (conventional and advanced technologies), including water re-use and use of waste water.

The Commission considers that EU partners in the proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Contributions for CN partners will come in addition and will be made available by China.

Expected impact:

- Improve both soil and water use efficiency in agricultural production
- Identifying tools, mainly at farm level, to improve soils water holding capacities and plant productivity under drought or floods risks. The practices to be effective need to be conducted at the farm level and then up-scaled regionally
- Identifying new advanced sustainable technologies for soil water management to efficiently reduce crop yield variability and the impact of extreme weather events on crops
- Evaluation and study of water balance at watershed level and the evaluation of real water footprint for crops.

Type of action: RIA (Research and Innovation Action)

SFS - 50. [2017] Resource-efficient urban agriculture for multiple benefits – Contribution to the EU-China Urbanisation Partnership

Specific challenge: With increasing urbanisation, high daily flows of agricultural products, water and energy coming from rural/remote areas enter cities where high amounts of heat, CO_2, waste water and other waste are generated. Urban agriculture can contribute to improve food security and to bring economic, environmental and social benefits to cities. Indeed, technological and social innovation in urban agriculture can notably play an important role in mitigating climate change, closing nutrient cycles and build more resilient urban areas.

Scope: The proposals should investigate innovative integrated urban farming systems which can use resources efficiently (e.g. space, energy, water, nutrients) and reuse or recycle heat, water, CO_2, waste or by-products from urban sources (e.g. industry, households) for horticultural production such as fruits, vegetables, herbs, sprouts, mushrooms, algae, ornamental trees and plants. The production and use of renewable energies (e.g. solar/wind energy, biogas) in these farming systems will also be investigated. Several (3-5) resource-efficient production systems in controlled environment or not should produce safe and high quality products and be demonstrated in different open urban spaces (e.g. rooftop/vertical farming, individual/collective gardens, other unused spaces) and at least in one European city and one Chinese city in different climatic conditions. Breeding activities are excluded.
The innovative production systems and the associated value-chains should be built according to business models which target economic and social benefits and are agreed with the relevant local actors and stakeholders. The contribution of these demonstrated production systems and value-chains to cities food security should be assessed as well as the economic, environmental and social impacts on the urban communities with new evaluation methods of multi-functional urban agriculture. Policy recommendations and best practices guides supporting sustainable urban farming systems should be delivered and knowledge platforms should be promoted. Proposals should fall under the concept of 'multi-actor approach'[35] targeting all relevant actors such as researchers/technology providers, public authorities, and private actors (e.g. restaurants, retailers, urban farmers, real estate businesses) and should also perform public engagement targeting urban communities.

The Commission considers that EU partners in the proposals requesting a contribution from the EU up to EUR 7 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Contributions for CN partners will come in addition and will be made available by China.

Expected impact:

- Shorter supply chains of safe and high-quality food and other horticulture products which reduce ecological footprint of cities by limiting losses and energy during transport
- Resource-efficient low-carbon urban farming systems with low consumption of water, energy, fertilizers, pesticides and space, and use of waste heat, CO_2, waste or rain

[35] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

water and other waste or by-products from urban source, which minimise environmental impacts and contribute to develop the circular economy
- Improved knowledge of business models for urban farming, including the thorough understanding of their potential for development, performance and interest in economic, environmental and social terms as well as success factors or reasons for failures;
- More sustainable and resilient urban development via notably the provision of ecosystem services (e.g. reduced air pollution, better water retention limiting floods, biodiversity, carbon sink, recreation, greener urban landscapes), social cohesion and jobs creation
- Increased collaboration at international level with knowledge and best practices exchanges notably between EU and China

Type of action: IA (Innovation Action)

SFS - 51. [2016 or 2017]: Food systems and water resources for the development of inclusive, sustainable and healthy Euro-Mediterranean societies (PRIMA)

[Placeholder: to be developed; will be added to call tables when finalised] TBC, pending decision on a CSA in SC5 WP

Specific challenge: Rapid demographic, socio-economic, and climate changes are threatening the sustainable development of the Mediterranean region, especially the capacity of its agriculture to cope with increased demand for food production in a scenario of water scarcity and increasing competition for water use between different sectors. A significant and well-coordinated research effort at regional scale is needed to find innovative solutions to further improve water productivity at farm and processing level. In its recent conclusions on a partnership for research and innovation in the Mediterranean area, the EU Council recalled the importance of creating a stable long-term and sustainable framework to deal with these challenges, based on the principles of co-ownership, mutual benefit and shared benefit. To ensure a long term commitment from the participating countries in a well-structured and integrated partnership, it is necessary to prepare the ground by integrating various related on-going joint programming activities on food and water into a large scale coherent programme with well-defined objectives and implementation actions.

Scope: The objective of this action is to bring together the main national research funding owners and/or managers involved in the PRIMA joint programming process, including the non-European participating states and their institutions, around a jointly designed Strategic Research Agenda with appropriate governance and implementation structures.

Expected impacts: Projects are expected to:

- reinforce cooperation and coordination of food systems and water research programmes within a long term partnership involving research funding bodies from the two sides of the Mediterranean area, reduce fragmentation of efforts and enhance a collective ownership;
- facilitate consultation, awareness and commitment;
- support structural, long-lasting progress toward sustainable economic and social development in the Mediterranean;

- unlock the innovation potential of participating countries in water management and use for food security;
- optimise the launch and implementation of a long term partnership, ensuring an appropriate funding from the participating countries and leverage effect.

Type of action: *Tbd*

CONDITIONS FOR THIS CALL

SFS CALL (F4 contribution)

Opening date[36]: XX/XX/201X for 2016 topics
XX/XX/201X for 2017 topics

Deadlines[37]:

SFS-12-2016 SFS-24-2016 (CSA) SFS-25-2016 (CSA) SFS-13-2016 SFS-35-2016 (IA) SFS-19-2016 SFS-43-2016 (ERANET)	02/03/2016 at 17.00.00 Brussels time	
SFS-1-2016 SFS-2-2016 SFS-3-2016 SFS-5-2016 SFS-6-2016 SFS-7-2016 SFS-9-2016 SFS-11-2016 SFS-12-2016 SFS-13-2016 SFS-14-2016 SFS-21-2016 SFS-23-2016 SFS-24-2016 SFS-25-2016 SFS-26-2016 SFS-31-2016 SFS-33-2016 SFS-35-2016 SFS-38-2016 SFS-40-2016 SFS-43-2016 SFS-44-2016 SFS-48-2016 SFS-49-2016 (RIA)	First stage 02/03/2016 at 17.00.00 Brussels time	Second stage 14/09/2016 at 17.00.00 Brussels time
SFS-18-2016 (FPA)		14/09/2016 at 17.00.00 Brussels time
SFS-4-2017 (CSA)	XX/XX/2017	

[36] The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening

[37] The Director-General responsible may delay this deadline by up to two months.

SFS-22-2017 SFS-36-2017 SFS-51-2017 (IA) SFS-37-2017 (EJP)	at 17.00.00 Brussels time	
SFS-7-2016/2017 (RIA) SFS-8-2017 (RIA) SFS-10-2017 SFS-13-2017 SFS-15-2017 SFS-16-2017 SFS-17-2017 SFS-20-2017 SFS-21-2017 SFS-22-2017 SFS-27-2017 SFS-28-2017 SFS-29-2017 SFS-30-2017 SFS-32-2017 SFS-34-2017 SFS-39-2017 SFS-41-2017 SFS-42-2017 SFS-45-2017 SFS-46-2017 SFS-47-2017 SFS-50-2017 (RIA)	First stage XX/XX/2017 at 17.00.00 Brussels time	Second stage XX/XX/2017 at 17.00.00 Brussels time

Indicative budget: EUR 211 million from the 2016 budget[38], and EUR 200 million from the 2017 budget

	2016 EUR million	2017 EUR million
SFS-1-2016	12.00	
SFS-2-2016	10.00	
SFS-3-2016	5.00	
SFS-4-2017		2.00
SFS-5-2016	7.00	
SFS-6-2016	7.00	
SFS-7-2016/2017	10.00	10.00
SFS-8-2017		8.00
SFS-9-2016	5.00	
SFS-10-2017		15.00
SFS-11-2016	12.00	
SFS-12-2016	3.00	
SFS-13-2017		6.00

[38] Of which EUR 7.00 million from LEIT-ICT

SFS-14-2016	11.00	
SFS-15-2017		14.00
SFS-16-2017		9.00
SFS-17-2017		10.00
SFS-18-2016	-	-
SFS-19-2016	17.60	
SFS-20-2017		5.00
SFS-21-2016-2017	5.00	5.00
SFS-22-2017		6.00
SFS-23-2016	8.00	
SFS-24-2016	2.00	
SFS-25-2016	2.00	
SFS-26-2016	10.00	
SFS-27-2017		10.00
SFS-28-2017		10.00
SFS-29-2017		5.00
SFS-30-2017		12.00
SFS-31-2016	5.00	
SFS-32-2017		10.00
SFS-33-2016	6.00	
SFS-34-2017		6.00
SFS-35-2016	6.50	
SFS-36-2017		3.00
SFS-37-2017		35.00
SFS-38-2017	9.00	
SFS-39-2016		10.00
SFS-40-2017	12.00	
SFS-41-2016		13.00
SFS-42-2017		9.00
SFS-43-2017	10.00	
SFS-44-2016	5.00	
SFS-45-2017		10.00
SFS-46-2017		5.00
SFS-47-2017		5.00
SFS-48-2016	5.00	
SFS-49-2016	5.00	
SFS-50-2017		7.00

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

SFS-28-2016	South Asian countries include Indonesia, Thailand, Malaysia, Singapore, Philippines, Vietnam, Myanmar, Brunei, Cambodia and Laos.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same s

core is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[39] published on the Participant Portal.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single or first stage*)	Information on the outcome of the evaluation (*second stage)*	Indicative date for the signing of grant agreements
	Maximum 5 months from the final date for submission		Maximum 3 months from the date of informing applicants
	Maximum 2 months from the final date for submission	Maximum 5 months from the final date for submission	Maximum 3 months from the date of informing applicants
	Information on the outcome of the evaluation (*single or first stage*)	Information on the outcome of the evaluation (*second stage)*	Indicative date for the signing of grant agreements

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

[39] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

Call for Blue Growth - Demonstrating an ocean of opportunities

In a context of growing demand for resources and competition, sustainably capturing and demonstrating the potential of seas and oceans is critical to turn this potential into an asset for Europe with long-lasting economic, social and environmental benefits. Targeted innovation in our seas and oceans can play a key role to tackle global challenges such as the scarcity and vulnerability of strategic resources (i.e. for food, energy, etc), while factoring in the climate change risks. This has the potential to provide more jobs, growth, renewable energy sources as well as climate-smart solutions. However, a risky environment, insufficient knowledge, data or data access, as well as uncertain financial and legal frameworks represent critical barriers to overcome.

EU intervention is therefore needed to bridge these gaps and create the conditions for mobilising investment in testing and demonstration projects for new technologies, bringing them 'from lab to market' while avoiding costly duplication of efforts.

This Focus Area will fully address cross-cutting marine and maritime research as specifically called for in the Specific Work Programme of Horizon 2020. It will bring technologies to readiness level for commercial applications and will strengthen the existing European marine observing, surveying and monitoring capability in order to increase our knowledge and understanding of the complex marine environment and its interaction with human activities. Finally, it will maximise synergies with activities funded at national and regional levels.

The Blue Growth Focus Area WP 2016 – 2017 is based on three interlinked pillars, all of which include mainstreaming of skills and competence development:

1. Innovation for emerging Blue Growth activities: the objective is to test, demonstrate, scale-up and bring to the market existing or new marine and maritime technologies, support innovative products and the development of new services.
2. Healthy oceans and seas for healthy people: the objective is to explore the interactions between the oceans and human health.
3. Strengthening the European ocean observing, surveying and monitoring capability: the objective is to create an inter-operational ocean and sea basin observation system, as well as the development/deployment of technologies necessary to accelerate the production of a high-resolution map of EU Sea Basins.

This Focus Area contributes to implement the EU Strategy for international cooperation in research and innovation[i] and other commitments made, such as the Galway Statement (the Arctic), the Blue Med initiative and cooperation with South-East Asian countries in the field of aquaculture.

This Focus Area has cross-cutting activities with other areas of Horizon2020, such as *Secure, clean and efficient energy* (Societal Challenge 3), *Smart, Green and Integrated Transport* (Societal Challenge 4) and *Climate action, environment, resource efficiency and raw materials* (Societal Challenge 5).

Wherever possible, proposers may seek synergies, including possibilities for funding, with relevant national/ regional research and innovation programmes and/or cumulative funding with European Structural and Investment Funds in connection with smart specialisation strategies.

Proposals are invited against the following topics:

Innovation for emerging Blue Growth activities

BG-1-[2016]: Large-scale algae biomass integrated biorefineries

Specific challenge: In a context of growing demand for resources and competition for land use, sustainably capturing the potential of seas and oceans is critical for the European Union. New markets, services and products will only arise from innovative, resource-efficient and integrated approaches which cut across economic sectors such as marine biomass integrated bio-refineries. Despite the large potential of algae as a production platform, the implementation is still limited mainly due to unfavourable economics. At present, microalgae are being applied in a limited volume (< 10.000 tonne dry weight/year) in various niche markets (including food supplements) and macroalgae mass production is facing several challenges including lack of space to further extend. To reach broader economic viability, costs of algal biomass production need to be reduced and the scale of production needs to be increased significantly. Even when the price of biomass production is reduced, algal biomass needs to be refined into multiple products in order to increase its total value and achieve economic feasibility. An integrated biorefinery concept of macro- or micro-algae and higher value bulk or speciality products can lead to an economically feasible process. Thus cost reductions in biomass production and harvesting in a sustainable way are essential for the further development and scale-up of the algal bioeconomy sector.

Scope: The proposals should focus on the optimisation of large-scale algae biomass production and harvesting systems for integrated bio-refineries demonstration projects aiming at testing, demonstrating, scaling-up production and harvesting concepts and bringing them nearer to the market in an economically, environmental and socially sustainable manner. They should leverage on existing or new marine and maritime technologies. The proposals should address key challenges for scaling up algae production systems, in particular higher yielding algae species, optimised operation conditions and energy saving, limited contaminants, recycled nutrients and water, optimal CO2 use, storage and preservation of harvests before treatment, etc. The proposals should also investigate at large scale the conditions for the access to sites, including in open sea combined or not with other maritime activities, as well as reducing the impact on the environment. The techno-economic viability of the proposed integrated approach, from algae to final added-value products, as well as life cycle assessment should be critical elements of the proposal. Stakeholders' engagement across the value chain and social acceptance should also be investigated involving representatives of concerned local coastal communities. Finally, the proposals should devise operational strategies in order to increase education and skills in these sectors.

The Commission considers that proposals requesting a contribution from the EU between EUR 6 and 8 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: In the context of capturing the potential of seas and oceans and in order to to optimise algae mass production and secure a sustainable development of integrated bio-refineries, proposals will:

- Develop marine innovation by de-risking investments and demonstrating the technical and economic feasibility of large scale algae biomass production for integrated bio-refineries for a range of value-added products.

- Bring to the market new and cost effective technologies and production systems.
- Increase stakeholder engagement and societal acceptance to achieve productive and sustainable algal biomass production for the benefit of the society.
- Enhance the competitiveness of European industry by demonstrating the potential of oceans for new jobs, growth and investment.

Type of action: Innovation Action

BG-2-[2016/2017]: High value-added specialised vessel concepts enabling more efficient servicing of emerging coastal and offshore activities

Specific Challenge: Increasingly business and services are undertaken within the marine space. Examples include: offshore terminals, aquaculture, renewable energy, marine biomass, blue tourism, survey, accident response and clean up, clearing of marine debris and other pollutants. Costs at sea are higher than an equivalent shore based operation and a significant proportion of these costs are associated with the support vessels which service these activities. Inappropriate vessels can increase costs due to having a limited operational weather windows, high overheads, slow speed, low efficiency and being ineffective for the task concerned. European yards and their suppliers (often consisting of SMEs), are world leaders in high value-added vessels and highly specialised ships. The challenge is to develop novel specialised vessel concepts which are economically viable which will more effectively serve coastal and offshore activities, there by supporting European growth and employment through development of a Blue Economy.

Scope: Concepts, should be developed to a pre commercial stage and include: model testing, consideration of the most suitable construction and productions principles for small series or one off vessel of this type, environmental impact assessment, cost estimation as well as both the marketability (technology push), and the cost effectiveness of the offshore operations concerned (demand pull). The topic will support development and testing of vessel concepts and its equipment that reduce costs and enable more efficient operations within either coastal environments or offshore as follows:
1 – Specialised vessel for coastal activities (2016)
2 - Specialised vessels for offshore activities (2017)

For 1, the Commission considers that proposals requesting a contribution from the EU between EUR 3 and 4 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.
For 2, the Commission considers that proposals requesting a contribution from the EU between EUR 3 and 4 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: To support significant economic growth and employment within the EU, proposals will:

- Develop solutions to at least TRL 4 that will have high impact on the development of a European marine and coastal economy.

- Aim at cost reductions of at least 20% compared to current practices with consideration of the entire process including increased productivity and the vessel cost.
- Increase the capability of European industry and in particular SME's within the marine and maritime sectors.
- Satisfy a market demand for the capability addressed by the concept.

Type of action: Innovation Actions

BG-3-[2016]: Multi-use of the oceans marine space, offshore and near-shore: compatibility, regulations, environmental and legal issues

Specific Challenge: Combining several activities such as renewable energy, aquaculture, maritime transport and related services in the same marine space, as well as the introduction of multi-use platforms, has the possibility to divide the infrastructure overhead and reduce the costs of offshore operations and the demand on the space needed for different activities. Barrier to multi use of the oceans is that different regulatory regimes, practices, environmental and safety regimes apply to different sectors and within different national jurisdictions. Furthermore, there is a lack of common understanding of the nature of operations within different sectors and the feasibility for these to be combined and to provide a mutual benefit. The challenge is to identify the real and perceived barriers to integration. There is a need to have a clear overview of compatibility, regulatory, environmental, safety, societal and legal issues which impact the combination of marine and maritime activities.

Scope: The economic, spatial, environmental and societal benefits of co-location of coastal and offshore activities can be hindered by regulatory, operational, environmental, health and safety, societal and legal barriers. An overview of all barriers both real and perceived is required as well as an action plan to overcome these challenges. It is expected that stakeholders (industry, NGOs, governmental organisations and representatives of concerned local communities) are actively engaged within this action.

The Commission considers that proposals requesting a contribution from the EU of EUR 2 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: In order to reduce costs of offshore operations and the marine space needed for different activities, proposals will:

- Enable a full understanding of barriers and possibilities associated with combining marine activities.
- Reduce risks associated with the commercial development of combined activities offshore and near-shore.
- Concentrate marine activities to enable more efficient use of the marine space with reduced environmental impact.
- Enhance social acceptance of these new developments by local communities and society at large.
- Increase development of European offshore activities supporting the Blue Growth agenda.
- Better harmonise regulations.

Type of action: Coordination and Support Action

BG-4-[2017]: Multi-use of the oceans marine space, offshore and near-shore: Enabling technologies

Specific Challenge: Combining several activities such as renewable energy, aquaculture, maritime transport and related services in the same marine space, including in multi-use platforms, has the possibility to divide the infrastructure overhead and reduce the costs of offshore operations and the demand on the space needed for different activities. Research on multi-use platforms funded under FP7 'The Oceans of Tomorrow' has already provided promising designs, technological solutions and models for combining activities in terms of economic potential and environmental impact. However, before reaching a demonstration pilot stage, further technological research and innovations are needed to reduce risks for operators and investors.

Scope: Proposals should develop combinations of innovative, cost-effective technologies and methods, including automation and remote monitoring technologies, flexible structures and facilities in order to test concepts of multi-use platforms leading to pilot demonstration phases. The proposals should test the sustainable operability of co-located maritime activities around coastal or deep sea environments. Proposals should also address health and safety issues at multi-use marine platforms. Economic viability and societal acceptance should also be investigated, especially by involving local communities. The proposals should capitalise on the results of EU and national projects including those testing business models of multi-use platforms for their economic feasibility and environmental sustainability.

The Commission considers that proposals requesting a contribution from the EU between EUR 3 and 4 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: To reinforce European competitiveness in the Blue Economy, proposals will:

- Bring technologies and selected designs of multi-use facilities to readiness level (TRL4-TRL6) for pilot demonstration.
- Reduce costs of implementation and increase economic viability of multi-use platforms for European maritime industry.
- Improve health and safety in multi-use marine platforms.
- Secure acceptance of these new developments by local communities and society at large.
- Contribute to the implementation of the Integrated Maritime Strategy and its environmental pillar.

Type of action: Innovation Action

BG-5-[2017]: ERANET COFUND on marine technologies

Specific Challenge: Innovation in seas and oceans can play a key role to tackle global challenges such as the scarcity and vulnerability of strategic resources and to unlock the potential of the blue economy, while factoring in the climate change risks. EU intervention is needed to create the conditions for mobilising investments while avoiding costly duplication of efforts.

Scope: Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing a joint call for proposals with EU co-funding resulting in grants to third parties. Proposals may involve, in addition, publicly-funded research performing organisations that will contribute with their own resources (in-kind contributions). In this case the joint call should include a separate topic for the participating research performing organisations. They will carry out the transnational projects resulting from this topic themselves. Their participation in the ERA-NET Cofund action must be mandated by the national/regional authorities in charge (normally the responsible Ministry). Proposals should address various applications including environmentally friendly, secure and safe waterborne transport, offshore and sub-sea activities, aquaculture, bio-refineries, desalination plants, etc. The proposals should focus on overarching challenges such as reducing underwater noise and emissions, minimising carbon footprint, developing novel recycling-oriented production technologies and processes, new materials, or sensors for navigation, observation and monitoring, including for deep-sea environment. The proposals should also aim at implementing other joint activities including additional joint calls without EU co-funding with open maritime and marine topics consistently with the Joint Programming Initiative "Healthy and Productive Seas and Oceans" (JPI Oceans) Strategic Research and Innovation Agenda and its Implementation Plan.

The Commission considers that proposals requesting a contribution from the EU of EUR 9.5 million would allow this area to be addressed appropriately.

Expected Impact: To contribute to the implementation of the European Blue Growth Agenda, proposals will:

- Bring to the market new knowledge-intensive products and services for marine and maritime activities.
- Increase resource efficiency, security, safety and environmental compliance of maritime activities.
- Reinforce trans-national, pan-European research networks and synergies among national/regional and EU research programmes.
- Enable economy of scale and research investment efficiency by an increased alignment of national/regional research programmes, in particular within the Joint Programming Initiative "Healthy and Productive Seas and Oceans".

Type of action: ERA-NET COFUND

Healthy oceans and seas for healthy people

BG-6-[2017]: Interaction between humans, oceans and seas: a strategic approach towards healthcare and wellbeing.

Specific Challenge: The interaction between humans and oceans and seas is a broad domain with key impacts on human health and wellbeing and yet it remains fragmented, poorly understood and underexploited. As coastal populations grow worldwide, not only due to permanent dwellers but also to increasingly larger masses of tourists, the determinants and impacts of this interrelation between oceans and humans becomes more relevant. On the one hand, the seas are a source of benefits namely through food, feed and positive impacts on overall wellness. On the other hand, the risks associated to the marine environment include chemical and physical pollutants of anthropogenic origin, harmful algal blooms, and a myriad

of marine microorganisms accountable for a still poorly assessed share of human morbidity and mortality. Therefore, there is a need to coordinate multidisciplinary research knowledge across Europe about the benefits and risks of the interaction and formulate evidence-based policies that can benefit citizens.

Scope: Proposals should devise the creation of a multi-stakeholder forum that shall enable a better understanding of the potential health benefits from marine and coastal ecosystems, permit a more effective anticipation of new threats to public health, and contribute to reduce the burden of disease caused by the interplay between marine-degraded environments and human behaviour. This forum should issue a strategic research agenda based on data covering biological, cultural and socioeconomic dimensions of the interaction between oceans and human health that ultimately impact morbidity and mortality in the general population. Data should encompass sex and gender differences in the populations studied. Data should be assessed through an active involvement of diverse stakeholders across Europe including local marine communities, civil society, industry, and public authorities.

The Commission considers that proposals requesting a contribution from the EU of EUR 2 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: In order to support key EU policies, in particular those directly related to the marine and maritime sectors such as the EU Blue Growth Agenda, the Blue Tourism Communication and the Marine Strategy Framework Directive, proposals are expected to:

- Create a multi-stakeholder forum that issues a strategic research agenda for oceans and human health, based on new scientific and/or technological evidence and best practices across different geographical locations and climates.
- Highlight novel, cost-effective solutions or interventions that enable effective policy making targeted at maximising health benefits and minimising risks derived from exposure to marine and coastal ecosystems.
- Active involve local communities across different European maritime regions, comprising civil society, industry, public authorities in data supply, knowledge generation and solution implementation processes.
- Improve global cooperation around oceans and human health.

Type of action: Coordination and Support Action

BG-7-[2017]: Blue green innovation for clean coasts and seas

Specific challenge***:*** Debris, chemical and microbial pollution, and blooms of algae and jellyfish are huge and increasing problems in the oceans, seas and coasts. For plastics alone, the economic and ecological cost is considerable when including beach clean-ups, tourism losses, and damages to fishing and aquaculture industries. In spite of strong legislation such as EU directives, pollution at sea remains high, and prevention as well as innovative coast and sea clean-up schemes remain a challenge. Many solutions are available to tackle these sources of pollution, including teams of collectors, and specific equipment such as skimmer boats, beach cleaning machines or algae harvesting devices. However there is a pressing need to develop powerful innovative methods and processes to clean coast and oceans and to restore the ecosystems to a healthy and clean state. The foremost challenge is not only to remove

litter and pollution, but to transform the collected waste into a resource stream in line with the concept of circular economy[40].

Scope: The proposals should be for demonstration projects to clean and lay the ground for a healthy ocean or sea and its coasts. They should be built on a sound analysis of the problem of pollution at sea and on the coasts and the associated ecological and economic costs in any given large geographic area(s), which can include regional seas or semi-closed sea basins such as the Mediterranean. This analysis should include an inventory of the origin of these pollutants, their impacts on ecosystems, the modelling of long-term effects of cleaning, and best practices for clean-up and treatment schemes. The demonstration projects should develop and scale-up innovative processes and measures to clean a selected site[41] from visible and invisible litter and pollutants[42], involving local communities and actors. Collected waste materials should be adequately processed so as to enable a subsequent usage/ exploitation/ re-usage. The proposals should also apply an ecosystem approach, developing forecasting tools and models to identify areas where the proposed intervention is likely to be most effective. Social acceptance and economic impact of measures envisaged should also be considered.

The Commission considers that proposals requesting a contribution from the EU between EUR 4 and 6 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: To contribute to the implementation of EU Policies such as the Marine Strategy Framework Directive and its aim for a Good Environment Status of our seas and oceans by 2020, proposals are expected to:

- Develop innovative technological methods or processes for cleaning coasts and seas and transforming waste into a resource.
- Reduce cleaning up/restoration costs through cost-effective solutions, in particular through enhanced resource efficiency.
- Increase awareness and acceptance of civil society about the importance of healthy oceans and seas, devoid of litter and pollutants.
- Progress towards the reduction of pollution in regional sea basins and beyond as well as the restoration of marine ecosystems.

Type of action: Innovation Actions

BG-8-[2016]: Innovative sustainable solutions for improving the safety and dietary properties of seafood

Specific Challenge: The seafood[43] production and processing industry contributes substantially to food security, employment and trade in regions where the activity takes place.

[40] An example is the partnership between Project Kasei and Covanta Energy for the conversion of plastic to fuel.

[41] Each site should be substantial in size and include or be adjacent to different activities.

[42] The exact selection of pollutants and litter will depend on the area selected. However, the choice of the area must be so that several sources of pollution are addressed.

[43] 'Seafood' comprises marine and fresh water biological resources (as defined in the Common Fisheries Policy) both from fisheries and aquaculture.

To safeguard and enhance these values and make this activity more sustainable, seafood production should be market-driven and consumer-responsive, addressing challenges such as increasing consumer awareness for quality, safety, traceability and animal welfare. Ensuring the sustainability of the seafood processing industry involves not just innovative technologies that could mitigate environmental damage but also its economic viability and consumer imperatives behind them. One way of ensuring the sustainable production and processing of nutritious and safe seafood products is through demonstration and first application in the market of eco-innovative, sustainable processing solutions of marine and aquaculture-derived food products and nutrients.

Scope: Proposals should build on state-of-the-art research insights from EU-funded and other projects in this field, with a specific focus on food safety (from harvesting to the final products) and aiming at generating new knowledge to develop commercial solutions for improving the socio-economic and environmental sustainability of the seafood production and processing industry while contributing to the quality and safety of the products. For that, proposals should comprise activities such as prototyping, testing, demonstrating and piloting in a (near to) operational environment, as well as experimental production, all with a view to paving the way for subsequent market replication and uptake by consumers. Proposals may take into account the impacts across different geographical locations and population segments, as well as the specificities of different types of seafood, also in terms of nutrition. Aspects of traceability and certification of EU seafood products and labels of quality should be conveniently addressed. SME participation is encouraged.

The Commission considers that proposals requesting a contribution from the EU of EUR 5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: To contribute to EU food safety common standards and legislation for seafood products and nutrients, proposals are expected to:
• Achieve a wider and faster deployment of eco-innovative solutions for sustainable production and processing of marine and aquaculture-derived food products and nutrients resulting from greater user acceptance, higher visibility of innovative solutions and the creation of scalable markets.
• Improve competitiveness as well as opportunities for growth, diversification and job creation for the EU seafood sector in general and SMEs in particular.
• Support a better informed consumers' choice of seafood.
• Enable healthier seafood products to improve diets for human health.

Type of action: Innovation Action

Strengthening the European ocean observing, surveying and monitoring capability

BG- 9- [2016]: Unified integrated Arctic Observing System

Specific challenge: The Arctic is the theatre of profound transformation. Climate change is deeply impacting on the sea-ice extension and thickness, on ice-sheet melting, on permafrost thawing, and on marine and land ecosystems. These changes are bringing with them both risks and opportunities, and an integrated and multi-disciplinary Arctic observing system is becoming essential for studying, forecasting and assessing changes supporting the sustainable development

of the region. The improvement of current assessment and prediction capabilities of Arctic environmental change requires the provision of data on a number of key variables of Arctic meteorology, climate, oceanography, and pollution. Monitoring and improved understanding of the Arctic climate system and its teleconnections, as well as ecosystem change and socioeconomic impacts on offshore operations, new shipping routes, mining activities, tourism etc. are important prerequisites for effective assessments of climate change adaptation and mitigation strategies in the Arctic and elsewhere.

Scope: The "Unified Arctic Observation system" should close critical gaps with innovative solutions, as well as improve the integration and inter-operability of existing observation systems. The activity shall be based on co-operation between the existing European and International infrastructures (in-situ and remote incl. space-based) and the numerical prediction communities, with active participation from relevant stakeholder groups. The action should, in line with the strategy for EU international cooperation in research and innovation (COM(2012)497), contribute to implementing the Transatlantic Ocean Research Alliance, the Sustaining Arctic Observation Networks (SAON) and the Cold Region Initiative of the Group on Earth Observation (GEO), and also support additional activities implemented through the Transatlantic Ocean Research Alliance. The action should connect with the relevant Copernicus and European Space Agency (ESA) programmes and infrastructure in order to maximise the synergies among the European efforts to deliver the Integrated Arctic Observing System. In particular, strong coordination with the ongoing Horizon 2020 project aiming at the development of an Integrated Atlantic Ocean Observation System should be sought[44].

The activity shall support and promote integrated use of Arctic land, ocean, ice and atmosphere observations from Europe, US, Canada and other international partners. Community-based observing programmes that draw on indigenous and local knowledge should be included and form the basis for participatory research and capacity-building within Arctic communities. The action should ensure data interoperability through internationally recognised standardisation and quality assurance/quality control (QA/QC) processes, promote database integration and allow free and open access to all data and data products, and should contribute through novel technology development to fill out in-situ observational gaps. Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least one participant each from the USA and from Canada. International cooperation with partners from other Arctic and non-Arctic third countries would add further value.

The Commission considers that proposals requesting a contribution from the EU in the order of EUR 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The project's results are expected to:

- Increase temporal and geographic coverage of observational data in the Arctic;
- Support standardization and improve inter-operability of Arctic observational data.
- Improve the integration of space-based and in-situ Arctic observations into process and climate models and forecast systems; long-term improvement of Arctic observation systems and related services.
- Integrate with existing pan-arctic monitoring networks by building additional capacity and adding monitoring parameters to current programmes;
- Reduce cost of data collection in support of Arctic-related economic and societal activities;

[44] AlantOS, www.atlantos-h2020.eu

- Lead to better-informed decisions and better-documented processes within key sectors (e.g. shipping, tourism, fishing);
- Support international assessments of global challenges such as climate change, scarceness of natural resources and global scale hazards;
- Enhance the societal and economic role of the Arctic region and support the EU strategy for the Arctic and related maritime and environmental policies;
- Contribute to the GEO Cold Region Initiative and to the Transatlantic Ocean Research Alliance;
- Contribute to the Sustaining Arctic Observation Networks (SAON) process;
- Contribute to the WMO Programme Year of Polar Prediction (YOPP).

Type of action: Research and Innovation Actions

BG-10-[2016]: Impact of Arctic changes on the weather and climate of the Northern Hemisphere

Specific challenge: The Arctic climate is changing more rapidly than in any other region. There is evidence that these changes strongly affect ecosystems, people and societies living inside and outside of the Arctic, including Europe and North America. A better representation of processes specific for the Arctic (e.g. related to sea-ice formation and melting) in weather and climate models is required to better constrain the role of the Arctic in the global climate system. In connection with improved observations in the Arctic (Topic 1) this is necessary to improve weather and climate prediction in the Northern hemisphere. These services are essential for managing the risks to infrastructure, agriculture, and other aspects of society across Europe.

Scope: Proposals should develop innovative approaches to improved descriptions and modelling of the mechanisms, processes and feedbacks affecting Arctic climate change and its impacts on the weather and climate of the Northern hemisphere. The assessment of the performance of state-of-the-art models in simulating key processes, and the linkages between polar and lower latitudes through well-evaluated coordinated model experiments, are critical to ensure that improved knowledge leads to advanced climate models and predictions. Actions should also explore the potential that an improved Arctic observing system – subject of another topic in this Call – would have on the accuracy of weather and climate forecasts in the Northern Hemisphere including Europe and North America. The activities should contribute to the programme of the Year of Polar Prediction (YOPP) and provide input to the improvement of short- to medium-term predictions of the Copernicus Climate Change services (C3S).

Proposals should include a work-package to cluster with other projects financed under this topic and – if possible – also under other parts of Horizon 2020, and build on those funded under earlier calls. Proposals should develop relevant forms of communication with the EU (and possible national) services to adequately disperse results that could be used for policy action. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), actions will contribute to implementing the Transatlantic Ocean Research Alliance. Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least one participant each from the USA and from Canada. International cooperation with partners from other Arctic and non-Arctic third countries is also strongly encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 million and EUR 8 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The project's results are expected to:

- Enhance predictive capacity of the weather and climate of the Northern hemisphere, and allow better forecast of extreme weather phenomena;
- Improve the capacity of response to the impact of climatic change on the environment and human activities in the Arctic, both in the short and longer term;
- Improve the capacity of climate models to represent Arctic warming and its impact on regional and global atmospheric and oceanic circulation;
- Contribute to a robust and reliable forecasting framework that can help meteorological and climate services to deliver better predictions, including at sub-seasonal and seasonal time scales;
- Enhance stakeholders' capacity to adapt to climate change;
- Contribute to better servicing of economic sectors which rely on improved forecasting capacity (e.g. shipping, mining);
- Contribute to the Year of Polar Prediction (YOPP) and IPCC scientific assessments, and to the Copernicus Climate Change (C3S) services.

Type of action: Research and Innovation Actions

BG-11- [2017]: Climate impacts on Arctic ecosystems, resources, new economic activities

This topic is presented with two possible options, showing both positive and negative elements.

In Option 1 the subject is left intentionally broad. The positive aspect is that this fosters a bottom-up approach and the submission of potentially ground-breaking ideas. The potential risk is to receive proposals which partially overlap with already funded actions, with - consequently – a limited impact.

OPTION 1: Climate impacts on Arctic ecosystems, resources, and new economic activities (2017)
[N.B. still under discussion which version of the topic will be retained]

Specific challenge: The 'Arctic amplification' of global warming has led to major and quantifiable changes across the region. Examples include the melting of ice-sheets and glaciers, the thawing of permafrost, the decreasing extent of sea-ice and the warming and acidification of the Arctic Ocean. These rapid changes put considerable stress on ecosystems and have, as well, an important socio-economic impact. Additional human activities linked to new shipping lanes opening up, previously inaccessible natural resources becoming accessible, and moving fish stock are putting added pressure on the Arctic ecosystems, and represent both risks and opportunities for indigenous populations, local communities and economic actors.

Scope: Proposals should develop an innovative approach to assess the ecological and socioeconomic impact of climate change and of new economic activities within the Arctic Ocean and surrounding landmasses on ecosystems, living resources and society. The needs, priorities and perspectives of indigenous populations, local communities and the economic actors operating in the region need to be considered in a context of economically, environmentally and socially sustainable development. Actions should address key processes with high socio-economic impact and provide solution-oriented and appropriate adaptation and mitigation responses, as well as support capacity-building for sustainable livelihoods. Innovative actions should go beyond the current state-of-the-art and support synergies among European and national actions. Appropriate consideration should be given to the geo-political and geo-strategic framework. Projects should include a work-package to cluster with other projects financed under this topic and – if relevant –

also under other parts of Horizon 2020. Proposals should develop relevant forms of communication for EU (and possible national) services to adequately disperse results that could be used for policy action. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), actions will contribute to implementing the Transatlantic Ocean Research Alliance.

Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least one participant each from the USA and from Canada. International cooperation with partners from other Arctic and non-Arctic third countries is also strongly encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 million and EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The project's results are expected to:

- Enhance the capacity to model and predict the socio-economic impact of key processes of change in the Arctic.
- Improve the predictability of poorly represented processes.
- Contribute to the sustainable management of Arctic ecosystems and thus support the provision of ecosystem services and natural resources for improved societal well-being.
- Promote sustainable economic Arctic opportunities arising from climate change and support the leverage of regional (EU) funds into these opportunities.
- Contribute to the mapping of areas of potential economic and social development;
- Support the competitiveness of European industry, particularly SMEs, engaging in sustainable development of the Arctic.
- Enhance the engagement of and interaction with residents from Arctic communities and indigenous societies and develop a legacy of collaborative community involvement with scientific, economic, and societal actors and stakeholders.

Type of action: Research and Innovation Actions

OPTION 2: Climate impacts on Arctic permafrost, with a focus on coastal areas, and its socio-economic impact (2017)

[N.B. still under discussion which version of this topic will be retained]

Specific challenge: Arctic permafrost contains twice as much carbon as the atmosphere, stored in the upper metres of the ground. Thawing of permafrost may trigger the release of this carbon and its transformation in greenhouse gases, reinforcing global warming ('permafrost carbon feedback'). Permafrost coasts make up 34% of the coasts of the world. Assessing the lateral transfer of material including organic matter from land to sea and its fate on the Arctic shelves is one of the most pressing challenges for understanding the impact of permafrost thawing on climate change and its direct implications for indigenous populations and local communities. The upper shelf environment itself is largely under-investigated and processes of accumulation and/or subsea permafrost degradation are not accounted for in global climate and Earth system models.

Scope: The action should model and assess the impact of permafrost thawing on Arctic (natural and human) coastal systems and its effect on availability/accessibility of resources and the growth of new economic activities, considering the needs of indigenous populations, local communities and the economic actors operating in this vulnerable region, in a context of economically, environmentally and socially sustainable development. Actions should address key processes of environmental change and develop appropriate adaptation and mitigation responses with an

emphasis on permafrost at the interface between land and water. Actions should put emphasis on partnerships and should co-design research with residents from Arctic coastal communities and with economic actors. Proposals should develop relevant forms of communication for EU (and possible national) services to adequately disperse results that could be used for policy action. Trans-disciplinary and participatory approaches, including social sciences and humanities, in the process are considered necessary. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), actions will contribute to implementing the Transatlantic Ocean Research Alliance. Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least one participant each from the USA and from Canada. International cooperation with partners from other Arctic and non-Arctic third countries is also strongly encouraged.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The project's results are expected to:

- Enhance the capacity to model permafrost thawing, sub-sea and on land, identify and reduce uncertainties, and quantify key processes not currently or poorly represented in predictive models.
- Identify economically, environmentally and socially sustainable Arctic opportunities arising from climate change, and harness the potential of living resources within the global context of competing interests from different sectors and countries and contribute to the competitiveness of European industry and particularly SMEs.
- Promote the engagement of and interaction with residents from Arctic coastal communities and indigenous societies and develop a legacy of collaborative community involvement with scientific, economic, and societal actors and stakeholders.

Type of action: Research and Innovation Actions

BG-12-[2016]: Towards an integrated Mediterranean Sea Observing System

Specific Challenge: The achievement of economic, environmental and societal sustainability of Blue Growth in the Mediterranean Area requires the understanding and forecasting of the evolution of the ecological, social and economic processes in the region. This must take into consideration the proper functioning of vulnerable marine ecosystems and sea-related economic sectors. In the Mediterranean region, several issues are specifically acute such as the vulnerability and poor resilience of ecosystems, the over exploitation of seabed and biological resources, the severe pollution events and limited remediation actions, the drastic climate change effects, the frequent extreme events and geohazards, and the uneven protection of coastal infrastructures and populations. The EU is committed to support the development of solutions to solve the above issues through several policies and international agreements such as the EU Integrated Maritime Policy (IMP), the Marine Strategy Framework Directive (MFSD), the Common Fishery Policy (CFP), the EU neighbourhood policy, the Barcelona convention and more recently the EU BLUEMED Initiative[45]. One of

[45] 'The Research and Innovation Initiative for Blue Jobs and Growth in the Mediterranean Area (The BLUEMED Initiative)' aim is to advance a shared vision of a Mediterranean Sea that is healthy, productive, resilient, understood and valued so as to promote the well-being and prosperity of our citizens and future generations and boost socio economic growth and jobs. It was jointly develop by Cyprus, Croatia, Greece, France, Italy, Malta, Portugal, Slovenia and Spain and presented by the Italian Presidency during the Competitiveness Council of 04-

the main targets of the later is to create an interoperable, fully integrated multiplatform observing and forecasting capacity supporting the conservation of biodiversity, forecasting and management of risks and emergencies at the coast and at sea. The implementation of those policies and conventions are all requiring a strong knowledge base and predictive capacities that are derived from Earth observation data. Those observation data that are however still very fragmented, or even lacking for certain areas of the Mediterranean Sea in particular in the southern part, and remain difficult to be accessed partly because of the many initiatives and systems existing. The challenge with this topic is to conduct the research and innovation activities necessary to facilitate the integration of the existing Earth observation facilities and networks in the Mediterranean Sea building on initiatives such as Copernicus[46], GEOSS[47], GOOS[48], EMODnet[49], ESFRI[50] relevant projects, and national initiatives, to fill out the existing observational gaps, and to exploit the relevant data to build the necessary knowledge base and prediction capacities.

Scope: The research and innovation activities to be included in the proposal should contribute to the development of an Integrated Observing System for the whole Mediterranean Sea building on existing facilities (remote sensing and in-situ) and initiatives, addressing both the open sea and the coastal zone. This should be based on open data and facilitate easy access to them. Another R&I focus will be to conduct the research and innovation necessary to underpin the full and open discovery and access to the ocean observations and facilitate the interoperable exchange of ocean observation as promoted through GEO (Group on Earth Observation) at the scale of the Mediterranean Sea. The proposal should also address observational gaps in the Mediterranean Sea in particular those related to the in-situ component of the observation system. Through optimising existing systems and the use of new ocean observation technologies the cost effectiveness of in-situ ocean observation and the integration of the biological dimension into observing systems should be enabled. The proposal should focus as well on the use of in-situ measurements to calibrate and validate relevant remote sensing data and products, including possible new products derived from space infrastructures such as the Sentinel and Earth Explorer missions supporting the improvement and evolution of operational services in the Mediterranean Sea. The above activities should include participation of international partners from the coastal states of the Mediterranean Sea.

The Commission considers that proposals requesting a contribution from the EU between EUR 6 and 7 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

05 December 2014. Since then a Strategic Research and Innovation Agenda and Implementation Plan has been developed.

[46] COPERNICUS - The European Earth Observation Programme

[47] GEOSS – Global Earth Observation System of Systems

[48] GOOS – Global Ocean Observing System

[49] EMODNet – European Marine Data Observation Network

[50] ESFRI – European Strategy on Research Infrastructures

Expected Impact: To contribute to implement the vision of the BLUEMED Initiative, its related Research and Innovation Agenda and Implementation Plan and in particular what regards its goals towards the development of an integrated Mediterranean observing system, proposals will have to:

- Contribute to implement the BLUEMED Initiative' vision, its related Research and Innovation Agenda and Implementation Plan. Achieve its goals towards the development of an integrated Mediterranean observing system.
- Provide an additional European contribution to established global observing systems e.g. Copernicus and GEOSS. Provide of a Mediterranean Sea Integrated Observing system as a component for GEOSS.
- Contribute to increase the temporal and geographic coverage of observational data in the Mediterranean Sea and identify observational gaps.
- Improve modelling outputs and improve cost effectiveness of data collection in support of ocean-related industrial and societal activities.
- Enhance the knowledge base necessary to cope with global challenges such as climate change, scarceness of natural resources and regional hazards, to make better informed decisions within key sectors, and increase safety of offshore activities and of coastal communities.
- Improve the implementation of European maritime and environmental policies and international agreements (e.g. Marine Strategy Framework Directive, INSPIRE Directive[51] , Common Fisheries Policy, EU Integrated Maritime Policy, Barcelona convention) by providing the knowledge base necessary to support policy decisions towards the sustainable growth of the EU Mediterranean marine and maritime economy.

Type of action: Research and Innovation Actions

BG-13- [2016]: Support to the BLUEMED Initiative: Coordination of marine and maritime research and innovation activities in the Mediterranean[52]

Specific Challenge: The Mediterranean Sea is going through rapid changes in response to closely interlinked natural and anthropogenic pressures. Climate change influences its physical dynamics and hydrological structure, while nutrient and pollutant loads are flowing from growing urbanization, land and coastal activities. Increasing maritime traffic also leads to safety concerns, potential pollution and the introduction of invasive alien species. Fishing stocks remain unsustainable. The marine heritage of the area and its ecosystem services are also at risk. In addition the geo-political complexity of the area adds further difficulties concerning the establishment of favourable framework conditions to support the growth of a blue economy (e.g. in trans-border cooperation in sea-related activities, including maritime spatial planning). Within this frame a coordinated and integrated effort is needed at Member State level and among Member States in order to create synergies and complementarities between sectors and countries and provide added value to regional, national and EU investments, remove barriers, avoid duplication and reduce fragmentation, as put forward in the vision Statement of the 'Research and Innovation Initiative for Blue Jobs and Growth in the Mediterranean Area – The BLUEMED Initiative'. This initiative, aims to achieve a healthier, more productive, resilient, better known and valued Mediterranean Sea. In addition,

[51] INSPIRE-Infrastructure for Spatial Information in the European Community

[52] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to REA and will be implemented by the Commission services.

a common marine and maritime R&I strategy needs to be further consolidated in order to enable the achievement of a solid knowledge-based sustainable and long lasting 'Blue Growth' in the region[53].

Scope: This action is expected to support the implementation of 'The BLUEMED Initiative' vision with its related Research and Innovation Agenda and Implementation Plan. This calls for the further alignment and convergence of national Research and Innovation activities and other relevant initiatives and investments with the different actors and across different sectors *in primis* between the European Countries bordering the Mediterranean Sea coasts and the whole EU. In this context proposals should be used to establish and consolidate an operational network of marine and maritime research funders and other key players. Proposals should provide support for the designing and implementation of new transnational joint activities, using the most suitable and effective methods and tools for collaboration. These new activities should focus on the key challenges and other relevant issues identified in the BLUEMED Strategic Research and Innovation Agenda (SRIA) and related Implementation Plan, namely: support technology development, promote multidisciplinary research and an innovation led environment, improve human and infrastructures capacities, create a fully integrated observing and forecasting system, promote citizens awareness and literacy on marine issues, improve training. This action should leverage on past and ongoing regional, national and EU projects (e.g. SEAS-era ERANET, PERSEUS COCONET, etc.) and initiatives; integrate research, policy, industry (including aquaculture) and society (including the preservation of local coastal cultures). It should also contribute to pool different funding streams, national and EU, and combine them in an effective mode. Furthermore it should create the conditions to allow an extension of the initiative to the Mediterranean coastal southern countries.

The Commission considers that proposals requesting a contribution from the EU of EUR 3 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: To implement the vision of the BLUEMED Initiative, its related Research and Innovation Agenda and Implementation Plan, proposals will:

- Implement the BLUEMED Initiative' vision, its related Research and Innovation Agenda and Implementation Plan.
- Achieve a healthier, more productive, resilient, better known and valued Mediterranean Sea.
- Boost the knowledge base and contribute to create the conditions for the development of new technologies and services as well as the conditions to strengthen human and infrastructures capacities in the Mediterranean region.
- Boost the 'Blue economy' and contribute to create more jobs in the Mediterranean region.
- Increase the competitiveness of EU researchers, industry and SMES within the marine and maritime sectors.

[53] 'The Research and Innovation Initiative for Blue Jobs and Growth in the Mediterranean Area (The BLUEMED Initiative)' aim is to advance a shared vision of a Mediterranean Sea that is healthy, productive, resilient, understood and valued so as to promote the well-being and prosperity of our citizens and future generations and boost socio economic growth and jobs. It was jointly develop by Cyprus, Croatia, Greece, France, Italy, Malta, Portugal, Slovenia and Spain and presented by the Italian Presidency during the Competitiveness Council of 04-05 December 2014. Since then, a Strategic Research and Innovation Agenda and Implementation Plan has been developed.

- Improve the coordination and alignment of national marine and maritime research programmes.
- Maximise the impact of national and EU funded marine and maritime research.
- Support the implementation of the EU Integrated Maritime Policy, its environmental pillar the Marine Strategy Framework Directive (MSFD), the Common Fisheries Policy (CFP) and 'Blue Growth -opportunities for marine and maritime sustainable growth'.

Type of action: Coordination and Support Actions

CONDITIONS FOR THIS CALL

BLUE GROWTH CALL

Opening date[54]: XX/XX/201X for 2016 topics
XX/XX/201X for 2017 topics

Deadlines[55]:

BG-01-2016 (IA) BG-02-2016 (IA) BG-03-2016 (CSA) BG-13-2016 (CSA) BG-08-2016 (IA)	02/03/2016 at 17.00.00 Brussels time	
BG-09-2016 (RIA) BG-10-2016 (RIA) BG-12-2016 (RIA)	First stage 02/03/2016 at 17.00.00 Brussels time	Second stage 14/09/2016 at 17.00.00 Brussels time
BG-02-2017 (IA) BG-03-2017 (CSA) BG-04-2017 (IA) BG-06-2017 (CSA) BG-07-2017 (IA)	XX/XX/2017 at 17.00.00 Brussels time	
BG-11-2017 (RIA)	First stage XX/XX/2017 at 17.00.00 Brussels time	Second stage XX/XX/2017 at 17.00.00 Brussels time
BG-05-2017 (ERANET-COFUND)	????2017	

H2020-SMEInst-26-2016-2017-BG Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	Phase 1 XX/XX/2016 at 17.00.00 Brussels time	Phase 2 XX/XX/2016 at 17.00.00 Brussels time	Phase 1 XX/XX/2017 at 17.00.00 Brussels time	Phase 2 XX/XX/2017 at 17.00.00 Brussels time

[54] The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening

[55] The Director-General responsible may delay this deadline by up to two months.

Indicative budget: EUR 85.5 million from the 2016 budget[56], and EUR 59.5 million from the 2017 budget[57]

	2016 EUR million	2017 EUR million
BG-01-2016	22.00	
BG-02-2016/2017	7.00	8.00
BG-03-2016	2.00	
BG-04-2016		8.00
BG-05-2016		6.5
BG-06-2016		2.00
BG-07-2017		12.00
BG-08-2016	5.00	
BG-09-2016	15.00	
BG-10-2016	15.00	
BG-11-2016		10.00
BG-12-2016	7.00	
BG-13-2016	3.00	
SME Instrument	9.50	10.00

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

BG-09-2016 BG-10-2016 BG-11-2017	Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least one participant each from the USA and from Canada.
SMEInst-26-2016-2017-BG	SMEs conditions

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

SMEInst-26-2016-2017-BG	SMEs conditions

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[58] published on the Participant Portal.

[56] Of which EUR 46.50 million from SC2, EUR 2.00 million from SC3, EUR 7.00 million from SC4 and EUR 30.00 from SC5

[57] Of which EUR 39.50 million from SC2, EUR 10.00 million from SC4 and EUR 10.00 from SC5

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single or first stage*)	Information on the outcome of the evaluation (*second stage)*	Indicative date for the signing of grant agreements
BG-01-2016 (IA) BG-02-2016 (IA) BG-03-2016 (CSA) BG13-2016 (CSA) BG-02-2017 (IA) BG-04-2017 (IA) BG-06-2017 (CSA) BG-07-2017 (IA)	Maximum 5 months from the final date for submission		Maximum 3 months from the date of informing applicants
BG-12-2016 (RIA) BG-08-2016 (RIA) BG-09-2016 (RIA) BG-10-2016 (RIA) BG-11-2017 (RIA)	Maximum 2 months from the final date for submission	Maximum 5 months from the final date for submission	Maximum 3 months from the date of informing applicants
SME Instrument)	Two months after the corresponding cut-off date set out above for phase 1 and four months after the corresponding cut-off date set out above for phase 2		One month from the date of informing applicants in phase 1 and two months from the date of informing applicants for phase 2
BG-05-2017 (ERANET-COFUND)	?	?	?

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

[58] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

Call for a Rural Renaissance - Fostering innovation and business opportunities

Rural areas are Europe's primary source of food and reservoir of natural resources. They play a major role in managing and ensuring sustainable use of these resources and the delivery of food and public goods and ecosystem services providing long-term benefits for the whole society. At the same time they are affected by a series of demographic, economic and societal developments such as urbanisation, depopulation, business relocation and ageing. The call will support a "rural renaissance" by lifting the natural, social, cultural and economic potential of rural areas as well as fostering policy coherence. It will aim at boosting economic development, environmental services and entrepreneurial innovations – in particular in SMEs- in rural and coastal areas. This will be achieved by building on diversification and modernisation strategies, capitalising on local assets including human, natural and cultural capital.

The call is structured around three main areas:

- New approaches towards policies and governance: activities will aim at improving policies and governance at various geographical scales to foster sustainable growth in rural areas. They will cover such aspects as territorial linkages, coherent policy approaches for the management and use of natural resources and for the provision of ecosystem services and public goods.

- New value chains and business models: fostering sustainable growth in rural areas will be sought through the development of new services, products and value chains, taking advantage of technological and non-technological innovations and exploring possibilities for greater cross-sectoral synergies.

- Innovation and skill development: activities directed at knowledge and innovation systems, education and training, advisory services and entrepreneurial skills will enhance the capacity of rural dwellers to mobilise new knowledge and technologies for the development of their activities. In addition, activities will aim at fostering the delivery of policies regarding innovation and will contribute to the implementation of the European Innovation Partnership "Agricultural Productivity and Sustainability".

Actions in this area will contribute in particular to the objectives of European Structural and Investment Funds, including Rural Development within the Common Agricultural Policy (CAP), the Innovation Union, recent developments on rural-urban partnerships as well as energy and climate policies.

Corresponding to these three sub-areas, proposals are invited against the following topics:

New approaches towards policies and governance

RUR - 1. [2016] - Consolidated policy framework and governance models for synergies in rural-urban linkages

Specific challenge: Increasing urbanization along with transformation of rural economies and communities results in new types of rural-urban interactions and dependencies, to which policies and governance approaches are not fully adapted yet. Consolidated evidence is needed to assess the impact of these interactions on rural growth potential (for which there is an increasing interest worldwide) and understand, in concrete and operational terms, how linkages and dependencies between urban and rural activities affect creation of value added and jobs. Recent studies provided some evidence that well-functioning rural-urban relationships can lead to higher growth rates of both urban and rural areas. They may also deliver more sustainable and inclusive forms of development, building on local assets to improve adaptation and resilience to global changes. Thorough understanding as well as a consolidated conceptual framework is needed to tailor policy interventions at different scales aiming at maximising rural job and growth creation thanks to synergistic interactions.

Scope: Building on the EU typology of urban and rural areas[59] and on the outcomes of previous studies on rural-urban linkages, proposals should consolidate a conceptual and policy framework adapted to the diversity of European needs for management of interactions between different types of territories, including a consolidated and well-argued approach to defining functional areas. They should undertake a thorough analysis of how European rural areas interact with other areas, in particular urban, in their region or beyond, exploring endogenous conditions which enable them to interact, quantifying the importance of these connections for the rural economy and society and looking at the distribution of adding-value production steps between rural and urban areas. Through operational case studies covering a diverse set of territorial contexts and scales of analysis, proposals should analyse the practical linkages between rural and urban activities, looking at mutual dependencies, competitive or synergistic relationships, describing the institutional and policy context and its influence.

Participatory research engaging with authorities, economic development bodies, businesses and society should pinpoint concrete opportunities for greater synergies and cooperation as well as bottlenecks impeding synergistic development and identify concrete solutions to remove these bottlenecks. The approach should look at economic, environmental and social linkages and dependencies in an integrated way. Attention needs to be given to different territorial settings, covering different forms of territorial interactions beyond city-hinterland relationships, including networks of small market towns and other types of more distant or cross-border and even international territorial interactions. Activities should assess the effectiveness of a variety of existing or emerging governance approaches and instruments, including those provided by the European Structural and Investment Funds, looking at official authorities but also at informal governance groups, and derive a set of governance models and tools adapted to different types of situations. These governance models should cater for better economic development as well as for modernisation of service delivery.

[59] http://ec.europa.eu/eurostat/statistics-explained/index.php/Urban-rural_typology;
http://ec.europa.eu/eurostat/statistics-explained/index.php/Urban-rural_typology_update

Projects should fall under the concept of 'multi-actor approach'[60], involving organisations committed to local development in urban and rural areas or representatives of both rural and urban economic players. Engagement of government bodies at the adequate scale, along with targeted communication activities and production of easy-to-use policy-oriented outputs and training material shall ensure a maximum uptake of project results during the lifetime of the project and beyond. Networking activities between case study areas extending to other areas interested in rural-urban synergies and leading to longer-term cooperation may be envisaged. Activities should also foresee cooperation with projects financed under topic RUR-2-2017.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expect impact:

- Consolidation of a policy-oriented conceptual framework allowing the description (quantitative and qualitative) of a wide variety of interactions between urban and rural areas (economic, environmental, social) and the definition of functional areas.
- Improved understanding of functional rural-urban linkages and how concretely these translate into varying development patterns, contributing to explaining growth and employment performance as well as sustainability, based on a collection of case studies serving as inspiration to a significant number of areas across Europe.
- Description of a set of successful and transferable governance models applicable to different types of situations and rural settings, completed by appropriate policy recommendations to enhance the development of these governance models at various scales as well as communication and training material to facilitate dissemination of projects outcomes and foster their uptake by relevant authorities.
- Enable further growth and job creation in rural areas as a result of better managed urban-rural relationships, improved governance and increased cross-sectorial cooperation.

Type of action: RIA

RUR - 2. [2017] – Coastal-rural interactions: enhancing synergies between land and sea-based activities

Specific challenge: At the interface of land and sea, coastal areas are fragile environmentally but also attractive areas with unexploited business opportunities. Land-based activities in coastal regions and even beyond in the upstream river basins influence the availability and quality of fresh water reaching the sea and, as a consequence, sea-based economic activities and exploitation of marine resources. The other way round, coastal development can have positive or negative effects on hinterland development, like tourism-related pressure on land availability. Mainstream agro-environmental policies tend to fail on lowering nutrient load on the shores while rural economies do not always benefit from the economic development on the coast. This topic wishes to explore how territorial governance approaches and cross-sectorial economic development approaches could deliver mutually beneficial impacts for

[60] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

both rural territories and coastal areas and seas which cannot be achieved in other ways, in particular in the field of mitigating impact of land-based activities on coastal water quality.

Scope:

Combining environmental, agricultural and socio-economic research, proposals will identify and characterize interactions between land and sea, single out the various components of local economies at the interface of land and sea and analyse their respective importance as well as their short, medium and long-term development trends taking into account market, environmental and climate forecasts. The analysis should inventory positive and negative externalities these different activities have on one another, and analyse whether solutions exist to mitigate negative externalities and enhance positive externalities, listing motivations and barriers to change for the different types of players involved. The analysis should highlight potential cross-sectorial interactions and innovation which could emerge from greater cooperation between sea-based and land-based businesses or organisations.

The analysis should cover a representative set of coastal areas or regions across Europe varying according to size, geographical, environmental, socio-economic, institutional and administrative conditions (regional, inter-regional, macro-region, cross-border). Interactive research approaches should be used to engage with local businesses and citizens, elaborate options for cooperation, networking and integrated governance seeking to enhance partnership. The analysis could usefully build on a review of positive –and maybe- negative examples from different areas, including innovative business models integrating land-based and sea-based production with simultaneous benefit to the local economy, local jobs and the environment both on the coast and in the hinterland. Proposals should seek to create long-lasting relationships inside the case study areas and between different areas which are involved and benchmarked by the project to generate knowledge exchange.

Concrete outputs would include a set of tools which could be used to foster synergistic relationships in different coastal areas of Europe, as well as concrete and operational governance models to be applied. The interest of instruments provided by the European Structural and Investment funds for the period 2014-2020 should be explored. Communication and dissemination activities should be carefully targeted and planned to reach out to all potentially interested areas beyond those participating in the consortium. Training material and coaching activities may be envisaged. Activities should foresee cooperation with projects financed under topic RUR-1-2016 and BG-7-2016/2017.

Proposals should fall under the concept of 'multi-actor approach'[61] and involve farmers groups and other land and sea businesses, economic and local development bodies. Engaging with managing authorities of European structural and investment funds will help implement outcomes of the project.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expect impact:

- Development of a transferable set of tools and indicators allowing the description (quantitative and qualitative) of a wide variety of land-sea interactions (economic,

[61] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

environmental, social), allowing an improved understanding of economic and social interactions in coastal areas, serving a more evidence-based policy making at local and regional level;

- Thorough understanding of barriers and motivations to behavioural change and solutions to remove bottlenecks to cooperation;

- Increased potential for job and added-value creation in coastal areas thanks to the identification of new business opportunities stemming from closer cooperation between the different economic operators operating on land and at sea;

- Reduced negative externalities from land-based activities in the regional hinterland on sea-based activities thanks to better economic cooperation and integrated governance;

- Creation of long-lasting relationships between coastal areas serving as European flagships for rural-coastal synergies and ensuring longer and wider dissemination.

Type of action: RIA

See also the topic on "Healthy oceans and seas for healthy people" under the Blue Growth Call.

RUR - 3. [2017]: Towards 2030: policies and decision tools for an integrated management of natural resources

Specific Challenge: Policies influencing the management and use of natural resources at national and EU levels have considerably evolved in the last few decades as underpinning objectives have widened to meet societal needs (food security, environment, climate change, etc.). This has, however, taken place in a fragmented and incomplete manner. In addition technology and information available to decision makers has significantly advanced in this time. To ensure sustainable management of natural resources in the long term it is necessary to adopt an integrated framework which deals in an appropriate manner with all the objectives of the society in view of incentivising actions / behaviours / investments contributing to desirable targets. The implementation of such an integrated and systemic approach needs to be accompanied with appropriate decision support tools.

Scope: Activities will take place at various geographical scales reflecting levels of policy / use relevance, from regional to EU levels. Investigations related to both policy and decision tools will take place in a full-fledged participatory manner so as to reflect the empowerment of the society at large into the process. Policy development will take account of all current and expected major societal needs regarding natural resources and their use in terms of products and other types of goods, services and functions. Decision support tools will help prioritize multiple resource uses (e.g. land use, water) at different geographic scales (meso level and related regional strategies + national/EU level for general policies) taking advantage of existing databases and tools and what is possible based on modern capabilities. Activities will cover agricultural and forestry land. While focusing on Europe, proposals are encouraged to draw on good examples from outside Europe.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 8 million would allow this specific challenge to be addressed appropriately.

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: the project's results are expected to:

- Improve knowledge at various geographical scales of land resource availability and use
- Improve decision support tools for the management of land resources
- Provide a coherent and integrated policy framework for the management of natural resources at regional / national / EU geographic scales

Type of action: RIA

RUR - 4. [2016]: WATER FARMS – Improving farming and supply of drinking water

Specific challenge: The quality of drinking water, which matters a lot to EU citizens, and the level and cost of treatment to be applied prior to consumption very much depend on the quality of ground water and surface water which are used to produce it. This is partly why the Water Framework Directive puts a high emphasis on the level of protection of water resources, in particular groundwater and surface water. Diffuse pollution of water sources by farming systems clearly remains an obstacle to achieving the objectives of the WFD which has been addressed with varying success by current policy tools. Additionally, the time dynamics of drinking water resource systems creates a delay between the action developed at the soil surface and the reaction in the groundwater.

Scope: Proposals shall work on a variety of case studies identifying best practices in the field of fresh water management involving improved farming systems and land use management. The effect of various mitigation measures for diffuse agricultural pollution shall be analysed. They shall undertake cost-efficiency analysis of mitigation measures and cost-benefit analysis for the society and the engaged actors of identified options for delivery of high-quality drinking water, comparing preventive and curative options. Transition pathways from "paying treatment for depolluting" options to "rewarding water quality delivering farming systems" options shall be investigated taking into account different temporal and spatial scaling issues. Governance models including both private spring water companies and public water supply bodies will be investigated. Case studies should be selected to cover a variety of pedo-climatic conditions, vulnerable zones with different types of farming systems, contrasted legal frameworks, cover larger and smaller water collection areas, including rural and urban areas and only rural areas. The project should deliver improved public policy instruments, model contractual arrangement, improved monitoring, reporting and verification and control tools as well as transparent and understandable indicators in order to engage the farmers and the citizens. Proposals should fall under fall under the concept of 'multi-actor approach'[62].

The Commission considers that proposals requesting a contribution from the EU up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts:

[62] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

- Novel pesticides and fertilizers management practices able to reduce source and non-source pollution.
- Increased engagement of the farmers in the monitoring, reporting and verification process of the water quality.
- Water governance models better supporting the adoption and long-term durability of efficient on-farm and land use strategies.
- Integrated scientific support to relevant EU policies (e.g. CAP, WFD, sustainable use of pesticides …).

Type of action: RIA

RUR - 5. [2017] Novel public policies, business models and mechanisms for sustainable supply and payment of forest ecosystem services

Specific challenge: Regional differences regarding forest management systems and long production cycles characterise the forestry sector in the EU. Forests generally provide for a series of goods and services, some valued (i.e. wood and non-wood products), some non-valued on the existing markets (i.e. ecosystem services). Of the latter, some fall in the 'public domain' (i.e. non-excludable and non-rivalry in consumption), such as C sequestration or landscape, while others are 'common-pool resources' (i.e. non-excludable but rivalry), such as recreation or water supply. The regulatory framework consists of both forest polices and forest-related policies (e.g. rural development, climate, biodiversity, energy), which are not necessarily mutually reinforcing. Responsibilities on forest policies range from EU level (e.g. monitoring, protection, LULUCF reporting, etc.) to member or federal state level (e.g. inventory, planning, management, etc.). In the case of policy/market failure – a recognised threat, suboptimal provision of ecosystem services are undesired outcomes. The sustainable provision of ecosystem services therefore requires policy coordination, and the use of novel policies, business models and mechanisms. While the assessment of economic value of forest ecosystem services has been addressed in recent studies, there remains significant room for further operationalizing this knowledge in practice.

Scope: Proposals should aim at novel public policies, business models and mechanisms to 'internalise' the proven socio-economic value of forest ecosystem services ('externalities') and contribute to their sustainable supply, with proper consideration given to the multifunctional role of EU forests. Proposals should consider the holistic basket of economic, socio-cultural, recreational and environmental services, from both the supply and demand side, and the trade-offs thereof, aim to close the gap between academic work, associated policy recommendations, and practice on the ground, and help their public acceptance. The role of active forest management, which incur reduced income and/or higher investment, needs to be emphasised. Mechanisms of payment for ecosystem services (PES), developed at the appropriate level of forest management and administration, are specifically required. Pilot testing of the proposed mechanisms, which may combine public policy tools with business models, is encouraged. Proposals should include contributions from the social sciences and humanities and implement a 'multi-actor approach'/public engagement with regard to the groups of stakeholders included in the Consortia and the proposed business models/mechanisms.

Expected impact: Proposals should show how some, or all, of the following impacts will be achieved:

- Enhanced coordination in policy making and novel policies and business processes, translated into increased incentives for forest owners/administrators to sustainably supply for essential ecosystem services, such as carbon sequestration, biodiversity conservation, water regulation, soil and nutrient regulation, landscape and recreation, while maintaining production of wood and non-wood forest products.

Type of Action: Innovation Action.

New value chains and business models

RUR - 6. [2016] Crop diversification systems for the delivery of food, feed, industrial products and ecosystems services: from farm benefits to value-chain organisation

Specific challenge: Crop diversification in time and space through rotations and associations allowing low-input agronomic practices are drivers for resource-efficient farming systems which can fulfil the need for producing at the same time food, feed, industrial products (e.g. bioenergy, biomaterials, biochemicals) and other ecosystems services. These diversified and low-input farming systems will emerge if clear benefits to farmers and society are demonstrated and if the downstream value-chains are properly organised.

Scope: Proposals should perform field experiments of diversified cropping systems with different species, low-input agronomic practices in conventional and organic sectors, and locations in Europe over several years with the objective of optimising the use of resources and increasing the global yield on a farm and/or the Land Equivalent Ratio benefiting from the synergistic effect of crop associations in time and space. The diversification of crops should be investigated with growing different crop species on the same land in successive growing seasons (i.e. rotations) and within a growing season (i.e. multiple cropping), and growing different species in proximity in the same field (i.e. mixed, row and strip intercropping). The proposal should address all options (rotations, multiple cropping and intercropping) using either only annual crops (scope A) or annual and perennial crops (scope B). Activities on improved machineries for low-input agronomic practices and harvesting should be considered. Breeding activities are excluded. Technical, economic, social and environmental evaluations of the tested diversified systems should be performed at farm level.

The proposals should also investigate how the downstream value-chains and the different actors and stakeholders involved (e.g. farmers, cooperatives, logistics providers, industry, consumers) can be impacted by the diversification of cropping systems through several existing case studies. Technical, economic, social and environmental evaluations of the diversified systems at the whole value-chain level will be performed based on the case studies quantifying the potential for food, feed and industrial products from harvested crops and residues/co-products. Proposals should address technical, social, cultural and economic barriers (e.g. logistics, volume of markets, transparency along the chain, payment for ecosystem services) and drivers. Path dependencies and lock-ins regarding the different actors will be analysed and roadmaps/recommendations for successful value-chain organisation will be delivered with a focus on resource-efficiency along the chain.

Proposals should fall under the concept of 'multi-actor approach'[63] targeting relevant actors such as farmers, cooperatives, logistics providers, industry and should include public engagement targeting consumers. Dissemination activities should plan field visits and produce

[63] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

end-user materials to feed the EIP-AGRI. Selected projects should closely liaise together and also with complementary activities funded in response to topic SFS-5 [2016] on mixtures and associations in cropping systems and SFS-36 [2016] on farming for tomorrow.

The Commission considers that proposals requesting a contribution from the EU up to EUR 10 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Up to one project will be financed in scope A and in scope B respectively.

Expected impact:

This action contributes to increase crop diversification in Europe, which is an objective of the Common Agricultural Policy. The applicants will measure the expected impact on the following aspects:

- Higher arable land productivity, and Land Equivalent Ratio for intercropping systems
- Diversified and increased farmers' revenues with access to new markets and reduced economic risk
- Lower environmental impact of low-input diversified cropping systems with reduced use of pesticides, chemical fertilisers, energy and water
- Improved delivery of ecosystem services including biodiversity, soil fertility, pest and diseases control, groundwater and surface water quality and carbon sequestration
- Organisation of resource-efficient downstream value-chains with the involvement of the relevant actors and decreased use of energy along the chains
- Market provision of food, feed and industrial products from harvested crops and residues/co-products produced from diversified cropping systems, which contributes to the development of the bioeconomy
- Increased awareness and knowledge/data exchanges among actors on the benefits of diversified cropping systems (covering different pedo-climatic conditions, using different crops) and on downstream value-chain organisation across Europe

Type of action: RIA

RUR - 7. [2016] Resource-efficient and profitable industrial crops on marginal lands

Specific challenge

Industrial crops contribute to the diversification of farmers' income and to the supply of renewable raw materials for industrial applications fostering the bio-based economy and climate change mitigation. To avoid land use competition with food, the development of resource-efficient varieties which can grow on marginal lands (i.e. areas facing natural constraints[64] such as low soil productivity or extreme climatic conditions) while generating technical and economic benefits and limiting environmental impact should be promoted.

Scope

The proposals should provide an up-to-date database of existing resource-efficient industrial crops (species and varieties) with their characteristics, needs, performance and end-use

[64] See JRC guidance document on "Scientific contribution on combining biophysical criteria underpinning the delineation of agricultural areas affected by specific constraints, http://publications.jrc.ec.europa.eu/repository/bitstream/JRC92686/lbna26940enn.pdf

applications (e.g. fine or bulk chemicals, materials, energy). Proposals should test, validate and disseminate this tool by involving end-users (e.g. farmers, industry). The proposals should map the most suitable marginal lands in Europe to be farmed with industrial crops while taking account of socio-economic (e.g. accessibility of marginal lands) and environmental considerations such as the EU and national mapping and assessment of ecosystems and their services. Proposals should perform an analysis of best practice cases of industrial crops deployment and address technical, social, cultural and economic barriers and drivers for the use of those marginal lands for industrial cropping. Policy recommendations and best practices guides will be provided promoting an appropriate sourcing of renewable materials from marginal lands at local/regional level.

Research activities will further improve the technical, economic and environmental performance of the most promising industrial crop species adapted to large surfaces of suitable marginal lands in Europe via breeding programmes and field tests to improve low-input agronomic practices.

Proposals should fall under the concept of 'multi-actor approach'[65] targeting relevant actors such as researchers, farmers, cooperatives and industrial players from different sectors (e.g. bioenergy, biochemical and biomaterial sectors). Dissemination and networking activities should focus on the promotion and use of the developed tools and guides (i.e. industrial crops database, most suitable marginal lands mapping, policy recommendations and guides at local/regional level) but should also plan field visits and produce end-user materials to feed the EIP-AGRI.

The Commission considers that proposals requesting a contribution from the EU up to EUR 6 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This action contributes to an increased sourcing of renewable materials from marginal lands with the production of low-ILUC (i.e. avoiding displacement of agricultural production for food and feed or forest production), low-input and economically profitable crops for farmers, which will foster the development of the bio-based economy and contribute to reach the energy and climate targets. The applicants will measure the expected impact on the following aspects:

- Increased awareness and knowledge/practice exchanges among actors across Europe on growing industrial crops on marginal lands covering different pedo-climatic conditions, using adapted crops and appropriate agronomic practices
- Improved agronomic practices with limited inputs use (e.g. pesticides, chemical fertilisers, energy and water) and genetic improvement of best industrial crop candidates adapted to marginal lands in Europe
- Diversified and increased farmers' revenues with access to new markets

Type of action: RIA

[65] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

RUR - 8. [2016] Demonstration of integrated logistics centres for food and non-food applications

Specific challenge: Most of agro-industries[66] are surrounded by biomass such as agricultural/forestry residues and industrial crops and usually produce by-products, which could be used as raw materials for industrial and farming applications (e.g. biochemicals, biomaterials, bioenergy, organic fertilisers). These agro-industries work seasonally and could diversify their regular activity during non-productive periods by organising the logistics and pre-treatment of available local biomass, thus developing synergetic logistics centres for food and non-food uses. These logistics centres will contribute efficiently to the organisation of new biomass supply chains, while supporting rural development by creating logistical activities and jobs at local level.

Scope: The proposals should demonstrate the technical and economic feasibility of integrated biomass logistic centres for food and non-food products under real operation conditions (TRL:7-8), taking advantage of seasonal activity of agro-industries. At least two demonstrations of logistics centres in different MS/AC should be performed. The decision of demonstration location should be based on business models identified via a thorough analysis of biomass availability around existing agro-industries and market potential for intermediate products or bio-commodities to be delivered by logistics centres while identifying potential industrial actors down the value chain especially at local/regional level. The logistics centres should develop cost-effective and environmentally-friendly logistics (e.g. avoiding biomass losses and GHG emissions) for collection/harvesting, transport, storage and possible pre-treatment (e.g. biomass densification) of surrounding available biomass such as agricultural/forestry residues and industrial crops while using the existing facilities/equipment of agro-industries to reduce overall logistics costs. Proposals should also investigate the possibility of treating agro-industry by-products (e.g. from crops or livestock) to bio-commodities or intermediate products for industrial and farming applications. Environmental (e.g. effect on soil compaction and organic content, impact on road transport traffic), economic (e.g. economic viability and added value for farmers, forest holders and agro-industry) and social impact of the integrated logistics shall be assessed. Recommendations and best practices guidelines for successful integrated logistics centers will be delivered. Selected projects should cooperate during the whole project life and should joint forces for dissemination activities.

Proposals should fall under the concept of 'multi-actor approach'[67] targeting relevant actors such as farmers/forest holders, cooperatives, logistics providers, industries and researchers.

The Commission considers that proposals requesting a contribution from the EU up to EUR 6 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This action contributes to build new sustainable value-chains for non-food applications based on available biomass at local level fostering the bioeconomy. The applicants will measure the expected impact on the following aspects:

[66] post-harvest activities involved in the transformation, preservation and preparation of agricultural production for intermediary or final consumption (mainly food industries)

[67] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

- Improved logistics in technical, economic and environmental terms for the demonstrated centres
- Improved knowledge of business models for logistics centres, including the thorough understanding of their potential for development, performance and interest in economic, environmental and social terms as well as success factors or reasons for failures;
- Diversified and increased revenues for farmers/forest holders, agro-industries in rural areas
- Increased attractiveness of rural areas around logistics centres for new industrial players which can benefit from industrial symbiosis

Type of action: IA

RUR - 9. [2017] – Business models for modern rural economies

Specific challenge:

Modernisation of rural economies depends on the capacity of rural businesses to cooperate successfully to form efficient value chains which will deliver competitive products and services, high-quality and diversified jobs as well as resilience to global economic and climate changes. Increased interest in regional and local economy, resource-efficient and low carbon value chains or short supply chains generate opportunities to rethink and improve value chain organisation in a way that will turn specific assets into economic, environmental and social benefits, including through enhanced valorisation of ecosystem services.

Scope:

Building on the outcomes of past European projects regarding rural economic development and rural jobs, proposals shall identify innovative business models which are developing in rural areas, have an important potential for creation of added value, social cohesion and jobs and which are likely to be up-scaled or replicated to a multiplicity of other areas, taking into account the diversity of conditions in different areas. Socio-economic analysis should identify, describe and benchmark different business models in terms of starting conditions, obstacles faced, enabling factors, financing mechanisms, generation of added value and jobs as well as other potential environmental and social benefits, gender issues, attractiveness to young workers, and repartition of the created value, exploring the concept of shared value. Particular attention shall be paid to models which foster a more sustainable mobilisation of resources, improved cooperation between different operators along the value chain and/or across traditional and developing sectors (e.g. via clusters/platforms), and lead to new products or services, recycling or up-cycling of materials. Food, bio-based value chains as well as other forms of rural businesses or services, in particular around digital technologies or valorization of ecosystem services should be considered. Practical and business oriented tools, such as a collection of business cases should be produced targeting new entrepreneurs who would like to setup businesses in rural areas and would seek guidance and benchmarks on similar businesses to build up their business plans.

Proposals should fall under the concept of' multi-actor approach'[68], targeting relevant actors involved in development of these new business models such as businesses themselves,

[68] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

business or economic development organisations as well as innovation support services. Communication and dissemination activities should be carefully planned and targeted to reach audiences which are likely to uptake, replicate and adapt the identified interesting business models.

Selected projects should closely cooperate to maximise the impact across Europe (e.g. production of common tools for entrepreneurs and stakeholders, joint analysis and recommendations, joint dissemination plans).

The Commission considers that proposals requesting a contribution from the EU of up to 4.5 million euros would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This action contributes to the modernisation and sustainable growth of rural economies. The applicants will measure the expected impact on the following aspects:

- Improved tools for entrepreneurship in rural areas notably with database of business cases and supporting environment (e.g. clusters/platforms, advisory services, funding opportunities)
- Improved knowledge of business models developing in rural areas, including the thorough understanding of their potential for development, performance and interest in economic, environmental and social terms as well as success factors or reasons for failures;
- Increased potential for rural economic diversification, added value and job creation in a variety of rural areas thanks to the dissemination of promising business cases.
- Increased resilience of rural economies and societies to global changes
- Improved delivery of ecosystem services resulting from innovative forms of valorisation.

Type of action: RIA

Innovation and skill development

RUR - 10. [2016-2017] – Thematic Networks compiling knowledge ready for practice

Specific Challenge:

Despite the continued generation of knowledge through scientific projects, research results are often insufficiently exploited and taken up in agricultural practice, and innovative ideas and methods from practice are not captured and spread. The Agricultural Knowledge and Innovation Systems (AKIS) of different countries and sectors are insufficiently connected to fully meet this challenge. In view of fostering economically viable and sustainable agriculture and forestry, it is essential to close the research and innovation divide and to act at EU level. Mechanisms for cooperation between researchers, advisors, farmers/foresters and other actors in the supply chain, which stimulate knowledge exchange, need to be developed in view of optimising resource use and to enhance the transition to a knowledge-driven agriculture. Thematic networks are a key element in the implementation of the EIP Agricultural Productivity and Sustainability (EIP-AGRI) in view of fostering knowledge exchange at cross-border level, and may enable links between the EIP-AGRI Operational Groups supported under rural development programmes.

Scope:

Thematic networks' activities include synthesising, sharing and presenting existing best practices and research results that are near to be put into practice, but not sufficiently known by practitioners. With this specific purpose, the networks shall involve a wide range of actors covering both science and agricultural/forestry practice on the specific themes, e.g. relevant scientists, farmers/farmers' groups, advisory services, enterprises, various EIP Operational Groups and interactive innovation groups operating in the context of the EIP-AGRI, or supply chain actors involved in the theme chosen. The specific themes of the networks may be chosen bottom-up and should contribute to a more competitive and sustainable agriculture and forestry. They must focus on the most urgent needs of specific agriculture or forestry sectors or develop important promising cross-sectorial issues, including where primary production needs to improve its linkages to the supply chain. A comprehensive description of the state of the art on the theme chosen should show the added value of the project proposal, the relevance of the theme and avoid duplication with existing or finished projects and networks. The resulting knowledge and easily accessible end-user material should be substantial in number and feed into the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability' for broad dissemination to practice. In the exceptional event that minor testing of specific solutions would be needed, a maximum of 20% of the project budget may be used for this purpose. Proposals should fall under the concept of 'multi-actor approach'[69].

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million per network would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This action should contribute to the successful deployment of the vast reservoir of existing scientific and practical knowledge on the theme chosen, and improve knowledge exchange between scientists and practitioners on agricultural and forestry practices. Impact can be measured as regards:

- The collection and delivery of easily accessible and long-term available practice oriented knowledge on the specific thematic areas chosen, to be delivered through the main existing dissemination channels which are most used by practitioners and where the material stays available beyond the project period, including material for training and educational purposes.
- The greater user acceptance and more intense dissemination of collected solutions to end-users.
- The increased flow of practical information between the geographical areas in Europe relevant to the specific themes chosen, taking into account the differences between the territories.
- Support to implementation of the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability', through interaction with Operational Groups, and in particular through the delivery of a substantial number of "practice abstracts" in the common format of the EIP-AGRI[70], including audio-visual material wherever possible

[69] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

[70] The EIP common format for "practice abstracts" is available on website xxxx

Type of action: CSA

RUR - 11. [2016]: On farm demonstrations: deepening farmer-to-farmer learning mechanisms

Specific challenge: Improving the sustainability of European farming systems and facilitating their transition is a key objective of both the CAP and Horizon 2020. Research and innovation activities should play a key role in the transition effort towards sustainable and resilient production systems but often do not dispose of efficient approaches for convincing and demonstrating the validity of innovative knowledge to the farming community. Best practices often stay limited under form of tacit knowledge within local communities and are not spread over the EU territory nor to research. Moreover, it is recognised that other farmers are the key source of information for farmers and their experience and opinion is often decisive for their peer farmers. Condition for effective peer to peer learning is that the demonstration farm operates within the same conditions as average commercial farms. This means that the farm is subject to normal regulatory constraints and that the alternative production systems / agricultural practices / technologies are an integral part of the commercial farming activity. In short, demonstration and pilot farms have a major role to play in the diffusion of results from science and the spreading of best practices and innovative farming approaches within the farming community. Efforts would need to be undertaken to deepen their potential and prepare for European connectivity.

Scope: Proposals should make an geo-referenced inventory of existing demonstration farms, analyse the key elements of efficient demonstration techniques and explore the potential of farmer-to-farmer learning. In a first step, activities should map open commercial farms which engage in demonstration activities in Europe and describe the mediation techniques they apply. This inventory should be organised around a list of themes that are sectorial (oriented to specific primary products, e.g. crops, livestock, etc.) but also oriented to non-sectorial/cross-cutting themes (e.g. specific farming systems, energy saving, supply chain initiatives, care farming, etc.). Using this inventory of open farms, project proposals shall work on a broad variety of cases with a representative geographic coverage for the wide range of EU agricultural sectors, systems and territories. They shall analyse the different types of demonstration farms and programmes which use a commercial farm setting, looking at what they do, how they do it, who plays which role, and what is the impact. Project activities should result in a better view on approaches and policies to incentivise effective demonstration activities, and provide added value in this regard to the European Innovation Partnership "Agricultural Productivity and Sustainability", its networking activities (e.g. EIP Focus Groups) and its Operational Groups. To deepen the understanding of effective demonstration activities, consortia shall include actors with practical experience in demonstration activities, covering as a minimum agricultural / forestry practitioners (demonstration farms) and intermediary persons/bodies organising or facilitating on-farm demonstrations. Proposals should fall under the 'multi-actor approach'[71] and may further as relevant involve a wide range of actors, such as farmers/farmers' groups, advisors, innovation

[71] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

support services, researchers, social scientists, EIP Operational groups[72], national/regional networks and enterprises or other supply chain actors if relevant.

Proposals should provide input for and look for synergies with topic RUR 12 [2017] to ensure that the inventory of demonstration farms and best demonstration practices resulting from this topic articulates in concrete thematic knowledge exchange activities across European sectors and systems under topic RUR 12 [2017].

The Commission considers that proposals requesting a contribution from the EU up to EUR 2 million per project and a maximum period of 30 months would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This activity should lead to a better view on effective practical approaches for demonstration activities on commercial farms. An inventory of demonstration farms and an analysis of their techniques, and the policies supporting these, would step up farmer-to-farmer learning. The following impacts can be expected:

- An inventory of open farms engaging in demonstration activities in Europe, detailing the sectors, themes and topics on which they provide particular expertise, which feeds into the EIP-AGRI web-databases.
- A set of best practical approaches for demonstration projects and programmes which are effective in increasing application of innovative entrepreneurial practices and scientific knowledge.
- Improved understanding of effective demonstration approaches and programmes, and increased impact of the knowledge exchange that can be reached by farmer-to-farmer learning. This should cover both demonstration of research results and spreading of best farming practices among practitioners, possibly accompanied bya limited set of appropriate indicators for measuring such impact.
- Recommendations for Agricultural Knowledge and Innovation System (AKIS) governance and policies on how to support effective demonstration activities
- Provision of added value to the European Innovation Partnership "Agricultural Productivity and Sustainability", its network and its Operational Groups.
- A basis to support networking and learning among commercial demonstration farms within the EU territory to be developed under RUR 12, organised around a list of themes.

Type of action: CSA

RUR - 12. [2017]: Networking European farms to boost thematic knowledge exchanges and close the innovation gap

[72] For the EIP and RD Operational groups, see p.xx (introduction of the Work Programme) and http://ec.europa.eu/eip/agriculture/

Specific challenge: As was highlighted by the SCAR- AKIS Strategic Working Group, the Subgroup on Innovation of the Rural Assembly and the EIP-AGRI Focus group on Organic Farming, EU added value is to be expected from connecting existing initiatives of open farms at local level. Demonstration and pilot farms have a major role to play for the broader farming community with regard to peer to peer learning and effective knowledge transfer on practical farming approaches. They are also a perfect instrument for dissemination of possible innovative approaches resulting from scientific work. Demonstration on "real" farms furthermore offers, beyond classical knowledge transfer activities, opportunities for actors to meet, network and exchange knowledge. Existing demonstration farms or experimental farms in specific thematic areas need to be connected and networked within Europe in view of doing more with less. The financial crisis and the start of the EIP Agricultural Productivity and Sustainability[73] raised awareness that farming infrastructure for demonstration purposes is costly and that thematic expertise deserves sharing within Europe. Beyond demonstration, thematic farm networks could develop increased interaction between science and practice, for instance for discussing research outputs, capturing research needs from practice, and providing a base to develop interactive innovation projects[74] on the needs or opportunities of the farming community.

Scope: Project activities should set up network activities between geo-referenced demonstration farms on specific themes across Europe with a view to exploit their potential to improve delivery of practice oriented knowledge and enhance interactive activities. Themes may be chosen according to where most EU added value is to be expected and should contribute to a more sustainable and resilient agriculture and forestry. The themes would cover both sectorial approaches (e.g. specific crops or livestock) and cross-sectorial themes, for instance specific farming systems, management of soils / nutrients / biodiversity / landscape / supply chains, resource efficiency, agro-ecology, precision farming, environmental/climate farming challenges, integrated pest management, animal welfare, effective, resilient and biosecure livestock systems, resilient cropping, energy production and management, speciality crops, biomass applications or other. Projects should organise knowledge exchange activities and provide for connecting means and structured output from exemplary demonstration farms in an approach appealing to an average farmer, which can be shared over Europe, e.g. farm visits, visual material (photos, video), easy to read texts, etc. The project activities should provide synergy and complementarity to the European Innovation Partnership "Agricultural Productivity and Sustainability", by thematically showcasing and cross-fertilising innovative practices/methods, and by delivering related audio-visual material and practice abstracts according to the common format for practitioners[75]. They should also seek to use and complement the outputs from relevant European, national and regional projects or clusters around the themes chosen, for instance Focus Groups[76], Operational Groups[77] and Thematic networks[78]. The demonstration networks

[73] http://ec.europa.eu/eip/agriculture/

[74] For the interactive innovation model, see p.xx (introduction of the Work Programme)

[75] The common format for practitioners is available on www. Eip. Zzz.eu

[76] See EIP website www.111.888.eu for the list of EIP Focus Groups

[77] See EIP website http://ec.europa.eu/eip/agriculture/ for the list of Operational groups

should furthermore also develop linkages with advisors and their activities. Proposals should fall under the 'multi-actor approach'[79], involve a wide range of actors with practical experience, such as farmers/farmers' groups, advisors, innovation support services, researchers, Operational groups, EIP national/regional networks and enterprises or other supply chain actors where relevant. They should look for synergies with the inventory of demonstration farms and best demonstration approaches delivered under topic RUR 11 [2016]. Activities and networks would extend for periods longer than 4 years where appropriately substantiated and organise synergies with the EIP Agricultural Productivity and Sustainability (EIP AGRI).

The Commission considers that proposals requesting a contribution from the EU up to EUR 7 million per project would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This action should initiate structured networking activities between demonstration farms in a broad range of specific themes with a view to boosting innovation across Europe. The following impacts can be expected:

- Increased flow of practical information on the specific themes chosen between the relevant geographical areas in Europe, exploiting possible complementarities with existing projects and networks.
- A series of activities spreading thematic innovative knowledge, on which Operational Groups under rural development and the EU wide EIP-AGRI network can build
- Support to implementation of the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability', through a structured organisation of the flow of information between the relevant geographical areas on the specific themes, resulting in an increased networking and learning among open farms and farmers within Europe
- Increased farmer-to-farmer learning and visibility of on-farm demonstrations on specific themes, helping to spread promising best practices and ensuring a timely uptake of research results by the farming community, and fuelling interactive innovative projects and approaches
- A greater user acceptance of the shared information contributing to a more competitive and sustainable agriculture and forestry

Type of action: CSA

RUR - 13. [2017] – Building a future science and education system fit to deliver to practice

[78] See EIP website www.xxx.yyy.eu for the list of Horizon 2020 thematic networks

[79] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

Specific Challenge: Transition towards more sustainable agriculture, forestry, food and bio-based value chains, equipped to face the challenges ahead of them, requires a renewal and strengthening of technical and soft skills of all players involved. Along with ensuring delivery of peer-reviewed output from practice-oriented research, this will contribute to an efficient and interactive agriculture knowledge and innovation system.

In 2010, 71% of European farm managers were operating on the basis of practical experience only. Education levels vary greatly depending on countries, generations, farm managers' age and gender or farm structures and can hamper innovation. As the share of farmers with secondary and tertiary education will rise, education will play an increasing role in farmers' capacity to co-create and implement new techniques and practices, anticipate and adapt to legal, policy, market and environmental changes, design innovative ways to market their products and take part in interactive innovation systems and networks. New production processes and new types of supply chains in the wood, food and bio-based industry sectors also create a business demand for new skills. On the science side, we may fall short of researchers and capacities in fields of science of crucial importance for sustainable agriculture which are under-developed or unattractive in Europe.

While basic research remains necessary, a crucial challenge is also to remove bottlenecks to delivery of practice-oriented research to end-users. Current research evaluation systems based mainly on scientific publications give little incentives, appreciation and reward to scientists willing to invest in practice-oriented research. Some front-runners are engaging in new ways to rate research activities which deserve to be assessed, applied to agriculture and up-scaled to a wider number of research providers and funding bodies.

Scope:

Proposals will carry-out a challenge and foresight-based inventory of skills which will be needed in agriculture, forestry and related value chains, covering primary producers, advisors, industry and businesses as well as scientists. Proposals shall review how current science, education and training systems in a wide and varied set of EU Member States (possibly also associating Third countries) cater for these needs, seeking to build roadmaps for improvement of curricula, learning methods and long-term interaction approaches between education, science and economic players. Particular attention should be paid to soft skills, such as entrepreneurial, intermediation and communication skills in particular for farmers, advisors and researchers, along with technical skills related to new practices or processes and sustainability requirements in science fields of importance for the future. Needs should be differentiated taking into account the variety of farming systems, current trends in structural change, various business models which are developing in farming and subsequent value chains and geographic conditions. The analysis should explore how education and training systems could improve, in particular by attracting more farmers and other players to sufficient education and life-long learning and by making these systems fit for purpose and permanently updated. Piloting of new curricula and training methods in some of the participating institutions would bring added value to the proposal. The effectiveness of existing EU policy instruments on education and training in this regard should also be assessed and improvements proposed.

Furthermore, to enhance effective delivery of practice-oriented research and best practices from the field, proposals shall develop an operational system for incentivising, measuring performance and reviewing outputs of interactive innovation and practice-oriented research. They should build on front-running initiatives in and out the EU and assess different options currently being tested. Activities should deliver practical methodologies and criteria that can

be used i) for measuring performance of research providers and projects with regard to their outputs for practice and ii) to translate academic knowledge into practical knowledge easily understandable by end-users. To this aim, proposals should develop a peer-review system for research outputs ready-made for delivery to farmers and foresters, exploring all components required to operate such a system.

The analysis should build-up to further policy recommendations on how to develop the education, training and science system of the future.

Proposals should fall under the concept of 'multi-actor approach'[80] and be highly participatory, involving specialised education bodies, sector representatives and advisors from the outset of project development to maximize bottom-up elaboration and final uptake of project results. Engagement of authorities in charge of curricula development and measuring research impact may be useful. Communication and dissemination activities should reach out far beyond the consortium to enlarge uptake of research results.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 7 million allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Shared inventory of skills needed for a transition towards more competitive and sustainable agriculture and related value chains, serving as a basis for continuous and longer-term cooperation between education bodies across Europe, leading to intensified exchanges and regular updates of this inventory;
- Improved technical and soft skills of farmers, foresters, advisors, industry employees and scientists translating into better farm management, increased competitiveness, sustainability and resilience to environmental, climate and market changes;
- Increased awareness of gaps in research capacities and specific fields of science of crucial importance for sustainable agriculture;
- Increased efficiency of the agricultural knowledge and innovation systems in the EU thanks to i) improved linkages between education, science and economic players, ii) enhanced capacity of players to interact with one another, iii) contribution to an institutional shift towards better recognition and rewarding of practice-oriented research;
- Improved quality and usefulness of outputs produced by researchers for the immediate use of farmers, foresters or value chain businesses, thanks to a peer-review system applied to these outputs, leading to an improved implementation of research results by end-users and an innovative agricultural sector;
- Recommendations for improved policies for education, agriculture, research and innovation at European, national and regional levels.

Type of action: Research and Innovation Action

[80] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

RUR - 14. [2016]: Advisor's role in functioning of AKIS and advisory policies boosting innovation in sustainable agriculture

Specific Challenge: The role of advisors in the Agricultural Knowledge and Innovation System (AKIS) needs analysis and farmers' decision making processes explored. The terms "advice" and "advisor" appear to cover various and different loads. The role authorities and the private industry attribute to advisory services and the expectations they have in this regard for fulfilling their own objectives needs exploration if one wants to understand the true functioning of AKIS. The way the various types of advisors are embedded in the country/regional Agricultural Knowledge and Innovation System (AKIS), how public and private advisory services interact and what type/ combination their financing sources have determines advisors' short and long term influence on farm decisions, advisors' impartiality and the way practical knowledge is kept public and conserved on the longer term. This complex interrelationship is governed by public policies at national, regional and EU level and impacts to a growing extent whether society can sufficiently steer towards improved sustainability of agricultural systems. New approaches need to be developed to enhance advisors' potential to boost innovation through their intermediate function connecting science and practice. Focus should be put on the needs and behaviour of the farmers, improvement of connections with research and the ways to provide accurate and timely advice, including the use of new ICT advisory tools. The quality, efficiency and effectiveness of an advisory service rely on the long lasting confidence between advisor and farmer and on the qualifications, experience and networking capacity of the advisors. Therefore sustainable financing of specific basic functions of existing public/private advisors may be a key to success. The growing number and impact of private advisors and the decrease of public extension services negatively influences cooperation among the various types of advisors. New ways of interaction with advisors need to be explored, with the ultimate goal to improve knowledge flows in the AKIS of the various Member States and the conservation and development of public knowledge for agriculture.

Scope: Considering the different types of farming systems and farmers, this action should examine how farmers take their decisions and who influences them the most. Within this context, activities should analyse the role of the various types of advisors in the AKIS. Taking into account the impact of face-to-face interaction, proposals should identify the key elements responsible for the creation of trust between farmer and advisor which enable effective knowledge transfer and exchange. They shall as a minimum explore the relationship between advisors and researchers and between advisors and farmers, identifying the main elements to facilitate the flow of information in both directions. Beyond linear knowledge transfer processes, particular attention should be paid to advisors' potential for boosting innovation: including with regard to advisors' funnelling of practice needs into research activities, to participation and intermediation by advisors in farmer-to-farmer learning processes and interactive innovation projects[81], and to advisors acting as innovation broker or innovation support service incentivising innovation projects and capturing grass-roots innovative ideas from practice.

Moreover, proposals should examine which governance models are most appropriate for empowering such multi-functional advisory services: how can the various advisory roles be embedded in the regional, national and EU AKIS policies, how can public and private

[81] For the interactive innovation model, see p.xx (introduction of the Work Programme)

advisors be interconnected (both at MS and at EU level), are they competing or well-coordinated, how is permanent training of advisors organised (who, when, why etc), what minimum education requirements are needed for fulfilling the role of advisor, how to support farmer-to-farmer learning or organise knowledge building with support of ICT tools or internet etc. Proposals shall also explore the role of advisors in innovation networks at local, regional, national or European level (e.g. within the EU Farm Advisory System, the EIP-AGRI network, National Rural Networks, ENRD, Leader, etc.) and the role of farmers' associations (trade unions, cooperatives, irrigation associations, etc.) or private advisors linked to agricultural input suppliers. Activities should analyse the impact of funding for multi-functional advisory services under national policies and the Common Agricultural Policy (CAP) in general, including the impact of public procurement for the selection of advisory services, possible difficulties for smaller advisory services to participate, the requirement that advisors should follow regular training etc. Proposals shall work on a broad series of practical cases across the EU and identify best practices. They fall under the concept of 'multi-actor approach[82]'. Consortia must include key actors with practical experience in the subject such as advisors and advisory services, but should involve also other relevant actors such as farmers, farmers' organisations, social scientists, researchers, authorities, businesses / cooperatives providing advice etc.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This action should contribute to understanding of the future role of advisors in AKIS and their potential in boosting innovation, and improve related public policies. The following impacts can be expected:

- Improved understanding of farmers' decision making processes across the EU and the way advising is impacting sustainable agricultural practices
- Enhanced impact of advisory systems on strengthening knowledge flows between science and practice, including suggestions for efficient support and training systems for advisors
- Resulting from the cases discussed, a set of good examples and best practices for well-connected and effective advisory systems, focusing on ways for long-term preservation of practical knowledge and including identification of success elements and possible novel ways of advice provision boosting innovation and improving networking
- Transition pathways and recommendations for improving advisory services performance and effectiveness, including interconnection and networking of advisory services and innovation support services at national/regional and EU level, supporting the implementation of the EIP Agricultural Productivity and Sustainability
- Suggestions for governance models and public policy mechanisms, contractual arrangements and appropriate funding instruments providing effective support for improved interactivity of advisors, enhancing innovation-driven research and advisory services which are able to support the path to more sustainable agriculture

[82] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

- Suggestions for deepening the networking capacity and impact of the CAP's horizontal Farm Advisory System, including a thorough understanding of the impact and mechanisms applied under 2014-2020 CAP's rural development support for advisory services

Type of action: RIA

RUR - 15. [2016]: The benefits of working with others – fostering social capital in the farming sector

Specific Challenge: the environmental and economic sustainability of the farming sector relies for an important part on the capacity of farmers and land managers to develop activities and participate in networks with fellow farmers and other individuals, groups or other entities. Despite the multiple advantages derived from such approaches, the level of involvement of farmers in such approach can be low in a number of European countries, for various reasons. To facilitate the development of such approaches, it is considered important to investigate the constraints and disincentives that impede their development in different areas of collective action (productivity, information sharing, sustainability) and to seek ways to overcome them.

Scope: proposals will cover primarily EU Member States where the level of organisation of farmers and land managers is considered low. Activities will address constraints to the development of cooperatives / networking activities in particular areas (economic activity, environmental sustainability etc.) and will elaborate on solutions. These will derive from case studies, identification of best practices, participatory workshops, etc. Proposals should fall under the concept of 'multi-actor approach'[83].

The Commission considers that proposals requesting a contribution from the EU up to EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: the project's results are expected to:

- Improve understanding of farmers' attitude towards cooperation and networking;
- Provide recommendations for policy makers to foster social capital in the farming sector
- Lead to higher levels of organisation of farmers in the medium to long term

Type of action: CSA

RUR - 16. [2017]: Optimising interactive innovation project approaches and the delivery of EU policies to speed up innovation in rural areas

[83] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

Specific challenge: A number of new initiatives and instruments for speeding up innovation have recently been established and deserve in depth exploration. With Horizon 2020 and the CAP towards 2020, innovation in agriculture and related sectors has been given specific attention. The European Innovation Partnership (EIP) "Agricultural Productivity and Sustainability", a new approach under the Europe 2020 Strategy, aims to speed up EU research and innovation by linking existing policies, instruments and actors. The agricultural EIP in particular implements the interactive innovative approach which relies on knowledge exchange, empowerment of all actors concerned and focuses on getting results implemented in practice. An EU wide EIP network is connecting the EIP Operational Groups funded under Rural Development Programmes and provides interaction with Horizon 2020 projects. Besides Horizon 2020 multi-actor research projects and thematic networks compiling knowledge ready for practice, other elements of EU and national policies may also contribute to innovation, e.g. the Farm Advisory System, Rural Development funding supporting advisory services, knowledge and information actions, LEADER, specific national/regional or particular H2020 instruments etc. All instruments cited contribute to innovation in the agricultural and forestry sector. The challenge is to improve their targeting and interlinking - if and where needed - , and possibly learn from relevant insights from outside Europe.

Scope: Proposals should explore how instruments and approaches under the various policies could be further adjusted and how they contribute to innovation in the agricultural and forestry sector. Learning also from experience at international level, this topic should investigate the conception and implementation of interactive innovation projects[84], based on a substantial number of case studies of interactive projects in a broad range of agriculture and forestry sectors. An essential part of this topic would go into depth to develop best practices/approaches for H2020 multi-actor projects and thematic networks at project level. Based on a series of cases of running multi-actor projects and thematic networks, proposals should develop best practices for consortia to combine and exploit as much as possible both scientific and practical knowledge in their projects. Special attention needs to be given to the role of facilitators that intermediate between the different type of actors and to the particular management/coordination needs for this type of projects in view of intensifying knowledge exchange between actors. Also unsuccessful approaches where project implementation is not delivering as expected are relevant: 'facts', 'feelings' and group dynamics should be taken into account. Activities should investigate how co-creation and co-ownership of project results can be improved and quantified/qualified in view of speeding up the use of project results in practice. Questions would also be on how practically/legally to construct consortia with different type of actors, taking into account the different status of the various types of organisations involved (partner, subcontracted…). Proposals should also explore pathways for involvement of secondary and higher education as actors in interactive innovation projects, including H2020 multi-actor projects, thematic networks and EIP Operational Groups. Furthermore, activities should examine how multi-actor projects and thematic networks can seek synergies and intensify effective linkages with Operational Groups and other interactive innovation projects under national/regional policies.

Proposals should involve key actors in the AKIS (farmers, advisors, researchers, research bodies, social scientists, managing authorities, network agents, enterprises etc.). They may include insights from outside Europe and fall under the concept of 'multi-actor approach'[85]

[84] For the interactive innovation model, see p.xx (introduction of the Work Programme)

[85] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

The Commission considers that proposals requesting a contribution from the EU up to EUR 5 million per project would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- A description of supporting mechanisms and governance for a more efficient conduct of interactive innovation projects, including pathways for improved interaction with existing sectoral, rural and innovation actors and networks at local, regional, national and EU level and to the Farm Advisory System under the Common Agricultural Policy
- Development of best practices for building and implementing multi-actor project proposals and consortia under H2020, including thematic networks compiling knowledge for practice
- Delivery of a set of good examples of various types of multi-actor research projects and thematic networks compiling knowledge for practice, which successfully connect to Operational Groups
- Better quantitative and qualitative measurement of scientific efforts impacting agricultural practices and systems, including the impact of the facilitating actors and the involvement of education
- Suggestions for public policy governance mechanisms, contractual arrangements and appropriate funding instruments providing for effective interactive projects, enhancing innovation-driven research and advisory services which are able to support the path to more sustainable agriculture

Type of action: RIA

CONDITIONS FOR THIS CALL

Opening date[86]: XX/XX/201X for 2016 topics
XX/XX/201X for 2017 topics

Deadlines[87]:

RUR-8-2016 RUR-10-2016 RUR-11-2016 RUR-15-16	02/03/2016 at 17.00.00 Brussels time	
RUR-1-2016 RUR-4-2016 RUR-6-2016 RUR-7-2016 RUR-14-2016	First stage 02/03/2016 at 17.00.00 Brussels time	Second stage 14/09/2016 at 17.00.00 Brussels time
RUR-5-2017 RUR-10-2017 RUR-12-2017	XX/XX/2017 at 17.00.00 Brussels time	
RUR-2-2017 RUR-3-2017 RUR-9-2017 RUR-13-2017 RUR-16-2017	First stage XX/XX/2017 at 17.00.00 Brussels time	Second stage XX/XX/2017 at 17.00.00 Brussels time

Indicative budget: EUR 66 million from the 2016 budget, and EUR 59 million from the 2017 budget

	2016 EUR million	2017 EUR million
RUR-1-2016	6.00	
RUR-2-2017		5.00
RUR-3-2017		8.00
RUR-4-2016	5.00	
RUR-5-2017		5.00
RUR-6-2016	20.00	
RUR-7-2016	6.00	
RUR-8-2016	12.00	
RUR-9-2017		9.00
RUR-10-2016/2017	10.00	10.00
RUR-11-2016	2.00	
RUR-12-2017		7.00

[86] The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening

[87] The Director-General responsible may delay this deadline by up to two months.

RUR-13-2017		7.00
RUR-14-2016	5.00	
RUR-15-2016	3.00	
RUR-16-2017		5.00

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

Topic number	Up to one project per topic or sub-scope shall be funded.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[88] published on the Participant Portal.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single or first stage*)	Information on the outcome of the evaluation (*second stage)*	Indicative date for the signing of grant agreements
RUR-5-2017 RUR-8-2016 RUR-10-2016/2017 RUR-11-2016 RUR-12-2017 RUR-15-2017	Maximum 5 months from the final date for submission		Maximum 3 months from the date of informing applicants
RUR-1-2016 RUR-2-2017 RUR-3-2017 RUR-4-2016 RUR-6-2016 RUR-7-2016 RUR-9-2017 RUR-13-2017 RUR-14-2016 RUR-16-2017	Maximum 2 months from the final date for submission	Maximum 5 months from the final date for submission	Maximum 3 months from the date of informing applicants

[88] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

Call for Bio-based innovation for sustainable goods and services - Supporting the development of a European Bioeconomy

The era of industrial growth supported by an ever expanding and non-sustainable use of fossil resources is rapidly coming to an end. The new wave of industrialisation comes from bio-based industries that produce and use sustainable bio-based resources at competitive prices and convert them into innovative, sustainable and viable industrial products. Championing this paradigm shift, from fossil to bio, will be critical in maintaining and reinforcing the EU industrial base and will contribute to bringing industry's weight in the EU's GDP back to 20% by 2020, from less than 16% today. Bio-based products will provide new markets to biomass producers, strengthening also rural economies and generating high-skilled jobs.

This call will embrace two main aspects of the bio-based innovation. Firstly, it will encompass the production, mobilisation and use of biomass including new business and service models, to sustainably secure raw material supply for a wide range of industrial products taking into account potential trade-offs of competing land-uses. Secondly, it will consider stakeholders engagement and demand-side measures supporting market development of bio-based products.

Within this focus area, two sub-areas have been identified:

- Securing sustainable biomass supply for bio-based goods and services
- Building the "bio-based markets of the future"- mobilising stakeholders engagement

Securing sustainable biomass supply for bio-based goods and services

Biomass is not unlimited and the success of a transition towards a less fossil fuel dependent society where bio-based innovation will play a key role, will depend on our ability to sustainably mobilize the biomass supply necessary for the different end uses. To secure sustainable supply for bio-based good and services, it is critical to diversify and increase the productivity, quality and output of biomass from forest, agricultural and marginal land (including specialised crops) and sea, avoiding the degradation of ecosystems (including soil and water quality and biodiversity aspects). Equally, it is important to unlock the potential of residues, industrial by-products, side-streams and wastes. The regional dimension of feedstocks mobilization and logistics; the need to build bridges between the different actors of the supply chain; the trade-off aspects of biomass uses as well as the need for industry to secure access to sustainable (certified) biomass, are also key aspects.

Building the "bio-based markets of the future"- mobilising stakeholders engagement

Bio-based products market uptake will be affected by economic and social factors such as environmental, health and ethical considerations which will influence consumer's choices; Stakeholders' engagement will be key to help identify and address the different actors' interests, aspirations as well as perceived risks, and to maximise the benefits of new bio-based business models within the society. Also critical for the development of bio-based markets is the continuous work on standardisation, including sustainability indicators, criteria and assessment approaches; the use of standards as well as the innovation in procurement approaches.

The Bio-based Industries JTI represents a major investment in this area. While it covers the whole value chain from the development of innovative feedstock, its conversion in next

generation bio-refineries, and supporting markets for bio-based products; its stronger emphasis is placed on development and demonstration of next generation bio-refineries. In this sense, the content of the current call, which is primarily on the upstream (biomass supply) and downstream (market development of bio-based products), complements the activities of the Bio-based industries JTI.

This call contributes to the objectives of the Bioeconomy Strategy, the CAP/Rural development, the integrated Maritime Policy and its environmental pillar, the Marine Strategy Framework Directive; to the Blue Growth strategy, the new EU Forest Strategy, the Industrial renaissance policy and the Strategic agenda for the Union in times of the change for stronger economies with more jobs and a secure energy and climate future.

The strategic orientation 'Mobilising stakeholders engagement for new bio-based markets' is tackled in particular under this call. This call has cross-cutting links with other areas of Horizon2020, being relevant to *Secure, clean and efficient energy* (Societal Challenge 3), *Climate action, environment, resource efficiency and raw materials* (Societal Challenge 5), *Inclusive, Innovative and Reflective Societies* (Societal Challenge 6), and LEIT//*Nanotechnologies, Advanced materials, Biotechnology and Advanced manufacturing and processing (*NMBP).

Securing sustainable biomass supply for bio-based goods and services

BE - 1. [2016] Sustainability schemes for the bio-based economy

Specific challenge: Sustainability assessments are major factors not only for consumer acceptance but also for developing an efficient and meaningful policy framework for bio-based products. While there is already a framework in place for the sustainability assessment of biomass and biofuels, there are only incipient initiatives for bio-based products. Objective and quality life cycle assessments based on robust and agreed methods are important to clarify the environmental impact/benefits of bio-based products and to benchmark their environmental performance with alternative non-bio-based products in the market.

Scope: Development of sustainability schemes for bio-based products building on (1) existing schemes for biomass and biofuels (2) the work of (CEN-TC411) on standards for 'Bio-based products – Sustainability Criteria' and 'Bio-based products – Life cycle Assessment' which should incorporate end of life (3) previous work on bio-based products LCA metholologies . Aspects that could be considered include: building-in economic and social factors; consideration of the circular economy and cascading use; development of ILUC factors for bio-based products; thresholds for different sustainability criteria/indicators; certification schemes and use of standards; Life cycle assessment on bio-based products in the context of (eco)labelling. The applicability and efficiency of the proposed sustainability schemes and criteria/indicators in the actual regulatory framework; the balance between costs and complexity of the sustainability assessment; and the market pull the specific proposed measures will represent, should be built as credible case in the proposal. In this context proposers may decide to centre the efforts and make the case for a specific segment/groups of bio-based products.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: To contribute to the implementation of the objectives of relevant European policy initiatives, including the Lead Market Initiative in Bio-based Products, the Industrial Policy, the Environmental Technology Action Plan and the Bioeconomy Strategy, proposals will have to:

- Contribute to the development of efficient, implementable and fit to purpose sustainability schemes and criteria indicators;
- Ensure market pull for bio-based products through (i) wider use of bio-based standards and certification schemes (ii) the expansion of bio-based products accessing sustainability schemes e.g.(eco)labelling;
- Develop objective and quality life cycle assessments based on robust and agreed methods, allowing benchmarking, accepted and applicable in regulatory and policy frames.

Type of action: RIA

BE - 2. [2017] Towards a methodology for the collection of statistical data on bio-based industries and bio-based products

Specific challenge: As compared to bioeconomy sectors such as food-chain or bioenergy which keep hold of consolidated official statistics, there is a current lack of reliable and uniform ones on bio-based industries and bio-based products. In spite of progress made by the European Bioeconomy Observatory and other initiatives to gather data on the use of biomass for bio-based products, the following hurdles are still laying ahead to reach a widespread data availability: (i) There is lack of a comprehensive database with statistics for industrial uses of biomass, (ii) The flow from raw materials to end products cannot be inferred from existing databases, (iii) There is insufficient comparability between different databases, (iv) Methodologies for data collection are not always transparent and existing data rely to a large extent on industry surveys and estimations of experts. This data gap hinders the development of economic models enabling the quantification of the bioeconomy and its economic, environmental and social effects. In turn, it has a negative effect on the ability of policy-makers to set the most appropriate policies to encourage investment in the bioeconomy in view of factors such as competition/synergies and possible trade-offs between various biomass uses.

Scope: Development and implementation of a methodology for collecting data on bio-based products, which should consider their incorporation to the European statistical infrastructure (Eurostat), building on and contributing to on-going activities on exemplary bio-based products (Bio-based Succinic Acid & 1,4-Butandiol, lubricants). The following aspects should be considered: (1) Interlinks with current CEN standardisation work addressed in CEN on bio-based products (2) Training support or technical inputs to official custom and competent laboratories staff in Member States and to relevant activities within the existing programmes such as Customs 2020 and European Union Customs Competency Framework (EU Customs CFW); (3) Definition of the minimum bio-based carbon and/or bio-based content for some bio-based product groups (except bio-based lubricants); (4) Data compatibility with European and international databases (e.g. FAOSTAT, PSD, etc). Data generated should be fed into economic models, existing or newly developed, enabling the description of the bioeconomy development, its interaction with the rest of the economy, and its economic, environmental and social impact. Consortia should include a balanced combination of expertise on bio-based products, statistical reporting from MS and modelling. Proposals should build upon the existing work of completed and on-going projects including the current activities of the Bioeconomy Observatory, RRM-Group as well as the Commission study on Biomass Supply and Demand.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: As a step forward in setting the most appropriate policies to encourage investment in the bioeconomy and defining possible trade-offs between various biomass uses, proposals will have to achieve:

- An implementation of an EU framework for data collection of bio-based products including disaggregated product-level statistics enabling the systematic monitoring of the evolution of bio-based products markets.
- The development of statistics and modelling tools providing decision-makers with the capacity to monitor bioeconomy developments and formulate clear targets and consider future impacts of present-day decisions, in particular in relation to establishing an efficient strategy for the biomass use in the EU. Contribution to interoperability activities (e.g. bioeconomy relates models, database interface specifications).
- Demonstrate the direct benefit to the bio-based industries in the form of an enhanced capacity to provide evidence on their economic, environmental and social impact in quantitative terms.

Type of action: RIA

BE - 3. [2017] Adaptive tree breeding strategies and tools for forest production systems resilient to climate change and natural disturbances

Specific challenge: Climate change and associated natural disturbances will increasingly influence the current distribution of tree species, bound by physical barriers, large production cycles and regulations on forest reproductive materials. These factors will also influence and impact on those areas where tree species and provenances could also (or better) grow in the future. Assisted migration of tree species from one region (or continent) to another has contributed to increased wood production in Europe over the last centuries. Though there are examples of good practice and benefits of genetic variation, there still is limited evidence of the inherent capacity of a variety of tree species and provenances, and their symbionts, to adapt rapidly enough and survive the current pace of environmental change. To counteract climate-induced decline and maintain/enhance forest productivity and meet the growing needs of society and the bioeconomy, there is opportunity to enhance the resilience of forests through the selection/development of new genotypes, with appropriate adaptation profiles.

Scope: Proposals should aim to develop novel tree breeding strategies and tools aimed at sustained yields (quality wood and non-wood products), while addressing resilience to climate change and natural disturbances (including pests and disease outbreaks). Proposals will aim to identify genotypes with appropriate, adaptive, traits for possible extension/change of tree species range, both vertically and horizontally, including those genotypes with potential for use on marginal land. Coniferous and broadleaved species that are of specific importance for forestry and ecosystem services EU wide should be targeted. The use of historical evidence of climate change linked with shifts in tree species and wood qualities should be included. Combining genomic information and traditional methods of genome sequencing and selection of desired traits, with methods of genome improvement, and the analysis of their potential application in tree breeding programmes, could also be considered. Compliance with biosafety and other relevant legislation (e.g. biodiversity and invasive alien species), and complementary with previous (FP7/LIFE) projects and COST actions is required.

Expected impact: To counteract climate change and maintain/enhance forest productivity, proposals should show how some, or all, of the following impacts will be achieved:

- Direct technical support to forest managers on the choice of tree species and provenances to increase stress tolerance under the underlying environmental change and meet the increasing societal demands on forest goods and services;
- Better understanding of benefits and risks related to economic performance of wood-value chains, and the environmental effects associated with the enhanced use of novel biotechnologies.

Type of action: RIA

Budget: 5m EUR

The following topics are also relevant to the "Bio-based innovation for sustainable goods and services" Call:

RR-[2016] Crop diversification systems for the delivery of food, feed, industrial products and ecosystems services: from farm benefits to value-chain organisation

For the topic text and further information, please refer to the description of the RR-[2016] topic under Rural Renaissance call

RR-[2017] Resource-efficient and profitable industrial crops on marginal lands

For the topic text and further information, please refer to the description of the RR-[2017] topic under Rural Renaissance call

RR-[2016/17] Creating added value from waste and by-products generated on farm and along the value-chain

For the topic text and further information, please refer to the description of the SMEInst[2016/17] topic under Rural Renaissance call

RR – [2017] – Business models for modern rural economies

For the topic text and further information, please refer to the description of the RR-[2017] topic under Rural Renaissance call

Building the "bio-based markets of the future"- mobilising stakeholders engagement

BE - 4. [2016] Bio-based products: Mobilisation and mutual learning action plan

Specific challenge: Ensuring that research and innovation in bio-based products and processes is not only excellent, but also relevant and responsive to the needs of all actors is important, not least in ensuring the uptake of results. Surveys show that consumers and citizens in general have little awareness and knowledge of bio-based products. To improve bio-based products market uptake, shape future research in BBP science, technology and innovation and meet views and expectations of society, there is a need for a broad, inclusive assessment of the challenges and opportunities at hand.

Multi-actor approaches are needed to identify and address both the risks and different stakeholders' interests and aspirations, in order to maximise the benefits of new bio-based business models within the society. Mobilisation of all actors along the value chain is crucial

to mitigate the probability of "technology mismatches" (i.e. development of technologies which cannot count on a cost-efficient and reliable feedstock supply, or which face insufficient market demand).

Scope: The Mobilisation and Mutual Learning Action Plan (MML) should ensure the engagement of all relevant groups and tackle innovation related challenges by establishing a multi-stakeholder platform, gathering a plurality of actors with different perspectives, knowledge and experiences[89], and maintaining open dialogue between the different stakeholders.

The objective of the platform should be the development and implementation of an Action Plan that would address the challenges of raising awareness of the citizens on the bio-based products. The approach should include applied innovation, better planning, and a more participatory approach**.** This project is to be based on the concept of Mobilisation & Mutual Learning Platforms (MML). The design of this platform and its activities should take into account and build on previous methodologies elaborated in European projects (including MMLs) and initiatives (including consultation processes in the field of bio-based products).

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: To contribute to responsible policy-making, helping to shape further research on Bio-based products and better acceptability of existing bio-based products; the direct and sustainable impact of proposals will be

- To create networks of specific targeted groups of citizens' awareness and understanding of bio-based products;
- To create a better framework for new bio-based market opportunities, through broad stakeholders' engagement leading to responsible, reliable, and societally acceptable solutions.

Type of action:

Coordination and Support Action (MML type)

BE - 5. [2017] Bio-based industries regional dimension

Specific challenge: Regions may play a key role in the establishment of bio-based industries by providing a favourable business environment and the necessary political frame. Few regions in Europe are in the process to build successful "bio-based industries" demonstrator case studies, and these have been largely in the regions with already established industries (chemical, energy, pulp and paper etc).

Strategies and implementing modalities should be shared in particular to regions that have so far unexploited biomass or waste resources so as to widen participation of countries, fully

[89] involving a balanced representation of experts and professionals in the fields of Public Engagement and bio-based products in general, and more specifically researchers, Civil Society (CSOs) and Non-Governmental Organisations (NGOs), scientists in the field of Social Sciences and Humanities, industry and policy-makers.

exploit the potentials of the bio-based economy in Europe and contribute to the rural and coastal renaissance. Bio-based industries and products offer new opportunities for regional and local actors using alternative resources and maximising possibilities for agro, forest and urban waste to be valorised. Development of synergies with the regional innovation strategies for the bio-based economy will definitely boost competitiveness of the region and its stakeholders on a regional, national, European and international level. Local actors may equally attract investments from other partners for establishing a favourable bio-based eco-system.

Scope: Creation of a Stakeholder platform of regional and local organisations (regional authorities or mandated agencies or clusters) interested to develop ambitious strategies in support of bio-based products/industries, with the aim to attract new investments in industrial projects. Building on the "model demonstrator regions", successful case studies shall be shared and transposed to other interested European regions. Industries, regions and investors should be bring together to establish an efficient dialogue matching demand and supply, establishing best practices and examples that can be followed by others.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 1 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: To widen the participation of countries developing regional bio-based strategies, proposals will have to:

- Constitute effective networks of stakeholders – local and industrial- for the implementation of concrete projects along the value chains of products to be used as demonstrators;
- Identify new opportunities at regional and local level and define mechanisms, tools, approaches, examples of good practice, guidelines, and further actions that may facilitate joint and/or complementary investments in research and innovation in the field of bio-based products.

Type of action: CSA

BE - 6. [2016] Life-cycle assessment of wood value chains and applications for the bioeconomy

Specific challenge: The forest-based sector is a sustainable and versatile value chain in Europe, and is of key importance to industrial development and economic growth. Forest stands require long production cycles, while the projections of wood demands are steadily increasing. In addition wood has a number of competing feedstock uses in the bioeconomy, including bioenergy, which may or may not be used on a cascading basis (from higher to lower added value products). To optimise the use of natural resources (e.g. land, water, soil, biodiversity) and production inputs (e.g. labour, capital), forest and wood value chains require a 'systemic' analysis (from 'cradle to grave'), encompassing social, economic and environmental considerations, including climate change mitigation (C sequestration in forest and harvested wood and GHG emissions from processing). This life-cycle assessment needs to address the evolving framework of natural conditions, societal demands, technological advancements and the policy framework. Optimisation of production and processing considering this broad framework of 'variables' remains a challenging task for decision making.

Scope: Proposals should aim to develop methodologies for the life-cycle assessment of wood value chains in both the traditional woodworking and paper industries and the emerging branches of bioeconomy, while addressing the sustainability of upstream primary production systems, building upon on-going activities such as the Bio-Observatory. Specific research questions may include, but are not limited to: the definition of technical and economic parameters/metrics against which common value chains need to be checked; the tipping points for a 'cascade' to be 'terminated' and replaced by renewed supply from primary sources, in order to maximise resource efficiency and minimise environmental footprint; etc. Methodological work should be based on concrete value-chains, consider the interrelated non-wood forest products and ecosystem services, and be integrated in a wider European context to enhance their sustainability. Business models covering both primary and secondary sector developed on this basis are expected and should also take account of wider societal impacts beyond purely economic models.

Expected impact: Proposals should show how some, or all, of the following impacts will be achieved:

- Development of tools for decision making to optimise the design of forest production systems and downstream value chains;
- Novel business models meeting sustainably the growing demands of society and the bioeconomy for wood and other forest goods and services.

Type of action: RIA

CONDITIONS FOR THIS CALL

Opening date[90]: XX/XX/201X for 2016 topics
XX/XX/201X for 2017 topics

Deadlines[91]:

BE - 4. [2016]	02/03/2016 at 17.00.00 Brussels time	
BE - 1. [2016] BE - 6. [2016]	First stage 02/03/2016 at 17.00.00 Brussels time	Second stage 14/09/2016 at 17.00.00 Brussels time
BE - 5. [2017]	XX/XX/2017 at 17.00.00 Brussels time	
BE - 2. [2017] BE - 3. [2017]	First stage XX/XX/2017 at 17.00.00 Brussels time	Second stage XX/XX/2017 at 17.00.00 Brussels time

BE - 8. [2016] Open call cut-off dates – Open from XX/XX/2016 for phase 1 and phase 2	Phase 1	Phase 2

Indicative budget: EUR 17 million from the 2016 budget, and EUR 9 million from the 2017 budget

	2016 EUR million	2017 EUR million
BE - 1. [2016]	3.00	
BE - 2. [2017]		3.00
BE - 3. [2017]		5.00
BE - 4. [2016]	3.00	
BE - 5. [2017]		1.00
BE - 6. [2016]	4.00	
BE - 8. [2016]- SME	7.00	

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

[90] The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening

[91] The Director-General responsible may delay this deadline by up to two months.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[92] published on the Participant Portal.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single or first stage*)	Information on the outcome of the evaluation (*second stage)*	Indicative date for the signing of grant agreements
BE - 4. [2016] BE - 5. [2017]	Maximum 5 months from the final date for submission		Maximum 3 months from the date of informing applicants
BE - 1. [2016] BE - 2. [2017] BE - 3. [2017] BE - 6. [2016]	Maximum 2 months from the final date for submission	Maximum 5 months from the final date for submission	Maximum 3 months from the date of informing applicants

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement

[92] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

Other actions (not subject to calls for proposals)

OTHER - 1. [2017] Specific Grant Agreements (SGAs) for ERA-NET Cofund actions supporting Joint Actions towards Public-Public Partnerships in the Bioeconomy

Once the Framework Partnership Agreement (FPA) resulting from topic SFS-18. [2016] is concluded between the Commission services and the consortium of programme owners and programme managers, each individual ERA-NET Cofund action will be implemented as a Specific Grant Agreement (SGA) linked to the FPA.

Individual topics suitable for SGAs will be identified and discussed in close collaboration with Member States' representatives through appropriate governance bodies (e.g. SCAR) on the basis of the indicative list of topics below. Additional topics may be included in agreement with the Commission services. The actual submission of the simplified ERA-NET Cofund proposals will only be possible after the Commission services have agreed to the scope and budget of each ERA-NET to be co-funded.

Proposers are encouraged to implement other joint activities, including additional joint calls without EU co-funding.

Participation of legal entities from international partner countries is encouraged in the joint call as well as in other joint activities. Participants from countries which are not automatically eligible for funding[93] may nonetheless request a Union contribution on to cover the coordination costs of additional activities on the basis of the ERA-NET unit cost.

Proposals will be evaluated by internal experts, ensuring in particular the compliance with the technical and legal requirements for ERA-NET Cofund actions as well as sufficient overall excellence of proposals before entering into grant preparation.

It is expected that the time from proposal submission to signature of the grant agreement will normally not exceed 4-5 months and thus contribute to a faster launch of joint calls and implementation of actions. Proposals shall not be submitted later than October 31st of the budgetary year.

Type of action: Specific Grant Agreements for ERA-NET Cofund actions in the context of the Framework Partnership Agreement resulting from SFS 18

Legal entities: Signatories of the Framework Partnership Agreement (SFS 18)

Indicative budget: EUR 29 MEUR

Proposals should address one of the following issues (A) to (E) and should clearly indicate to which one they refer. Nonetheless, this does not preclude submission of proposals addressing other topics, upon previous agreement with the Commission services.

A. Sustainable crop production

Objectives: To pool resources and know-how to develop and test solutions for sustainable crop production, including areas such as breeding, nutrients recycling and soil-plant-atmosphere interactions, plant health and protection, management practices and added value of the agricultural products.

[93] http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm

Impacts: Activities will contribute to developing cropping systems with an improved performance in terms of reducing environmental impacts, resource-use efficiency and quality of products. It will support the farming sector in adapting to expected changes resulting e.g. from emerging resource scarcities, environmental variations, demography, consumer preferences, global trade.

B. Innovative forest-based bioeconomy

Objectives: Forests cover more than 40% of the EU's landmass and are instrumental in a number of key policy areas. The forest-based sector provides income for 16 million owners, supports 3-4 million jobs in rural areas, represents some 8% of the EU's total manufacturing value; removes the equivalent of ca. 9% of GHG emitted in other parts of the economy; and provide for a diversity of other social, economic and ecological services. The proposed Co-fund action will promote increased innovation and competitiveness of the forest-based sector in Europe and support its transformation from a resource-intensive to a knowledge-intensive, productive and resource-efficient sector. Sustainability and modernisation of forestry systems and downstream value chains including innovative business concepts and production technologies will be needed to develop the forestry sector and the European bioeconomy, of which it has a very significant share. This proposal has been prepared in collaboration with, and is conceived as a follow-up to the current forest-related ERANETs: WoodWisdom ERANET+, Foresterra ERANET and SUMFOREST ERANET. Both basic and applied research, as well as close-to-market research and innovation actions are envisaged.

Impacts: enhanced resilience of forestry systems to natural disturbances; sustainable provision of forest biomass for the European bioeconomy, ecosystem services and non-wood forest products; development of sustainable and resource-efficient new value chains and consolidation of the existing ones; development of new knowledge and processes to support major transitions and innovations in the forest-based sector, supporting business development in rural areas and industrial development, in crucial sectors such as forest-based industries (traditional and emerging branches), construction, transport and energy; increased resource efficiency (e.g. water, energy) and climate change mitigation (C sequestration in forest and wood-based products).

C. GMO research

Objectives: The ERA-Net will coordinate transnational research on the effects of genetically modified organisms (GMOs) in the areas of human and animal health, the environment, and techno- economics and societies. The focus of the ERA-Net will be on GMOs intentionally released into the environment and/or used immediately in feed and food applications. In addition, the ERA-Net will explicitly take into account the wider views of a diversity of stakeholders and end-users (e.g. non-governmental organisations, industry, farmers). This is intended to strengthen ownership of the ERA-Net among stakeholders in order to encourage participation of different scientific communities in the future joint transnational calls, to enhance collaboration between actors and to increase the accountability of research trajectories and outcomes. There is a need to better and more openly communicate on all societally relevant issues associated with GMOs in order to formulate a more diverse and open view, taking into account both benefits and risks. This will allow making an informed choice about whether and how biotechnologies can be used to deliver solutions to the current and future challenges in agriculture and other areas. The ERA-Net will build on the results of the CSA project "Preparatory steps towards a GMO research ERA-Net".

Impacts: The overall goal of EU science, development, innovation and agricultural policies is to increase the sustainability and efficiency of agricultural production, leveraging the potential for the implementation of the future bioeconomy, greening agriculture, and for the mitigation of and the adaption to climate change. Therefore, these goals are taken as a benchmark to

assess the character and magnitude of possible effects of GMOs and their contribution to these goals and inform decision-making on how these can be scientifically addressed in a meaningful way. The ERA-Net projects will also deliver more meaningful results that can better inform regulatory as well as political decisions in order to protect the environment, human and animal health, and valued socio-economic conditions (e.g. structure of rural communities, sharing of power among different actors in the value chain) than the present uncoordinated research structure. The proposed implementation plan will also safeguard the possibility of using GMOs for the benefit of society (e.g. by increasing the sustainability of agricultural systems, by protecting biodiversity through the replacement of current practices with large negative footprints, by enhancing animal welfare or the livelihood in rural communities).

D. Nutrition and epigenome

Objectives: Although genome wide association studies have yielded a wealth of information on human genetic heterogeneity with literally hundreds of alleles found that define a susceptibility to lifestyle-dependent diseases in the context of diet. However, it has also become obvious that information on dietary exposure and genotype alone is insufficient to define the phenotype or provide causal relationships. There is thus an urgent need to gain a better understanding of additional factors that contribute to the phenotype and this refers to metabolic imprinting processes including epigenetic effects. There can be no doubt that during critical periods of human development such as embryonic, fetal, and early postnatal life, nutrition has pronounced effects that have long-lasting or lifelong effects for example on mechanisms that control body weight and/or predisposition to diseases later in life. Although it is believed that this "metabolic programming" is mainly via epigenetic processes it is not clear whether any epigenetic dysregulation is indeed a major cause of human obesity. Moreover, it seems necessary to assess whether not only energy balance and other metabolic parameters are altered but also to which extent and magnitude for example food preferences and other food intake behaviours are determined via such mechanisms. It also needs to be clarified in which cells or tissues these imprinting effects take place and how out of these routes lifelong or even trans-generational alterations can occur.

Impacts: An ERA-NET in this area would provide the required investment to fully realise the opportunity better understanding of the diet-genome and diet-epigenome and imprinting relationship. This investment would build on the existing capacity within some of the MS and provide opportunities to develop capacity in others, positioning the countries involved in the JPI HDHL at the forefront of this research area.

E. Plant Molecular Factory

Specific challenge: Plant Molecular Factory is defined as the use of plants or plant cells to produce high-value products such as proteins, peptides and metabolites, particularly for pharmaceutical and medical/veterinary, diagnostic, agricultural and industrial applications, including strategies to engineer plants to allow better processing of biomass into such high-value products. The specific challenge consists in increasing the availability to end users, lowering the cost of end products by scaling up efficient manufacturing and purification process, shortening production cycles and achieving high product yield. For the successful implementation market related issues such as regulatory compliance and approval, public acceptance and engagement need to be fully addressed. National and regional research programmes in this area are currently fragmented. Based on the necessary critical mass, an ERA-NET Cofund project will aim at mobilising national resources in the coordination and alignment of national programmes and activities in the field.

Scope: Proposals should coordinate national and regional programmes for research in the area of plant molecular factory and pool the necessary financial resources from these programmes,

with a view to implementing a transnational call with EU co-funding resulting in grants to third parties.

Proposals should also aim at improved collaboration and alignment of national programmes and activities and will provide concrete plans for decreasing fragmentation, for data sharing, for promoting common data elements for the establishment of patent registries, for addressing hurdles for effective coordination, for involving stakeholders and relevant existing initiatives. Proposals should consider and may build on previous EU-funded activities and projects in the field (e.g. COST Action FA804, projects PlantaPharma, Comofarm, PLAPROVA, Smartcell).

Proposals should demonstrate the expected impact on national and transnational programmes as well as the leverage effect on European research and competitiveness, and should plan the development of key indicators for supporting this. Proposal should consider implementing other joint activities including additional joint calls without EU co-funding, building on previous experience and avoiding overlaps with other initiatives, support to mutual learning and training, compliance with regulatory issues, exchange of good practice, researcher mobility and equal opportunities for female and male researchers (e.g. through EURAXESS) and better careers in the field. The proposal should consider the establishment of a pan-European network of funding agencies and other key players in Europe under condition it is not at the expense of the joint call success.

The Commission considers that proposals requesting a contribution from the EU a minimum of EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Effective trans-national, pan-European research networking and synergies among national/regional and EU research programmes in the area of plant molecular factory.
- Turning the opportunity demonstrated at research scale into full-scale adoption, to allow the technology to become mature and fully economically competitive. This will be achieved by focusing on end-products with high value and by ensuring early industrial engagement.
- Creating new opportunities for European bioindustries by increasing the range of natural bioactive compounds for the end product development.
- Effective integration of research community, agriculture, bioprocessing industry and end-user representative groups.
- Clear benefit to bioproduct end-users due to improved safety and economic parameters.

OTHER - 2. [2016]: Bioeconomy Knowledge Centre

Specific Challenge: The development of an improved system of strategic intelligence is needed to help identifying and developing new promising Bioeconomy value chains.

Scope: The Bioeoconomy Knowledge Centre will present both the state of advancement and the results of a systematic policy-watch, market-watch and science and technology-watch as well as of foresight exercises and of assessments potential impacts of legislation. Research activities performed in the framework of the action should include the use and/or development of state of the art methodologies for data retrieval and/or gathering and/or simulations as well as for foresight tools and for modelling future impacts. Special attention will be paid to present and analyse market developments, National Bioeconomy strategies, Regional Smart specialisation strategies, skills availability and future requirements, infrastructures, services, etc.

Type of action: Named beneficiary *(JRC)*

OTHER - 3. [2016]: Support to Research and Innovation Policy in the area of Bio-based products and services

The objective is to provide with high quality external expertise to ensure objectivity and high-level technical service to support the design and preparation of Union policy initiatives and legislative and programme proposals relevant for the Bio-based products and services Research and Innovation. The required service is in the area of policy analysis and technical assistant and will be delivered in the form of studies.

Type of action: Public procurement.
Indicative number of direct service contracts: 1
Indicative timeframe*:* 3rd quarter of 2016
Indicative budget: EUR 2.0 million from the 2016 budget

OTHER - 4. [2016] Final evaluation of the Joint Baltic Sea research and development programme (BONUS)

Specific Challenge & Scope: A Final Evaluation of the Joint Baltic Sea research and development programme (BONUS) is required by decision of the European Parliament and Council 862/2010/EU to be undertaken no later than 31st December 2017. This evaluation will assess the progress of BONUS towards achieving the objectives set out in Article 2 and Annex 1 of this decision. A group of external experts will be established to provide this analysis.

Type of action: Experts contracts

Indicative budget: EU 0.15 million from the 2016 budget

OTHER - 5. [2016/2017]: Inducement Prize on Food Security

Specific challenge: Inducement prizes stimulate new and innovative solutions to address the existing and emerging societal challenges that are otherwise rarely pursued via normal grants and business processes in enterprises.

Scope: This topic calls for the design of one inducement prize in the food security area and for its subsequent implementation. The ultimate objective is to develop innovative and fully tested prototypes (products and/or processes) that can subsequently rapidly enter the commercialisation/market deployment phase. For this prize contest, the prize will be awarded once a pre-defined, and ambitious yet feasible target has been reached. The specific scope and rules of the competition are in development.

Impact: The project is expected to:

- create innovative products/processes that are marketable and that have the potential to create new businesses, jobs and growth;
- make a visible contribution to the area of sustainable food production/processing with further impact on other societal challenges.

Type of action: Inducement prize

Budget: 2 million form the 2017 budget

OTHER - 6. [2016]: Independent reviewers on the interim evaluation of H2020

Specific Challenge & Scope: A group of independent reviewers will be set up to carry out the interim evaluation of Horizon 2020 for SC2. The group will also look into the achievements of FP7 projects with a view to identifying the long term impact of the EU Framework Programmes. The composition of the group will reflect the need for a mix of skills and competences. The experts will be selected on the basis of objective criteria.

Type of action: Expert contracts

Indicative timetable: 2016-2017

Indicative budget: EUR 0.4 million from the 2016 budget

OTHER - 7. [2016]: External expertise

This action will support the use of appointed independent experts for the evaluation of project proposals and, where appropriate, for the monitoring of running projects and ex-post evaluation of the programme.

Type of action: Expert contracts

Indicative timetable: First half of 2016 and first half of 2017

Indicative budget: EUR 2.80 million from the 2016 budget and EUR 3.03 million from the 2017 budget

OTHER - 8. [2016]: Bioeconomy Stakeholders' Conference

In support of the implementation of the Strategy "Innovating for Sustainable Growth: a Bioeconomy for Europe", a Bioeconomy Stakeholders' Conference should provide opportunities for public awareness raising and for an informed dialogue on the progress of the bioeconomy, involving researchers, stakeholders, policy makers and the civil society at large across the whole bioeconomy value chain. The Conference should address in particular the importance of aligning all stakeholders around the creation of new markets and boosting investments in the bioeconomy, to deliver jobs and inclusive, sustainable economic growth. The organisation of such a Conference should build on efforts undertaken in this direction by the European Commission and the Netherlands Presidency of the Council of the EU.

Indicative budget: EUR 0.15 million from the 2016 budget

Legal entity: *TBC*

Type of Action: Grant to identified beneficiary - Coordination and support actions

The standard evaluation criteria, threshold, weighting for award criteria and the maximum rate and co-financing for this type of action are provided in parts D and H of the General Annexes.

OTHER - 9. [2016]: Review of the Bioeconomy strategy

A group of independent reviewers will be set up to review the Bioeconomy Strategy and its Action Plan. The group will assess the strategy, projects and actions implemented and their achievements so far, and propose future actions. The composition of the group will reflect the need for a mix of skills and competences. The experts will be selected on the basis of objective criteria.

Type of action: Expert contracts

Indicative timetable: 2016

Indicative budget: EUR 0.2 million from the 2016 budget

Budget: Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy

Calls	**2016 Budget EUR million**[94]	**2017 Budget EUR million**[95]
Call H2020-SFS-2016/2017 Call for Sustainable Food Security – Resilient and resource-efficient value chains	*210,1*[96] *of which 138 from 05.090301, 72,1 from 08.020302 and 7 from LEIT ICT*	213 of which 152 from 05.090301 and 61 from 08.020302
Call H2020-BG-2016/2017 Call for Blue Growth - Demonstrating an ocean of opportunities	37[97] *from 08.020302*	28,5[98] from 08.020302
Call H2020-RR-2016/2017 Call for a Rural Renaissance - Fostering innovation and business opportunities	*66* *of which 61 from 05.090301 and 5 from 08.020302*	59 *from 05.090301*
Call H2020-BE-2016/2017 Innovative, sustainable and inclusive bioeconomy	*10* *from 08.020302*	9 from 08.020302
Contribution from this societal challenge to call 'H2020-XX' (under Part X of the work programme) LEIT-ICT	*15.00* *from 05.090301*	
Contribution from this societal challenge to call 'H2020-XX' (under Part X of the work programme) Smart Cities	–	7.00 from 05.090301
Contribution from this societal challenge to call 'H2020-XX' (under Part XX of the work programme) Circular Economy	3.00 *from 08.020302*	
Contribution from this societal challenge to call 'H2020-SME' (under Part XX of the work programme) SME instrument	*35,10* *of which 15,6 from 05.090301 and 19,5*	46,00 *of which 18,4 from 05.090301 and 27,6*

[94] The budget figures given in this table are rounded to two decimal places.
[95] The budget figures given in this table are rounded to two decimal places.
[96] To which EUR 7.00 million from 'LEIT ICT' (budget line XX) will be added making a total of EUR 217.10 million for this call.
[97] To which EUR 2.00 million from the societal challenge 'Secure, clean and efficient energy' (budget line 08.020303), EUR 7.00 million from the societal challenge 'Smart, green and integrated transport' (budget line 08.020304) and EUR 30.00 million from the societal challenge 'Climate action, environment, resource efficiency and raw materials' (budget line 08.020305) will be added making a total of EUR 76.00 million for this call.
[98] To which, EUR 8.00 million from the societal challenge 'Smart, green and integrated transport' (budget line 08.020304) and EUR 15.00 million from the societal challenge 'Climate action, environment, resource efficiency and raw materials' (budget line 08.020305) will be added making a total of EUR 53.50 million for this call.

	from 08.020302	*from 08.020302*
Contribution from this societal challenge to call 'H2020-XX' (under Part XX of the work programme) InnovFin	_	10.00 *from 08.020302*
Other Actions	**2016 Budget EUR million**[99]	**2017 Budget EUR million**[100]
Experts (expert evaluators, monitors, experts groups)	*2.80* *of which XX from 05.090301 and XX from 08.020302*	3.03 *of which XX from 05.090301 and XX from 08.020302*
SGA		*27.47* *from 08.020302*
Inducement Prize		2.00 *from 08.020302*
Public Procurement	*2.00* *from 08.020302*	
Grants to named beneficiaries	*1.65* *from 08.020302*	
Estimated total budget	*383*	405

Contribution to Horizontal activities (08. 020500 in 2016 and 2017)		
Dissemination activities (see Part 17 of the work programme)	*XX* *of which XX from 05.090301 and XX from 08.020302*	XX *of which XX from 05.090301 and XX from 08.020302_*
Corporate communication (see Part 17 of the work programme)	*XX* *of which XX from 05.090301 and XX from 08.020302*	_
Estimated total budget for the horizontal activities	*XX*	XX

Estimated total budget, including horizontal activities	***XX***	**XX**

[99] The budget figures given in this table are rounded to two decimal places.
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Contributions of SC 2 to other parts of Horizon 2020

Industry 2020 in the circular economy [2017] Unlocking the potential of urban organic waste

Specific challenge: Waste production, processing and disposal are increasing challenges for urban areas. In this context, local biorefineries can use waste from surrounding industries and municipalities in a symbiotic manner. Today, there are very few examples of facilities that can convert the biodegradable fraction of municipal solid waste and sewage sludge into anything other than compost and energy. Further innovations in urban waste management schemes could contribute to better collection and processing of waste for the production of higher value bio-based products, including for example bio-based chemicals and bio-plastics.

Scope: Catalogue proven and emerging innovations in the collection, processing and use of organic urban waste and sewage sludge, and on that basis identify potential new value chains. Create and support a platform of regional, municipal and local stakeholders, including public authorities, civil society, and industry (the waste management industry, as well as industries that produce organic waste and those that may have an interest using such waste as a resource). Identify technological and regulatory barriers that hinder the use of more biodegradable waste as raw material for higher value bio-based products, and carry out targeted research that would help to address specific barriers. Such research could contribute to the generation of information required for the development of end-of-waste criteria for urban organic waste.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: To enable the creation of new value chains for higher value purposes other than just for compost or energy, proposals will have to show how to

- Contribute to new developments in strategy and policy at regional and local level for the innovative use of urban organic waste.
- Boost investments in the local and regional economy supporting sustainable growth, development and employment;
- Facilitate the exchange of information and sharing of experiences among local and regional bioeconomy stakeholders on the production of bio-based products from urban organic waste. In particular, provide inputs to tackle related regulatory gaps and obstacles.

Type of action: RIA

LEIT-ICT [2016]: Smart Agriculture and Food Security

Internet of Things

Internet of Things - Focus Area (IoT- FA) ambition is to take the IoT evolution to the next level. It will be addressed through a complementary set of activities structured around Large Scale Pilots.

IoT Pilots will make use of the rich portfolio of technologies and tools so far developed and demonstrated in reduced and controlled environments and extend them to real-life use case scenarios with the goal of validating advanced IoT solutions across complete value chains with actual users and proving its enormous socio-economic potential.

Piloting activities will be complemented with support actions addressing challenges critically important for the take-up of IoT at the anticipated scale. These include ethics and privacy[101], trust and security, standards and interoperability, user acceptability, liability and sustainability.

Research and innovation effort in specific IoT topics will ensure the longer-term evolution of Internet of Things.

Finally, a coordination body will be put in place to ensure an efficient interplay of the various elements of the IoT-FA programme and liaise with relevant initiatives at EU, Member States and international levels.

LEIT-ICT [2016]: Smart Agriculture and Food Security

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Piloting activities will be complemented with support actions addressing challenges critically important for the take-up of IoT at the anticipated scale. These include ethics and privacy[102], trust and security, standards and interoperability, user acceptability, liability and sustainability.

[101] In the context of this call, the concept of privacy refers to the EU legal provisions applicable at the moment of pilot implementation in relation to both the "right to privacy" (right to respect for private and family life) but as well to the "right to protection of personal data".

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Finally, a coordination body will be put in place to ensure an efficient interplay of the various elements of the IoT-FA programme and liaise with relevant initiatives at EU, Member States and international levels.

ICT7.1 – 2016: Large Scale Pilots

Specific Challenge:
The challenge is to foster the deployment of IoT solutions in Europe through integration of advanced IoT technologies across the complete value chain, demonstration of multiple IoT applications at scale and in a usage context and as close as possible to operational conditions. Compared to existing solutions, the roadblocks to overcome include i) the integration and further research development where appropriate of the most advanced technologies at various levels (components, devices, networks, middleware, service platforms, application functions) and their operation at large scale to responds to real needs of end-users (public authorities, consumers, citizens and business, including agro-business), based on underlying open technologies and architectures that may be reused across multiple use cases and enable interoperability across those; ii) the validation of user acceptability by addressing, in particular, issues of trust, security and privacy in the specific real-life scenarios of the pilot, in the context of pre-defined privacy and security impact assessments; iii) the validation of the related business models to guarantee the sustainability of the approach beyond the project.

Scope:
Pilots are targeted, goal driven initiatives that will propose IoT approaches to specific real-life industrial/societal challenges. Pilots are autonomous entities that involve representatives stakeholders across the value-chain, from supply side to demand side, and contain all the technological and innovation elements, the tasks related to the use, application and deployment as well as the development, testing and integration activities. Large scale validation is characterised by the fact that it will be possible to operate the functional entities implemented in the pilot under load and constraints conditions close to operational load one's, either with real traffic/request/processing loads, or with emulated loads where full implementation is not possible. It will though be possible to operate the system with real users, across multiple sites and/or large amount of heterogeneous devices and systems, as well as large amount of users. Pilot work plans should include feedback mechanisms to allow adaptation and optimisation of the technological and business approach to the particular use case. Validation of complex technologies, architectures, standards, of interoperability of underlying platform technology, of business models, of sustainability and replicability are key outcomes of the pilots.

Use of experimental testbeds, such as FIRE[103], and real-world demonstrations may support the demonstration that IoT technologies are fully proven before they are deployed in field trials. Given the considerable amount of work carried out on M2M/IoT and Cyber Physical Systems architectures (e.g. IoT-A), open platforms (e.g. FIWARE, CRYSTAL, UniversAAL) and standards (e.g. oneM2M) over the last few years, pilots are encouraged to exploit this previous work where applicable with the objective of further demonstrating the generic applicability and interoperability of these and other architectures, platforms and standards and to identify where standards are missing or should evolve, as well as needed pre-normative activities.

[103] Future Internet Research and Experimentation

IoT finds applicability in a broad range of industry, business and public services scenarios. On the basis of European relevance, technology readiness and socio-economic interest the following areas have been identified to be addressed with Large Scale IoT Pilots:

Pilot 1: Smart living environments for ageing well[104]

Pilot 2: Smart Farming and Food Security[105]

The implementation of Precision Agriculture has become possible thanks to the development of sophisticated sensors, robots and sensor networks combined with procedures to link mapped variables to appropriate farming management actions. Those sensors, either wired or wireless, integrated into an IoT system gather all the individual data needed for monitoring, control and treatment on farms located in a particular region. Such future Internet of Things scenario would bring data management to a new level by establishing interaction between the concerned objects, help them exchange information in efficient ways and enable them to execute autonomously appropriate interventions in different agriculture sub-sectors (arable crops, livestock and horticulture) and their associated post-production value chain through to the consumer. The introduction of the IoT scenario would allow monitoring and control of the plant and animal products during the whole life cycle from farm to fork. The challenge is to design architectures to "program" each object for optimal behaviour, according to its role in the smart farming system and in the food chain, lowering ecological footprint and economical costs and increasing food security.

Proposals shall include an adequate combination of different farms to ensure that the deployment of the technology is adapted to the needs of different types and sizes of farms existing across Europe. Activities should allow for a wide geographic coverage within Europe. In addition, proposals shall cover at least the three mentioned sub-sectors: arable crops, livestock and horticulture.

Proposals should fall under the concept of multi-actor approach[106] and allow for adequate involvement of the farming sector in the proposed activities.

Type of instrument:
Innovation Actions: The Commission considers that proposals requesting a contribution from the EU in the rage of 30 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. It is expected that one pilot is supported for this area.

[104] A contribution from SC1: Health, Demographic Change and Wellbeing to cover demand side activities has been agreed

[105] 15 million contribution from SC2 to cover demand side activities has been agreed with DG CONNECT who will contribute with the same budget for the supply side of the pilot.

[106] See definition of the 'multi-actor approach' in the introduction of this Work Programme part (see text box).

Pilot 3: Wearables for smart ecosystems

Pilot 4: Reference zones in EU cities

Pilot 5: Autonomous vehicles in a connected environment[107]

Pilot 6: Water management for resilient cities[108]

Specific Pilot considerations:

- Mapping of pilot architecture approaches with validated IoT reference architectures such as IoT-A enabling interoperability across use cases;
- Common or interoperable object connectivity/functionality/intelligence approaches on various levels – protocols, data formats
- Common or interoperable set of IoT related enablers and services. Pilots are requested to address the elements that provide the basis for interoperability with related fields outside the pilot especially for key aspects such as object identification/naming, service publication characteristics, search, semantic properties.
- Use of cascading grants (20%) for the incorporation of users of the pilots, developers of additional applications, replication of the pilot through new sites or new connected devices, and complementary assessment of the acceptability of the use case where appropriate.
- Exchange on requirements for legal accompanying measures
- Involvement of social scientists and representative user groups, in order to design systems that are useful and acceptable for people/citizens/consumers and optimise testing and experimentation
- Integration of objects, devices and systems in an IoT environment adapted to the expressed needs of the users.

Pilots Implementation:

Pilots in the selected areas will clearly identify the supply and demand sides of the large scale pilots. The effort devoted to supply and demand should be balanced for each pilot.

The supply side represents the technological part of the pilot and addresses all the ICT elements that constitute the proposed approach. This includes:

- definition of the IoT architecture
- IoT platform choice, technologies , necessary adaptations and their management
- development and operation of the distributed IoT nodes
- management and adaptation of involved sensing, actuating, processing, energy supply, storage technologies at node level (setting, programming, conditioning)
- integration of devices, objects and systems in an IoT environment
- design trade-offs for optimal implementation of the application requirements
- approaches to interoperability and openness

[107] This pilot will only be included if there is co-funding from SC4 Smart, green and integrated transport

[108] This pilot will only be included if there is co-funding from SC5: Climate action, environment, resource efficiency and raw materials

- security and privacy approaches
- contribution and compliance to relevant IoT standards

The demand/user side of the pilot covers all the application and usage related elements. This includes:

- definition, design, implementation and testing of multiple use-case scenarios
- setting up application(s) requirements in terms of performance, scale, reliability, cost, usability, maintenance …
- interoperability needs and testing
- security and privacy needs
- feed-back to IoT supplier for technology optimisation
- users/citizen/consumer awareness, involvement and acceptance
- impact, added value and affordability assessment
- mechanisms for replication
- models for business and sustainability
- pilot conclusions and validation from the user side
- dissemination of results in relevant communities
- contribution and compliance to relevant IoT standards

Pilot projects are expected to contribute through clustering their results of horizontal nature (interoperability approach, standards, security and privacy approaches, business validation and sustainability, methodologies, metrics..) to the consolidation and coherence actions that will be implemented by the CSA supporting the activities defined under "Horizontal Activities" below.

Expected Impact:
Pilots are expected to have a high impact on citizens/consumers both in the public and private spheres, industry, businesses (including agro-businesses) and public services. Key performance indicators should be identified to measure progress on citizen and consumer benefits, economic growth, jobs creation, environmental protection, productivity gain, etc.

Pilots' impact should go beyond involved partners and will aim at influencing external communities by putting in place appropriate mechanisms.

- Validation of technological choices, of interoperability properties, of key characteristics such as security and privacy;
- Exploration of new industry and business processes and innovative business model validated in the context of the Pilot.
- Significant and measureable contribution to standards or pre-normative activities in the pilot area of action via the implementation of open platforms
- Improvement of citizens/consumers quality of life, in the public and private spheres, in terms of autonomy, convenience and comfort, participatory approaches, health and lifestyle and access to services.
- Creation of opportunities for entrepreneurs by promoting new market openings, providing access to valuable datasets and direct interactions with users/consumers, expanding local businesses to European scale, etc.
- Development of sustainable IoT ecosystems and contribution to IoT infrastructures viable beyond the duration of the Pilot.

For Pilot 1:

- Proposals should show clear evidence of the benefits of the proposed solutions for active and independent living and quality of life of older person compared to current state of the art.

Type of instrument(s):
Innovation Actions: The Commission considers that proposals requesting a contribution from the EU between EUR 10 and 20 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. It is expected that at least one pilot is supported for each area.

Budget per type of instrument(s):
LEIT ICT Contribution: EUR 75 million

ICT7.2 – 2016: IoT Horizontal activities

Specific Challenge:
The challenge is to ensure a sound coherence and exchange between the various activities of the Focused Action, and notably to ensure cross fertilisation of the various pilots for technological and validation issues of common interest across he various use cases. Issues of horizontal nature and common pilot topics interest, such as privacy, security, user acceptance, standardisation, creativity, societal and ethical aspects, legal issues and international cooperation, need to be coordinated across the pilots to maximise the output and to prepare the ground for the next stages of deployment, including pre-commercial or joint public procurement. A related challenge is to foster links between communities of IoT users and providers, as well as with Member States' initiatives, and to connect with other initiatives including Public-Private-Partnerships (e.g. in the area of Big Data, Factories of the Future, 5G-infrastructure) Joint Technology Initiatives (e.g. ECSEL), European Innovation Partnerships (e.g. on Smart Cities), other Focus Areas (e.g. on Autonomous transport), and RRI-SSH issues.

A related challenge addresses inter-operability and integration, through open IoT platforms across application areas such as FIWARE or CRYSTAL. It addresses the reference implementation of promising IoT standards serving the interoperability and openness objectives, by consolidating results obtained through standard implementation and pre-normative activities at the platform and/or pilot levels.

Scope:

- Programme level coordination ensuring consistent exploitation of the outcomes of the various projects forming the FA: overall coordination of the projects and the related pilot areas through mapping of pilot architecture approaches, development of interoperable object connectivity and functionality approaches for e.g. protocols, data formats, privacy & security, technical and semantic interoperability, standard interfaces for APIs, and a basic set of related enablers and services, common KPI for success and impact measurement, exchange on requirements for legal accompanying measures, development of common methodologies and KPI for testing and validation and for success and impact measurement; federation of pilot activities and transfer to other pilot areas, facilitating the access for IoT entrepreneurs/API developers/Makers and SME in general. The corresponding activities will be developed and consolidated together with the pilots at programme level
- Horizontal support: further development and exploitation of security and privacy mechanisms towards best practices and a potential label ("Trusted IoT"); legal support in relation to data ownership and protection, security, liability, sector-specific legislations; contribution to pre-normative activities and to standardization both horizontally and in various application areas, also linked with IoT Governance. The corresponding activities will be developed and addressed in the pilots and consolidated at programme level under this horizontal support activity line. Promotion for sharing of conclusions and road-

mapping with similar activities in countries and regions outside Europe, including convergence and interoperability of European and non-European IoT reference architectures/platforms. Exploitation of the combination of ICT & Art for stimulating innovation and acceptance; preparation for the next stages of IoT deployment including through pre-commercial or joint public procurement.

- RRI-SSH support: pilots shall be citizen-driven, involving existing and local communities at an early stage and addressing a combination of sustainability areas. The corresponding activities should accompany the pilots, analyse societal, ethical and ecological issues related to he pilots, and develop recommendations for tackling IoT adoption barriers including educational needs and skill-building. Consortium participation requires at least two entities from domains different than ICT technologies (e.g. social sciences, psychology, gerontology, economy, art, etc.).

Expected Impact:

- Ensure efficient and innovative IoT take-up in Europe, building on the various parts of the initiative (pilots, research, horizontal actions)
- Efficient information sharing across the programme stakeholders for horizontal issues of common interests
- Extension and consolidation of the EU IoT community, including start-ups and SMEs
- Support to commercialisation, deployment and replicability
- Identification, assessment and preparation of the most promising standards
- Strengthening of the role of EU on the global IoT scene, in particular in terms of access to foreign markets.

Type of instrument(s):
Coordination and Support Action

Budget per type of instrument(s):
LEIT ICT Contribution: EUR 5 million (including EUR 1 million devoted to RRI-SSH)

ICT7.3 – 2016: R&I on IoT integration and platforms

Specific Challenge:
As the future design of the Internet of Things applications depends crucially on the development of sophisticated platform architectures for smart objects, embedded intelligence, and smart networks, the challenge addresses the fact that today most of the IoT systems are mainly focused on sensors, whereas in the future actuation and smart behaviour will be the key points.

It thus relates to ambitious use cases and benefit from existing technologies from related innovation areas in components, systems and networking to respond to the ever increasing needs of future IoT systems in terms of scalability, heterogeneity, complexity and dynamicity. Due to the importance of innovations coming from third parties IoT platforms should be open and easy-to-use.

Architectures, concepts, methods and tools for Open IoT platforms integrating evolving sensing, actuating, networking and interface technologies. Platforms should provide connectivity and intelligence, actuation and control features, linkage to modular and ad-hoc Cloud services, Big Data analytics and open APIs as well as semantic interoperability across use cases and conflict resolution.

Platforms should be compatible with existing, international developments addressing object identity management, discovery services, virtualisation of objects, devices and infrastructures and trusted IoT approaches. Proposed research and innovation should take advantage of

previous work and build on existing platforms, such as FIWARE and CRYSTAL, if appropriate.

- IoT security and privacy. Advanced concepts for end-to-end security in highly distributed, heterogeneous and dynamic IoT environments. Approaches must be holistic and include identification and authentication, data protection and prevention against cyber-attacks at the device and system levels. They should address relevant security and privacy elements such as confidentiality, integrity, resilience and authorisation.

Proposals should address both of above mentioned topics and identify the added value of the proposed approach specific to IoT when compared with generic solutions. In addition they are expected to include two or more use-cases to demonstrate the practicality of the approach.

Expected Impact:

- Contribute to the scientific and technological progress of advanced, semi-autonomous IoT applications
- Strengthen the industrial EU technological offer of innovative IoT solutions
- Contribution to emerging or future standards and pre-normative activities
- Promote the usability of IoT regarding smartness and user control.
- Promote the adoption of EU platforms in European and international context

Type of instrument(s):
Research and Innovation Action – The Commission considers that proposals requesting a contribution from the EU between EUR 4 and 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts

Budget per type of instrument(s):
LEIT ICT Contribution: EUR 34 million

SME Instrument Call

H2020-SMEInst-26-2016-2017-BG Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth

Specific Challenge: The potential of Europe's Oceans, seas and coasts is significant for job and growth creation if the appropriate investments in research and innovation are made. SMEs contribution to the development of the 'Blue Growth Strategy' (COM (2012) 494) can be significant in particular in the fields of marine biotechnology (related applications, key tools and technologies including those related to the link between oceans and human health) as well as aquaculture (marine and fresh water) related technologies and services. However, one of the most important barriers for the development of innovative maritime economic activities is the lack of access to finance for SMEs to develop high-potential, but high-risk innovative ideas and to bring them close to market. The SME instrument offers financial support to SMEs with an EU dimension to put forward their most innovative ideas in the previously mentioned maritime and aquaculture sectors with a particular focus on close-to-market solutions and potential for high growth and internationalisation.

Budget: 2016: 9 M€; 2017: 10 M€. For phases 1, 2, and 3.

H2020-SMEInst-21-2016-2017-SFS Resource-efficient eco-innovative food production and processing

Specific challenge: To remain competitive, limit environmental degradation and optimise the efficient use of resources, the development of sustainable and more resource-efficient food production and processing, throughout the food system, at all scales of business, in a competitive and innovative way is required. Current food production and processing systems, especially in the SME sector, need to be revised and optimised with the aim of achieving a significant reduction in water and energy use, greenhouse gas emissions and waste generation, while at the same time improving the efficiency in the use of raw materials, increasing climate resilience and ensuring or improving shelf life, food safety and quality. New competitive eco-innovative processes should be developed, within the framework of a transition towards a more resource-efficient, sustainable economy.

A priority for 2016 and 2017 is the reduction of food losses and waste along the value-chain.

Scope: Solutions need to be developed for energy, water and raw material efficiency for food production and processing, also by means of hygienic design practices.

The SME instrument consists of three separate phases and a coaching and mentoring service for beneficiaries. Participants can apply to phase 1 with a view to applying to phase 2 at a later date, or directly to phase 2.

In phase 1, … Funding will be provided in the form of a lump sum of EUR 50,000. Projects should last around 6 months.

In phase 2, … The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 and 2.5 million would allow phase 2 to be addressed appropriately.

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Projects should last between 12 and 24 months.

In addition, in phase 3, SMEs can benefit from indirect support measures and services as well as access to the financial facilities supported under Access to Risk Finance of this work programme.

Expected impact: With the overall objective of enhancing profitability and growth performance of SMEs in Europe, proposals should achieve the following impacts, adopting the most appropriate qualitative and quantitative metrics (e.g. on turnover, employment, market seize, IP management, sales, return on investment and profit):

- Combining and transferring new and existing knowledge into innovative, disruptive and competitive solutions seizing European and global business opportunities.
- Market uptake and distribution of innovations tackling the specific challenge of Sustainable Food Security in a sustainable way.
- Increase of private investment in innovation, notably leverage of private co-investor and/or follow-up investments.

Type of action: SME Instrument (70%)

Budget : €12m in 2016 and €20m in 2017

[2016] Intelligent solutions and tools in forest production systems, fostering sustainable supply of quality wood for the growing bioeconomy

Specific challenge: Increasing societal demands and emerging policies relating to forest resources present new challenges for the sector and trigger the need to enhance the multi-functional role of forests in the EU. The quantity and the quality of wood yields depend on forest management objectives, silvicultural regime and measures adopted from the establishment of forest stands to the end of rotation (for even-aged forests) or the selection harvest (for uneven-aged forests). Managing forests' horizontal and vertical structure is crucially important given the long production cycles involved and the demand to adapt, within the production cycle, to the evolving framework of environmental and societal conditions. In this respect, there is opportunity to develop intelligent (i.e. cost-efficient, productive and environment-friendly) and novel solutions and tools to support sustainable wood production from forests managed on a multifunctional basis. To add value to the wood production and enable close-to-market outputs, these tools and solutions can refer to a series of cutting edge technologies in relation to measures including, but not limited to seedling/replanting, non-destructive measurement/analysis, weeding, cleaning, pruning, thinning, harvesting, etc..

Scope: The SME instrument consists of three separate phases and a coaching and mentoring service for beneficiaries. Participants can apply to phase 1 with a view to applying to phase 2 at a later date, or directly to phase 2.

In phase 1, … Funding will be provided in the form of a lump sum of EUR 50,000. Projects should last around 6 months.

In phase 2, … The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 and 2.5 million would allow phase 2 to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Projects should last between 12 and 24 months.

In addition, in phase 3, SMEs can benefit from indirect support measures and services as well as access to the financial facilities supported under Access to Risk Finance of this work programme

Expected impact: With a view to enhancing the multifunctional role of forests, proposals should show how some, or all, of the following impacts will be achieved:

- Improved tools for forest management decisions and works in primary production systems, marketable within a period of up to three years from the approval, entailing higher efficiency in operation;
- Lower environmental impact of forest management and harvesting works, in order to preserve their capacity to provide for non-wood forest products and essential ecosystem services such as carbon sequestration, biodiversity conservation, water regulation, soil and nutrient regulation, and recreation;
- Sustainable supply of quality wood for the growing bioeconomy development of forestry enterprises and creation of new jobs in the SMEs.

Type of action: SME Instrument (70%)

Budget: €4m in 2016 and €6m in 2017

SME [2016/17] Creating added value from waste and by-products generated on farm and along the value-chain

Specific challenge: Agriculture and agro-industries[109] generate organic waste streams and by-products (e.g. manure, effluents, losses and by-products from plants and livestock production at farm level and down the chain) that are not properly valorised and can bring economic and environmental benefits. A broad range of innovative technical solutions for improved logistics (i.e. collection, storage and transport) and conversion technologies should provide environmentally friendly, secure/safe and profitable business cases for SMEs while contributing to a sustainable circular economy. These innovative solutions include improved existing routes to biogas/bioenergy, high quality feed and fertilizers and also new processes for the production of added-value products which can be used inside or outside the agricultural sector. A combined use of different waste/by-products and/or a multiple output is also considered. Proposals should analyse the competitive use of selected by-products to compare the environmental benefit of the proposed conversion with existing ones.

Scope

Standard text for all SME Instrument topics

Expected impact:

This action contributes to improve resource efficiency through improved waste/by-products management in primary production and agro-industries fostering a sustainable circular economy. The applicants will measure the expected impact on the following aspects:

[109] post-harvest activities involved in the transformation, preservation and preparation of agricultural production for intermediary or final consumption (mainly food industries)

- Economic, social and environmental impact of the project should be described in qualitative and quantitative terms (e.g. turnover, return on investment, profit, market seize for end-products, employment, GHG emissions savings compared to existing waste/by-products management, improved water quality)
- Environmental and economic benefits for farmers and agro-industries selling/ providing organic by-products and/or waste for conversion in added-value products
- Enhancing profitability and growth performance of SMEs by the exploitation of innovative and competitive solutions seizing European and global business opportunities
- Market uptake of the demonstrated innovative solutions by other actors

Type of action: SME Instrument

(indicative budget: €10 mio in 2016 and €10 mio in 2017)

InnovFin Call

[2016/2017]: Bioeconomy and Blue Economy Window (BioBlueWindow)

Specific Challenge & Scope: The BioBlueWindow targets R&I-driven SMEs and small midcaps[1] requiring loans of between EUR 25 000 and EUR 7.5 million who are either suppliers and developers of bioeconomy and blue-economy related innovations (commercially available or near-to-market) or end-users of such innovations. To be eligible as final beneficiaries, R&I-driven SMEs and small midcaps must a) be located in Member States and b) satisfy "bioeconomy and blue economy" criteria[2] that will be specified by the services of the Commission before the launch of the BioBlueWindow.

Subject to the successful outcome of negotiations, the European Investment Fund (EIF) will implement the BioBlueWindow[3] as a sub-facility within the 'SMEs & Small Midcaps R&I Loans Service'. It will be delivered by financial intermediaries (such as banks), who will extend the actual loans to final beneficiaries. Financial intermediaries will be guaranteed against a proportion of their potential losses by EIF.

Type of action: named beneficiary (*TBC*)

[i] COM(2012) 497 of 14.9.2012. 'Enhancing and focusing EU international cooperation in research and innovation: A strategic approach'.

[1] Up to 499 employees.

[2] Along the lines of undertaking innovations in the areas of investments in processes, products, materials, management, use patterns, skills or training; or in supply-chain measures in the areas of bioeconomy and blue economy.

[3] Subject to the successful conclusion of negotiations.