BiodivERsA/ FACCE-JPI 2013-2014 call for proposals

Promoting synergies and reducing trade-offs between food supply, biodiversity and ecosystem services

FACCEJPI

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The ERA-NET promoting European Research on biodiversity and ecosystem services

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Ministry of Food Agriculture and Livestock, TURKEY
Joint Nature Conservation Committee, UNITED KINGDOM

The FACCE-JPI partners

Federal Ministry of Agriculture, Forestry, Environment and Water management, AUTRIA
University of Natural Resources and Applied Life Sciences, AUSTRIA
Département des programmes de recherche – direction des programmes fédéraux et internationaux, BELGIUM
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AKA – Academy of Finland, FINLAND
Ministry of Agriculture and Forestry, department of agriculture, FINLAND
Institut National de la Recherche Agronomique, FRANCE, Coordinator
Agence Nationale de la Recherche, FRANCE
Federal Ministry of Education and Research, GERMANY
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Ministry of Agriculture and Rural Development, ISRAEL
Ministero delle politiche agricole e forestali, ITALY
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From the coordinators

Between 1950 and 2011, the world population grew from 2.5 billion to 7 billion and the threshold of 9 billion people is expected to be reached in 2050. Linked to this situation, global food production has also increased rapidly: according to the FAO (The Food and Agriculture Organization of the United Nations), food production has tripled between 1960 and 2009. In addition, to cope with the increasing global population and the related growing demand for food, 300 million additional tons of grain should be produced each year.

Over the last century, the need for increased production led to a shift in the production patterns and an evolution of agriculture from traditional to intensive and industrial systems. This evolution of agriculture has been responsible for damage to the environment and notably to biodiversity. Indeed, the use of chemical products (such as fertilizers and pesticides) and the homogenization of agricultural landscapes and crop variety or domestic races are major threats to biodiversity and ecosystems wich can reduce the resilience of productions to global changes.

"The need to balance the demand for food against the capacity to deliver it appears as one of the major challenges of our time"

In this context, the need to balance the demand for food against the capacity to deliver it in a more sustainable way that can preserve biodiversity and a range of ecosystem services appears as one of the major challenges of our time. More specifically, the link between biodiversity and agricultural production needs to be reinforced, as biodiversity and agriculture are strongly interdependent. On the one hand, biodiversity is critical for agriculture, through species diversity and the delivery of ecosystem services essential for agriculture such as pollination and the maintenance of soil fertility. On the other hand, innovative and more sustainable agricultural systems can contribute to the conservation and sustainable use of biodiversity.

The joint call launched by BiodivERsA and FACCE-JPI on "Promoting synergies and reducing trade-offs between food supply, biodiversity and ecosystem services" addressed these challenges, with the aim to gain knowledge on the linkages between agriculture, biodiversity and the ecosystem services it provides.

In addition, the issues addressed through this BiodivERsA/FACCE-JPI joint call are at the heart of current political actions. The importance of agro-biodiversity is indeed, at least partly, recognized both at the international level through the Convention on Biological Diversity (CBD) and at the European level through the latest reforms of the Common Agricultural Policy (CAP) and the Biodiversity Action Plan for Agriculture.

Moreover, even if new agricultural approaches and practices have already emerged to promote the conservation and sustainable use of biodiversity, the full potential of such approaches will only be achieved

in a context where consumers are aware of the importance of producing food in a way that preserves biodiversity, where land managers are provided with socially acceptable and economically profitable solutions, and where the policy framework supports the shift in production practices.

For this reason, one of the two themes of the BiodivERsA/FACCE-JPI joint call was dedicated to the question: "Which policies and governance systems can promote the emergence and support of agro-ecosystems / agricultural production systems benefiting from and beneficial to biodiversity and ecosystem services?"

A call at the crossroad of the issues addressed by BiodivERsA and FACCE-JPI

The call was at the crossroads of different themes and issues addressed by BiodivERsA and FACCE-JPI.

BiodivERsA is now a network of 31 organizations from 18 European countries that programme and fund research in the field of biodiversity. The network is currently funded as an ERA-net Cofund project under the European Union's Horizon 2020 Framework Programme. Since 2005, BiodivERsA partners have developed a durable collaboration programming and funding research on biodiversity and ecosystem services for policy and practice. Together, they create added value by offering an opportunity for high quality biodiversity research across national boundaries.

The Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI) brings together 21 countries that are committed to building an integrated European Research Area addressing the interconnected challenges of sustainable agriculture, food security and impacts of climate change. FACCE-JPI provides and steers research to support sustainable agricultural production and economic growth, to contribute to a European bio-based economy, while maintaining and restoring agro-ecosystem services under current and future climate change.

Given the interrelations between agriculture, food supply, biodiversity and ecosystem services, there was a real interest for our two initiatives to join forces and collaborate to launch a call specifically addressing the links between biodiversity and agriculture. We thus first initiated a collaboration to identify shared priorities and to agree on topics and procedures to launch a truly joint call between BiodivERsA and FACCE-JPI.

"The 2012-2013 call allowed to fund 10 projects for an amount of 10.2 million euro"

The call was a real success. It allowed the submission of 52 projects and the mobilization of a great number of funding partners from both BiodivERsA and FACCE-JPI, it avoided duplications, demonstrated complementarities between the two initiatives, and led to the funding of 10 projects for a total amount of 10.2 million euros. These projects were selected on the basis of both their scientific excellence and societal relevance. The call also allowed addressing cross-sectoral issues and mobilizing researchers from both natural and social sciences. BiodivERsA and FACCE-JPI will continue to build on this success and to collaborate in the future.

We would like to thank the members of the evaluation panel and external reviewers who are key to ensuring a high quality assessment of the submitted proposals and thus the quality of the selected proposals. We also thank the funding organizations participating in the call for all their efforts to make this joint call possible and to ensure that the greatest number of top-quality research proposals could be funded.

This brochure will give you insights on the implementation of the call from its development to the evaluation process, as well as on submitted proposals and funded projects.

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Development of the call text

Having common priorities for the reinforcement of the ERA and for promoting research at the crossroad between (i) biodiversity and ecosystem services, and (ii) agriculture, food security and climate change, BiodivERsA and FACCE-JPI decided to engage in discussions on the necessity to implement joint activities, such as information exchange, mapping exercises, but also joint calls. In particular, the two initiatives jointly organized a workshop mobilizing key experts to explore research priorities at this crossroad.

These interactions between the BiodivERsA and FACCE-JPI allowed the identification of a topic suitable for a joint call of interest for both initiatives, i.e. "Promoting synergies and reducing trade-offs between food supply, biodiversity and ecosystem services".

14 funding agencies from 14 different countries decided to participate in the call:

- FWF – Austria
- BNSF – Bulgaria
- RPF – Cyprus
- ANR – France
- Pt-DLR/BMBF – Germany
- RCL – Lithuania
- NWO – The Netherlands
- RCN – Norway
- FCT – Portugal
- UEFISCDI – Romania
- MINECO – Spain
- Formas – Sweden
- SNSF – Switzerland
- MFAL - Turkey

The FRB (BiodivERsA Secretariat) and INRA (FACCE-JPI Secretariat), both located in Paris, France, were in charge of the Call Secretariat and contributed to the smooth implementation of the call and hence to its success.

The call was published on 1st November 2013 and the deadline for submission of full proposals was 14th February 2014.

The evaluation process ran from the end of February to the final Evaluation Committee meeting on 27-28 May 2014.

Selected projects were published in the course of June, allowing for an earliest possible starting date in Fall 2014.

Summary of the 2013-2014 BiodivERsA/FACCE-JPI call

Designed around the major challenge of "Promoting synergies and reducing trade-offs between food supply, biodiversity and ecosystem services", the call addressed the two following themes:

1) To what extent can biodiversity better support agro-ecosystems / agricultural production systems in terms of multi-functionality and outcomes in a global change context?

This theme was based on the need for new research and a better use of existing knowledge to promote innovation and 'transformational technology', at the scale from field to landscape.

The applicants were invited to address this challenge by tackling the following key questions in their proposals, placing them in the broader context of global change, including climate change and food price volatility in global markets due to massive land use changes:

- To what extent can multiple biodiversity-based ecosystem services in agricultural systems substitute for external inputs?
- How can a bundle of biodiversity-based ecosystems services and biodiversity preservation be used in European food production systems to maximize beneficial environmental effects, production and benefits (e.g. pest control, soil fertility, etc.)?
- What are the relevant scales for management of agricultural systems and their biodiversity for identifying potential trade-offs and promoting possible synergies among them (from plot and farm to landscape and regions)?

The proposed research is expected to help developing innovative agricultural landscapes and systems delivering ecosystem services and preserving biodiversity, as well as to enhance biodiversity-based adaptation of agriculture to climate change and extreme events.

2) Which policies and governance systems can promote the emergence and support of agro-ecosystems / agricultural production systems benefiting from and beneficial to biodiversity and ecosystem services?

This theme relies on the need for interdisciplinary research to identify what policies and governance systems could promote multifunctional agro-ecosystems and associated biodiversity in Europe. The challenge of this theme was to explore the feasibility of designing adequate agricultural landscapes across regions in the EU, accounting for the institutional context, market and trade agreements, and the diversity of actors at play at different scales.

The applicants were invited to address the following questions:

- What are the temporal evolutions in match/mismatch between biodiversity-based ecosystem services delivery and demand, and possible co-evolution of both?
- What are the trade-offs/conflicts & possible synergies associated with different governance systems and actors at play?
- What is the institutional feasibility of agricultural landscape planning to promote biodiversity and reach multi-functionality?
- Which governance structures can best promote and sustain multi-functional agricultural landscapes relying on biodiversity?

The expected impact of the research proposed is to gain knowledge and inform relevant actors for the support of agricultural production systems benefiting from and beneficial to biodiversity and ecosystem services. This includes defining how innovative governance and economic arrangements could reduce the barriers preventing the development of productive agro-ecosystems with high nature value.

Evaluation process

An evaluation committee (EC) was assembled made up of experts from the natural and social science fields as well as professionals from the field of biodiversity. These experts were divided between two sub-committees: the scientific sub-committee (SEC) assessing the scientific quality of the proposals, and the societal impact subcommittee (SIEC) assessing the policy relevance, respectively led by Bill Slee and Simon Gardner.

In addition to the assessment performed by the members of the EC, international peer reviews were organized with several external reviewers assessing the scientific quality of each submitted proposal.

The evaluation was implemented following specific guidelines and criteria established for each subcommittee: 11 criteria were defined for scientific excellence and 9 for societal impact (including 3 for policy relevance and 6 for stakeholder engagement). Hence, two grades were assigned per proposal – one for scientific excellence and one for societal impact, with a predefined slight emphasis on scientific excellence over societal impact.

The final evaluation meeting took place on 27-28th May 2014. Each sub-committee first met separately to attribute grades to each proposal. They subsequently gathered together to agree on the final ranking of the projects to propose to the Call Steering Committee (CSC) for funding.

Highland cattle

Scientific and administrative follow-up of the funded projects and dissemination of results

The kick-off meeting of the projects funded by this joint call was held in Paris (France) on April 29, 2015. All the funded projects have a duration of 3 to 4 years. The scientific and administrative follow-up of projects will be performed by the Call Steering Committee with support of the joint Call Secretariat (FRB for BiodivERsA and INRA for FACCE-JPI).

Project results and highlights will be disseminated through the BiodivERsA (www.biodiversa.org) and FACCE-JPI (www.faccejpi.com) websites. In addition, the funded teams may be offered the possibility to develop additional activities with BiodivERsA and FACCE-JPI, such as policy briefs based on projects' evidence and providing key information and recommendations to European policy-makers and other stakeholders.

From the Evaluation Committee chairs

The topic of the BiodivERsA/FACCE-JPI joint call on "Promoting synergies and reducing trade-offs between food-supply, biodiversity and ecosystem services" was grounded in one of the great debates of our time: the need to balance the demand for food against the capacity of the environment to deliver it, taking into account how socio-economic and ecological systems interact.

The call generated over 52 full proposals, which came from some of the best-qualified scientists in Europe. Research around ecosystem services associated to biodiversity has acquired increased prominence. Ecosystem services provide an organizing concept, which enables a more holistic perspective for scientific inquiry and policy development on environment-society inter-relations, here with regard to agricultural systems. Calls such as this significantly help to build European strength and capacity in the field of biodiversity and sustainable agriculture, through the creation of valuable new skills, knowledge and scientific approaches. They also drive positive environmental outcomes both within Europe, and more widely.

The submitted proposals ranged from the biological sciences to the social sciences, and a significant proportion had a multidisciplinary/interdisciplinary component to them.

Several panel members commented on how the capacity of the European science community to undertake research work straddling the social and environmental (natural) sciences had improved significantly in the past few years and noticed that the quality of the proposals reflected this. The best proposals reflected the significant recent advances in interdisciplinary sciences in the ecosystem services, agro-biodiversity and policy fields.

The quality of the proposals received could be measured in two ways:

(i) In the content of proposals received, both at the scientific and policy relevance level: most of the proposals received were indeed of a really excellent quality with respect to their science, with capacity to produce extremely valuable scientific findings, often of high policy relevance. In the areas measured by the Societal Impacts Evaluation Committee (SIEC), big improvements were also observed in the proposals submitted in this call, particularly in terms of the linkages with identified policy drivers; two-way stakeholder engagement throughout the course of the project; use of active forms of communication; and a commitment to co-design and co-delivery.

(ii) In terms of the capacity of bidding consortia to accommodate both scientific and societal impact perspectives within their proposals, the emergence of a positive correlation between Scientific Evaluation Committee (SEC) and SIEC evaluations observed for this call is an appropriate indicator of such a trend.

The evaluation panels faced a significant challenge in selecting the top proposals for funding. Ultimately, 10 projects rated as 'excellent' were able to be funded. However, due to the finite budget available for the call, many high-quality proposals just missed out. The evaluation panels had a commitment to provide useful feedback to all consortia.

The science, policy and practice communities should all benefit from the findings of this research. We very much hope that it can be disseminated in a variety of ways to meet the different needs of those different, but increasingly inter-linked, constituencies.

We congratulate the successful proposals and send our commiserations, particularly to those with good proposals that just missed the cut. The field of inquiry is new and expanding and there will surely be further opportunities to work up imaginative and innovative science proposals with good stakeholder engagement.

Dr. Bill Slee
Chairman
(Scientific Evaluation sub-Committee)

Dr. Simon Gardner
Chairman
(Societal Impact Evaluation sub-Committee)

Composition of the Evaluation Committee

Scientific Evaluation sub-Committee

Bill Slee – UNITED KINGDOM (Chair of the SEC & of the Evaluation Committee)
Kestutis Armolaitis - LITHUANIA
Mihaela Begea - ROMANIA
Virginijus Feiza - LITHUANIA
Leslie Firbank – UNITED KINGDOM
Boyko Georgiev - BULGARIA
José Luis Gonzalez Andujar - SPAIN
Louise Jackson – UNITED STATES
Mark Reed – UNITED KINGDOM
Jean-Michel Salles - FRANCE
Saran Sohi – UNITED KINGDOM
Jean-François Soussana - FRANCE
Ayfer Tan - TURKEY
Ulrike Tappeiner - AUSTRIA

Societal Impact Evaluation sub-Committee

Simon Gardner– UNITED KINGDOM (Chair of the SIEC & Vice-Chair of the Evaluation Committee)
Claire Hubert - FRANCE
Katia Hueso - SPAIN
Devra I. Jarvis - ITALY
Jozsef Kiss - HUNGARY
Manfred Klein - GERMANY
Mart Külvik - ESTONIA
Erik Mathijs - BELGIUM
Bulent Miran - TURKEY
Anders Branth Pedersen - DENMARK
Jan Plesnik – CZECH REPUBLIK
Jana Polakova - CZECH REPUBLIK
Petteri Vihervaara - FINLAND


Bill Slee


Simon Gardner

Analysis of the submitted research projects

Analysis of the submitted research projects

Overall figures of the call

With 52 full proposals submitted, 372 participating teams and 1293 individual participants, the 2013-2014 BiodivERsA/FACCE-JPI joint call was a real success.

Reaching a success rate of ca. 19%, this call resulted in the selection and funding of ten excellent pan-European projects.

	No. of proposals (No. of teams)
Submitted proposals	52 (372)
Selected proposals	10 (73)
Success rate	19.2%

Thanks to a good anticipation of the required budget for each participating country and to the flexibility of several partners who made an effort to increase their budget, final funding amount (10.2M€) was slightly above the total initial reserved budget (9.8M€).

Nationality of the applicants

The BiodivERsA/FACCE-JPI joint call aimed at promoting pan-European research, although self-financed partners from other countries could also take part in the consortium.

The large majority of the teams who submitted proposals came from the 14 countries participating in the funding of the call, i.e. Austria, Bulgaria, Cyprus, France, Germany, Lithuania, The Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland and Turkey. 95,7% of the teams were indeed from the participating countries, while the remaining 4.3% (self-funded applicants) came mostly from European countries not participating in the call (3.8%), i.e. Albania, Greece, Hungary, Iceland, Italy and the United Kingdom, and from Africa (0.5%) and from Africa (0.5%), i.e. Kenya and Namibia.

Reserved and requested budgets, and funding model

Reserved budget per country was published during the announcement of the call, which might have influenced some of the budget requests made by applicants. The highest values of both reserved and requested budgets were indeed observed for Austria, France, Germany, and Sweden (Figs. 1 and 2).

When the reserved budget proved insufficient as for example with Austrian, Dutch, German, Romanian, Spanish and Swiss partners, the issue was addressed during the funding process thanks to the flexibility of these partners, as well as the French partner (ANR) who managed to fund a foreign team. The weighting of requested budgets combined with agencies' flexibility allowed funding the ten top-ranked projects, strictly following the ranking list established by the evaluation committee.

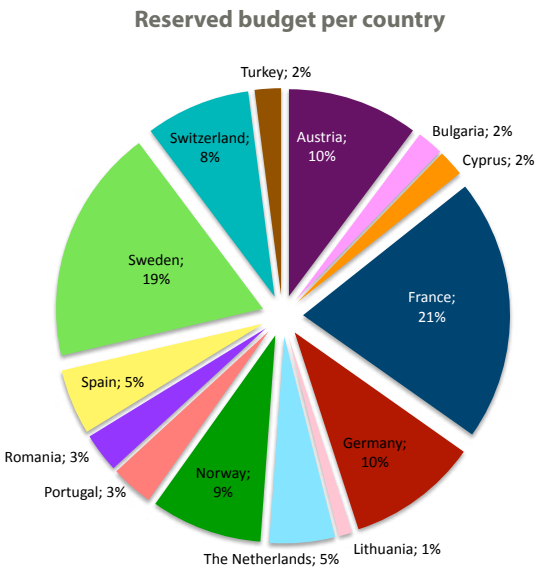

Fig. 1: Distribution of the reserved budget in each country

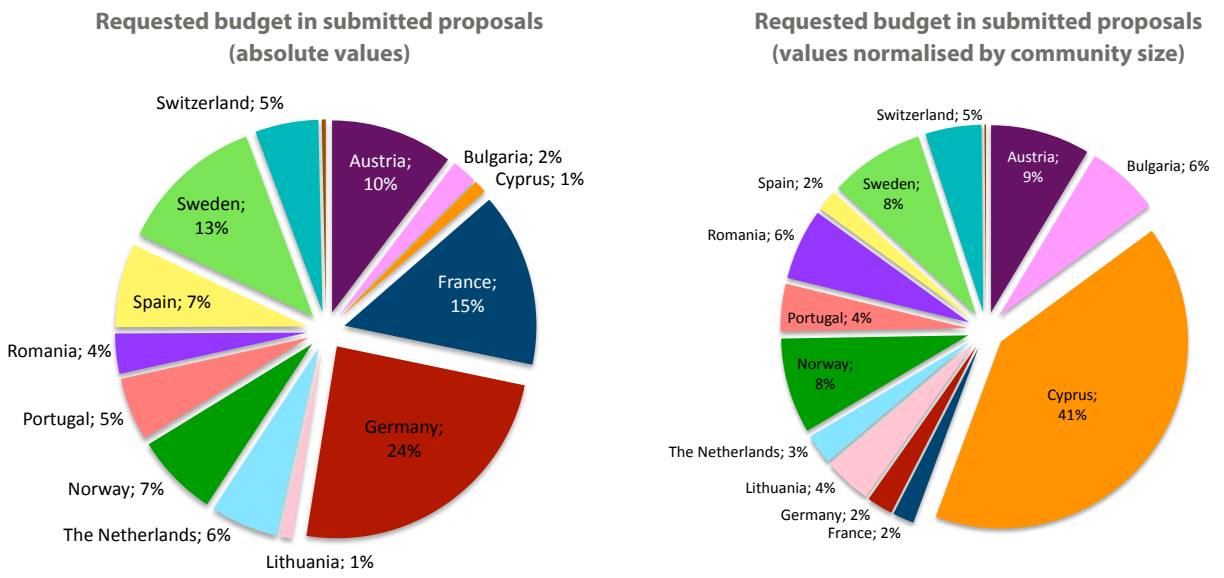

Fig. 2: Budget requested by applicants among countries in absolute values (left) and values normalized according to the size of the national scientific community (right) – [Source: Eurostat 2011 – all sectors, Full Time Equivalent unit]

Despite a relatively low participation in terms of required budget (Fig. 2), the biodiversity scientific communities from Bulgaria and Cyprus and to a lesser extent Lithuania responded well to this call. This can be observed once budget requests are normalized according to the estimated number of researchers from all scientific areas in each country. Unfortunately, there is no available data to know precisely the size of the specifically targeted research community within the overall research community of each country (Fig. 2).

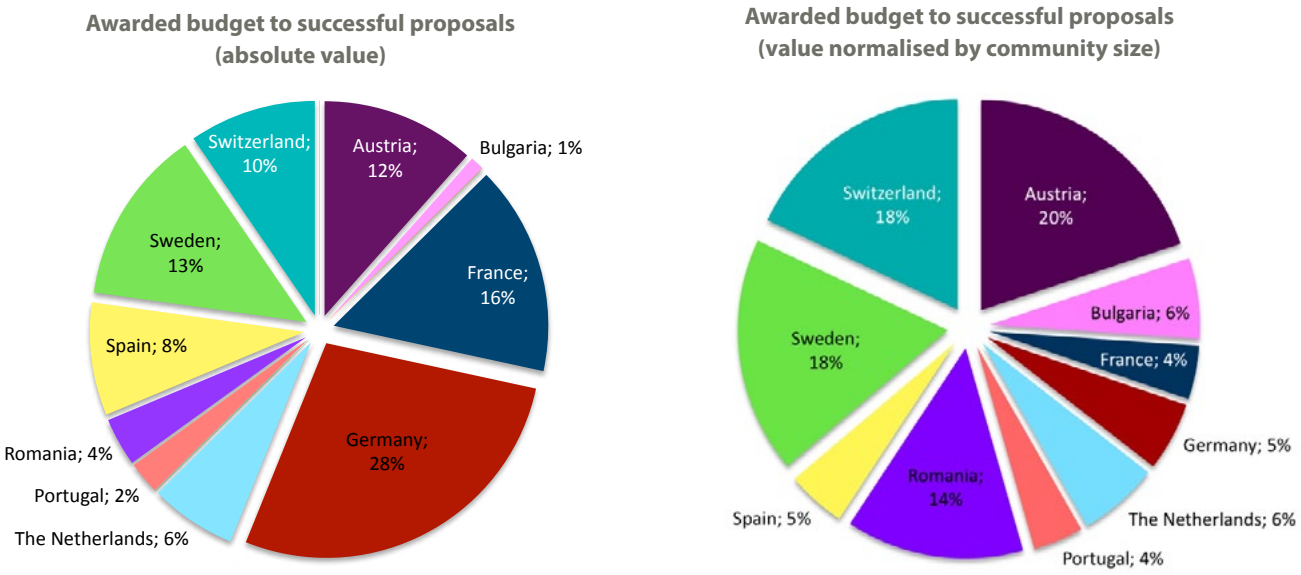

Fig. 3: Distribution of awarded budget to the successful applicants by country in absolute value (left) and value normalized according to the size of the national scientific community (right) – [Source: Eurostat 2011 – all sectors, Full Time Equivalent unit]

The 2013-2014 call funded teams from ten different countries (Fig. 3). A large number of funded teams came from the participating countries with the most important amount of funding, namely Austria, France, Germany, Sweden and Switzerland. Again, it is worth comparing the funding amounts between countries in terms of both absolute values and amounts normalized according to the estimated number of researcher from all scientific areas in each country, as by doing so other countries emerge such as Austria, Bulgaria, the Netherlands, Romania, Sweden and Switzerland.

Success rate per country

Despite the participation of Cyprus, Lithuania, Norway and Turkey in the call, the ten funded projects do not involve research teams from these countries.

Out of the 14 countries participating in the call, the teams, namely the Austrian, French, German, Dutch, Romanian, Spanish, Swedish and Swiss research teams, as demonstrated by their success rate, i.e. ratio of granted to requested funded amounts (Fig. 4). However, these figures should be viewed with caution given the low number of funded proposals for each country.

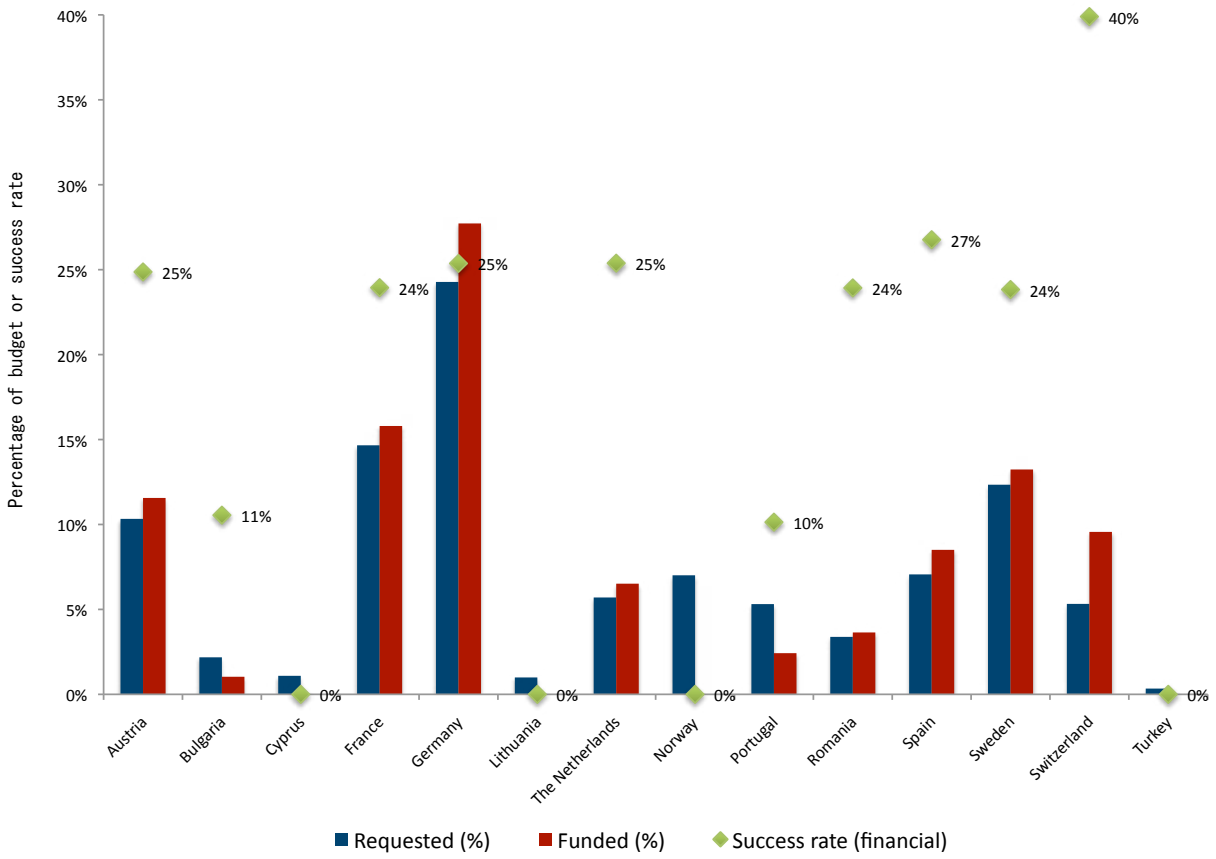

Fig. 4: Comparison of the percentage of budgets in the proposals between countries at the submission phase (requested – blue bars) and after selection (funded – red bars), along with the financial success rate (green dots).

Proposal coordination

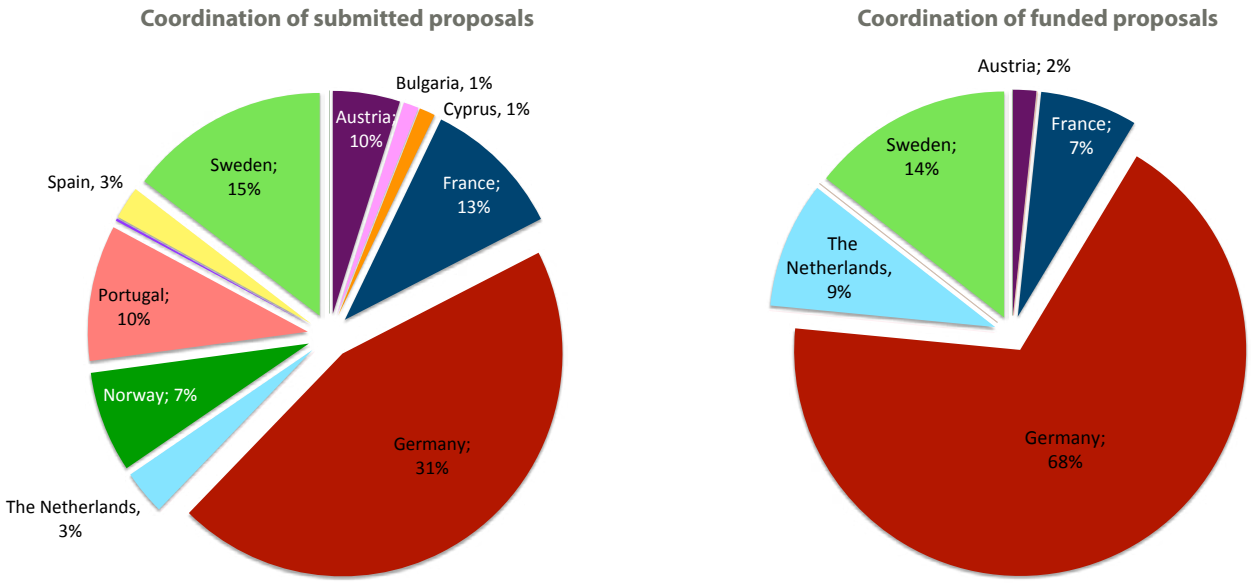

Fig. 5: Percentage of requested budget according to the country of the coordinator for submitted (left) and funded (right) proposals.

At the submission stage, the coordinators of proposed project represented all countries participating in the call except for Lithuania and Switzerland (Fig. 5). At the end, the coordinators of funded proposals came from Austria, France, Germany, the Netherlands and Sweden. Again, these figures should be viewed with caution as they represent only the geographical spread of coordinators (respectively 52 and 10 for the submission and funding phases) and not all teams involved in the project (respectively 372 and 73)

Call themes addressed by the proposals

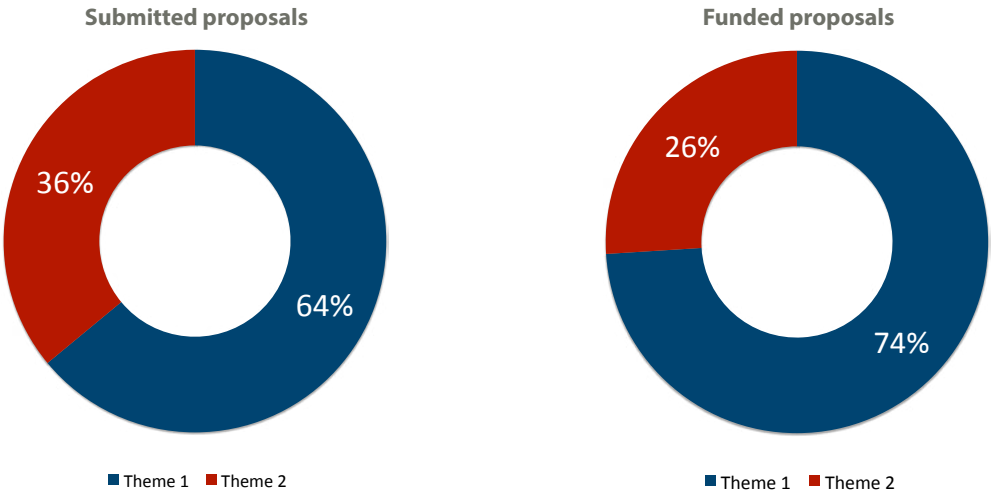

Fig. 6: Proportion of the proposed research themes between submitted and funded proposals. One proposal can address several themes.

During the submission phase, the project leaders gave an indication of the relative importance of the theme(s) addressed by each proposal. This provided a clear view of the way each theme was considered (Fig. 6). It clearly appears that theme 1 was favored over theme 2 both in submitted and selected proposals.

Conclusion

The above analysis provides a good insight into the implementation and results of the BiodivERsA/FACCE-JPI 2013-2014 joint call. The following aspects were found useful for future calls:

- The topic of this call has proven to be of interest for European countries as it mobilized several national agencies across Europe, with substantial funds allocated. It also mobilized a high number of pan-European research consortia.
- Nevertheless, at the end of the evaluation process, four countries were not represented in funded projects, i.e. Cyprus, Lithuania, Norway and Turkey.
- On the two themes covered by this call, the theme 2 focusing on policy and governance systems was addressed to a lesser extent than the theme 1, which was expected by BiodivERsA and FACCE-JPI partners.
- Given the amounts of funding reserved by countries, and thanks to agencies' flexibility for funding, BiodivERsA and FACCE-JPI partners fully respected the outputs of the selection procedure and funded the ten top-ranked proposals.

Funded projects

Presentation of the 10 funded projects

BASIL: Landscape-scale biodiversity and the balancing of provisioning, regulating and supporting ecosystem services

Context

Global change may endanger agricultural landscape functioning in the future. Biodiversity has the potential to buffer agro-ecosystems against change and stabilize ecosystem functions and services. However, the suitable level of biodiversity to maximize ecosystem services in agricultural landscapes is not yet known and quantified.

Main objectives

BASIL aims at understanding the importance of diversity from the field to the agricultural landscape scale, evaluating the mosaic of extensively and intensively managed sites and natural habitats for ecosystem services (ESS) and a sustainable agriculture.

BASIL will cover the following specific objectives:

- To understand differences between extensively and intensively managed agricultural landscapes in terms of biodiversity and provisioning, regulating and supporting ESS (e.g. water quality, soil conservation, preservation of soil structure and biodiversity, C and N storage, weed and pest control);
- To determine the contribution of plant and microbial diversity to the closure of nutrient cycles, the synchronization of plant nitrogen (N) requirement and N delivery by soil, and the coupling of carbon (C) and N cycles;
- To determine the necessary level of integration of biodiversity that is required to improve the economic and environmental sustainability of agriculture by performing landscape trait-based analyses;
- To identify particular landscape structures and cropping systems promoting biodiversity and its contribution to targeted ESS;
- To assess the importance of different policies and governance systems having an impact on environmental and economic sustainability via agricultural landscape management.

Main activities

To achieve its objectives, BASIL will:

- Assess the N availability and N cycling, i.e. the temporal and spatial distribution of N accross studied landscapes (i.e. France, Germany, Spain and Switzerland) including bordering zones of intensively managed agricultural fields and natural ecosystems;
- Assess management impact on soil microbial communities and their regulation of C and N cycles;
- Test whether forests, semi-natural areas or natural patches in agricultural fields (e.g. in-field ponds) are stepping stones for belowground microbial re-colonization of intensively used areas after disturbance;
- Investigate whether subsoils of agricultural fields are reservoirs for mycorrhizal fungi that may re-colonize topsoils of intensively used areas after disturbance;
- Conduct surveys, stakeholder workshops and expert interviews, and use the research results to perform a socio-economic analysis to understand the impact of regional/national agricultural and conservationist policies on management practices.

The BASIL project is being developed in contact with networks of farmers who promote the use of different plant species and reduced soil tillage in order to 1) benefit from their field observations and 2) transfer to them the scientific knowledge. BASIL will set up contacts with national, international and global environmental agencies that have an overlapping interest in the goals of the project. BASIL will also engage with policy makers and administration to conduct interviews, keep them informed about the project's schedule and results and develop a policy brief. BASIL plans to organize visits for the general public to the different study sites and, thus, give visibility to the project and its goals to a broader audience.

Poppy flower in a wheat field

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Duration:
05-2015 to 04-2018

Total grant:
€ 978 015

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BEEHOPE - Honeybee conservation centers in Western Europe: an innovative strategy using sustainable beekeeping to reduce honeybee decline

Estimation of brood surface during the eco-ethological protocol

Partners:
CNRS - Laboratoire Evolution Génome Comportement Ecologie, Gif sur Yvette FRANCE (Coordinator)
CNRS - Centre d'Etudes Biologiques de Chizé, FRANCE
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Duration:
01-2015 to 12-2017

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Context

Like numerous natural species, European honeybee populations have faced increasing challenges imposed by different interacting drivers such as malnutrition, agrochemical molecules, climate change, and invasive species. All these global change factors are probably involved in the important colony losses observed all over the world. Moreover, no publications have suggested the spread of invasive pathogens carried by allochtonous unadapted honeybees as a putative supplementary cause of colony losses in Europe.

While numerous studies have already been published to determine factors involved in honeybee decline, paradoxically no particular protocol, especially at ecosystem and subspecies distribution levels, has been developed to counter the effects of colony losses.

Main objectives

The aim of Beehope is to set up, according to a North/South gradient in Europe, genetic conservatories of original naturally distributed honeybee populations. Those populations are particularly interesting to study and preserve in a context of sustainable beekeeping. These honeybee preservation areas will have as missions to:

- Characterize the genetic and eco-ethologic diversity of honeybees from the Western European lineage (M lineage);
- Protect the genetic diversity of those populations;
- Constitute a reserve of diversity usable by the honeybee industry and beekeepers;
- Collect data on impact of climate change on the life cycle of subspecies from M lineage (here, *A. m. mellifera* and *A. m. iberiensis*) and on the spatio-temporal succession of their cortege of microbiota and parasites;
- Be able to use the honeybee as a bio-collector and as a biological indicator of environmental quality.

Genetic conservatories will be established and monitored in Portugal, Spain (Basque country) and France covering a wide range of landscapes and climate

Main activities

To reach its goals, BEEHOPE will implement the following activities:

- Characterize the genetic structure of 5 preserved populations (population genetics / genomics);
- Implement an eco-ethological survey of 5 preserved populations;
- Study the spatio/temporal dynamics of bee pathogens;
- Develop and deliver sustainable beekeeping courses and training.

BEEHOPE will also implement the following specific activities to disseminate the project outputs and involve stakeholders and policy-makers in the project:

- Inform beekeepers about the advantages to breed honeybee ecotypes via bimonthly meetings in each European preservation honeybee center involved in BEEHOPE with different associations of beekeepers and honeybee breeders;
- Create a socio-economic committee (schools, inhabitants, beekeepers, farmers, regional and municipal communities) in each European preservation center to help and assist the director in the managing choice of biodiversity in each concerned area.

CP³ - Civil-public-private-partnerships (cp³): collaborative governance approaches for policy innovation to enhance biodiversity and ecosystem services delivery in agricultural landscapes

Context

There is often a misfit between established governance approaches, including the institutional structures created for governance implementation, and the spatial and temporal scales that are relevant for effective ecosystem service (ES) provision and biodiversity protection in agricultural landscapes. Against this backdrop, the CP3 project hypothesizes, that particularly collaborative approaches in governance exist that can help in providing an institutional fit and that such approaches offer valuable insights to inform stakeholders in governance and policy who face similar challenges.

Main objectives

CP3 main objectives are to:

- Identify, describe, and analyze collaborative governance models that are successful in providing institutional fit for better protecting biodiversity and delivering ecosystem services in agriculture;
- Identify, describe, and analyze agricultural production practices linked to the different governance models to explore their relations to ES, food production and biodiversity targets, including existing trade-offs and synergies;
- Develop an inventory of ES provided by and needed to sustain agro-ecosystems, including spatial and temporal scales of delivery, and ES flows;
- Derive recommendations for stakeholders, i.e. policy makers, market actors, civil society initiatives, farming communities on how development of such collaborative governance models can be supported by specific policies.

Main activities

The project will conduct inter- and transdisciplinary research involving natural and social scientists closely cooperating with regional stakeholders in three core case studies in Austria, Germany and The Netherlands. To allow for a more comprehensive analysis, additional case studies for 'desk top' research from inside and outside Europe will be considered. The case studies will exemplify different combination in regard to their protection status (e.g. nature park, biosphere reserve, etc.), agro-ecosystem management type and intensity, and different sets of ES they provide and are dependent upon.

Specific activities to foster the dissemination of the projects outputs towards stakeholders will be implemented. User group tailored materials will be developed and participatory movies realized. Events mobilizing stakeholders will also be organized.

Targeted groups include in the first place regional stakeholders at case study level (e.g. land owners and managers/farmers, regional and local authorities, business companies, research institutes, civil society organizations based in the regions, etc.) as well as policy decision makers at the national and EU level. Further end user groups are the scientific community and the general public to raise public awareness and contribute to the research topic.

Ijissel, the Netherlands

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Duration:
05-2015 to 04-2018

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Duration:
01-2015 to 12-2017

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ECO-SERVE: Sustainable provisioning of multiple ecosystem services in agricultural landscapes

Context

The options of farmers to respond to rainfall variability differ between agro-ecological zones of Europe in terms of changing crop or cultivar choices, agricultural systems and soil management. A common, central element, however, is that the ways farmers can influence water infiltration and storage are closely related to how crop and residue management influence soil organic matter and, hence, carbon, nutrient and water loss or storage in soil and associated water and nutrient use efficiencies. In that sense, organic matter management is central in coping with increased variability of droughts and rainfall.

Main objectives

ECO-SERVE will evaluate current agricultural systems in agricultural landscapes for biodiversity-based options for adaptation to increased rainfall variability due to climate change. In this context, ECO-SERVE will evaluate alternatives to current agricultural systems that confer adaptation to the agro-ecological conditions that are changing in agricultural landscapes due to increased rainfall variability under climate change. Traits of crops, plant litter biota, rhizosphere biota and soil ecosystem engineers will be quantified, enabling ECO-SERVE to evaluate the performance of different agricultural systems in space and time in terms of carbon allocation and water and nutrient use efficiencies. Depending on whether water deficit or surplus situations will become more prevalent under climate change, management of soil organic matter for higher water-holding capacity versus water infiltration will be more important. By focusing on the (diversity of) relevant traits, trait combinations and trait attributes rather than (the diversity of) species of plants and soil organisms, the acquired knowledge will be generic, and ultimately applicable to different agro-ecological conditions in Europe.

Main activities

A combination of factorial experiments and stakeholder interactions in selected agricultural landscapes (i.e. - arable agriculture, extensive grassland and sown grassland and agroforest in France, the Netherlands, Portugal, Spain, Sweden and Switzerland) is foreseen, with the aim to develop and test the project understanding of (combinations of) traits and trait attributes of plants and soil, as they are affected by, and affect soil organic matter properties, topsoil hydrology and associated water and nutrient use efficiencies.

Results will be interpreted in terms of general applicability and local limitations in similar and different agro-ecological areas in Europe than the ones studied.

Specific activities for dissemination of the project's outputs and involvement of stakeholders / policy-makers will also be at the core of the project.

Stakeholder dialogue throughout the project will ensure that knowledge is communicated from stakeholders to the ongoing research as well as enabling research data to be adopted into implementing changes into management of production systems for improved sustainability. Discussion on the initial results will be engaged with farmers and other actors to identify possible synergies and trade-offs between ecosystem services considered important at the landscape level and, hence, which and to what extent adaptation strategies under climate change are feasible. Integration at the landscape level will take place through a scenario-building task with stakeholders, starting from the novel technical information obtained in the project, and leading to a variety of stakeholder-preferred management schemes, which will be evaluated in the project. In addition to regional stakeholder involvement, the implications of the project will be discussed with European-level stakeholders.

ECODEAL - Enhancing biodiversity-based ecosystem services to crops through optimized densities of green infrastructure in agricultural landscapes

Context

Biodiversity can replace external inputs to agricultural crops by delivering ecosystem services such as pollination and pest control, even in intensively farmed landscapes. The organisms driving these services depend on the presence of non-crop habitats, or "green infrastructure", in the landscape. We know little about how changes in quantity and quality of green infrastructure at different scales translate into net benefits. This makes it difficult to convince farmers that biodiversity can help them support crop production, and means that the evidence base for policy makers attempting to jointly address food security, rural development and environmental goals is insufficient.

Main objectives

The ECODEAL project aims to reach a mechanistic understanding of the effects of green infrastructure at different spatial scales on crop ecosystem services. More specifically ECODEAL will provide recommendations on the scales at which sparing land from cultivation can support food production, biodiversity preservation and farm economic performance across a range of European agricultural systems.

Main activities

ECODEAL will synthesize large existing databases to model the relationship between density of green infrastructure and the distributions of functional traits and the structure of the ecological interaction networks that underlie pollination and natural pest control. Cases studies from established study areas covering economically important field crops (i.e. France, Germany, the Netherlands, Spain and Sweden) will be used to fill the gaps in the existing data, to validate and update the ecosystem service models derived from the synthesis work and to quantify economic and ecological consequences of changes in quality and quantity of green infrastructures.

As regards specific activities for dissemination of the project outputs and involvement of stakeholders/policy-makers, ECODEAL partners will engage the dialogue with the farming community, policy-makers and NGOs early on to ensure questions are perceived as relevant, and the uptake of results facilitated, using existing networks. ECODEAL will also perform demonstration of ecological mechanisms in the field, engage dialogue about obstacles on the path towards change and produce synthetic policy briefs.

Beeflower

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€ 1 516 140

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Apple orchards in Altes Land, northern Germany

EcoFruit - Managing ecosystem services for fruit production in different European climates

Context

Animal communities provide important ecosystem services (ES). Nowhere is their service more important than in fruit production, where certain species are required for pollination, and others function as biocontrol agents against various pest species attacking flowers, leaves or fruits. Different species provide benefits but others negative impacts on net fruit production. Therefore it is crucial to understand how biodiversity can be promoted to maximize fruit production while minimizing external agricultural inputs such as renting honeybees and the use of pesticides.

Main objectives

The overall goal of ECOFRUIT is to understand how European agri-environmental schemes (AES, organic farming, flowering strips and hedgerows) affect biodiversity and related ES and how this relates to net fruit production in different climates across Europe.

ECOFUIT has set the following specific objectives:

- Evaluate the effectiveness of AES implemented at two spatial scales (farm and adjacent farm scale) to increase biodiversity and ES in a landscape context;
- Measure the functional importance of biodiversity in leaf- and fruit-attacking animals (pests), their natural enemies (insects and birds) as well as flower-visiting and pollinating insects to better understand the complementary role of different species for multiple ES;
- Establish a trait database for pests, natural enemies and pollinators;
- Identify the trade-offs between benefits and negative effects of different functional groups of animals.

Main activities

To reach its goals, ECOFRUIT will implement the following activities:

- Study orchard selection and contact growers to identify the most effective AES in given landscape conditions with the goal to reduce external inputs without minimizing net fruit production. The study sites will comprise a climatic gradient from southern to northern Europe in Spain, Germany and Sweden. Apple will be used as a target crop as it is the most frequently grown fruit in Europe and both organic and conventional orchards, managed with and without adjacent hedgerows and flower-providing habitats will be studied.
- Organize stakeholder meetings to deliver results of direct importance for growers and policy to improve the implementation of AES.
- Set up experiments to provide important information of key species (functional and response traits) affecting fruit production across Europe.

Local fruit growers and marketers of the three European countries contributing to the project will be involved; the project aims and approach will be discussed with them and objectives and methods refined if needed. Besides, interviews will be conducted with apple growers to select sites and to get information on their management practices. The project results, as well as basic information of interest to growers such as showing the main pollinators and natural enemies, and how to promote them, will be transferred in an understandable way. These activities to inform stakeholders will likely result in a higher adaptation of biodiversity-friendly management practices at the farm- or adjacent-farm scale.

End-users (fruit consumers) will also be informed with specific brochures that retailers will hand them at local markets. Additionally ECOFRUIT will contact wholesale companies to propose them to add information about the project research results in the flyers they use to inform consumers about sustainable agriculture and products.

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04-2015 to 03-2018

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PromESSinG: Management concept for Central European vineyard ecosystems: Promoting ecosystem services in grapes

Context

New approaches are needed to secure food production while creating sustainable agricultural systems requiring as few external inputs as possible. The interaction between biodiversity and ecosystem services (ESS) is recognized to play a key role in this context although large gaps in knowledge exist. Cultivation of grapevine as a perennial crop has a high potential of providing ESS linked to biodiversity since viticulture does not aim at producing maximum yield but rather high quality products. Additionally, viticulture can provide high levels of biodiversity inside the cropped area, which cannot be found in annual cropping systems. Thus, viticultural systems provide ideal conditions for analyzing ESS relevant for the grapevine grower such as soil fertility and stability, water retention, pest and weed control as well as grape quality in relation to soil biodiversity and functioning.

Main objectives

The major aim of PromESSinG is to identify management options for promoting biodiversity linked ESS in order to reduce external inputs in Central European vineyard ecosystems. The project intends to unravel biodiversity driven processes associated with the main ESS in viticultural systems taking different management factors into account. A particular focus will be on soil biodiversity, as interactions between the diverse soil biota as well as chemical and physical properties of the soil environment are fundamental for the provision of soil-based ecosystem services.

Main activities

The intended research will be conducted in temperate vineyard systems in France, Switzerland, Germany, Austria and Romania, thus covering a gradient from maritime to continental climates. In a common study with all countries involved and using a standardized sampling design PromESSinG will analyze the links between diversity of soil relevant species groups (soil microflora including mycorrhiza, meso , macrofauna, plants), soil function and respective supporting, regulating and provisioning ESS. Management effects on these interactions are analyzed on two different scales by combining a) the factor soil management including three vineyard ground management treatments of different disturbance intensities with b) the factor landscape management consisting of three landscape heterogeneity levels.

In addition, individual studies based on already existing experimental sites in Germany, Switzerland and France focusing on nitrogen fertilization and farming type (integrated, organic, biodynamic) will further promote knowledge on biodiversity-ESS relationships in the vineyard.

Specific activities for dissemination of the project outputs and involvement of stakeholders / policy-makers during the project will be implemented. The PromESSinG project will indeed integrate the entire knowledge chain from providing novel and improved techniques for measuring ESS in viticulture, performing empirical research in a common study across countries, to fostering exchange and consultation with local and regional stakeholder in each country. The knowledge will be spread to all major relevant stakeholders and interested parties to achieve improvements in the utilization of ecological services provided by soil and landscape management for the grapevine grower.

Under vine vegetation

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Duration:
01-2015 to 12-2017

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Wheat fields

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04-2015 to 09-2018
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STACCATO - SusTaining AgriCultural ChAnge Through ecological engineering and Optimal use of natural resources

Context

The key determinants of the stability of multiple ES delivery and biodiversity in agro-ecosystems and agricultural landscapes, including resilience to climate variability and extremes, much remains to be developed for the scientific foundation of ESS-based approaches. Besides the assessment of the functioning of productive ecosystems in terms of basic provisioning services is facing limits.

Main objectives

In order to advance long-term sustainable development of land use systems, against risks arising from multiple aspects of global change, STACCATO plans to quantify the sensitivity of ecosystem functions (ESF) and the services (ESS) generated from them to environmental pressures in representative agriculturally dominated landscapes in Europe. The focus is on local as well as regional land use intensity (including the socio- economic background) and biodiversity, and the potential impacts of future climate and land use change.

Following the framework of the Millennium Ecosystem Assessment (MEA), STACCATO define supporting services as ESF and deal with selected characteristic elements of 2 of the 3 service strands defined by the MEA, namely a) Provisioning Services (PS): nutrient cycling & crop production; b) Regulating Services (RS): biocontrol & pollination; and c) Cultural Services (CS): identity with cultural landscapes.

Studies are planned in representative regions across Europe (i.e. Bulgaria, Germany, Romania, Spain, Sweden and Switzerland), in landscape along a gradient reflecting changing geo-climatic and land use intensity, and socio-economic conditions.

STACCATO aims at achieving the following specific objectives:

- Investigate the interactions between crop production areas and the landscapes in which they are imbedded across a European wide field site network;
- Develop valuations of the investigated ESF/ESS strands through monetary as well as non-monetary methods;
- Develop Ecological Engineering and Eco-functional intensification in conventional, integrated or organic agriculture.

Main activities

To achieve its goals, STACCATO will implement the following activities:

- Quantification (incl. the assessment of uncertainty) of the current and future dependencies of ESS of the cropping systems on a) local & regional land use intensity and its driving forces, b) biodiversity and c) climate;
- Study of three ESS strands: a) nutrient status & crop production, b) crop related biocontrol & pollination, and c) cultural services and how they are affected by land use intensity

Regarding stakeholder engagement and dissemination of the project outputs, STACCATO will pay particular attention to the involvement of a broad spectrum of stakeholders throughout the whole duration of the project by:

- Co-Designing STACCATO project and Ecological Engineering in close interaction with stakeholders;
- Developing guidelines for decision makers (incl. farmers) to further enhance ESS provision, in particular through ecological engineering as a tool for eco-functional intensification;
- Developing socio-economic analytical frameworks & tools for promotion of advanced land management practices, based on analyses of driving forces & stakeholders

TALE - Towards multifunctional agricultural landscapes in Europe: Assessing and governing synergies between food production, biodiversity, and ecosystem services

Context

World-wide increase in human population, market's globalization, dietary shifts and urbanization are increasing the pressure on natural resources and have become a high priority on the political and scientific agenda. Most of these processes lead to multiple competing demands for land. The resulting demand-driven land use changes come at a cost in the form of trade-offs between food or bioenergy production, biodiversity conservation and other ecosystem services (ESS) like clean water, erosion control or soil fertility. Understanding and balancing these trade-offs has a high priority on the policy agenda to promote sustainability and avoid undesirable societal outcomes. By assessing and governing synergies between food production, biodiversity and ecosystem services, TALE will develop related strategies.

Main objectives

Main objectives of TALE are i) to disentangle and quantify the multifaceted links between agricultural production, biodiversity and ecosystem services in different European landscapes; and ii) provide a learning environment that supports the design and evaluation of policy options particularly regarding the Common Agricultural Policy (CAP) that can help to reconcile conflicting demands, namely the production of agricultural commodities while at the same time ensuring the provision of ESS and conservation of biodiversity.

TALE addresses the effects of different land use structures and land use intensities in a set of agricultural landscapes using selected site-specific measures of biodiversity and ecosystem services (ESS) indicators. Main aspects include the identification of (a) synergies and quantitative trade-offs between ESS, biodiversity and agricultural production at different scales; (b) how agricultural production, ESS supply and biodiversity conservation, as well as the synergies and trade-offs between them, might change under different scenarios representing various land use strategies, climate change conditions and objectives across scales; (c) those land management strategies and policy instruments that could help to reduce trade-offs between ESS and biodiversity conservation in the different regions.

Main activities

TALE will analyze policy frameworks that impact land use decisions regarding agricultural use, biodiversity conservation and ESS supply in five different study areas. The environmental settings in these areas will be characterized, and the status of biodiversity conservation and ESS provision will be identified and quantified by developing and applying different bio-physical, bio-economic and statistical models.

Relevant stakeholder groups will be involved within the study areas to analyze expectations and perceptions on policies, biodiversity and ESS objectives. The development of a learning environment that serves as a platform for integration and exchange between partners and stakeholders will facilitate the dissemination of results. Specific parts of the learning environment will be designed to make TALE methods and results available to the wider public, including decision makers and practitioners, but also fellow scientists and students. Besides project reports and scientific publications, the learning environment can include tools, decision trees, webinars, tutorials, etc. Regular stakeholder workshops will be used to collect insights on user needs regarding the communication of results, which will be complemented by needs from the wider user group through interactive web communication tools (e.g. blog, forum, online survey). Together, this will ensure project outcomes are made available in a way that facilitates uptake in practice and decision-making.

Dutch case study area

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Duration:
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Vineyards

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VineDivers - Biodiversity-based ecosystem services in vineyards: analyzing interlinkages between plants, pollinators, soil biota and soil erosion across Europe

Context

Essential ecosystem services in viticulture landscapes result from diverse communities of organisms and their interactions. Traditional viticulture usually was part of a multifunctional agricultural system including low-input grassland management and fruit production. Therefore, the high diversity of habitats resulted in a high functional biodiversity. However, in the last decades, land use changes and intensification in vineyard management caused a separation of production and conservation areas.

Main objectives

With the aim of integrating biodiversity and agricultural production, VineDivers will examine new approaches at different spatial scales (plot, vineyard and landscape), assess the socio- economic consequences and formulate best practice recommendations for policy and farmers.

More precisely, the objectives of the project are to:

- Determine how different management practices in vineyards and their surroundings affect the relations between the trophic network of plants, soil biota and pollinators and how these functional groups promote ecosystem services in viticultural landscapes;
- Assess which management regime (type and frequency of disturbance) in vineyards of different structural complexity may minimize the trade-offs between productivity and ecosystem services;
- Develop recommendations for farmers, stakeholders and policy makers for management practices in vineyards and their surroundings that sustain ecosystem functioning, biodiversity and high grape yields and wine quality.

Main activities

In the course of the project, the following activities will be implemented:

- Assessment of landscape diversity, management and aesthetics;
- Examination of biodiversity, the soil-water system and production in vineyards in Spain, France, Romania and Austria;
- Identification and modeling of interactions between biodiversity, landscape diversity, management intensity, and the soil-water system;
- Development of scenarios, regional assessments, evaluations and policy recommendations.

Regarding the dissemination of the project outputs and engagement of stakeholders/policy-makers, strong effort will be made to raise the public awareness for the importance of vineyard management on biodiversity and associated ecosystem services. VineDivers aims to contribute to the dissemination of biodiversity knowledge, between its partners and towards other scientists as well as towards the general public and relevant stakeholders. Specific activities to reach this goal will be implemented such as presentation of results at regional wine growers events, publication of popular science articles in stakeholder relevant journals, dissemination of technical guidelines, and brochures and organization of a day of vineyard biodiversity.

Joint perspective for BiodivERsA and FACCE-JPI

This call jointly launched by BiodivERsA and FACCE-JPI has proven to be a success. It allowed the funding of 10 excellent projects that address cross-sectoral issues.

This joint call was not designed as a one shot joint action with the only aim of funding research projects. BiodivERsA and FACCE-JPI both aim at achieving a long term and successful collaboration, and working together in the future. This is even more the case since the success of this joint call has demonstrated that there are complementarities between the two initiatives.

> "BiodivERsA and FACCE-JPI aim at achieving a long-term and successful collaboration"

In the future, the follow-up of the call will require a close collaboration between BiodivERsA and FACCE, and not only from an administrative point of view. The two initiatives will jointly work towards an enhanced dissemination of the funded projects outputs and knowledge transfer to relevant stakeholders and policy-makers. Once the funded projects have sufficiently advanced and produced consolidated results, BiodivERsA and FACCE-JPI will work together with the funded teams to develop additional activities such as policy briefs. These policy briefs will be based on the funded projects' outputs and will aim at linking new knowledge with major European policies as well as providing European policy-makers and stakeholders with specific recommendations.

The collaboration between BiodivERsA and FACCE will also go beyond the activities related to the joint call. For example, they will consult each other when developing their strategic research roadmap and agenda, and more specifically when determining activities that could strengthen linkages between agriculture, biodiversity and ecosystem services.

Over time, further discussions on other possible joint activities will be engaged to explore a larger range of common actions.

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BiodivERsA and FACCE-JPI have received funding from the European Union's Horizon 2020 research and innovation programme