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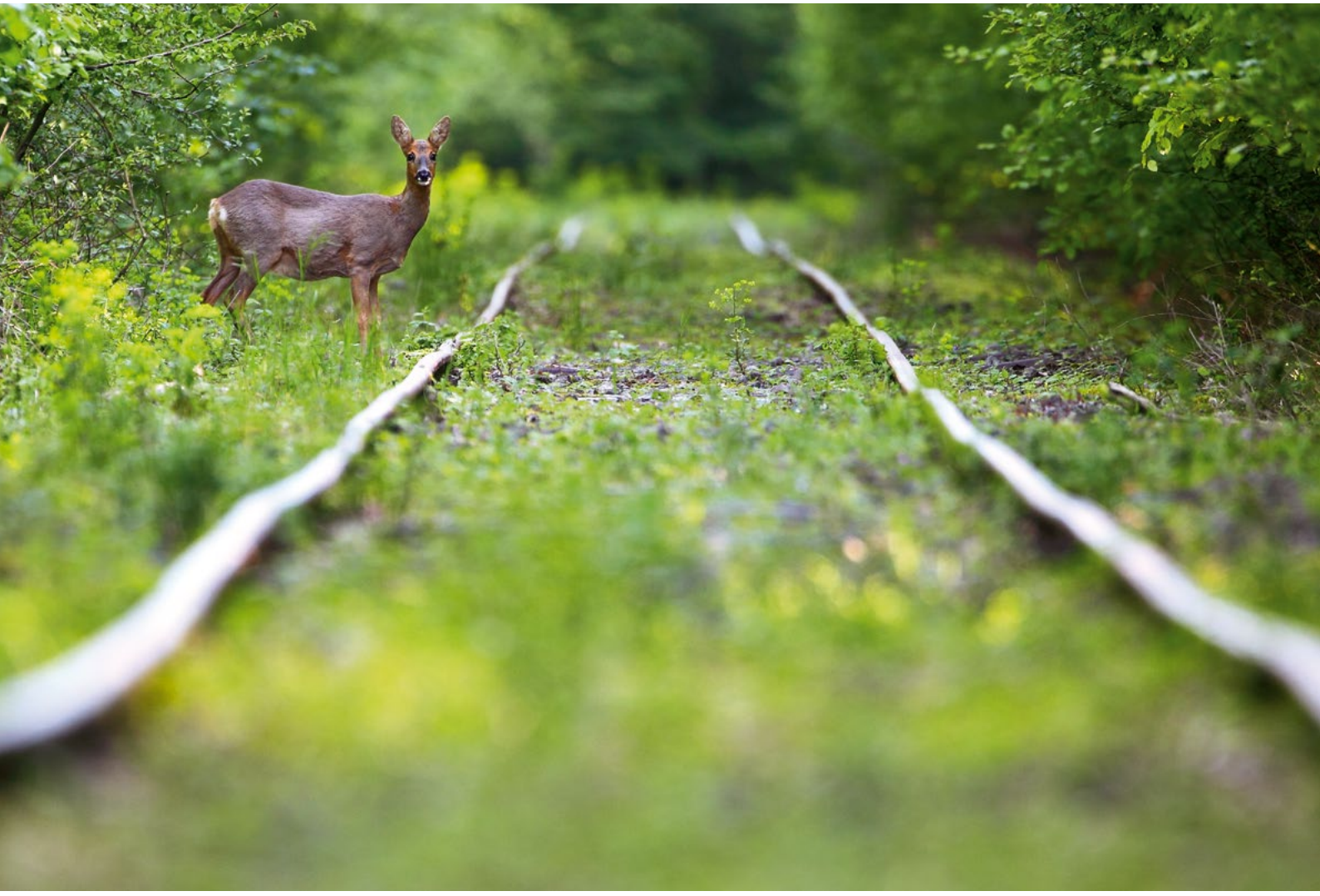
The ERA-NET promoting European Research on biodiversity and ecosystem services

BiodivERsA 2015-2016 Call for proposals



Understanding and managing biodiversity dynamics to improve ecosystem functioning and delivery of ecosystem services in a global change context:

The cases of soils and sediments, and land- river- and sea-scapes

www.biodiversa.org

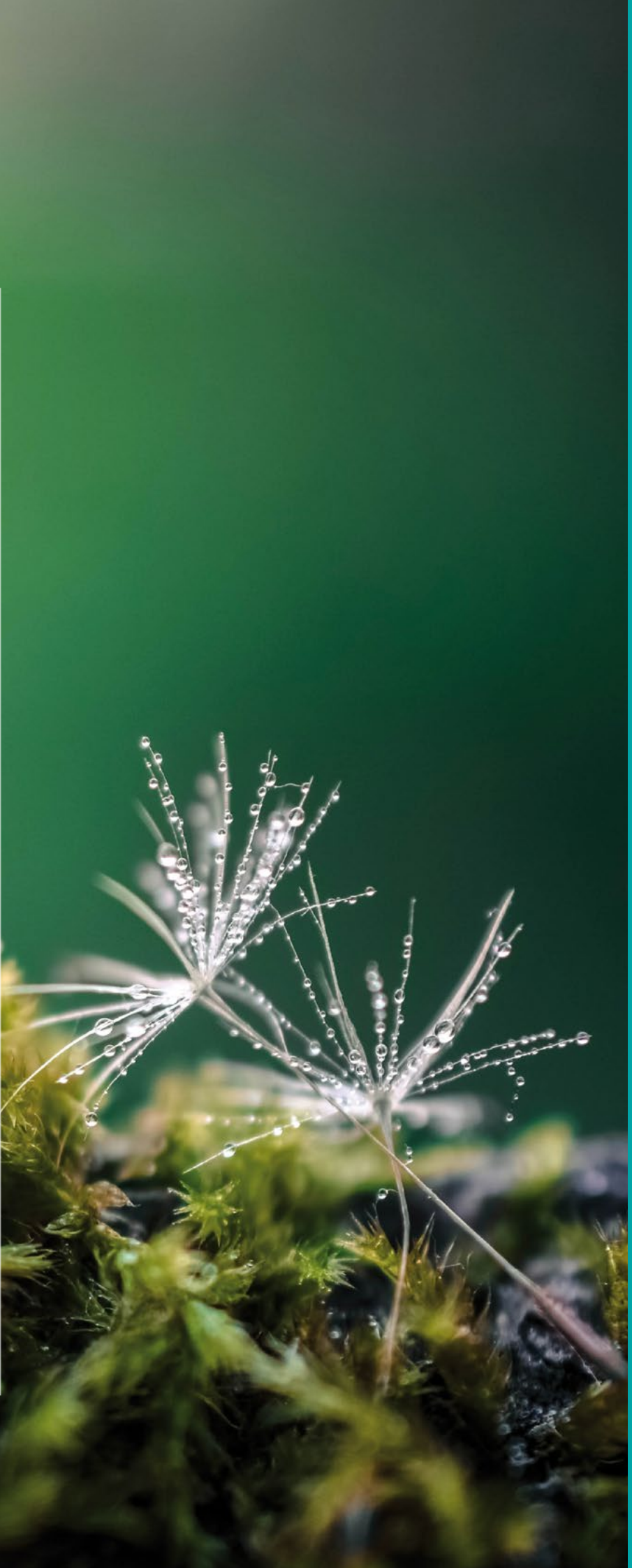
BiodivERsA is the European network of programmers and funders of research on biodiversity, ecosystem services and nature-based solutions. It gathers 32 agencies and ministries from 21 European countries.

Since its beginning in 2005, BiodivERsA has developed a great array of activities ranging from research mapping and programming to research funding, promotion of stakeholder engagement throughout the whole research process, dissemination of research projects' outputs and knowledge brokerage.

BiodivERsA aims at strengthening the cooperation between biodiversity research programmers and funders, and identifying and developing shared biodiversity research strategies. A main objective is to further develop a coherent vision of research planning and funding within the European research area on biodiversity and ecosystem services. The ultimate aim is to provide policy makers and other stakeholders with adequate knowledge, tools and practical solutions for addressing issues related to biodiversity and ecosystem degradation and restoration, and developing nature-based solutions tackling major societal challenges. This will contribute to sustainable development in Europe, including overseas.

The BiodivERsA members

French Foundation for Research on Biodiversity, FRANCE - coordinator
Austrian Science Fund, AUSTRIA
Belgian Science Policy Office, BELGIUM
The Research Foundation - Flanders, BELGIUM
National Science Fund Bulgaria, BULGARIA
Estonian Research Council, ESTONIA
Academy of Finland, FINLAND
French National Research Agency, FRANCE
French Ministry of Ecology, Sustainable Development and Energy, FRANCE
New Caledonian Economic Development Agency, FRANCE
Guadeloupe Region, FRANCE
French Guyana Region, FRANCE
Reunion Region, FRANCE
German aeronautics and space research centre, GERMANY
German Research Foundation, GERMANY
Ministry of Agriculture, HUNGARY
Latvian Ministry of Environmental Protection and Regional Development, LATVIA
Research Council of Lithuania, LITHUANIA
Research Council of Norway, NORWAY
National Science Centre, POLAND
Portuguese national funding agency for science, research and technology, PORTUGAL
Regional Fund for Science and Technology, PORTUGAL
The Executive Agency for Higher Education, Research, Development and Innovation Funding, ROMANIA
Slovak Academy of Sciences, SLOVAKIA
Spanish Ministry of Economy and Competitiveness, SPAIN
Regional Government of the Canary Islands, SPAIN
Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, SWEDEN
Swedish Environmental Protection Agency, SWEDEN
Swiss National Science Foundation, SWITZERLAND
The Netherlands Organisation for Scientific Research, The NETHERLANDS
Ministry of Food, Agriculture and Livestock, TURKEY
Joint Nature Conservation Committee, UNITED KINGDOM



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From the BiodivERsA Coordination Team

Biodiversity and ecosystem services, and the vital benefits they bring to human societies, are our life insurance and underpin economic growth and human well being. It is increasingly recognised that biodiversity is essential for the delivery of ecosystem services, which are as much an environmental issue as an economic, food-security, energy-security and political one. However, the loss of biodiversity and degradation of ecosystems jeopardize the sustainable provision of ecosystem services and are thus major scientific and societal challenges.

Biodiversity and ecosystems provide human populations with direct and indirect ecosystem services that are essential for their survival and well-being

In particular, biodiversity and ecosystems provide human populations with direct and indirect ecosystem services, such as food, raw material, fresh water, medicinal resources, carbon sequestration, prevention of erosion, etc. In this context, a durable management of biodiversity allowing a sustainable delivery of a broad range of ecosystem services is needed.

This major challenge is recognized at the international and European level. The signatories of the Convention on Biological Diversity, among which the European Union and its Member States, committed in 2010 to achieve the Aichi biodiversity targets and to take action to halt the loss of biodiversity in order to ensure the resilience of ecosystems and the continuous provision of essential services. The European Union's 7th Environment Action Programme (7EAP) has a priority objective to protect, conserve and enhance the Union's natural capital, while the European Union's Biodiversity Strategy (EUBS) sets out the targets and actions needed to reverse those negative trends, to halt the loss of biodiversity and the degradation of ecosystem services by 2020 and restore them as far as feasible. Biodiversity and intact ecosystems are also the backbone of many of the Sustainable Development Goals defined within the 2030 Agenda for Sustainable Development.

New knowledge to support evidence-based decision-making for a sustainable management of biodiversity

The BiodivERsA 2015-2016 Call for proposals will contribute to generate new knowledge and tools to help achieve these ambitious targets and support evidence-based decision-making. The call supported research for understanding and managing biodiversity dynamics in order to improve ecosystem functioning and delivery of ecosystem services in soils and sediments (Theme #1 of the Call), and land-, river- and sea-scapes (habitat connectivity, green and blue infrastructures, and naturing cities) (Theme #2). These two themes are of great importance for a proper management of biodiversity and are in line with the European agenda.

Theme #1 on soil and sediments notably resonates with the so-called '4 per 1 000 initiative' launched in 2015 on the occasion of COP21. This initiative highlights the role of soil for the provision of major ecosystem services such as carbon sequestration, which can contribute to ensure food security as well as limit the temperature increase and fight against climate change. The 2015-2016 BiodivERsA Call will contribute to provide knowledge and support the design of new tools that could enable a better use of soil and sediment biodiversity with the objective to enhance the sustainable delivery of individual or multiple ecosystem services to human societies.

Theme #2 on land-, river- and sea-scapes also refers to a very topical issue. Over the last decades, land use change has been one of the main reasons of biodiversity loss through the destruction and fragmentation of natural and semi-natural areas. The issue of rapid urbanisation coupled with population growth will represent a major challenge over the coming years in the fight against habitat destruction and fragmentation. In this context, Green and Blue Infrastructures (GBIs) can offer solutions to maintain and restore biodiversity by increasing connectivity between habitats. More knowledge on GBIs is however needed to better understand the critical features of GBIs and how they can contribute to maintain and enhance ecosystem services; the projects funded under the 2015-2016 Call will contribute to fill these knowledge gaps.

The 2015-2016 call funded 26 projects for a total amount of 33.9 million Euros

This 6th BiodivERsA Call co-funded by the European Commission has proven to be a success. It attracted 122 full proposals representing 817 research teams and nearly 3,000 individual applicants! It allowed funding 26 excellent research projects combining scientific excellence and policy / societal relevance for a total amount of 33.9 million Euros (total projects' cost of 52.4 million Euros). These projects build bridges across disciplines, and address key sectorial issues related to agriculture, aquaculture, landscape and urban planning, or forestry.

We would like to thank the Evaluation Committee members as well as the external reviewers who ensured a high-quality evaluation process and a fair ranking of the proposals. We would also like to express our gratitude to the different funding agencies that participated in the call. Their efforts allowed for a smooth call implementation and the funding of the highest possible number of top-ranked proposals.

This brochure gives insight on the call process, from the call development to the selection of proposals and their follow-up. It gives an overview of the profile of the submitted proposals and a short description of each of the 26 projects selected for funding.

Xavier Le Roux

Fondation pour la Recherche sur la Biodiversité (FRB)
BiodivERsA Coordinator and CEO

Hilde Eggermont

Belgian Science Policy Office (BelSPO)
BiodivERsA Vice-Chair

Henrik Lange

Swedish Ministry of Environment and Energy
BiodivERsA Vice-Chair

BiodivERsA: connecting national research programmes across Europe on biodiversity and ecosystem services in support of EU policies

Europe and the world is facing great many environmental challenges, such as climate change, natural resources depletion, biodiversity loss, water pollution and scarcity, air pollution, unsustainable urbanisation and land use, and natural hazards. They need to be addressed properly to secure that our planet can continue to provide the resources that are indispensable for life, economic growth, human prosperity and well-being. There is growing recognition and awareness that nature can help provide viable solutions to tackle these challenges through the provision of the services that natural ecosystems provide.

The EU Framework Programme for Research and Innovation (2014-20), Horizon 2020, and more specifically its Societal Challenge 5 part on Climate action, environment, resource efficiency and raw materials invests in the design, development, implementation, demonstration and evidence about the multiple benefits that such Nature-based Solutions provide. The aim is to make a strong business case for the use of those cost-effective solutions. By tapping into the innovation potential of nature, we want to contribute to more jobs, green growth and investments, a resilient energy union with a forward-looking climate change policy and make Europe an ambassador for sustainable growth in line with President Juncker's political priorities and with the international agreements such as the 2030 Agenda for Sustainable Development and its SDGs, the Paris Agreement on climate change, the New Urban Agenda, and the Sendai Framework for Disaster Risk Reduction. Commissioner for Research, Science and Innovation Carlos Moedas' political vision is to make Open Innovation, Open Science and Open to the World the prevailing features of EU research and innovation. Therefore Horizon 2020 activities engage far more actors in the innovation process, from researchers, to entrepreneurs, to users, to governments and civil society; they also promote excellence in science through open access to publications and data; and they engage in an array of international collaborations including within multilateral fora such as the Belmont Forum and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

BiodivERsA has since years played an essential role in complementing EU activities by supporting the much needed knowledge base for innovation and for improving the biodiversity and ecosystem status in Europe and beyond.

Through successful networking and alignment of national research agendas on biodiversity and ecosystem services, BiodivERsA has contributed substantially to establishing synergies, added value and effective use of the European taxpayer's money. We are very pleased with the directions and priorities set out in its new strategic research and innovation agenda, which includes Nature-based Solutions. We are confident that it will create more critical mass and also provide opportunities for stronger linkage between the scientific community and innovators.

A number of projects selected under the BiodivERsA co-fund call «Understanding and managing biodiversity dynamics to improve ecosystem functioning and delivery of ecosystem services in a global change context» are particularly relevant to Nature-based Solutions. We are delighted with the great success of the call, to which H2020 has contributed 10 Million €, and the highly promising and diverse portfolio of selected projects. Strengthening collaboration among these projects and relevant ones launched under Horizon 2020 should be encouraged.

We look forward to continue the close interaction between DG R&I and BiodivERsA and to explore ways to create further synergies and collaboration in the future. We applaud the effort that BiodivERsA is investing in opening up to more EU countries as well as internationally and hope that this will continue.

Christos FRAGAKIS

Deputy Head of Unit
Sustainable Management of Natural Resources European Commission, Directorate General for Research and Innovation
Member of the BiodivERsA Advisory Board

Summary of the 2015 BiodivERsA Call

By addressing global climate change consequences and the intensive impacts of human activity, the pan-European call on "Understanding and managing biodiversity dynamics to improve ecosystem functioning and delivery of ecosystem services in a global change context" focuses on two main themes to bring answers to these large-scale matters:

Theme 1: Understanding and managing the biodiversity dynamics of soils and sediments to improve ecosystem functioning and delivery of ecosystem services

This first theme deals with soils, freshwater sediments, and/or marine sediments, which have increasingly become a major part of the biodiversity enhancement challenge. Indeed, as they provide an important amount of ecosystem services to human kind, they can support challenges such as food, water and energy security, as well as climate change mitigation. However, research is greatly needed on these biodiversity components as their entire effects and benefits are still to be analysed and fully discovered.

Therefore, the applicants were invited to address at least one of the following sub-themes:

- The relationships between changes in soil and sediment biodiversity and ecosystem functioning and services.
- The impacts of global change and anthropogenic activities on soil and sediment biodiversity, and feedbacks on global change drivers.
- The knowledge base for innovative management of soil and sediment biodiversity to enhance ecosystem functioning and service delivery.

Through the study of the relationships between biodiversity and ecosystem services, research could shed light on the necessary management of terrestrial, freshwater and marine ecosystems, but also on the regulatory effects which biodiversity could have. This new knowledge could lead to the development of tools for better management and use of soils and sediments biodiversity.

Theme 2: Understanding and managing biodiversity dynamics in land-, river-, and sea-scapes (habitat connectivity, green and blue infrastructures, and naturing cities) to improve ecosystem functioning and delivery of ecosystem services.

The development of human activity generates major biodiversity losses through the fragmentation of habitats (transport, intensive agriculture, and urbanisation). The implementation of green and blue infrastructures (GBIs) aims at reconnecting natural habitats to enhance ecosystem services in both rural and urban areas, possibly with many advantages for human health and well-being, resilience and adaptation of species, ecosystems and society. Yet, critical scientific validation of the GBIs' benefits is still scarce, because of the very limited studies made. Therefore, their costs, benefits and drawbacks still need major evaluations. Yet, there are other challenges to be addressed such as the relationships between GBIs and "grey" infrastructures, as well as the connectivity between marine protected areas and effects on marine biodiversity conservation and ecosystem services, such as fisheries and tourism.

Within this theme, applicants were invited to address at least one of the three following sub-themes and could target terrestrial, freshwater, and/or marine environments.

- The critical features of GBIs that determine their ability to support biodiversity and ecosystem functions and services.
- The incorporation of global change drivers when designing GBIs, to preserve and sustainably manage biodiversity and ecosystem services.
- The effects of GBIs in intensively managed sea-/land-scapes, and interactions with "grey" infrastructures.

This theme thus focused on the scientific knowledge base needed to support the conservation, restoration and development of GBIs for increasing the resilience of human-dominated landscapes and seascapes, benefitting people and other biological species in these areas.

Call process

The BiodivERsA partners have a common research agenda, in which they agree on research priorities in the field of biodiversity and ecosystem services. This agenda builds on existing partners' research priorities as well as on national and international research agendas and strategies.

During the second phase of BiodivERsA, the partners defined seven top priorities. Four of these priorities were addressed in previous calls, namely: biodiversity and ecosystem services, and their valuation (2010-2011 Call); biodiversity dynamics: developing scenarios, identifying tipping points, and improving resilience (2011-2012 call); invasive species and biological invasions (2012-2013 Call); and promoting synergies and reducing trade-offs between food supply, biodiversity and ecosystem services (2013-2014 call).

For the 2015-2016 Call, the BiodivERsA partners agreed to address two of the remaining top priorities: (i) from soil biodiversity to soil functioning and services in a global change context, and (ii) improvement of habitats connectivity, functioning green infrastructures, diversifying landscapes. These topics were largely supported among BiodivERsA partners and by the European Commission as they have a strong European added value and socio-political relevance.

24 national and regional funding organisations from 15 countries participated in the call, with a financial support from the European Commission through an ERA-NET COFUND Action.

ANR hosted the Call Secretariat and thus played an important part in the swift implementation and success of the call.

The Call was launched on May 14th, 2015, with a deadline to submit pre-proposals by July 20th, 2015. Eligible pre-proposals were invited to submit full proposals by December 16th, 2015. The proposals were evaluated by an independent Evaluation Committee as well as by external reviewers between January and April 2016.

Based on the results of the evaluation process, BiodivERsA partners agreed on a list of projects to be recommended for funding in June 2016, allowing for a start of the funded projects between November 2016 and March 2017.

All the projects have a 3-year duration. During their lifetime, they will be requested to submit two reports: one mid-term report and one final report, which will be assessed by the Call Steering Committee composed of the funding agencies that participated in the Call.

Agencies participating to the Call

BELSPO – Belgium
FWO – Belgium
BNSF – Bulgaria
ETAG – Estonia
ANR – France
ADECAL – France, New Caledonia
Guadeloupe Region – France
Guyana Region – France
Réunion Region – France
DFG – Germany
DLR-PT – Germany
VM – Hungary
RCL – Lithuania
RCN – Norway
NCN – Poland
FCT – Portugal
FRCT – Portugal, Azores
UEFISCDI – Romania
GOBCAN – Spain, Canary Islands
MINECO – Spain
FORMAS – Sweden
SEPA – Sweden
SNSF – Switzerland
MFAL – Turkey

Composition of the Evaluation Committee

Scientific experts

Stephen Hawkins – UNITED KINGDOM (Chair of the Evaluation Committee)
Richard Bardgett – UNITED KINGDOM
Nicola Beaumont – UNITED KINGDOM
Patrick Bohlen - USA
Iain Brown – UNITED KINGDOM
Michael Bruford – UNITED KINGDOM
Lijbert Brussaard – THE NETHERLANDS
Aimee Classen - USA
Britas Klemens Eriksson – THE NETHERLANDS
Paul Giller - IRELAND
John Griffin – UNITED KINGDOM
Christoph Kleinn - GERMANY
George Kowalchuk – THE NETHERLANDS
Jason Pither - CANADA
Andrew Pullin – UNITED KINGDOM
Niels Raes – THE NETHERLANDS
Christopher Raymond - AUSTRALIA
Bill Slee – UNITED KINGDOM
Jan Dirk van Elsas – THE NETHERLANDS
John Timothy Wootton - USA

Policy/management experts

Marina von Weissenberg – FINLAND (Vice-Chair of the Evaluation Committee)
Miriam Balgos – USA
Simon Gardner – UNITED KINGDOM
Katia Hueso – SPAIN
Andreas Kruess – GERMANY
Riikka Paloniemi – FINLAND
Ivone Pereira Martins – DANEMARK
Jan Plesnik – CZECH REPUBLIC
Matthew Shepherd – UNITED KINGDOM
Esther Wolfs –THE NETHERLANDS

Evaluation process

The submitted proposals were evaluated by an independent Evaluation Committee, as well as by external reviewers. Both the Evaluation Committee and group of external reviewers were comprised of scientific experts, as well as policy-makers and practitioners.

The proposals were evaluated following specific guidelines and according to the following three criteria: scientific excellence; quality and efficiency of the implementation; and societal impact. These three criteria were further divided into sub-criteria. Three grades corresponding to these three criteria were given to the proposal, with a predefined emphasis on scientific excellence over policy relevance. For each criterion, threshold scores were defined. Proposals with scores below the threshold were not ranked nor considered for funding.

The final evaluation meeting was organised in Paris on 26-27 April 2017 with all the evaluation Committee members. This meeting was the chance for the Committee members to discuss the proposals and agree on the final grades to be attributed to the proposals. This led to the establishment of a final ranking list of the best proposals, which was provided to the Call Steering Committee.

As this call was co-funded by the European Commission, an independent observer was in charge of assessing the quality of the evaluation process and its compliance with EU co-funding rules.

Photo of the MARFOR project, demographic survey of Laminaria digitata in Roscoff

From the Evaluation Committee chairs

Nature knows no political boundaries. It is only through transnational calls that ecological processes can be addressed at appropriate broad-scales. More importantly the knowledge gained can then be applied to deliver conservation and management of biodiversity and ecosystem services via international agreements such as the Convention on Biological Diversity, European Directives, National and Regional policy and practice – and above all local awareness, participation and action by the general public and stakeholders. To this end, the guidance issued by BiodivERsA to project proposers on translation into policy, practice and public engagement was excellent.

It was a great honour to be invited to be Chairs of the 2015-2016 Evaluation Committee, as well as a challenge to chair such a large and diverse international evaluation panel involving both scientific experts joined by policy-makers and practitioners. The call was very broad, encompassing both natural and social sciences. It addressed two themes: firstly, below ground biodiversity in soils and sediments, ecosystem processes and services; secondly the connectivity on land, in rivers and in the sea and its role in greening cities via green and blue infrastructures. The panel members were from different geographic origins inside and outside Europe; most of the scientific European panel members were from countries not sponsoring the call to ensure fairness and lack of conflicts of interests. The panel had diverse expertise and perspectives plus much experience - all of which was brought to bear in assessing the proposals.

Above all we were very struck by the rigour and fairness of the procedures adopted to ensure only the best science with excellent prospects for translation into tangible action via policy, public engagement and practice was funded. Thresholds for scientific excellence and societal impact both had to be exceeded – these criteria were independently assessed. There was some excellent science that was not funded due to inadequate proposals for translation into policy, practice and outreach. Some projects with potentially high societal impact were not successful as the science was flawed or non-cutting edge.

The outcome was 26 projects funded to the tune of 33.9 million euro. These projects benefitted from the ability to compare across the diverse landscapes and seascapes and urban areas of Europe and beyond. They addressed a variety of topics spread across terrestrial, freshwater and marine ecosystems including urban, agricultural, forested and fished areas. There was a strong socio-ecological and science-policy interface. Organisms studied ranged from brown bears through barnacles to bacteria. Approaches ranged from cutting edge genomics up to the latest thinking in the socio-economics of the environment. This is a splendid portfolio of projects that will lead to some major scientific discoveries and will contribute to reinforce the knowledge base for decision and policy-makers and lead to tangible action on conservation and management of biodiversity and continued delivery of valuable ecosystem services.

The panel members were very impressed by the way such calls mobilize and integrate the European scientific community to ensure societally relevant research – thereby bridging the gap between the spatial scale of ecological processes and the resolution of much legislation.

Dr. Stephen Hawkins
Chair of the Evaluation Committee

Marina Von Weissenberg
Vice-Chair of the Evaluation Committee

Analysis of the submitted research projects

Overall figures of the call

	N° of proposals	Teams	Budget
Submitted proposals	122	817	151.1 M€
Selected proposals	26	165	33.9 M€

With a total of 122 full proposals submitted, 817 participating teams and 2,944 individual participants, the 2015-2016 BiodivERsA call was really successful. By attracting so many proposals, the call showed a major interest from the European scientific community in the different topics and themes proposed by the BiodivERsA consortium. More generally, this demonstrates the large size of the biodiversity research community in Europe.

Out of the 122 full proposals, the Call Steering Committee agreed to fund the 26 highest ranked proposals for a total amount of 33.9 Million Euros, which represents a success rate of 21%.

Thanks to good anticipation of the required budget for each participating country and to the flexibility of several partners who agreed, when necessary, to increase their budget, the partners managed to fund the highest possible number of top ranked proposals. This also allowed BiodivERsA partners to make use of nearly all (>97%) of the EC funding reserved to this call.

Nationality of the applicants

The large majority (93.5%) of the teams who submitted a proposal came from the 15 partner countries participating in the funding of the call, i.e. Belgium, Bulgaria, Estonia, France, Germany, Hungary, Lithuania, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and Turkey. Among these teams, 3.4% came from one of the participating Overseas Regions and Overseas Countries and Territories (ORs and OCTs) (i.e. Azores, Canary Islands, Nouvelle Calédonie, Région Guadeloupe, Région Guyane and Région Réunion).

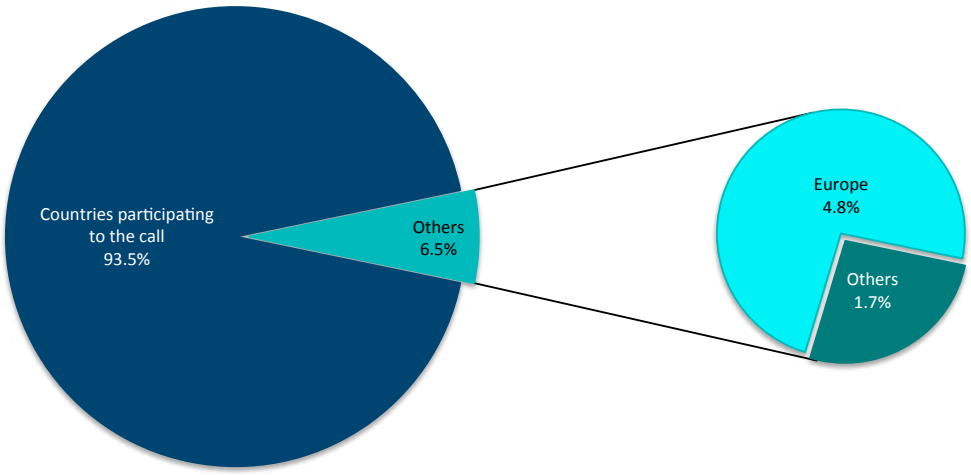

Fig. 1: Geographical origin of the participating teams in the BiodivERsA 2015-2016 call

The remaining 6.5% corresponded to self-funded teams mostly from European countries not participating in the call (4.8%) and from Africa (0.1%), North America (0.9%), South America (0.2) and Oceania (0.5%).

Reserved and requested budgets, and funding model

The reserved budgets per country were published during the announcement of the call, which might have influenced some of the budget requests made by the applicants. The highest values of both reserved and requested budgets were indeed observed for Germany, France and to a lesser extent Sweden (which were the countries with the highest reserved budgets).

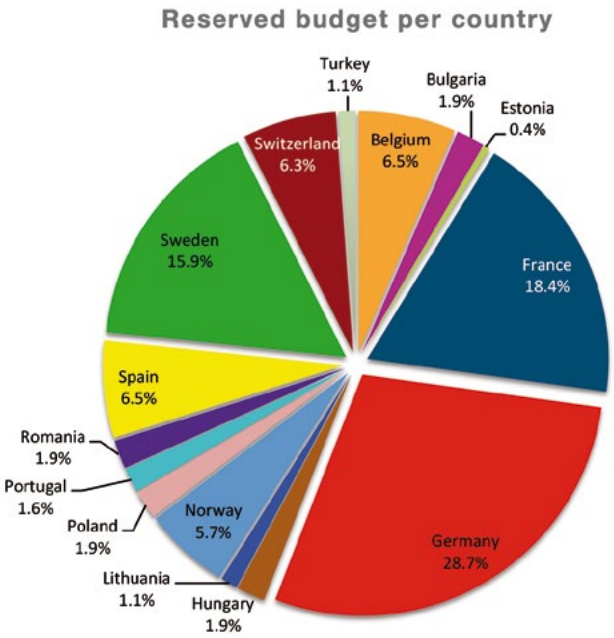

Fig. 2: Distribution of the reserved budget among participating countries

In some cases, such as for Belgium, Germany, Norway, Poland and Sweden, the reserved budget proved to be insufficient compared to the financial demand from the successful applicants. However this did not block the call process thanks to the flexibility of these partners.

Ultimately, the 26 top ranked projects could be funded, strictly following the ranking list established by the evaluation committee.

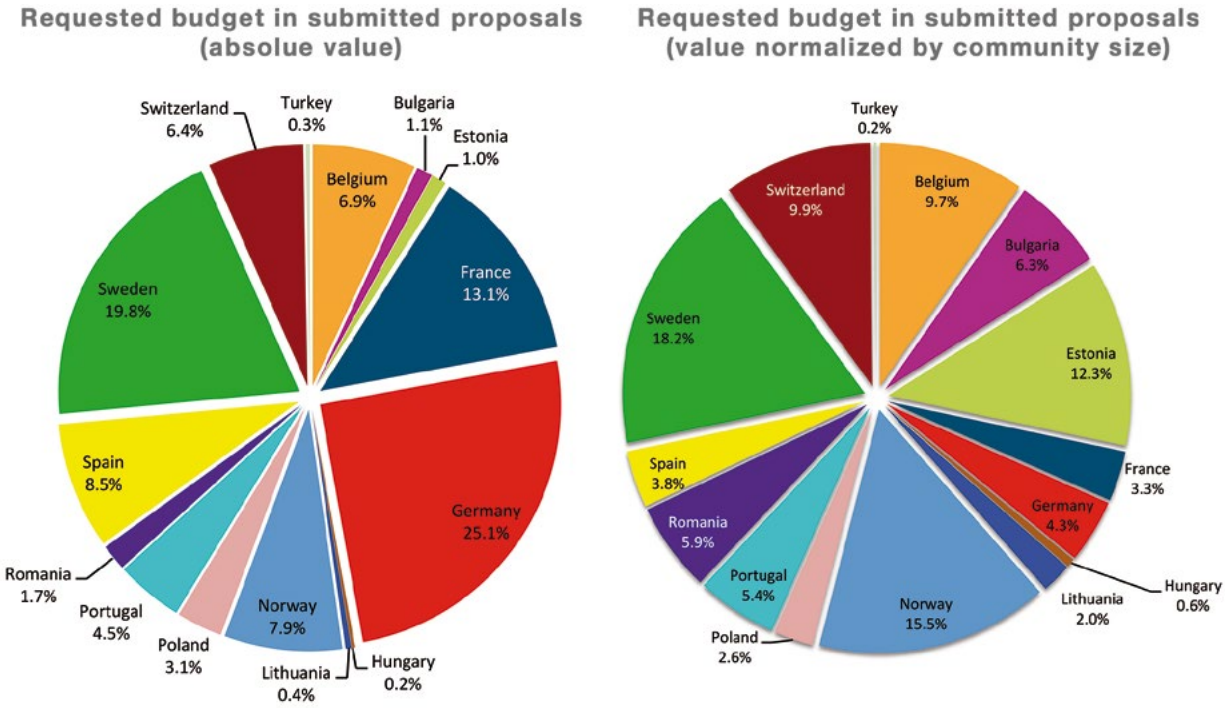

Fig. 3: Budget requested by applicants among countries in absolute values (left) and values normalised according to the size of the national scientific community (right) [source: Eurostat 2013, all sectors, Full Time Equivalent unit]. Note that the requested budget includes or not salaries for permanent positions according to countries.

Despite a relatively low participation in terms of required budget (Fig. 3), the biodiversity scientific communities from Bulgaria, Estonia, Norway, and to a lesser extent Romania and Switzerland seem to have responded well to this call once the budget requests are normalised according to the estimated number of researchers from all scientific areas in each country (Fig. 3). There is however no available data to know precisely the size of the specifically targeted biodiversity research community within the overall research community of each country, which would have improved the normalization.

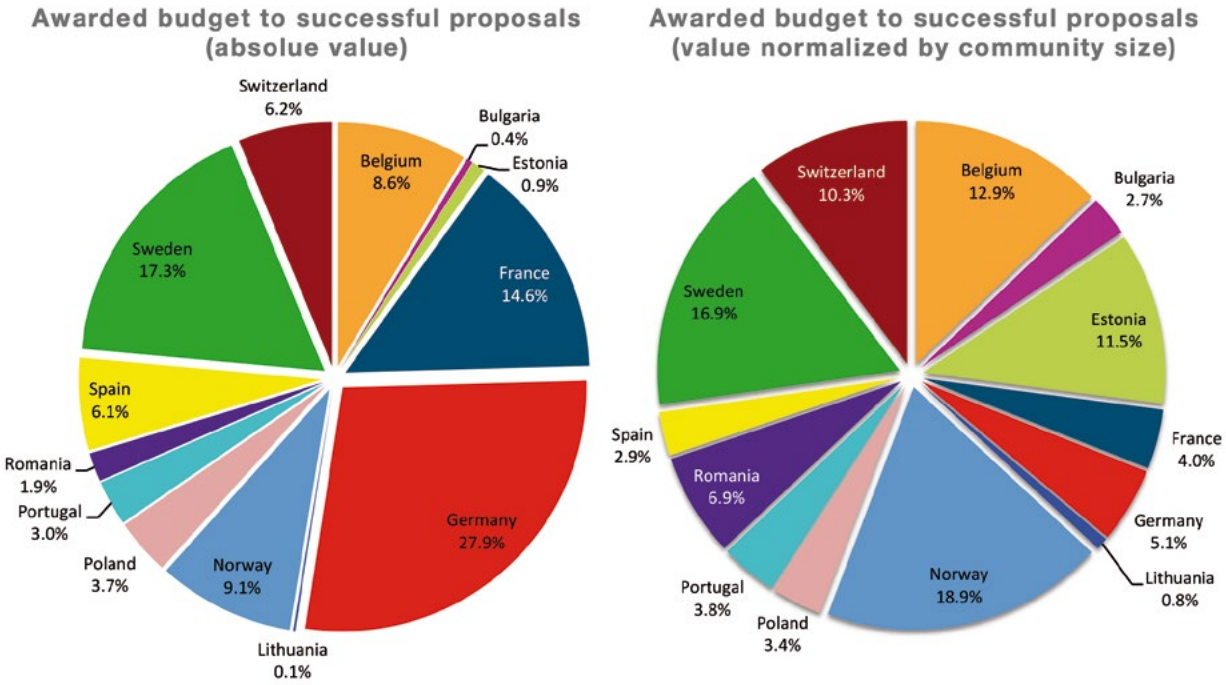

Fig. 4: Distribution of awarded budget to the successful applicants among countries in absolute values (left) and in values normalized according to the size of the national scientific community (right) [source: Eurostat 2013, all sectors, Full Time Equivalent unit]

The teams funded through the 2015-2016 Call came from 13 different countries (Fig. 4). The largest number of funded teams came from the countries with the highest amount of funding, namely Germany, France, and Sweden. Again, it is worth comparing the funding amounts between countries in terms of both absolute values and amounts normalised according to the estimated number of researchers (both panels of Fig. 4). This better highlights the success observed for other countries like Estonia, Norway and Romania.

Success rate per country

The Belgian, Estonian, French, German, Norwegian, Polish, Romanian, Swedish and Swiss research teams applying to this call had a particularly good success rate, i.e. ratio of granted to requested funded amounts (Fig. 5). The figures should be viewed with caution for some countries, given their low number of submitted proposals.

Despite the participation of Turkey and Hungary to the call, none of the 26 funded projects involved a research team from these countries, likely due to the low number of proposals including Turkish and Hungarian teams. This may be linked to the fact that participating agencies for these two countries did not cover the whole national research community on biodiversity.

In addition, out of the 26 funded projects, only 2 included teams from Azores. The other ORs and OCTs participating to the call had no research teams in the funded projects, partly due to the low number of proposals submitted by their teams.

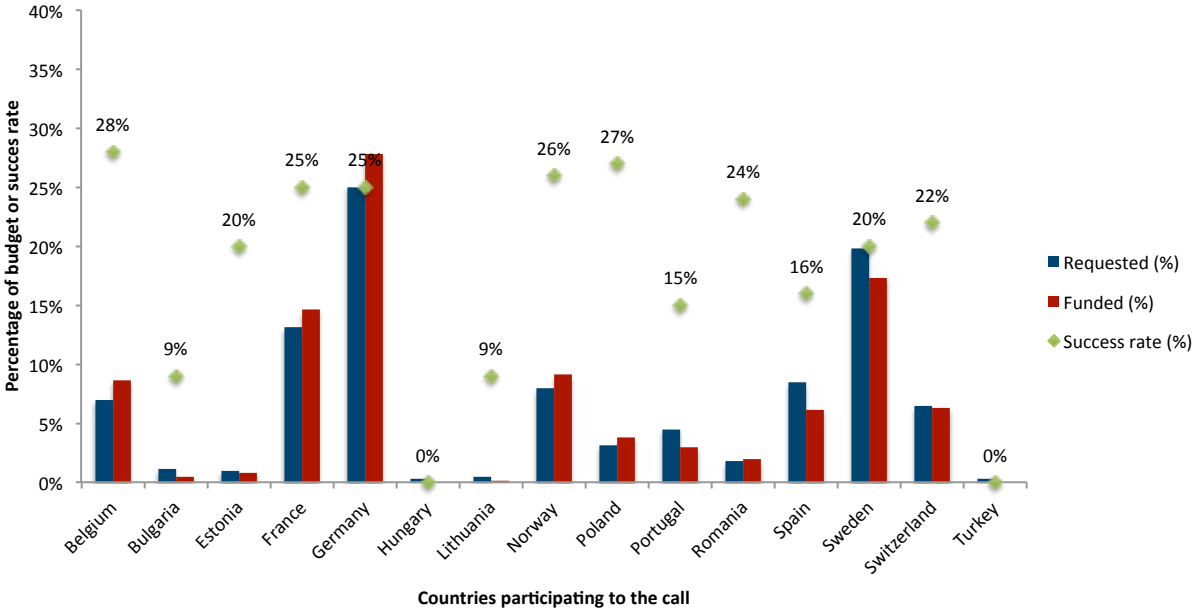

Fig. 5: Comparison of the percentage of budgets in the proposals between countries at the submission phase (requested – blue bars) and after selection (funded – red bars), along with the financial success rate (green diamond)

Proposal coordination

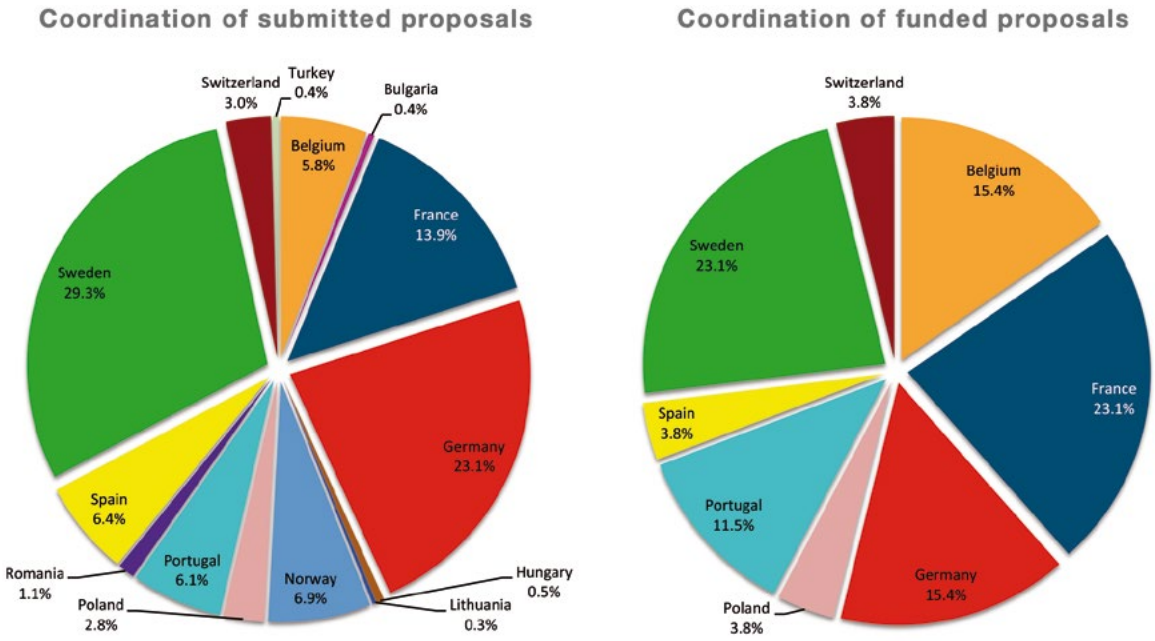

Fig. 6: Percentage of total requested budget according to the country of the coordinators for submitted (left) and funded (right) proposals.

At the submission stage, the proposed project coordinators represented all the countries participating in the call (Fig. 6). At the end, the coordinators of the funded proposals represented 8 countries out of the 15 participating in the call. The coordinators of the funded projects mainly came from Belgium, France, Germany and Sweden; the success rate for coordination was particularly high for Belgium, France and Portugal. Again, these figures should be taken with caution since they represent the geographical spread of coordinators only (respectively 122 and 26 for the submission and funding phases) and not of all the teams involved in the projects (respectively 817 and 165 for the submission and funding phases).

Call themes and sub-themes addressed by the proposals

This BiodivERsA call was composed of two main themes, “Understanding and managing the biodiversity dynamics of soils and sediments to improve ecosystem functioning and delivery of ecosystem service” (theme 1) and “Understanding and managing biodiversity dynamics in land-, river-, and sea-scapes (habitat connectivity, green and blue infrastructures, and naturing cities) to improve ecosystem functioning and delivery of ecosystem services” (theme 2).

During the submission phase, the project coordinator had to indicate to which theme they applied allowing to assess the interest in each of the themes. The numbers revealed that more projects were submitted under Theme 2, which also led to a higher number of proposals funded under this theme (17 proposals funded under Theme 2 against 9 funded under Theme 1).

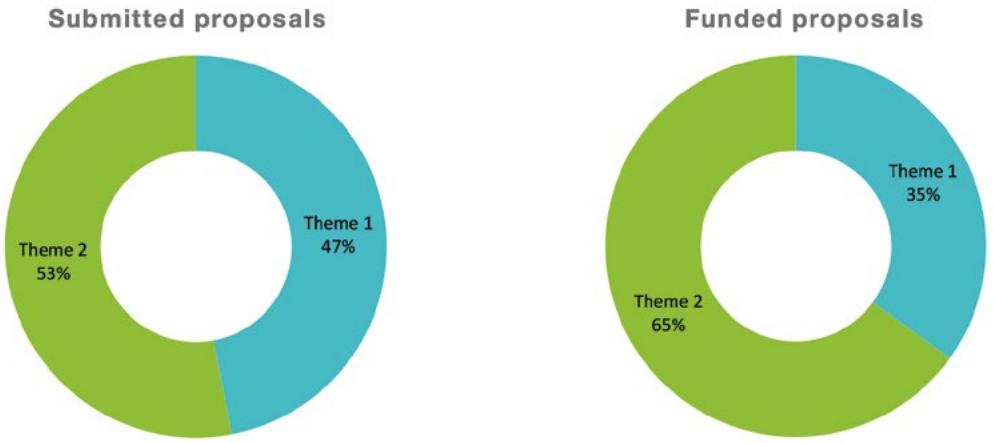

Fig. 7: Repartition of the two themes in the submitted proposals (left) and funded proposals (right)

Each one of the two themes was divided into three different sub-themes. The proposals could address one, two or three of the sub-themes from the main theme they had chosen.

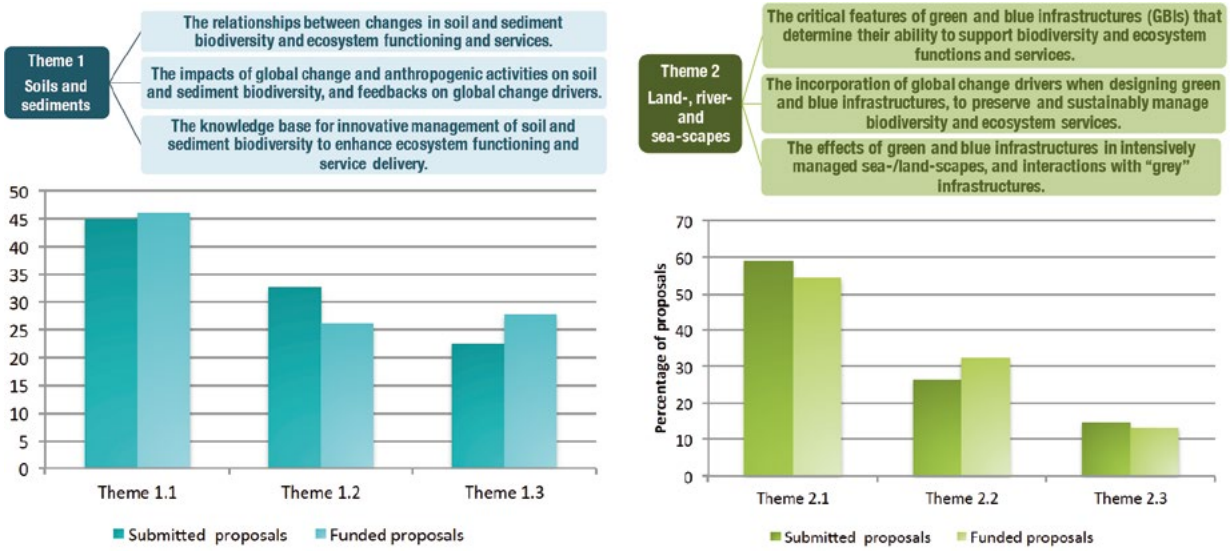

Fig. 8: (Top) Explanation scheme of the distribution of sub-themes for each one of the two main themes. (Bottom) Representation of the different sub-themes addressed by submitted and funded proposals (theme one on the left; theme two on the right)

During the submission phase, the project coordinators also gave an indication of the relative importance of the sub-theme(s) addressed by their proposal.

For both themes, we can see that the first sub-theme was preferred over the other sub-themes in both submitted and funded proposals.

Types of studied environments

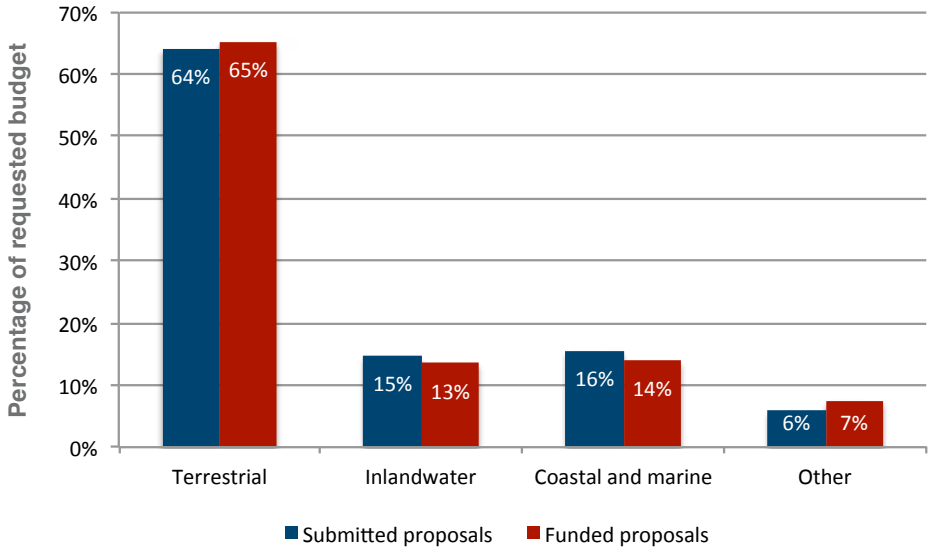

Fig. 9: Distribution of budgets of submitted and funded proposals according to the studied environments. One proposal can address several environments.

The majority of submitted and funded proposals focused on terrestrial ecosystems (Fig. 9), whereas those focusing on inland water and marine/coastal environments were fewer.

It is clear that few marine researchers applied to this call. This is probably due to the fact that there are other well-known funding resources available for marine biodiversity research at the European level. In addition, it should be noted that applicants were informed that the Norwegian funding agency would not fund studies in marine environment, which may contribute to the rather small number of proposals targeting this environment.

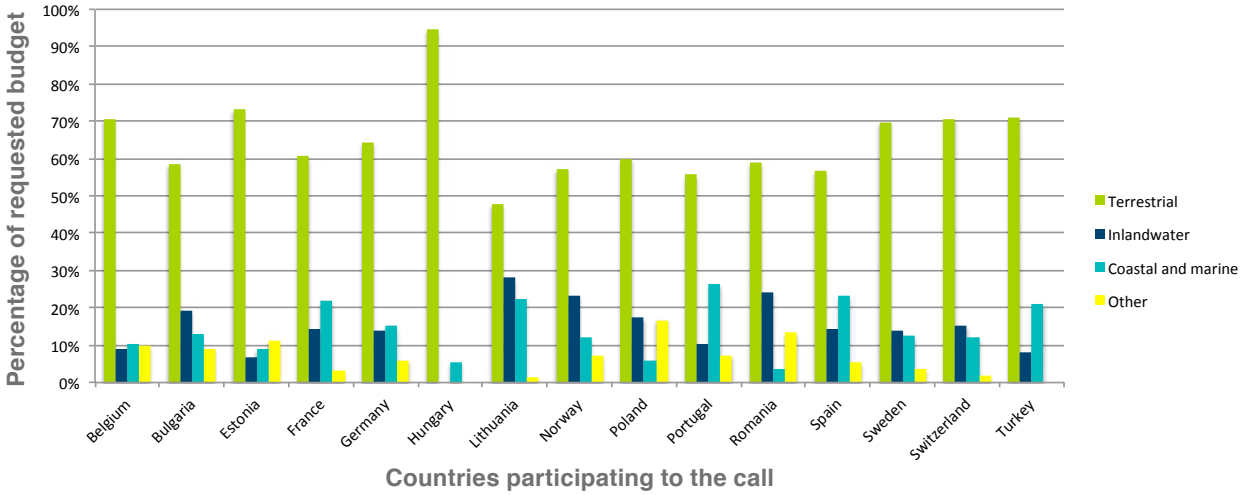

Fig. 10: Percentage of requested budget in the submitted proposals by country according to the studied environment

Figure 10 shows that Bulgaria, Lithuania, Norway and Romania had the highest proportion of inland water focused submitted proposals. Lithuania was also among the countries with the highest proportion of proposals focusing on the marine and coastal environments, with France, Portugal, Spain, Turkey. For France, Portugal and Spain, this situation is partly explained by the participation of French ORs and OCTS, Azores and Canary Islands in this Call.

Conclusion

The above analysis provides a good insight into the implementation and results of the BiodivERsA 2015-2016 COFUND Call. The following aspects were found useful for future calls:

- The topics of this call have proven to be of great interest to the European research community: it mobilised a large number of local and national agencies across Europe (including overseas regions and overseas countries and territories) as well as the European Commission who allocated substantial funds to the call; and it mobilized a high number of pan-European consortia.
- Although both themes covered by this call have been well addressed, theme 2 on the management of biodiversity dynamics in land-, river- and sea-scapes attracted more proposals, this partly explains the fact that more proposals were funded under this theme than under theme 1 on soil and sediments.
- Unfortunately, some countries and regions participating to the call did not have any teams in the 26 proposals selected for funding. This was the case for Turkey, Hungary and most of the overseas regions and overseas countries and territories. This situation can largely be explained by the fact that these teams were not well represented in the submitted proposals and that they may benefit from capacity building activities. Accordingly, efforts are currently underway within BiodivERsA to remediate this situation.
- Thanks to the initial balance in the amounts of funding reserved by countries and to the flexibility of agencies to increase their budget when needed, BiodivERsA partners were able to fund a high number of proposals, strictly following the outputs of the selection procedure.

Photo of the CLIMARCTIC project, field work Svalbard

Presentation of the 26 funded projects

THEME 1

Understanding and managing the biodiversity dynamics of soils and sediments to improve ecosystem functioning and delivery of ecosystem services

BIO-Tide - The role of microbial biodiversity in the functioning of marine tidal flat sediments

Context

The functioning of marine and coastal ecosystems is partly sustained by the key role played by tidal sand- and mudflats. They contribute to the support and well-being of coastal fish and shellfish populations, as well as the protection of coastal inland areas from sea-level rise and storm surges. Natural key elements are a precious tool to minimise or avoid climate calamities and represent an important ecological and economical asset that needs to be further analysed and protected.

The productivity of these ecosystems is largely driven by highly diverse microbial biofilms inhabiting the tidal flat sediments. However, the precise relationship existing between their diversity and functioning is little understood.

Main objectives

The main aim of the project is to **study the relationship between microbial biodiversity and important ecosystem functions in tidal flats**. The focus will be on functions related to the carbon cycle (photosynthesis by microalgae, mineralisation by bacteria and grazing by animals) and its relations with living organisms by contrasting tidal flat environments (sand vs. silt) in the explicit context of biotic interactions.

Main activities

Throughout two large-scale experiments in both France and The Netherlands, a description of the relation between microbial biodiversity and the essential functions of these ecosystems, such as fuelling of coastal food webs, including commercial fisheries and shellfish farming, driving carbon fluxes across the sediment-water interface, and stabilizing sediments, will be provided. This description will be established through the use of a combination of state-of-the-art molecular, tracers and imaging experiments to follow carbon throughout the food web.

Laboratory experiments will be used to unravel the mechanisms underlying the observed relationships. Following these observations, models to describe the tidal flat carbon flux will be built to obtain a more explicit view of the phenomenon. Finally, remote sensing will be used to study biodiversity-ecosystem function relationships at the scale of whole tidal flats.

Our results will be highly relevant to policy makers, consultancies and companies (e.g. dredging) involved in integrated coastal zone management, and private stakeholders exploiting the tidal flat ecosystem (e.g. oyster farmers). Stakeholders will be informed and involved in dedicated meetings at all stages of the project, and parts of the project will be jointly carried out with stakeholders (e.g. experiments on the relevance of oyster feed diversity on their growth). Results will be disseminated during meetings, and in popular science articles, posters and brochures aimed at schools and the general public, and hands-on demos (e.g. during the annual 'Week of the Sea' science festival in Belgium).

Biofilm and oysters

Partners:

Ghent University, Ghent, BELGIUM (Coordinator)

Muséum National d'Histoire Naturelle, Paris, FRANCE

Université de Nantes, Nantes, FRANCE

Ecole Polytechnique Fédérale de Lausanne, Lausanne, SWITZERLAND

University of St-Andrews, St-Andrews, UNITED KINGDOM

Duration:
03-2017 to 02-2020

Total grant:
€ 880,613

Further information:

Prof. Koen SABBE
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Field experiment in Sweden.

Partners:

University of Hohenheim, Stuttgart, GERMANY (Coordinator)

Regionalentwicklung Oberallgaeu, Altusried, GERMANY

Universidade de Lisboa, Lisbon, PORTUGAL

Universidade dos Açores, Punta Delgada, PORTUGAL

Swedish University of Agricultural Sciences, Alnarp, SWEDEN

Agroscope, Zürich, SWITZERLAND

Duration:
02-2017 to 01-2020

Total grant:
€ 1,684,974

Further information:

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Website:
bioinvent.uni-hohenheim.de

BIOINVENT - Generic bio-inventory of functional soil microbial diversity in permanent grassland ecosystems across management and climate gradients

Context

BIOINVENT introduces a science-based research approach to close remaining knowledge gaps on the efficiency of permanent and extensively managed grassland systems to enhance above- and below-ground biodiversity. The pan-European study scale of BIOINVENT ranging from the Azores to northern Sweden will yield in a profound understanding of interdependent effects of grassland management and agro-climatic distinctions on soil microbial dynamics and their consequences for central ecosystem services. BIOINVENT contributes to ongoing EU-incentives to develop future-oriented management and monitoring objectives to reach optimal protection and utilisation of soil biodiversity and its contribution to various ecosystem services in permanent grassland ecosystems.

Main objectives

BIOINVENT's main objectives are:

- To **generate fundamental understanding of soil microbial biodiversity and its functional potential controlled by permanent grassland systems** along management and agro-ecological gradients across Europe;
- To apply this fundamental knowledge to **develop a novel and generic bio-inventory toolbox** ('BIOINVENT') to enable prospective monitoring of below-ground soil microbial diversity and functional properties, such as 'provision', 'support' and regulation' functions in European grassland ecosystems at various spatial scales.

Main activities

BIOINVENT applies a concerted 2-stream approach. In the 'Research Stream', all partners apply process-oriented research activities in experimental settings and on farmers' fields allowing for a spatial assessment of soil microbial diversity and its functional potential across European grasslands. A participatory 'Outreach Stream' is simultaneously initialised to engage stakeholders right from the start of the project and to disseminate project outcomes in an adjusted manner to various stakeholder groups through the establishment of diverse communication channels.

BIOINVENT will also transfer the knowledge on conservation of below-ground microbial diversity in permanent and extensively managed grassland systems by accomplishing close interactions with non-governmental organisations (NGOs) in joint research and outreach activities, with farmers by performing a survey on farmers' fields, and with relevant decision makers from national to European levels through the establishment of diverse communication channels including multi-language media (e.g., website, print media), workshops and round-tables.

CLIMARCTIC: Climate change impacts on Arctic soil and lake microbiomes

Context

Nowhere is climate change more intense and visible than in the Arctic, making it a critical reference region for the detection and understanding of global change and its effects on biodiversity. Arctic soils and lakes in particular appear to be very sensitive to climate change because of their close proximity to tipping points related to the 0°C threshold. While the biogeochemical cycles and functioning of these ecosystems are to a large extent controlled by microorganisms, little is known about their genetic diversity and functional activity in Arctic soils and lakes. Data on the response of Arctic microbiota are however urgently needed, given the important role Arctic terrestrial ecosystems play in the global carbon cycle. More particularly, over millennia, the cold Arctic climate has minimized the breakdown of organic matter leading to large quantities of carbon and nitrogen stored in the permafrost.

Main objectives

The main objective of CLIMARCTIC is to **study the potential effects of climate change on the microbial diversity and functioning of High Arctic soils, wetlands and lake sediments**. This will allow the research community to assess their role as feedback mechanisms in the global climate system.

Main activities

The project will implement five main activities:

1. The study of the biodiversity and structure of dormant and active microbial communities and food webs in soils and lakes along environmental and temporal (diurnal and seasonal) gradients;
2. The assessment of the role of biodiversity and climate change on ecosystem functions such as carbon, nitrogen and phosphorus cycling;
3. The study of the ecophysiological and biogeochemical responses of these communities to changes in temperature, water availability, growing season length and light;
4. The quantification of the dynamics and transfer of nutrients, carbon and biota between soils and lakes;
5. And finally the study of the rate of change and temporal (natural) variability in food web structure and nutrient concentrations in lake sediments and the soils, also in response to past climate anomalies over the past 2000 years.

The results of CLIMARCTIC will be communicated to a variety of stakeholders including the media, national conservation bodies, the general public, students, Arctic indigenous people, and leading national and international science policy initiatives, such as the Arctic Council, the European Polar Board, the Svalbard integrated Arctic Earth Observing System, EU-Polarnet, and the IPCC (Intergovernmental Panel on Climate Change).

Arctic tundra.

Partners:

Ghent University, Ghent, BELGIUM (Coordinator)

University of Rostock, Rostock, GERMANY

The Arctic University of Norway, Tromsø, NORWAY

Universidad Autónoma de Madrid, Madrid, SPAIN

Swiss Federal Research Institute, Birmensdorf, SWITZERLAND

Duration:
03-2017 to 02-2020

Total grant:
€ 1,349,921

Further information:

Prof. Dr. Elie Verleyen
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Website:
www.climarctic.ugent.be

Shallow soil on top of a multicolored sub-soil, in Radelfingen, Switzerland

Partners:

Agroscope, Zürich, SWITZERLAND (Coordinator)

INRA, Dijon, FRANCE

Freie Universität Berlin, Berlin, GERMANY

Rey Juan Carlos University, Móstoles, SPAIN

Swedish University of Agricultural Sciences, Uppsala, SWEDEN

Duration:
12-2016 to 12-2019

Total grant:
€ 1,446,965

Further information:

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marcel.vanderheijden@agroscope.admin.ch

Digging-deeper - Agro-ecosystem diversification

Context

Biological diversity is of pivotal importance for maintaining ecosystem functioning. While most studies on this topic have targeted aboveground communities, a large part of biodiversity is literally hidden below ground. Thus, the consequences of soil biodiversity losses for ecosystem functioning are still poorly understood. This is particularly true in agroecosystems, where soil biodiversity declines upon land use intensification are commonly reported. We have previously shown that belowground diversity is key for maintaining multiple ecosystem functions (i.e. multifunctionality) in model ecosystems, and those particular functional groups of soil biota affect ecosystem sustainability by reducing greenhouse gas emissions, immobilizing nutrients and affecting nutrient losses. Here we test, for the first time, whether agroecosystem diversification can promote soil biodiversity and the delivery of beneficial ecosystem services across Europe. The main hypothesis of the project is that increased plant diversity will promote belowground biodiversity and related ecosystem services.

Main objectives

Digging-Deeper's main objectives are to

1. Quantify the impact of land use/agricultural practices, in particular those increasing plant diversity, on soil communities, ecosystem functions and services.
2. Determine the role of soil diversity and biological interactions for multifunctionality of European agroecosystems.
3. Assess the impacts of climate change on the provision of ecosystem services by agroecosystems from different climatic zones, management practices and soil biodiversity levels.
4. Identify innovative land management practices that maximize the delivery of multiple ecosystem services delivered by soil biota.

Main activities

To address these objectives, the Digging-Deeper project will establish a pan-European network (from Sweden to Spain) of 250 agricultural fields that vary in aboveground diversity. This network includes sites from low to high above ground diversity, as well as field experiments where the diversity of agro-ecosystems is manipulated in time or space (e.g. through crop rotation, cover crops, or intercropping). Links between below-ground diversity and number of ecosystem functions will be assessed: plant yield, nutrient cycling, soil aggregation, soil carbon sequestration and soil nitrous oxide sink will be evaluated as acting surrogates of essential services in agroecosystems.

Together with stakeholders and policy makers, the project will develop a theoretical and applied framework to identify the impact of agricultural practices on the yield, biodiversity and sustainability of European agroecosystems. The results will be implemented at the national (through meetings, press releases and publications targeting farmers, advisors and policy makers) and European (through a policy paper and communications to policy makers) levels.

REPEAT - REstoration and prognosis of PEAT formation in fens - linking diversity in plant functional traits to soil biological and biogeochemical processes

Context

Peat soils around the world represent the most concentrated stores of soil carbon. Most of them have been storing carbon dioxyde for thousands of years, but the drainage process, following agricultural measures, has turned most of European peatlands from major carbon sinks to significant sources of carbon released into the atmosphere. Rewetting is a well-established method for peatlands restoration to improve climate change mitigation and other ecosystem services provision. However, surprisingly little is known regarding the ability of peatlands restoration's process to reinstate carbon accumulation, as well as regarding the enhancement of this process - especially in groundwater-fed fens, which are far less investigated in this respect than rainwater-fed bogs, with different mechanisms of peat accumulation.

Main objectives

The REPEAT project aims to **clarify the mechanisms of peat formation in fens** by linking biogeochemical processes to soil community structure and biodiversity, as well as to plant belowground litter quality, with special focus on the prospects of restoring peat formation.

Main activities

In order to compare undrained, drained and rewetted fens, the REPEAT project will analyse ecosystem processes in four specific study areas: Belgium, Germany, Poland and Romania, and supplement this study with ex-situ mesocosm and laboratory experiments. Peat formation will be measured in all sites, both by direct methods and by calculating balance between production and decomposition of organic matter. Diversity of producer and decomposer communities will be described and quantified in functional terms. Using modelling tools project results will be translated into ecosystem processes and integrated with terrestrial climate models.

Stakeholders in participating countries will be integrated through workshops, side events, and field days. End-users at the EU, national, and regional level are identified. A key stakeholder (Wetlands International) is involved as a consortium partner. The project will advance the knowledge base for process-oriented restoration of fens and will directly impact the application of related policy. REPEAT project will consolidate the peatland ecology expertise of five institutions covering the most important European fen regions to obtain the best state-of-the-art knowledge about fen peat formation processes.

Fen peatlands in the Biebrza Valley, Poland

Partners:

University of Warsaw, Warsaw, POLAND (Coordinator)

University of Antwerp, Antwerp, BELGIUM

Charles University, CZECH REPUBLIC

University of Greifswald, Greifswald, GERMANY

Norwegian Institute of Bioeconomy, Ås, NORWAY

Research and Danube Delta Institute for Research and Development, Tulcea, ROMANIA

Wetlands International European Association, Ede, THE NETHERLANDS

Duration:
01-2017 to 01-2020

Total grant:
€ 1,452,722

Further information:

Dr. Wiktor Kotowski
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Prototype of a rainout shelter.

Partners:

Lund University, Lund, SWEDEN (Coordinator)

University of Tartu, Tartu, ESTONIA

Georg August University, Göttingen, GERMANY

Spanish National Research Council, Almeria, SPAIN

Research Institute of Organic Agriculture, Frick, SWITZERLAND

Duration:
12-2016 to 12-2019

Total grant:
€ 1,428,238

Further information:

Prof. Dr. Klaus Birkhofer
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klaus.birkhofer@b-tu.de

SOILCLIM - Managing soil biodiversity and ecosystem services in agroecosystems across Europe under climate change

Context

Soil organisms are pivotal for a range of ecosystem services in agroecosystems, such as nutrient mineralization, water infiltration, decontamination of soil and water and decomposition of organic matter. The provision of soil ecosystem services will in the future be impacted by changing climatic conditions, such as more and more frequent severe drought episodes. These major changes, and their impacts on soil biodiversity, ought to be further evaluated and studied. The SOILCLIM project addresses the pressing need to better understand the consequences of precipitation changes on soil biodiversity and ecosystem services in agroecosystems.

Main objectives

Through its implementation, the SOILCLIM project aims to:

- Determine the relationship between soil management, biodiversity and ecosystem services during simulated drought periods across a range of present climatic conditions;
- Identify how the relationships between soil management, biodiversity and ecosystem services during simulated drought periods depend on organic carbon content of local soils and fertilization strategy;
- Develop indicators that act as an early warning system for a reduction in soil ecosystem services under climate change.

Main activities

To achieve these objectives, the SOILCLIM project will:

- Assess effects of simulated drought periods on microbial and faunal biodiversity;
- Assess effects of simulated drought periods on biological control (i.e. pest control), decomposition of soil organic matter and crop growth;
- Identify microbial and faunal indicators of changes in soil ecosystem services under drought conditions;
- Identify trade-offs and synergies between soil biodiversity and ecosystem services and their dependence on climatic and local soil conditions.

SOILCLIM will also implement specific activities to disseminate the project outputs, to allow knowledge transfer and to involve stakeholders and policy-makers in the project. These activities will include:

- An initial workshop to discuss the details of the project with participating farmers and members of farmer associations
- Two dissemination meetings with farmers to discuss the identified indicators of changes in soil ecosystem services under drought conditions
- Annual farmer letters (fact sheets about major results)

SoilForEUROPE - Predicting European forest soil biodiversity and its functioning under ongoing climate change

Context

As a result of land use change and climate change, soils are under increasing pressure, and their capacity to serve as a carbon (C) stock, water filter, and support of food and fibre production is a major issue in environmental policy. However, while the role of plant diversity for net primary production has been studied intensively over the past 20 years, the consequences of changes in soil biodiversity are much less understood. Moreover, despite being the largest ecosystem in Europe (covering 210 million ha), forests have remained fairly marginal in the past research effort on how soil biodiversity affects ecosystem functioning. Ecosystem processes and related ecosystem services depend not only on the number of species, but rather on the variety of key functions represented by these species. The functional approach to biodiversity was developed in plant ecology, but recently also applied in soil ecology. A functional characterization of soil biodiversity is promising for predicting how soil communities can resist and recover in response to climate change, and may enable a predictive assessment of how ecosystem processes respond to environmental change-induced alterations of soil biodiversity.

Main objectives

A main goal of SoilForEUROPE is to **determine the relationships between tree species diversity and soil biodiversity**, and their consequences for ecosystem functioning across major European forest types. These linkages may help to predict and manage soil biodiversity based on the diversity and relative abundance of tree species.

A second objective is to complement the network of comparative plots in mature forests with tree diversity experiments that additionally manipulate climatic variables, and with experiments at the European Ecotron in Montpellier to test how soil biodiversity affects resistance and resilience of ecosystem processes in response to extreme drought. Finally, a third objective is to assess the appreciation for and value given to soil biodiversity by the public, managers and stakeholders, which has not previously been thoroughly quantified.

Main activities

- Exhaustive determination of soil biodiversity, and functional trait diversity of tree roots and soil organisms in the FunDivEUROPE exploratories (ranging from boreal to Mediterranean forests) and in two TreeDivNet sites.
- Determination of a range of soil processes to evaluate the relationship between process rates and the various diversity measures of above- and belowground biota.
- Analysis of ecosystem resistance and resilience in response to extreme drought as a function of changing soil biodiversity.
- Evaluation of the impact of information on soil biodiversity for choosing among different forest management scenarios, and assessing how information provision alters preferences and willingness to pay (or contribute time) for the conservation of soil biodiversity.

The project's outputs will be transferred through scientific publications in top journals. The detailed assessment of the perception of soil biodiversity by different stakeholder groups (policy makers, forest resource managers, nature conservation agencies, forest users) will be used to establish specific channels of knowledge transfer and dissemination activities (dynamic strategy depending on results). Policy briefs, i.e. short and concise reports will be released at the end of the project. A ThinkForest discussion forum in the European Parliament in Brussels will be organized. Finally, the development of the web-based Knowledge Transfer Platform established within FunDivEUROPE (www.fundiveurope.eu), which was created based on best practices guidelines for knowledge transfer and outreach strategies for European projects, will be implemented.

Cylindroiulus caeruleocinctus, an abundant millipede in Mediterranean forests.

Partners:

CNRS, Montpellier, FRANCE (Coordinator)

KU Leuven, Leuven, BELGIUM

University Gent, Gent, BELGIUM

Institut Nationale de Recherche Agronomique, Bordeaux, FRANCE

CNRS/European Ecotron, Montpellier, FRANCE

UFZ Centre for Environmental Research Leipzig-Halle, Halle, GERMANY

University Freiburg, Freiburg, GERMANY

SLU Umeå, Umeå, SWEDEN

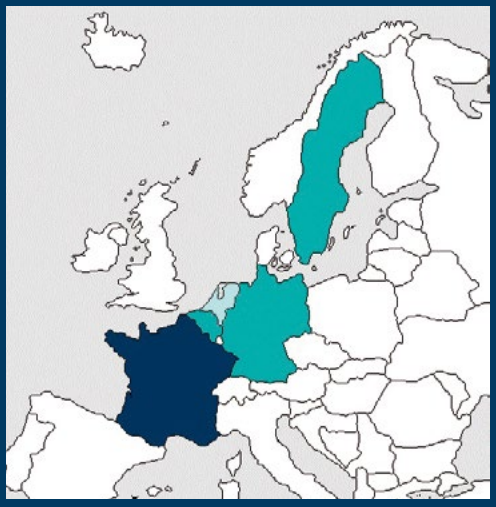
VU Amsterdam, Amsterdam, THE NETHERLANDS

Duration:
01-2017 to 12-2019

Total grant:
€ 1,590,754

Further information:

Dr. Stephan Hättenschwiler
stephan.hattenschwiler@cefe.cnrs.fr



Earthworm.

Partners:

University of Goettingen, Goettingen, GERMANY (Coordinator)

University of Tartu, Tartu, ESTONIA

Agrocampus Ouest, Rennes, FRANCE

CNRS/Université de Rennes 1, Paimpont, FRANCE

INRA, Rennes, FRANCE

Thuenen-Institute, Braunschweig, GERMANY

Institut für Angewandte Bodenbiologie, Hamburg, GERMANY

University of Agricultural Sciences and Veterinary Medicine, Cluj Napoc, ROMANIA

Spanish National Research Council, Córdoba, SPAIN

Swedish University of Agricultural Sciences, Uppsala, SWEDEN

Duration:
03-2017 – 02-2020

Total grant:
€ 2,759,252

Further information:

Dr. Martin POTTHOFF
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Website:
ecobiosoil.univ-rennes1.fr

SoilMan - Ecosystem services driven by the diversity of soil biota – understanding and management in agriculture

Context

It is recognized that soil biota diversity and biota interactions are pivotal for driving soil functions such as water and nutrient cycling, soil formation, carbon sequestration and control of pest organisms. In agricultural systems these functions support and regulate ecosystem services directed to agricultural production and agricultural sustainability. A main goal of future cropping systems will be to maintain or raise agricultural productivity while keeping production sustainable in spite of increasing food demands and ongoing soil degradation caused by inappropriate soil management practices. In order to reach these two goals, we need to better understand and valuate the relationships between soil biodiversity, soil functions and ecosystem services in agriculture contexts.

Main objectives

SoilMan aims at fostering the understanding of **how the interplay of farm based soil management practices affect soil biodiversity and how soil biodiversity in turn feeds back into soil functions and ecosystem services as factors for productivity and sustainability**. Investigations will be performed in typical mainstream agricultural areas, in different European regions (Spain, France, Germany, Sweden, and Romania) graded with the four basic soil management factors: tillage, fertilization, crop rotation, and residue management.

Soil biota driven ecosystem services will be valuated from socio-economic as well as socio-ecological perspectives and this valuation will form the basis for identifying and developing best practice soil management options, maximizing biodiversity and sustainability as well as lowering economic loss for farmers and society. Policies and policy drivers will be compared and related to regional constraints in sustainable soil management, with a special focus on trade related international and regional as well as knowledge related drivers. By the end, SoilMan will deliver strategies for improving soil biodiversity levels and associated services for the long-term sustainable management of soils as a basis of human nutrition and well-being.

Main activities

To reach these goals, SoilMan will implement the following activities:

- Inventories of major soil biota groups (microorganisms, enchytraeidae, earthworms, collembolan, mites, gastropods) in the different regional contexts, using morphological and biomolecular tools
- Investigation, using field or lab-based experiments, of different processes: decomposition and carbon cycling, soil aggregation, water infiltration, nutrient availability to plants, nutrient transport and leaching, and suppressiveness (of pathogens)
- Socio-economic and socio-ecological valuation of soil biota driven ecosystem services

Regarding dissemination, SoilMan will devote large efforts to raising stakeholder and public awareness for the importance of soil biodiversity and soil sustainability. In parallel of scientific dissemination and interactions between SoilMan partners, specific actions addressed to stakeholders and the general public will be carried out: technology transfer of knowledge will be done through workshops and publications of technical guide lines; educational tools will be widely distributed to schools or exposed to the general public; trainings addressed to scientists and stakeholders (farmers, technicians) will be managed, and policy recommendations and briefs will be provided.

URBANMYCOSERVE - Understanding and managing urban ectomycorrhizal fungal communities to increase the health and ecosystem service provisioning of urban trees

Context

As 80% of the EU population is expected to live in urban areas by 2020, the quality of the urban environment is of growing importance. Urban trees are key elements in mitigating the common environmental problems in cities, through provisioning crucial ecosystem services such as microclimate mitigation. Yet, urban trees typically face harsh environmental conditions, resulting in reduced health, and potentially jeopardizing ecosystem service provisioning. Because of their well-known host tree benefits, Ectomycorrhizal Fungi (EcM) may play an important part in urban tree management through improving tree vigour, and thus the extent of the ecosystem services delivered.

Main objectives

URBANMYCOSERVE aims at achieving the following objectives:

- Provide an assessment of the EcM communities of urban trees, and of their environmental drivers;
- Relate the composition of EcM communities, and the presence of specific functional groups of EcM, to tree health and ecosystem services delivery;
- Develop a dedicated EcM-inoculum, specific for a set of urban tree species, to improve their health and ecosystem services delivery.

Main activities

To achieve its goals, URBANMYCOSERVE project will implement the following activities:

- Characterize the EcM communities of a set of model tree species from three cities (Porto, Leuven and Strasbourg) through advanced DNA-barcoding techniques.
- Identify the environmental drivers of EcM community composition of the model tree species;
- Quantify tree health, growth and ecosystem services provided by the tree species (such as air quality improvement, decrease of water runoff and microclimate mitigation) through advanced remote sensing techniques and modelling, and identify the mediating role of EcM;
- Develop and test (in situ and ex situ) dedicated EcM-inocula for urban settings.

URBANMYCOSERVE will disseminate tailored guidelines for enhancing urban tree health through actively and passively managing EcM-communities to municipalities and urban greenery services. These stakeholders will also be actively involved in tree and site selection. Other stakeholders are companies that develop and market bio-fertilizers. These companies will be involved in the choice of the technology for inocula production and of the carrier for their formulation. These issues are key elements to their successful application.

Urban trees.

Partners:

KU Leuven, Heverlee, BELGIUM (Coordinator)

KU Leuven, Leuven, BELGIUM

INRA, Clermont Ferrand, FRANCE

Strasbourg University, Illkirch, FRANCE

Universidade Católica Portuguesa, Porto, PORTUGAL

Duration:

02-2017 to 01-2020

Total grant:

€ 893,481

Further information:

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THEME 2

Understanding and managing biodiversity dynamics in land-, river-, and seascapes (habitat connectivity, green and blue infrastructures, and naturing cities) to improve ecosystem functioning and delivery of ecosystem services.

BearConnect - Functional connectivity and ecological sustainability of European ecological networks – a case study with the brown bear

Context

High biological diversity can still be witnessed in some specific parts of Europe, where populations of large carnivores still roam free in their natural habitat. The charismatic and cultural value of these great predators is not to be under appreciated: being at the top of the food chain, they have a major impact on biodiversity regulation and ecosystem functioning over large scales. Their important role regarding ecosystem services delivery increases the need for species protection endeavours.

Therefore, the implementation of coherent systems of ecological networks considering simultaneously protected areas and other non-protected components of the landscape is needed to achieve successful conservation of these important and emblematic carnivore species.

Main objectives

The objectives of the BearConnect project revolve around the brown bear (or Ursus arctos) and aim at:

- Evaluating functional connectivity and factors influencing brown bear distribution, movements, and effective dispersal in current and future landscapes scenarios;
- Understanding the role brown bears have in ecosystems, with focus on trophic interactions and associated ecosystem services;
- Assessing the effectiveness of existing ecological networks for supporting the resilience of brown bear populations and associated ecosystem services;
- Providing spatially explicit guidelines for the improvement of ecological networks to be used in landscape connectivity planning for the conservation of brown bears and other species in Europe.

Main activities

In order to accomplish and achieve these objectives, the BearConnect project will:

- Coordinate with relevant stakeholders across Europe to combine different data types available for the 10 European brown bear populations;
- Analyse telemetry, demographic, genetic and ecological data to evaluate patterns of functional connectivity and landscape effects on bear movement and gene flow;
- Derive the structure of food web interactions and the economic value of a key ecosystem service provided by brown bears;
- Predict future changes in range dynamics of the brown bear and its food resources;
- Use quantitative models and simulations to assess whether existing ecological networks are suitable for conserving biodiversity and ecosystems functions and where management actions are required for improvement.

Stakeholders will be involved in project activities through an initial workshop and regular updates on project progresses. Final results will be presented to relevant stakeholders at regional workshops in Europe. Practical, spatially-explicit recommendations on how to maintain and improve ecological networks will be developed with the stakeholders and transferred to policy makers. A project website and a smartphone application are going to be created for the public and stakeholders.

Ursus arctos.

Partners:

CNRS/Université Grenoble Alpes, Grenoble, FRANCE (Coordinator)

Georg-August-University, Göttingen, GERMANY

University of Rome “La Sapienza”, Roma, ITALY

Telemark University College, Bø I Telemark, NORWAY

Polish Academy of Sciences, Krakow, POLAND

National Institute for Research and Development in Forestry “Marin Dracea”, Brasov, ROMANIA

Duration:
03-2017 to 02-2020

Total grant:
€ 1,397,615

Further information:

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Agricultural landscape in Bulgaria.

Partners:

Adelphi Research gGmbH, Berlin, GERMANY (Coordinator)

University of National and World Economy, Sofia, BULGARIA

Institut für Agraökologie und Biodiversität, Mannheim, GERMANY

National Museum of Natural Sciences, Madrid, SPAIN

Universidad de Extremadura, Plasencia, SPAIN

Duration:
12-2016 to 11-2019

Total grant:
€ 739,584

Further information:

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BIOGEA - Testing BIOdiversity Gain of European Agriculture with CAP greening

Context

The intensification of agriculture and the conversion of semi-natural areas to cropland are considered as serious threats to biodiversity in Europe. They have led to a loss of Green and Blue Infrastructure (GBI) in agricultural landscapes. GBI includes landscape structures and habitats such as hedges, water meadows, field margins and woodland, essential for ensuring connectivity between habitats and allowing the migration of species. The “Greening” of the Common Agricultural Policy (CAP) (the introduction of compulsory agri-environment requirements in the 2014-20 CAP) should help support GBI by encouraging measures across the wider countryside. Farming systems across Europe are however highly variable and the impacts on different types of system have yet to be evaluated.

Main objectives

BIOGEA has the following objectives:

- Understand the impacts of greening on the quantity and quality of GBI in the agricultural landscape;
- Understand the short-, medium- and long-term effects of GBIs on biodiversity and ecosystem services at different spatial scales and under different land uses;
- Examine the potential for indicators to measure GBI and the linked biodiversity and ecosystem services;
- Explore ways in which this knowledge can be used to design, develop and manage more resilient GBIs.

Main activities

Analyses will be carried out both vertically and horizontally: a top-down analysis, from an EU wide scale to a local scale will be complemented by a more regional approach through comparative analyses in German, Spanish and Bulgarian case studies. Through this, the following will be examined:

- The EU targets for GBI and greening and their translation into national law. This will be carried out through policy analysis;
- The actual CAP policy implementation and advice provision in six example regions (one intensive and one High Nature Value in each member state). This will be examined through surveys, interviews and workshops on the national and local level;
- The impacts of these CAP policy implementation on biodiversity and ecosystem services, such as climate mitigation, landslide decrease or diversity of insects (through the increase of habitat connectivity thanks to GBI for example) will be examined through biological field work and modeling.

The development and implementation of political instruments as well as guidance and tools for farmers and their advisors will be supported through the involvement of a ‘Participatory Research Development Network’ (PRDN). This will occur through a series of workshops, round tables, local learning laboratories and a final conference.

BIOVEINS: Connectivity of green and blue infrastructures: living veins for biodiverse and healthy cities

Context

Urban green areas have been shown to support native biodiversity, enhance ecosystem functions and provide important ecosystem services. Nevertheless, urban green and blue infrastructure (GBIs) are fragmented and isolated.

GBI enhances the permeability for biodiversity through dense and hostile urban matrices. However, the effectiveness of these GBI depends on several factors, in particular their structural complexity, management regime, and spatial configuration.

Main objectives

The main objective of the BIOVEINS project is to **use functional diversity (FD) to highlight the mechanisms underpinning the link between GBI, taxonomic diversity (TD) and ecosystem services (ESs) provisioning**.

Seven cities were selected along a S-N and W-E gradient throughout Europe allowing to include several climates and different types of urbanization (i.e. Almada, Antwerp, Lisbon, Paris, Poznan, Tartu, Zurich).

Together with local stakeholders, the ecological and interdisciplinary knowledge will be provided to identify the critical features of GBI, to guide the establishment, management and restoration of GBI, and to mitigate the effects of major urban global challenges.

This main objective will be accomplished through several specific objectives by:

1. Analysing the actual and planned GBI from an urban planning perspective, and determine sampling plots;
2. Assessing the FD for a variety of taxonomic groups (i.e. woody and flower plants, leaf-dwelling bacteria, herbivorous mites, other arthropods, lichens, birds and bats) to link the considered taxa to ESs (e.g. flood protection, fixation of air pollution, pollination, climate regulation, pest control; etc.) and to determine the importance of GBI connectivity on urban biodiversity;
3. Assessing the impact of proportion, configuration and connectivity of urban GBI on provisioning and regulating ESs by an experimental and modelling approach; and
4. Providing tools, best practices, and guidelines about how to improve urban GBI and how to enhance multiple ESs for people and nature.

Main activities

To reach the above mentioned objectives, the following activities will be implemented:

- Selection of sampling sites in each involved city, selected along a S-N and W-E gradient.
- Assessment of biodiversity and ESs' indicators in these sampling sites for distinctive taxonomic groups of plants and animals differing in their dispersion ability.
- Assessment of connectivity and size effect of urban GBI on the provision of ESs by a three-dimensional microclimate modelling approach.
- Involvement of citizens by several distinctive citizen science initiatives.
- Development of tools to guide the establishment, management, restoration and monitoring of urban GBI by involving local stakeholders.

Regular meetings between local scientists and various stakeholders will be organised during the project, as well as a general stakeholder meeting. Besides the more common scientific output dissemination via publications and scientific meetings, the project also will intensively communicate project results by setting up various citizen science projects.

Urban gardens in Zurich

Partners:

University of Antwerp, Antwerp, BELGIUM (Coordinator)

Estonian University of Life Sciences, Tartu, ESTONIA

French National Institute for Agricultural Research, Paris, FRANCE

Université Paris Sud, Orsay, FRANCE

Poznan University of Life Sciences, Poznan, POLAND

Universidade de Lisboa, Lisbon, PORTUGAL

WSL Swiss Federal Research Institute, Birmensdorf, SWITZERLAND

Duration:
02-2017 to 02-2020

Total grant:
€ 1,164,649

Further information:

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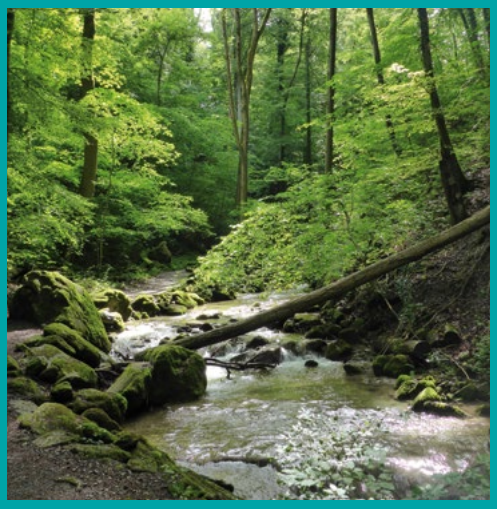

Stream-riparian network.

Partners:

Swedish University of Agricultural Sciences, Uppsala, SWEDEN (Coordinator)

Ghent University, Gent, BELGIUM

Helmholtz-Centre for Environmental Research, Leipzig, GERMANY

Norwegian Institute for Water Research, Oslo, NORWAY

University of Bucharest, Bucharest, ROMANIA

Duration:
12-2016 to 01-2020

Total grant:
€ 1,569,041

Further information:

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Website:
www.slu.se/Biodiversa_Crosslink

CROSSLINK - Understanding cross-habitat linkages between blue and green infrastructure to optimize management of biodiversity, ecosystem services and multiple human uses

Context

Stream-riparian networks are key components of green and blue infrastructure (GBI) that underpin landscape integrity by transporting nutrients, regulating floods, buffering human impacts and supplying fresh water. Unfortunately, stream-riparian networks are also subject to multiple human pressures (e.g. from agriculture and hydropower) that affect longitudinal and lateral connectivity, driving habitat and diversity losses, threatening ecosystem services, and causing stakeholder conflicts. There is thus a pressing need to understand the importance of connectivity within these networks, in particular its effects on biodiversity and ecosystem functioning and services, and to apply this understanding in managing stream-riparian GBI for both natural values and societal needs.

Main objectives

CROSSLINK aims to:

1. evaluate how the extent, spatial arrangement and connectivity of riparian-stream GBI affects biodiversity, and ecosystem functioning, services, and resilience in forested, urban and rural settings, and
2. to produce an optimization framework capable of balancing multiple values, uses and needs, including biodiversity, water provisioning and purification, exploitation for hydropower, and aesthetic values, in riparian-stream networks.

Main activities

The CROSSLINK project will analyze existing data and conduct extensive novel and spatially explicit field studies. A GBI asset portfolio will be constructed, comprising biodiversity, ecosystem processes and services, flood protection and resilience properties. Relationships between the portfolio elements, spatial connectivity and human impacts are analyzed and incorporated into an optimization platform, which identifies spatial configurations and strategies for GBI that minimize management trade-offs and maximize multifunctionality.

Stakeholders assist the CROSSLINK project in identifying pressures and priorities, areas of conflict, and possible management actions. CROSSLINK's findings, including optimal solutions for GBI planning, will be translated into a learning-based environment, allowing stakeholder analysis of tradeoffs/ synergies between multiple values/goals in GBI management.

ENABLE - Enabling Green and Blue Infrastructure Potential in Complex Social-Ecological Regions: A System Approach for Assessing Local Solutions

Context

Green and blue infrastructure (GBI) has the potential to tackle numerous environmental and social challenges. However, the successful design and implementation of GBI requires careful consideration of a number of critical enabling factors beyond the biophysical infrastructure itself (e.g. user rights, accessibility, and ecological linkages). What exactly these factors are, how they interact with one another and when/how they influence the performance of a green or blue 'solution' are questions that require thorough investigation, in particular in complex socio-ecological systems such as cities.

Main objectives

ENABLE aims to advance knowledge of how to design and implement GBI in a way that maximizes its potential to deliver numerous social and environmental benefits, such as social inclusion, health and human wellbeing, stormwater retention and habitat functions. This ambition will be pursued by developing and testing multi-method assessment frameworks, analytical tools and approaches for evaluating GBI performance.

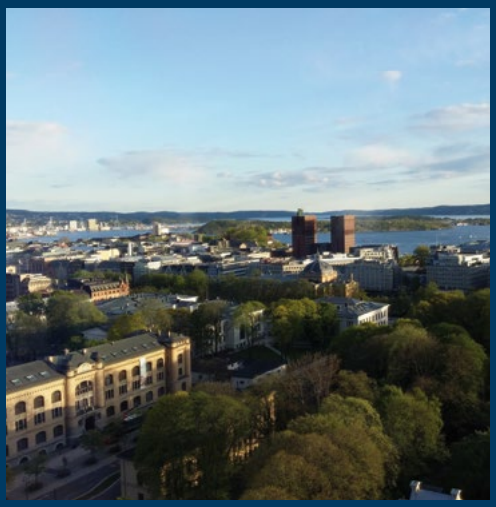
Main activities

ENABLE will, together with local actors in five case study sites (Stockholm, Halle, Oslo, Barcelona and Lodz), use a systems perspective to examine three key issues related to GBI solutions:

1. How and under what conditions are the benefits provided by GBI most appreciated by people?
2. How are GBI benefits distributed among urban residents, and how accessible are they?
3. How can the continuation of GBI benefit-flows be secured in the long-term?

The project will use a multimethod approach to probe different takes on the three questions and use the five case studies for both comparison and contrast. Each case will be explored and described with the help of a wide range of information including census data and surveys as well as modeling and participatory research.

The project will ensure continuous interaction between the research team and the local stakeholders (policy makers, local business, civil society initiatives and citizens) in the case study cities to promote shared learning and benefit from local knowledge and different perspectives. Multi-stakeholder meetings, factsheets, webinars, social media and a conference will provide opportunities for interactive dialogue and learning throughout the project and will facilitate the uptake of scientific findings in policy and practice for mainstreaming across Europe.



Oslo, one of the 5 case studies of the ENABLE project.

Partners:

Stockholm Resilience Centre, Stockholm, SWEDEN (Coordinator)

International Union for Conservation of Nature, Brussels, BELGIUM

Humboldt University, Berlin, GERMANY

Ecologic Institute, Berlin, GERMANY

ICLEI - Local Governments for Sustainability, Freiburg, GERMANY

University of Lodz, Lodz, POLAND

European Regional Centre for Ecohydrology, Lodz, POLAND

Norwegian Institute for Nature Research, Oslo, NORWAY

Autonomous University of Barcelona, Barcelona, SPAIN

Erasmus University Rotterdam, Rotterdam, THE NETHERLANDS

The New School, New York, USA

Duration:
12-2016 to 12-2019

Total grant:
€ 2,540,309

Further information:

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Galium verum, one of the species that will be used for genetic analyses.

Partners:

Stockholm University, Stockholm, SWEDEN (Coordinator)

Katholieke Universiteit Leuven, Leuven, BELGIUM

University of Regensburg, Regensburg, GERMANY

Institut Mediterrani d'Estudis Avançats Mallorca, SPAIN

NERC Centre for Ecology & Hydrology, Wallingford, UNITED KINGDOM

Duration:
01-2017 to 02-2020

Total grant:
€ 1,046,885

Further information:

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FUNgreen- Functional connectivity and green infrastructure

Context

The anthropogenic threats of habitat destruction and climate change highlight the key role of dispersal in allowing species and populations to persist. Reduced dispersal among isolated populations also leads to population extinction and a lower chance of subsequent recolonization, resulting in a reduction in biodiversity at local and landscape scales. The realised movement of organisms across landscapes is determined by functional connectivity, which for plants occurs through the dispersal of seeds among habitat patches. The FUNgreen approach will link theory and practice through a new conceptualisation of functional connectivity for plants, which incorporates factors both dependent upon and independent of a landscape's green infrastructure.

Main objectives

The FUNgreen project will investigate **how the dynamic attributes of plant functional connectivity interact with green infrastructure in the maintenance of biodiversity and ecosystem services**. Specifically, functional connectivity in fragmented landscapes will be compared with both high and low amounts of green infrastructure, and the role of active management will be assessed to enhance functional connectivity through migrating herds of cattle and sheep. Seed dispersal in these landscapes will be evaluated through genetic analyses, recruitment experiments and modelling. The effects of dispersal on biodiversity, genetic diversity and a range of ecosystem services will be investigated and used as the basis of predictive models which can help shape future landscape management.

Main activities

The FUNgreen project will assess current, past and potential future levels of green infrastructure and functional connectivity in important grassland landscapes across Europe. Focus will be on semi-natural grasslands and comparison of functional connectivity in fragmented landscapes with both high and low amounts of green infrastructure will be conducted, as well as an assessment of the role of active management to enhance functional connectivity through rotational grazing by cattle and sheep. Seed dispersal ecosystem services (climate mitigation, water retention, landslide decrease, etc.) will be evaluated through genetic analyses, recruitment experiments and modelling. The effects of dispersal on biodiversity, genetic diversity and a range of ecosystem services will be investigated and used as the basis of predictive models which can help shape future landscape management and to aid planning for future green infrastructure.

Farmers and conservation managers will be part of the development of alternative modelling scenarios for improving functional connectivity to have economically realistic scenarios. Results from FUNgreen will be relevant to farmers, other grassland managers, land owners, nature organizations and policy makers. Results and ideas from FUNgreen will be made available on a website and by uploading GIS-data and biodiversity data to open access repository such as Dryad for regional and national governments to use.

GreenFutureForest – Scenarios for a Sustainable Future Forest Green Infrastructure

Context

Wood production is a pivotal provisioning ecosystem service of major economic importance and a key component of the transition from a fossil- to a bio-based economy. However, the intensive utilization of forests is also a key reason for species declines in the EU and globally. We therefore need to modify the forestry and conservation strategies to secure both high yield of wood products and viability of forest species.

Main objectives

The overall objective is to **identify national forestry and conservation strategies that produce wood in a sustainable way**. The strategies will balance the global demand for wood, the profitability of forestry and the long-term viability of forest species. To achieve this, the project aims to estimate the future global demand for wood and the supply of wood in EU countries during the coming 100 years assuming different scenarios of socio-economic development and climate change. Based on the estimated global demand for wood from our study countries, the project will identify landscape-scale scenarios with profitable forestry and cost-efficient conservation. In order to simulate these scenarios, the project will develop models for the spatial dynamics of forest species. This work includes testing how different properties of the green infrastructure, such as connectivity among habitats, may affect the spatial dynamics of different species. The models will mainly be based on systematically collected field data, but the potential of using Citizen Science Data (CSD) will also be evaluated. CSD are voluntarily reported observations of species to open-access websites, such as Artportalen.se or gbif.org.

Main activities

The core work is to formulate and simulate scenarios for land-use, forestry and conservation, from the global to the landscape scale. The global scale simulations will account for factors such as consumer demand, production capacity, and competition between geographical regions and land use sectors. The landscape scale simulations will differ concerning forestry parameters, such as stand rotation length or tree species composition. They will also differ concerning conservation strategies, such as how long time the areas are set aside and where in the landscape the set-asides are located. Empirical data will be compiled from the website Artportalen.se holding CSD, but will also be systematically collected in the field. These data will be used to build the models for the spatial dynamics of forest species to be used in the scenario simulations.

A two-way communication with stakeholders throughout the project will be implemented. Initially, stakeholders will provide input on the scenario formulation. When the results from the scenario simulations are available, discussions with stakeholders will be carried out on how to translate the findings into specific, regional management guidelines. Finally, the dissemination of the project's results will be made together with the stakeholders.

Fomitopsis rosea

Partners:

Swedish University of Agricultural Sciences, Uppsala, SWEDEN (Coordinator)

Technische Universität Braunschweig, Braunschweig, GERMANY

Technische Universität München, Munich, GERMANY

Norwegian Institute for Nature Research, Oslo, NORWAY

University of Zürich, Zürich, SWITZERLAND

Duration:
12-2016 to 12-2019

Total grant:
€ 2,093,367

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The Thau Lagoon.

Partners:

IRSTEA, Antony, FRANCE (Coordinator)

Research Institute for Nature and Forest, Brussels, BELGIUM

Estonian University of Life Sciences, Tartu, ESTONIA

Institute for Social-Ecological Research, Frankfurt, GERMANY

University of Kiel, Kiel, GERMANY

Norwegian Institute for Nature Research, Trondheim, NORWAY

Duration:
02-2017 to 01-2020

Total grant:
€ 1,495,876

Further information:

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IMAGINE - Integrative Management of Green Infrastructures Multifunctionality, Ecosystem integrity and Ecosystem Services: From assessment to regulation in socio-ecological systems

Context

According to the European Commission definition, Green Infrastructure (GIs) is "a strategically planned network of natural and semi-natural areas designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation" inside urban areas. With the implementation of its Green Infrastructure Strategy, the EU promotes the implementation of nature-based GI solutions to cope with multiple issues present in cities throughout the continent. Indeed, GI can be approached through the multiple benefits they provide on economic, social, environmental and human health related issues. The IMAGINE project team supports the idea that sustainable territorial management requires a transition from the management of natural resources that degrades the ecological integrity of ecological systems to an adaptive management that preserves it while improving human wellbeing.

Main objectives

Using a multidisciplinary approach across six case study territories spanning a European north-south gradient from the boreal zone to the Mediterranean, the IMAGINE project aims at **quantifying the multiple functions, ecosystem services and benefits provided by Green Infrastructures (GI) in different contexts from rural to urban**.

Main activities

IMAGINE will provide guidelines and elaborate ready-to-use methods for an integrative management of GI multifunctionality. In order to stimulate and enhance ecosystem services performance of GI, a toolbox of management and restoration techniques will be prepared. These tools will be based on state-of-the-art knowledge regarding the interacting environmental (abiotic soil and water characteristics), structural (size, shape, spatial configuration of the network) and biological (species composition, structure, production) GI-properties that are required for the optimal provisioning of ecosystem services by GI. This way, the IMAGINE project will not only produce new knowledge on the relationship between the management, ecosystem integrity and ecosystem-service-based multifunctionality of GI, but also provide local stakeholders with science- and place-based arguments, regulatory mechanisms and decision tools for a sustainable landscape management.

IMAGINE will conduct its transdisciplinary research activities in close contact with stakeholders (land managers, municipalities, contractors in planning, design and building activities, nature conservation services, NGOs and the wider public as users). We will test our approach on the case study territories with two main gradients: rural-urban gradient within case studies and latitudinal across case studies.

The IMAGINE project will have 2 meetings per year to be organised within the Case study sites in order to be able to exchange with stakeholders. The final workshop will aim to build future capacity for implementation with the presentation of a guidance report to local/ regional stakeholders including land users, beneficiaries of ecosystem services and policy makers (Stakeholders, Policy makers, Citizens, NGOs, experts). We also plan to deliver 3 user-friendly guides: How-To Management and Restoration of GI, How-To Ecological Integrity Assessment, How-To ES and EDS Assessment and Mapping for Local Stakeholders.

INFRAGECO - INference, FRAgmentation, GEnomics and COnservation.

Context

The global biodiversity crisis that is affecting ecosystems worldwide is a major subject of concern and is expected to worsen with ongoing global changes. Climate change together with other anthropogenic factors will lead to the displacement of many favourable environments in the next decades owing to fast altitudinal and latitudinal shifts, with the greatest predicted impacts in "biodiversity hotspots". These shifts will lead to an increase in Habitat Loss and Fragmentation (HL&F), the main threats to Biodiversity worldwide. There is therefore a need to understand the consequences of HL&F, and to identify the barriers to gene flow at various spatial and temporal scales. The project will aim at studying HL&F in the context of past and future environmental changes, across taxa and regions.

Main objectives

The main objectives of this project will include:

- The identification of ancient and recent barriers to gene flow based on genomic datasets;
- The development of freely available software to study (quantify and date) HL&F events in the recent and ancient past;
- The simulation of management scenarios of reconnection that increase genetic diversity.

With Madagascar as a model region, comparative genomic analyses will be used to infer generalizable critical features of ecological networks (e.g invasive Rattus versus endemic Eliurus rodents; small nocturnal Microcebus versus large diurnal Propithecus, humid North-East versus dry Northwest habitats, etc.).

Main activities

In order to successfully carry out the main activities of the INFRAGECO project, six Work Packages will be implemented which correspond to a) sampling, b) genetic/genomic analyses, c) spatial analysis across habitats with various features, d) spatial simulations and modelling, e) stochastic modelling and inference, and f) dissemination.

Communication will be done with national environmental authorities, conservationists (NGOs), local communities and the scientific community (articles, congresses, posters, reports, etc.).

Brookesia

Partners:

Instituto Gulbenkian de Ciência, Oeiras, PORTUGAL (Coordinator)

Evolution and Biological Diversity laboratory, Toulouse, FRANCE

Toulouse Mathematics Institute, Toulouse, FRANCE

University of Veterinary Medicine, Hannover, GERMANY

Duration:
01-2017 to 12-2019

Total grant:
€ 742,199

Further information:

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Website:
www.infrageco-biodiversa.org

Demographic survey of Laminaria hyperborea in Roscoff

Partners:

Centre of Marine Sciences at the University of Algarve, Faro, PORTUGAL (Coordinator)

Aarhus University, Silkeborg, DENMARK

Aix-Marseille University, Marseille, FRANCE

CNRS UPMC Station Biologique de Roscoff, Roscoff, FRANCE

AWI - Alfred-Wegener Institute, Bremerhaven, GERMANY

University of Cologne, Cologne, GERMANY

University of Bologna, Bologna, ITALY

University of Azores, Horta, PORTUGAL

University of Malaga, Malaga, SPAIN

University of Goteborg, Strömstad, SWEDEN

Duration:
01-2017 to 12-2019

Total grant:
€ 1,618,359

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MARFOR - Functional Variability and Dynamics of Responses of Marine Forests to Global Change

Context

Marine forests support major ecosystem functions along the coastlines of Europe. These ecosystems, structurally formed by large brown algae such as kelp and fucoids, have undergone major range shifts that left imprints in contrasting population traits along each species range. Their expected restricted connectivity causes climate-driven range shifts to create homogeneous lower diversity along expansion zones, leaving behind in ancient presently warmer stable ranges unique diversity and traits that are increasingly threatened. Changes in marine forest ranges and adaptive traits can affect stakeholders in many ways, from the loss of entire forests and services, to the loss of adaptive traits and of blue growth potential linked with genetic resources, aquaculture and other seaweed-derived industries.

Main objectives

The MARFOR project aims to understand past and **predict future consequences of global change for biodiversity of marine forests below species level**, by the geographical distribution of functional traits, genetic biodiversity and connectivity, and their consequences for stakeholders linked to blue-green ecosystem infrastructures formed by marine forests along European coastlines.

Specifically, the project goals are:

1. Quantification of the variability in functional genetic diversity and differentiation of seaweed populations along environmental gradients across European coastlines.
2. Discovery of ecological, ecophysiological and functional genomic differences between populations and species with contrasting biogeographic affinities, population structure and microevolutionary history.
3. Prediction of changes in marine forest diversity and function under possible future climate scenarios. 4) Identification of critical features of marine forests along European rocky shorelines and their implications for stakeholders.

Main activities

The MARFOR project will study the functional consequences of the ongoing and predicted spatial shifts in intra-specific biodiversity from genomic to ecological and evolutionary responses of marine forest species. These results will be used to develop models to predict the consequences of these changes for the future of European marine forest ecosystems and will outline the implications and recommendations for practical applications of biodiversity for blue growth (e.g., kelp aquaculture industries) and for coastal green infrastructures and management measures (e.g., for ecosystem restoration practices).

The MARFOR project is organizing several workshops with stakeholders from the industry to conservation and management to provide them with solid data-driven scientific basis for habitat conservation and sustainability management, and for the blue growth economic activities that depend on marine forest species. A large-scale citizen science initiative will contribute to assess the status of marine forests, while promoting European wide awareness about marine forests.

ODYSSEUS: Between Scylla and Charybdis – Managing connectivity for freshwaters fish

Context

Anthropogenic fragmentation has particularly strong effects in dendritic networks, like river-scapes, where there is only one connecting route between two locations. Man-made obstacles, such as dams and weirs, often form absolute barriers for upstream migration, with many negative effects on fish communities. Restoring connectivity by removing barriers is thus important for improving the functioning of stream-lake networks, but may have unwanted side-effects by facilitating the spread of invasive species. We have therefore named the project ODYSSEUS in reference to the dilemma faced by Odysseus when navigating between *Scylla* (a six-headed monster) and *Charybdis* (a whirlpool) in the narrow strait of Messina.

Main objectives

The overarching objective is therefore to provide a decision support system for the management of connectivity in the form of interactive maps of river-scapes. The maps will be provided as a web service and show local slopes, colonization probabilities, and extinction risks for different management scenarios proposed by the user. The decision support system will be developed for Scandinavia, where much of the required infrastructure in the form of high-resolution geographic and ecological data is available. An important sub-objective is to provide a road map for the development of similar systems for other EU-regions.

Main activities

The requirements in the form of data and models that underlie the decision support system are extensive. Important project activities are thus the development of ecological and geographical databases and models as well as their integration and implementation in a web service:

- Quantification of the ability of important native and non-native species to pass barriers and colonize.
- Quantification of relationships between fragment size and extinction rates for these species.
- Studies of how the effects of connectivity interact with other anthropogenic stressors such as drought, water quality, climate change and invasive species.
- Development and implementation of a web service that allows managers to investigate the ecological consequences of connectivity modifications.

The development and implementation of the decision support system will benefit from a close dialogue with regional and national managers of connectivity. When evaluating the consequences of proposed modifications of connectivity, it is often necessary to consider the social dimensions of the problem, including the perception of different species and barriers. Activities focused on stakeholder involvement will therefore include:

- Workshops where the design and functionality of the web service is discussed by connectivity managers and researchers.
- A study of the dialogue between scientists and managers
- A study of how the local perception and value of species and habitats differ between groups of end-users in different regions.

Dam Barrage Noisiel, Marne

Partners:

Umeå University, Umeå, SWEDEN (Coordinator)

Institut de Recherche pour le Développement, Marseille, FRANCE

Norwegian University of Technology and Science, Trondheim, NORWAY

Norwegian Institute for Nature Research, Trondheim, NORWAY

University of Girona, Girona, SPAIN

Luleå University of Technology, Luleå, SWEDEN

Duration:
12-2016 to 12-2019

Total grant:
€ 1,184,473

Further information:

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Woody buffer strip, Salz Hessen, Germany.

Oscar - Optimising the configuration of woody riparian buffer strips along rivers to enhance biodiversity and ecosystem services

Context

Woody riparian buffer strips along rivers have widely been used mainly to reduce nutrient and fine sediment input from agricultural areas but potentially offer many more ecosystem services (e.g. habitat provision increasing biodiversity, shading and temperature regulation, mitigating climate change effects). Moreover, their beneficial effects potentially depend on their spatial arrangement, such as fragmentation, and woody buffers may provide migration corridors and connect near-natural sites in a green infrastructure network.

Main objectives

The Oscar project will synthesize the various pieces of knowledge on woody buffer effects, complement these with new analyses on biodiversity and ecosystem functions, consider their spatial arrangement and function as migration corridor, and, based on this, provide rules and tools to optimise the overall effect of woody buffers and policy recommendations on the strategic and targeted implementation of woody buffers at national and EU-level.

Main activities

The main activities in Oscar will be:

- Synthesize the general effects of single woody buffers: Review and complementary studies on the effects of single woody buffers on ecosystem functions (e.g. nutrient and sediment retention, temperature) and biodiversity (i.e. species diversity of various organism groups - aquatic and riparian).
- Investigate the effects of woody buffers in a green infrastructure network: Investigate and assess the effect of the spatial arrangement of woody buffers on ecosystem functions and biodiversity as well as their role as migration corridors (based on large monitoring datasets).
- Integrated assessment of woody buffer effects: Assessment of the ecosystem services (ES) (e.g. regulating services like nutrient retention, provisioning services like provision of food, etc.) effects on biodiversity, and role as migration corridor in four case-study catchments based on the knowledge derived in the first two steps. Objectives are threefold: Assess the potential use in river restoration under real-world conditions, test the widely stated assumption that biodiversity goes together with high ES, and provide a baseline scenario for the next step.
- Optimize the configuration of woody buffers: Assess the effect of different woody buffer management and climate change scenarios in the four case-study catchments on ES, biodiversity, and their function as migration corridors. The objective is to identify realistic woody buffer configurations with a high overall effect.
- Knowledge brokering: Provide and disseminate knowledge rules, a GIS-based multi-criteria decision analysis tool to assess the effect of woody buffers and provide policy recommendations on woody buffer establishment.

Beside the involvement of local stakeholders in the case-study catchments, the project's research plan and results will be presented and discussed with relevant working groups at national (e.g. German LAWA, French ONEMA) and EU level (e.g. ECOSTAT), especially the relevance of woody buffers for the European Biodiversity Strategy, the implementation of the WFD and establishment of funding schemes under the Common Agricultural Policy (CAP) and its current 'greening' policy reform.

Partners:

University of Duisburg-Essen, Essen, GERMANY (Coordinator)

Institut National de Recherche en Sciences et Technologies pour l'Environnement et l'Agricultulture, Lyon-Villeurbane, FRANCE

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Duration:
03-2017 to 02-2020

Total grant:
€ 502,420

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PERCEBES- Tools for the transition to spatial management of coastal resources: the stalked barnacle fishery in SW Europe

Context

Spatial management of the marine environment is central to the EU environmental strategy, although it has not been at the forefront of the Common Fisheries Policy. It is time to focus on those rare cases of fine-scale spatial management of marine resources currently active in Europe, to extract precious information of potential relevance to other contexts. The Stalked Barnacle (SB) fishery is one of such cases.

Main objectives

Project PERCEBES builds on the sheer diversity of management scenarios of the European Stalked Barnacle fishery, from open access through marine protected areas to Territorial Users Rights for Fishing, a kind of fine-scale, adaptive, spatial co-management system. PERCEBES will use that variety of management scenarios to **develop a set of tools to forecast the implications of spatial management options on productivity, biodiversity and connectivity of barnacle stands**, and to extract information to guide marine spatial planning in other contexts in the EU.

Main activities

PERCEBES is intended as a scientific and practical demonstration of the effects of SB harvesting on the biodiversity, productivity and connectivity of SB stands. This will be done by a continental-scale, Human Exclusion Experiment (HEE) and by construction of regional, spatially explicit Bioeconomic Models (BM) on the coasts of Alentejo (Portugal), Atlantic Islands (Galicia, Spain), Western Asturias (Asturias, Spain) and South Brittany (France), covering the latitudinal range where the barnacles are exploited in the EU. The HEE will use steel cages to simulate the effects of 1 and 2-year harvest halts and open plots as controls where harvest continues unimpeded. The HEE will test the effect of those treatments on the biodiversity, productivity and economic value of SB stands and on their potential to produce larvae. The results of the HEE will be linked to biophysical larval dispersal models to visualize the seeding effects of fallow or protected areas on other regions and the patterns of connectivity among managed or co-managed units. These models will be validated by direct measurement of recruitment distributed in time and space.

PERCEBES contemplates a collaborative engagement of stakeholders, with fishers, administrations and NGOs involved in site selection, experiment surveillance and sample collection. PERCEBES seeks to stablish a consortium with the fishers to secure a large number of recruitment observations distributed in time and space. The project will combine results from experiments, hydrodynamic models and landings data into spatially explicit bioeconomic models which will allow the generation of “policyscapes” to optimize the conservation/exploitation trade-off. This is of interest for Administrations seeking to manage the SB fishery. At the end of PERCEBES, fishers, scientists, administrators and ONGs will participate in a facilitated workshop with the goal of producing a Policy Brief with recommendations based on the project results. PERCEBES will also produce a video documentary focused on the effects of harvesting on biodiversity patterns, intended for a general audience, and focused on the science of the interaction humans-ecosystem.

A Stalked Barnacle stand at the Berlenga Island Portugal

Partners:

University of Oviedo, Orviedo, SPAIN (Coordinator)

ENSTA Bretagne, Brest, FRANCE

University Pierre and Marie Curie, Roscoff, FRANCE

University of Evora, Sines, PORTUGAL

University of Aveiro, Aveiro, PORTUGAL

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Duration:
03-2017 to 02-2020

Total grant:
€ 559,108

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Fisherman in a Marine Protected Area.

Partners:

Ecole Pratique des Hautes Etudes, Montpellier, FRANCE (Coordinator)

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GEOMAR Helmholtz Centre for Ocean Research, Kiel, GERMANY

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Duration:
01-2017 to 12-2019

Total grant:
€ 1,164,659

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RESERVEBENEFIT: Evaluating and managing connectivity in a network of Marine Protected Areas to maintain genetic diversity and deliver fish beyond protected limits

Context

Coastal marine resources provide major ecosystem services, with about 45% of the world's fisheries and 90% of fishing employment linked to small-scale artisanal fisheries (vessels smaller than 12 m). Nevertheless, Mediterranean marine resources are declining at an alarming rate and fishing has resulted in the overexploitation of more than 50% of the Mediterranean fisheries resources. In this context, Marine Protected Areas (MPAs) are emerging as key conservation and management tools to sustain marine resources and artisanal fisheries through adult spillover and larval dispersal beyond their boundaries. The Mediterranean Sea however lags behind the Aichi's Conservation Target 11 of the Convention on Biological Diversity (10% of sea surface protected by 2020) with only 1% of sea area currently covered by MPAs. There is an urgent need to both inform further expansion of conservation efforts that allow exploited species to persist and sustain artisanal fisheries. Yet, the extent to which larvae and adults disperse outside of MPA boundaries and contribute to sustain local artisanal fisheries are largely unknown.

Main objectives

Using a regional cluster of 9 MPAs along the Mediterranean French-Spanish coast as a model system, the project RESERVEBENEFIT aims to **assess the capacity of MPAs to deliver marine resources for artisanal fisheries at a regional scale** (from >1km to >1000km) for four species targeted by artisanal fisheries encompassing a variety of life histories and ecologies (the striped red mullet, the white seabream, the comber and the spiny lobster).

Specifically, the objectives of the project are to:

- Evaluate dispersal and connectivity in the cluster of MPAs for the 4 species;
- Evaluate the potential benefits in terms of genetic diversity from the cluster of MPAs;
- Evaluate the potential benefits in terms of biomass exportation outside MPAs, and the socioeconomic outcomes, from the cluster of MPAs;
- Define new locations and configurations of future MPAs using a multi-criteria approach (connectivity, distance of fishing location, fishing pressures) to optimize these benefits.

Main activities

- Sampling the 4 exploited species (About 3000 individuals);
- Genotyping the individuals using next generation sequencing and deriving a draft genome of each species;
- Evaluating the connectivity in the network of MPAs, and the genetic diversity within the MPAs;
- Defining the locations of new MPAs using a multi-criteria marine spatial planning approach.

A specific activity is planned to involve stakeholders and policy-makers in the project and disseminate the project outputs, i.e. (i) inform fishermen of the potential benefits of MPAs in fisheries areas; (ii) inform MPA managers and decision makers of the identification of new MPAs in the Mediterranean to optimize genetic diversity and sustain artisanal fisheries. This specific dissemination activity is based on the project website, social media, MEDPAN newsletters, project meetings and vulgarisation papers.

SPONFOREST - Unravelling the potential of spontaneous forest establishment for improving ecosystem functions and services in dynamic landscapes

Context

Forests play a key role in the EU Biodiversity Strategy 2020. European policy strongly supports the afforestation of former farmlands but has to date largely neglected opportunities for passive landscape restoration. Spontaneous forest establishment is occurring in many parts of Europe following the widespread abandonment of agricultural land use. This process can contribute to the creation of multifunctional, diverse landscapes, yet it is often regarded rather as a challenge than an opportunity for landscape management and conservation.

Main objectives

The project will aim to elucidate the potential of spontaneous forest establishment as a cost-effective and politically feasible tool for reinforcing networks of self-sustaining forests in fragmented rural landscapes.

Concretely, the project will address three major questions:

1. How do new forest patches establish?
2. Which consequences does the establishment process have on their character and functioning?
3. Which ecosystem services do they provide, and how are they perceived and managed by local societies and political governance systems?

Main activities

Five case studies in Mediterranean and temperate landscapes will be submitted to a combination of ecological and sociological investigations. The case studies involve contrasting socio-economic contexts ranging from the greater metropolitan area of Barcelona to sparsely populated mountain areas. Forest establishment will be investigated drawing on a broad spectrum of approaches including dendroecology, population genetics, functional ecology, remote sensing, and landscape analysis. Its societal implications will be assessed using standardized surveys and in-depth expert interviews with stakeholders and policy makers.

The project will organise a “Synthesis for Policy Application” workshop in Brussels that will translate into a jointly elaborated special issue on spontaneous forest establishment in an international policy-oriented environmental or forest science journal. Moreover, a BiodivERsA policy brief will be edited to support the outputs of the project.

Old oak tree in a rural landscape

Partners:

INRA, Cestas, FRANCE (Coordinator)

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INRA, Avignon, FRANCE

Unique Forestry and Landuse GmbH, Freiburg, GERMANY

University of Hohenheim, Stuttgart, GERMANY

Instituto de Ciências e Tecnologias Agrárias, Vairão, PORTUGAL

CREAF, Barcelona, SPAIN

Museo Nacional de Ciencias Naturales, Madrid, SPAIN

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01-2017 to 12-2019

Total grant:
€ 1,190,453

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Study sites in Portugal, Coimbra.

Partners:

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Duration:
03-2017 to 02-2020

Total grant:
€ 692,715

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URBANGAIA - Managing urban biodiversity and green infrastructure to increase city resilience.

Context

UrbanGaia will capitalize on the untapped knowledge of the many existing Green-Blue Infrastructures (GBIs) in the urban context. The project has the explicit aim to develop realistic indicators to evaluate, manage and develop performant GBIs in cities and intensively managed landscapes.
More than half the global population is living in cities, and this number is increasing. The need for resilient and healthy ecosystems, fostering biodiversity and maintaining human wellbeing under different future scenarios is particularly pressing in urban contexts where the highest population densities coincide with the highest environmental impacts. Urbanisation and increase of built surfaces are the main drivers for fragmentation, ecosystem degradation and biodiversity loss in Europe. Urbanisation provokes fragmentation and degradation: ecological connectivity and ecosystem condition (quantity as well as quality) are heavily affected especially in urbanized areas. This decreases ecological resilience, ecosystem functioning and biodiversity, in turn affecting the supply of ecosystem services and all potential well-being benefits related to it.
Green-Blue Infrastructures (GBI), ranging from technological solutions with an ecological component to entirely nature-based solutions, are hypothesised to increase ecological connectivity and quality, improve biodiversity and functioning, deliver multiple ecosystem services and direct improvements of human wellbeing. Moreover, GBI have an indirect well-being effect by mitigating the negative urbanisation cascade.

Main objectives

UrbanGaia main scientific objectives are to:
1. Verify the contribution of urban GBI to ecological resilience in four case study contexts (i.e. Vilnius, Leipzig, Ghent and Coimbra);
2. Verify urban GBI functionality and their impact on biodiversity through the provision of a support to ecosystem functions;
3. Value ecosystem services provided by urban GBI according to an integrated valuation process considering multiple values (ecological, socio-economic) and units (monetary and non monetary)

Analyse synergies and trade-offs of Urban GBI management in the local case studies and develop ecological and social sustainability conditions and performance indicators for urban GBI evaluation, management, and development.

Main activities

The URBANGAIA project aims to implement four main activities:
1. Ecological analysis of case studies including data collection, ecological characterization of the study areas (such as the quality of life, the greening level, the involvement of citizens, etc.) , validation of data by the stakeholders mapping ecosystem functions and biodiversity, and development of spatial indicators. For the case studies, four cities were selected to cover a broad range of socio-ecological and governance contexts in Europe, i.e. Vilnius, Leipzig, Ghent and Coimbra.
2. Governance analysis of the case studies, including survey and analysis of current policies; strategic environmental assessment; assessment of governance impact; governance performance indicators.
3. Assessing urban U-GBIs' multiple values and ecosystem service demand, including valuation of U-GBI-ecosystem services, foci for ecological function and governance analyses, assessing ecosystem service flows from U-GBI using scientific data, participatory mapping and citizen science validation, performance indicators
4. Typology and scenarios of Nature Based Solutions, including Refinement of the U-GBI typology and analysis of policies according with stakeholders, integrating U-GBI into locally adapted scenarios for each case study, impact assessment of the U-GBI scenarios, synthesis and comparative analysis of case studies

Throughout the implementation of different dissemination activities, the project's outputs are intended to gain a broader impact. These activities would be as followed: project website, electronic print media dissemination, engagement and information of national to EU stakeholders, as well as scientific outreach.

WOODNET: Connectivity patterns and processes along a gradient of European landscapes with woody vegetation and spatial heterogeneity

Context

Many species of cultural importance or providing ecosystem services in rural landscapes depend on the presence of semi-natural elements in landscapes, especially wooded ones (forests, hedgerows etc.). Several European policies deal with these points (nature conservation, lesser use of pesticides).

In its Green Infrastructure Strategy, the EU Commission defines GBI as a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. Yet it clearly appears a need to have a European view of the GBIs to understand their role for nature conservation and services to crop production.

Woodnet deals with these two aspects by connecting semi-natural elements to foster species movement and evaluating the regulation services for crop protection and is thus a step forward.

Main objectives

WOODNET aims at:

1. Providing innovative spatially-explicit tools for connectivity analysis along a range of landscapes from forest and shrubland to agricultural landscapes where woody vegetation elements play a key role for conservation and service delivery linked to connectivity (e.g. pest control, pollination); and
2. Integrating scientific uncertainties into policy design.

Main activities

- Mapping of the studied landscapes with a range of novel satellite images for a better characterization of habitats and landscapes;
- Use of a range of species (such as bears, lynx, birds, damselflies, etc..) behaving at different spatial and temporal scales to characterize landscape properties;
- Development of freely available connectivity models with novelties in the way 1) landscape permeability is determined and 2) species behavior is considered;
- Providing means to incorporate and manage the scientific uncertainties and their dynamics into policy models and legal frameworks for green infrastructure implementation.

Through the implementation of specific activities for the good dissemination of the project's outputs, a better knowledge transfer and involvements of stakeholders and policy makers, the WOODNET project will develop the two main following points:

- Organise meetings with policy makers and stakeholders at different scales during the first year of the project to better understand their expectations and plan interactions;
- Use existing parallel projects to link-up with stakeholders.

Contrasted landscapes with hedgerows, Brittany, France.

Partners:

INRA, Rennes, FRANCE (Coordinator)

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Université de Picardie Jules Verne, Amiens, FRANCE

Universidad Politéchnica de Madrid, Madrid, SPAIN

Duration:
01-2017 to 12-1019

Total grant:
€ 715,536

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Perspectives for BiodivERsA

BiodivERsA will support the funded projects throughout their three-year lifetime. The Call Steering Committee, composed of the BiodivERsA partners funding this call, will monitor the implementation of the scientific and societal objectives of the projects over their lifetime. BiodivERsA will also invite the projects' researchers to participate in several additional activities, for example to identify and engage new relevant stakeholders, to develop policy briefs based on their results, or to contribute to foresight activities on emerging issues and research needs of the domain. A joint kick-off meeting was organised in April 2017, which was an opportunity for projects to liaise between each other to assess potential for cross-project cooperation and opportunities for synthesis work. This kick-off meeting was coupled with a workshop on linking research and innovation, offering an additional opportunity for projects to engage new private sector stakeholders approached and invited by the funded projects and/or BiodivERsA. A final meeting will be organised with knowledge and technology transfer organisations, focusing on the further uptake of projects' results. This is just a flavour of the different BiodivERsA activities that project researchers could take part in.

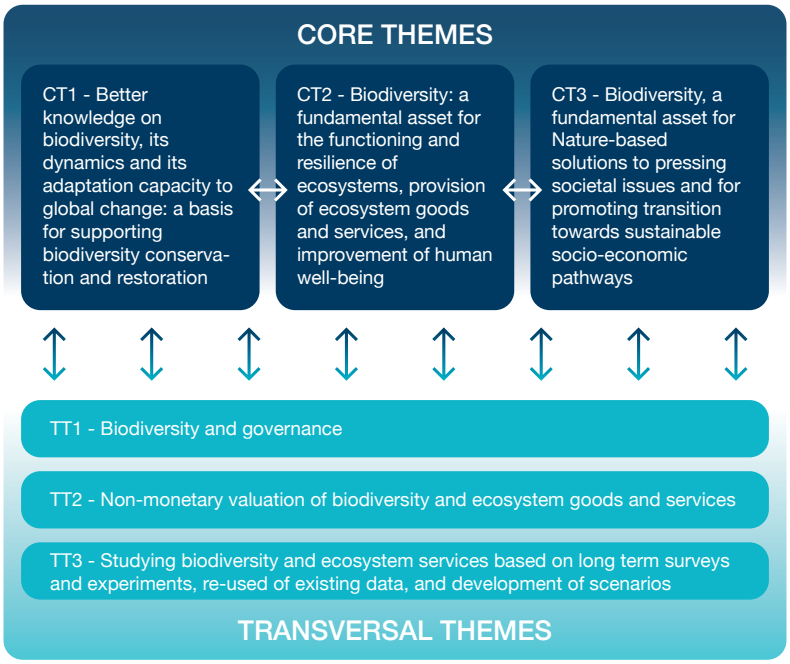

Fig. 11: core and transversal themes from the BiodivERsA SRIA for 2017-2020, titled "Biodiversity: a natural heritage to conserve, and a fundamental asset for ecosystem services and Nature-based solutions tackling pressing societal challenges"

This joint call was not designed as a one-shot action. BiodivERsA partners have adopted in early 2017 a Joint Strategic Research Agenda (SRIA) valid until at least 2020 which states the broad intentions of their cooperation, be it in terms of programme alignment, cooperation with other initiatives or main themes that they will support together (Figure 11). The BiodivERsA Coordination team prepared this agenda with inputs from all BiodivERsA partners and the academic and non-academic members of its Advisory board. The SRIA also underwent a wide public consultation, attracting responses from key organisations from academia, international cooperation or socio-economic sectors with important stakes in biodiversity and nature-based solutions research.

The SRIA sets the context for future joint calls that will be launched by BiodivERsA, which can be done jointly with other initiatives such as the Belmont Forum or Joint Programme Initiatives when relevant, and/or possibly with additional top-up funding from the European Commission for the research projects, as it was the case for the present action.

The agreement on the SRIA and on a multi-annual perspective for BiodivERsA's activities are all steps towards the longer-term sustainability of the cooperation, allowing BiodivERsA partners to continue to offer regular and consequent support and opportunities for the development of European research on biodiversity and nature-based solutions, responding to knowledge needs for public and private decision-making and finding sustainable solutions to major environmental and societal challenges of our time.

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Layout

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