

Project Report

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Deliverable D1.1 Network of EBAs established across Europe

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Network of EBAs established across Europe Deliverable D1 (D1.1)

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SHOWCASE

**SHOWCASing synergies between agriculture, biodiversity and
Ecosystem services to help farmers capitalising on native
biodiversity**



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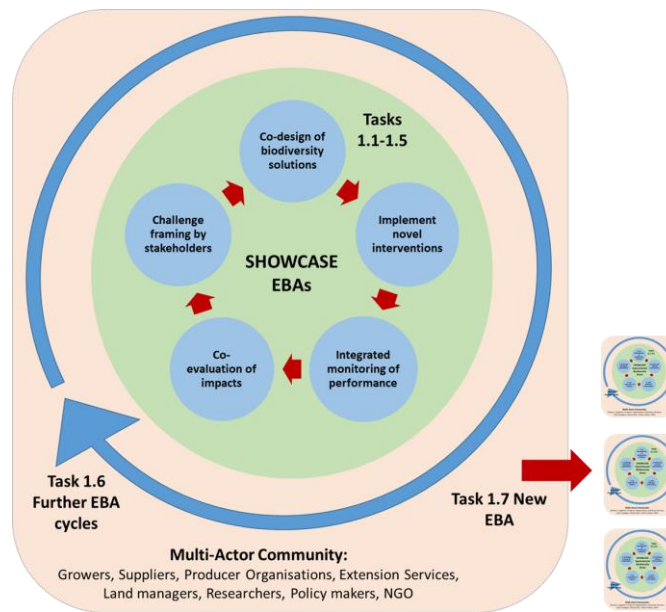
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Introduction

Aims

SHOWCASE's first step is to create a European network of local Experimental Biodiversity Areas (EBAs), that will be used to co-develop (though to varying degrees) and test successful strategies for better integrating biodiversity into farming. EBAs are located across a wide range of agro-ecosystems and represent farming systems undergoing both intensification as well as agricultural abandonment. Rather than creating new sites for the network, the approach in SHOWCASE was that EBAs would be developed mostly from existing collaborations between scientists and practitioners. The first work Package of SHOWCASE, WP1, has built in the 10 countries an experimental and knowledge exchange network in agricultural landscapes across Europe. Existing collaborations include LTSER platforms from eLTER RI, farmer cooperatives, farming research organisations and conservation organisations. These are well-established multi-actor networks already undertaking knowledge exchange, participatory research and innovation activities. Then, participatory approaches with farmers, administrators and other stakeholders are defining operational biodiversity targets at field/farm/regional level by discussing the types and extents of biodiversity indicators that should be used. WP1 thus is building our EBA network, with each EBA serving both as a local testbed for developing and implementing novel interventions and as a knowledge exchange hub. This is a pan-European network of Experimental Biodiversity Areas. In these EBAs multi-actor communities (growers, extension workers, researchers, NGOs, citizens etc.) work together to co-develop, co-manage, co-monitor and co-evaluate biodiversity innovations to enhance farm production, wildlife protection, livelihood quality and resilience of social-ecological production systems. These multi-actor communities will i) identify and prioritise local or regional challenges of biodiversity-agricultural production trade-offs, and ii) co-formulate and test potential solutions. However, to add value at the European level and allow up-scaling and out-scaling of solutions, it is essential to have a common framework and set of core standardised methodologies and measures used by all EBAs. EBAs are expected to be somewhat representative of Europe, in terms of biogeography, farming system or agricultural intensification/abandonment. However, all EBAs are starting from different points. One main target was to develop the network of EBAs based on a core approach, though place-based, in order to provide local solutions to local challenges. A conceptual representation of an EBA is given below illustrating how each EBA will be the fundamental base and operational platform integrating the various Tasks of WP1.



The first 9 months of SHOWCASE have been used to elaborate our network. This deliverable 1.1 describes our approach to build the network and gives an overview of each EBA.

What is an EBA?

An EBA should gather growers and researchers that work closely together to design, implement and test innovative interventions to enhance biodiversity in harmony with production. It is also a platform for performing a wide range of ecological, economic, social and inter/intra-disciplinary experiments. Within SHOWCASE, EBAs are the units for knowledge exchange, demonstration and dissemination. EBAs are also intended to bring together a wide set of stakeholders (e.g. NGOs, other land owners).

Methodology

The 10 countries with EBAs (CH, EE, ES, FR, HU, NL, RO, PT, SE, UK; Figure 1 below) have identified the most appropriate already existing local or regional multi-stakeholder initiatives as a basis to build upon to develop the SHOWCASE EBA network in agricultural landscapes. 2 of the countries have 2 EBAs (Hungary, Romania). At the start of the project, the multi-actor networks in each EBA have met to share and discuss the overall EBA approach, develop a common set of goals, and agree on the participatory process and timeline to achieve these. This is still an ongoing approach in most of the EBAs. The present document is therefore a living document that provides a snapshot (August 2021) of the current status of each individual EBA, presents their goals, the reasons for selected these goals (i.e. related to the local issues), and how and the timeline for reaching these goals. The document will be reviewed and refined periodically throughout the duration of the project.

Beginning of January, we (Simon Potts, Sabrina Gaba, Amelia Hood and Vincent Bretagnolle) built a framework to collect information on the environmental and agricultural features of each EBA. From January 2021 up until end of February, we organised web conferences with each individual EBA lead. In some cases, several conferences were necessary. Then, in two virtual Workshops (March and April 2021), we met as a group to refine the concepts, organisation, and aims of the network.

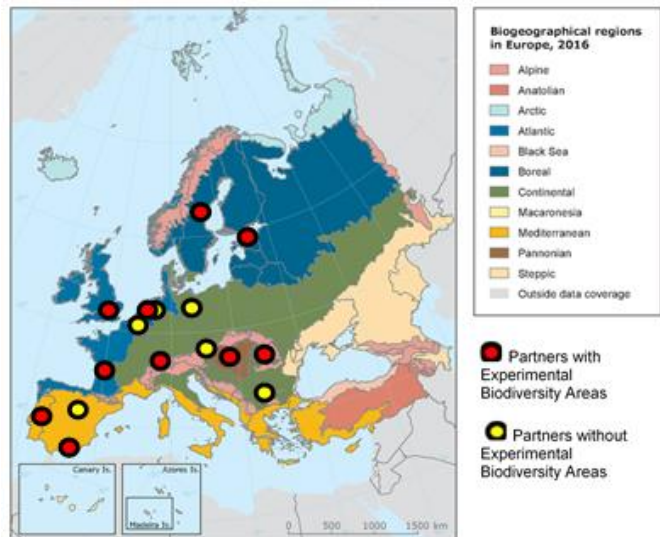


Figure 1. The SHOWCASE map, showing the 10 originally planned EBAs all over Europe.

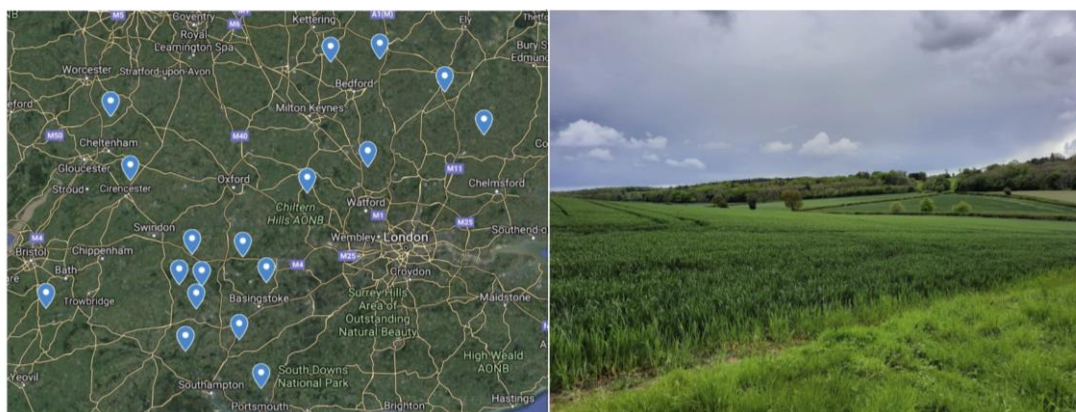
In the present document, we present each EBA separately, with the same structure, and provide at the end of the document a brief comparison of the EBAs.

Description of EBAs: site by site

UK

Location

The UK EBA is dispersed across Southern England, within an area of ~17,000 km². It consists of 16 farms (marked in blue in the map below), each of which volunteered to participate in Showcase. Many of them have an existing relationship with project-partners Leaf, and were recruited via their network.



Geographical location and impression of the UK EBA.

What type(s) of farming?

These 16 farms are predominantly arable, but some are mixed. The most common arable crops are wheat, oilseed rape, barley, and oats. The farms vary in size from large estates to small local businesses, and the intensity of farming also varies, but most are intensive. A typical group of farmers as many are particularly interested in sustainability (including biodiversity, soil health, and carbon-capture) and are LEAF Mark Certified. All farms are participating in some agri-environment schemes. One farm converting to organic this year (2021), but the others not organic.

What kind of ecosystem ?

The EBA covers a large area of Southern England (~17,000 km²), so the ecosystems vary between sites. Some (north east) are in flat areas that are intensively managed as arable land with heavy soils. Local reserves in this area are predominantly fenland. Others (west) are in hilly areas that are more commonly managed for livestock, and forest is more common.

The EBA

Though some farms are mixed, all work in the EBA is focussed on arable farming. Farmers were recruited via the Leaf network, social media, and word of mouth.

The kind of experiment/intervention have already thought about

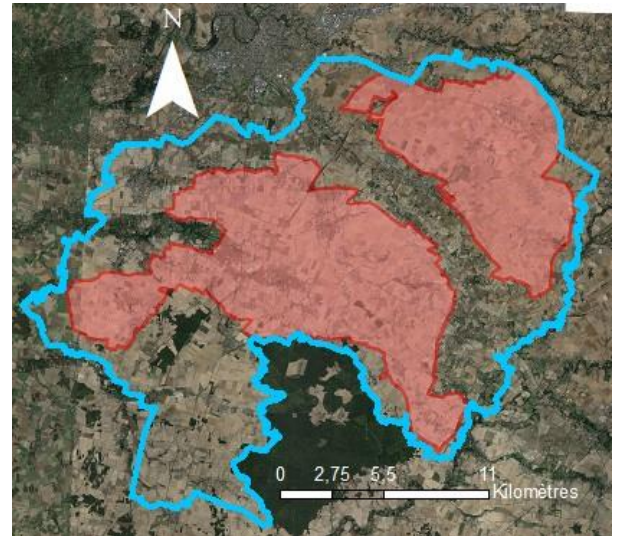
The UK EBA will conduct a plot-scale experiment on winter cover crops with four treatments that vary in their rooting depth. This intervention was selected following a farmer-led co-design process that was conducted over seven months (Feb-August 2021). Outcomes will focus on plants, soil (biodiversity and physical/chemical properties), yield, and profitability. We expect that deeper rooting species will provide

an advantage over shallow rooting species in terms of soil health, including carbon storage. The aim is to produce guidance on the types of cover crops that provide the best benefits to the soil.

FRANCE

Location

The French EBA is located within the *Nouvelle Aquitaine Region*, Centre West of France. The site size is about 450 km² with more than 13 000 agricultural fields belonging to almost 450 farms. The EBA is situated just south of the City of Niort, and around the Chizé Forest (see map; the blue line contour shows the EBA).



What type(s) of farming?

More than 90% of the 450 km² are farmed. Agricultural systems are equally shared between mixed farming (50%) and pure arable (50%), though over the last 25 years, mixed farms have strongly decreased from c.80% to 50%, as well as the overall number of farms (650 in 1994). Our team is currently working with ~100 farmers per year, 250 over the last 5-6 years. Of the 450 farms, 70 are currently organically farmed, and > 100 have contracted AES (Agri-environmental measures), because half of the study area is a NATURA2000 site (in red, map above).

What kind of ecosystem ?

The EBA is a typical lowland intensive farmland, with 8% forests, 8% urban, many hedges, 3% permanent grasslands (aged >10yrs). Semi natural elements include mainly hedges, small forest fragments (about 400 patches), stone walls, isolated trees and small vineyards. The EBA is a research platform with long-term monitoring of weeds, insect pollinators and birds.



The EBA

In terms of landscape, the EBA consists in intensive arable plain with a few meadows and fodder crop for livestock, hedges and small fragment of forests, and about 40 villages (>30 000 inhabitants, excluding the city of Niort). The EBA is a Long-term Social Ecological Research Site (LTSER Platform), belonging to French (Réseau des Zones Ateliers), European (LTER/LTSER Europe, ESFRI/ENVRI project) and world (ILTER) networks of LTER sites. It is monitored since 1994.

The kind of experiment/intervention have already thought about

Reducing inputs (fertilizer, pesticides) on field borders in arable crops. The experiment will be conducted at the field scale level, mainly on winter crops (Oilseed Rape, Wheat). The intervention is co-designed with farmers, who are allowed to chose the width, position, and the level/magnitude of pesticide and nitrate reduction of the border.

HUNGARY 1

Location

The EBA HU1 is located in Central Hungary, in the Kiskunság area (see Map).

What type(s) of farming?

In the EBA there is 88% livestock and semi-natural grassland, 10% arable land, 2% other. The EBA hosts c. 80 farms, belonging to an informal network, of which the Showcase team works with 20, via a farmer advisory hub. There are some certified organic farming, and many farmers take up agri-environmental schemes (AES).



What kind of ecosystem?

Low productivity farmlands with low intensity management. Dry and wet grasslands, wetlands and forests. We are sampling plants, plant biomass, insect pollinators and measure soil properties. Parts of the region belongs to the Kiskunság National Park and to the Natura 2000 network.



Geographical location and impression of the Hungary EBA1

The EBA

EBA HU1 is constituted by 9 locations. Each location is one parcel, two 0.5 ha parts were delineated: 1 control and 1 treated. Farmers provide the experimental parcels free of charge. However, continuous attention is needed to maintain their experimental status due to change in field personnel. National Park staff also present and is informed and is supportive of the experiment. We have a permission from the nature conservation authority.

The kind of experiment/intervention already thought about

The aim is to improve the soil after overseeding the treatment 0.5 ha parts with native, legume-rich seed mixture of 11 species in 2019. The idea is to enhance soil productivity, which improves the vegetation: more plant species and more feed (hay). Win-win situation for both conservation and production. In addition, we expect better grassland functions, like pollination, carbon cycling and other ecosystem services.

HUNGARY 2

Location

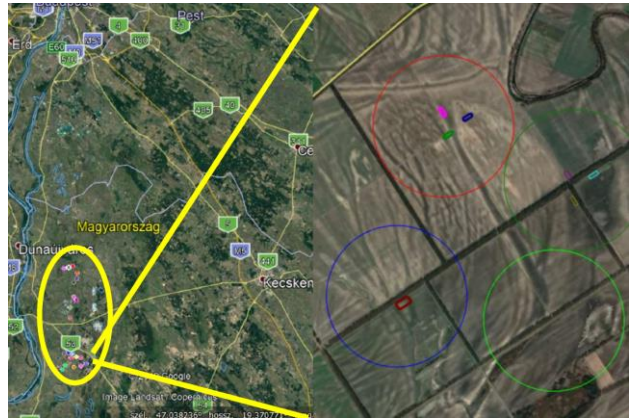
The EBA HU2 is located in Central Hungary, in the Kiskunság area.

What type(s) of farming?

One large farm, which have ten-thousand ha of crops and low intensity pastures; crops: cereal, maize, oilseed rape, sunflower; animal breeding: pig, sheep, poultry, but only sheep graze the pastures.

What kind of ecosystem?

Mainly arable landscapes composed of large fields, and semi-natural grasslands. There are tree lines, small woodlots, wetlands scattered in the landscape. We are sampling plants, insect pollinators via various techniques (trapnets, pantraps, transect walk, Malaise-traps), yield of neighbouring arable fields.



Geographical location and impression of the Hungary EBA2.

The EBA

EBA HU2 is constituted by 12 homogeneous simple landscapes + 12 heterogeneous complex landscapes (4 control plots; 4 plots contain the treated 0.5 ha area in 1 unit, 4 plots contain the treated 0.5 ha area in 3 units). Landscapes are 500m radius landscape windows. The land belongs to one big state company. The questions addressed are co-designed with the stakeholder.

The kind of experiment/intervention already thought about

We established wild flower fields in 2020 (0.5 ha area in 1 unit) and strips (0.5 ha area in 3 units) by seeding a mixture of 32 locally occurring native, non-protected herbaceous plant species, with a wide diversity according to season, flower morphology, taxonomy to best support pollinators. Our aim is to demonstrate that wildflower parcels improve pollination and biological pest control services next to the parcels, and at the landscape scale.

NETHERLANDS

Location

The Dutch EBA is located in the southern tip of the Netherlands. The area is centered around the Living Lab Boshommellandschap Geuldal (<https://www.boshommellandschap-geuldal.nl>) where WU is doing a landscape-level multistakeholder approach towards on bee conservation (yellow area in the figure below). The Showcase experimental work and social interactions are taking place in a larger area south of the city of Heerlen and bordered on all other sides by Belgium and Germany (Orange area in the figure below).



Geographical location and impression of the Dutch EBA.

What type(s) of farming?

Farming in the area consists of a mix of dairy, orchard and arable farming, which are all very intensively managed. Many farms participate in agri-environment schemes (AES) and we collaborate intensively with the agricultural nature conservation cooperative that is coordinating the AES. The number of organic farmers is limited and is highly biased towards dairy farming.

What kind of ecosystem ?

The EBA is located on a plateau of loess soils in which a number of small rivers have eroded a range of valleys into the limestone substrate. Intensive arable farming and orchards dominate the plateau's and dairy farming dominates the valleys. A significant proportion of the valleys furthermore consists of N2000 areas as the slopes, in particular, support species-rich calcareous grasslands. The management of most of these protected areas is subcontracted to farmers under strict guidelines set out by conservation organizations. The key economic sector of the area is however recreation (popular region for vacations, outings or cycling trips).

The EBA

The EBA is located between two largish cities (Maastricht -122,000; Heerlen – 89,000 inhabitants) with many smaller villages in between. Showcase work in the EBA focuses on all key sectors: orchards, grasslands (both protected and intensively farmed) and arable farming. One route to contact farmers is through the agricultural nature conservation cooperative and nature conservation organization that lease their land to farmers. However, because they only have access to farmers participating in AES we use additional approaches to contact conventional farmers. Our most successful approach is to contact them in person directly in the field (e.g. knock on doors, hail farmers on tractors).

The kind of experiment/intervention have already thought about

The Dutch EBA focuses on two different interventions in separate studies: (i) lupin cultivation in arable fields (farmers financially supported to grow lupin) and (ii) (combinations of) hedges and semi-natural grasslands next to winter wheat. Additionally, studies are being done to assess the benefits of biodiversity in apple orchards, and private benefits and public goods along a grassland management intensity gradient.

SWITZERLAND

Location

The EBA is on the Swiss plateau in the canton of Solothurn between Bern and Basel. It is part of a project running in a larger area consisting of 5 small regions of 20 km² each, 1 near Geneva (8 farms), 3 in the canton of Vaud (40) and the foreseen EBA in the Solothurn region (20 farms).

What type(s) of farming?

Farming systems consist in arable farming (cereals, oilseed rape, sugar beet, potatoes, sunflower; dominance of the crops varies with the regions), but also mix arable/diary, with grasslands between. Most of the farms have cows. There are no organic farms in the set of farms involved.

What kind of ecosystem?

The agricultural landscape is mixed, arable, pastures and semi natural elements, such as



Geographical location and impression of the Swiss EBA.

hedgerows, grasslands, traditional orchards and sown wild flower strips. Agricultural production fields are interspersed with woodlots. The region is mainly flat with few gentle slopes. Soils are mainly very high to high productive for Switzerland.

The EBA

The EBA is located in the Solothurn region with 20 farms, on the Swiss plateau between Basel and Bern. The largest city in the vicinity of the farms involved is Solothurn (17'000 inhabitants). Works in the EBA will involve close collaboration with an existing project – PestiRed (www.pestired.ch) which goal is a reduction of pesticide use by implementing agroecological practices in crops. A list of agroecological measures includes e.g. wildflower strips, undersowing, relay cropping, Push-Pull, which are currently implemented (first year: 2020). Goal is to reduce the pesticide use. The 20 farms are currently working with scientists and extension services in a co-innovation process. Noxious organisms are monitored in fields with and fields without measures by scientists and farmers. Biodiversity has been (partly) already assessed, such as weeds, pests, diseases and natural enemies of pests. Farmers participate on a voluntary basis and receive contributions for the measures implemented. During workshops the crop rotation was defined in 2019 (for six-years => 2024). The measures applied for each crop are discussed every year for the next year. The complete cropping practices are monitored with detail.

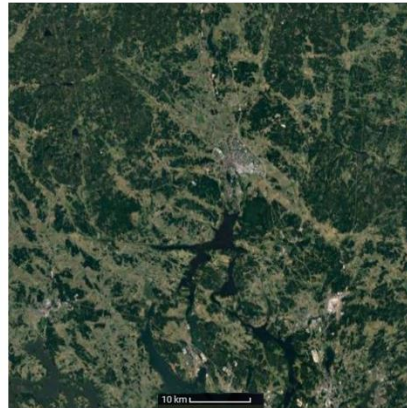
The kind of experiment/intervention already thought about

The EBA would focus on implementing flower strips as well as in-field intervention e.g. undersowing. This can be done on a larger scale, using mixtures that target both pollinators and natural enemies (sown in spring and mown in autumn). There are specifically tailored to these groups.

SWEDEN

Location

The Swedish EBA is located in the Uppland region, centred around Uppsala, and north of Stockholm in eastern south-central Sweden. The EBA consists of farms distributed over the entire region, rather than being one contiguous area.



Location of the study area in Sweden, aerial photo of the region, and impression of one farm with cover crop in autumn.

What type(s) of farming?

Arable farming is dominating in the area, but there are also livestock farming (mainly cattle, for meat), and few dairy farms. Cereals are the dominating crop type, with oilseed rape and ley (grass, clover etc.) also typically being part of the crop rotation. Both organic and conventional farms are represented in the EBA. Average farm size within the EBA is highly variable and in some cases, the farming is only a part-time occupation.

What kind of ecosystem?

The landscape in the region is dominated by a mix of production forest and agricultural land (see map). In addition to arable land, there are fragments of permanent, semi-natural, grasslands. Arable land is typically situated on post-glacial clay deposits, while forest and semi-natural grasslands are typically on moraine or outcrops.

The EBA

To establish the EBA, we are building on previous (now finished) collaborative projects, especially the Swedish Farmer and Birdwatcher alliance (<https://birdlife.se/projekt/tidigare-projekt/lantbrukare-och-fagelskadare/>), but we have also reached out to farmers who would be interested in collaborating with us through newsletters and social media. More than 30 farmers have indicated their interest in participating in the EBA, but we expect that not all of the will participated in the end, depending on what interventions we agree upon (see below).

The kind of experiment/intervention have already thought about

Interventions in the EBA will be co-developed together with farmers in the EBA during autumn 2021. The intervention(s) will be selected based on what farmers are interested in, and is likely to work well on their farm. Potential interventions include modified flower strips or flower patches, no-till farming, and cover crops. Co-developing interventions through this bottom-up approach will take longer time than a researcher-lead top-down approach, but will hopefully increase the level of involvement by

farmers, increase their level of trust, and yield interesting insights in the motivations of farmers to adopt biodiversity-promoting farming practices, in line with the overall aims of SHOWCASE.

PORTUGAL

Location

Alentejo is located in the south of Portugal, being the largest natural region in the country. It has an area of 26158 km², which corresponds to about 29% of the country's total surface. It is divided into three large areas, Alto Alentejo, Central Alentejo and Baixo Alentejo. Alentejo is bordered on the north by the Tejo River, on the east by Spain, on the south by the Algarve and on the west by the Atlantic Ocean. The region's relief is characterized by the great uniformity of peneplains, where low altitude mountainous masses stand out, disperse and far apart, with the exception of the São Mamede (1025m) and Mãrvao (865m) mountains. The climate is temperate Mediterranean, with hot, dry summers and mild, rainy winters. The decrease in maritime influence makes the inland areas of the Alentejo particularly hot in summer and relatively cold in winter. Natural and semi-natural vegetation occurs in the form of extensive savanna-like forests mainly composed of cork (*Quercus suber* L.) and holm-oak (*Q. rotundifolia* L.) trees in varying densities, the characteristic Portuguese montado, which is considered a High Nature Value Farming System according to the European Environmental Agency.



Geographical location and photo of 1 of the study areas of the Portuguese EBA

What type(s) of farming?

The agricultural characterization of the area encompasses a useful agricultural surface of 582,190ha being represented by a wide variety: cultivation of cereals, irrigated cereals, olive groves, vineyards, orchards (both dried and fresh fruits) temporary forage surfaces or meadows, permanent pastures under covered, biodiverse pastures, forage and forest areas (especially cork, holm-oak and pine tree). Crops present a wide range in terms of management intensity, from organic, biodynamic, passing through semi-intensive and intensive.

What kind of ecosystem?

The Alentejo landscape is characterized by cork oak forests, entirely built due to agrarian history and human labor that over the centuries have changed the original Mediterranean ecosystem, in its structure and biodiversity, in an extensive agro-silvo-pastoral system associated with great land exploitation. The cork oak forests are areas of holm oaks and cork oaks in which other crops and livestock production can be associated. Associated with this production system, rural settlements are usually clustered in hills and in compact villages. Due to all these factors, the landscape and production structures are heterogeneous. The topography is flat, with altitude ranging

between 100 and 450 m a.s.l. The regional landscape includes open agricultural areas for cattle grazing and cereal farming, orchards of tree-like crops such as olive (*Olea europaea* L.) and vineyards (*Vitis* spp.), and timber plantations (mainly *Pinus pinaster* L. and *Eucalyptus* spp.) all interspersed with human settlements, roads and wetlands as well as riparian vegetation along streams. Natural and semi-natural vegetation occurs in the form of extensive savanna-like forests mainly composed of cork (*Quercus suber* L.) and holm-oak (*Q. rotundifolia* L.) trees in varying densities, the characteristic Portuguese montado.

The EBA

Our EBA belongs to both Central and Baixo Alentejo. The physical geography of the territory is quite uniform, with the plain dominating the landscape almost completely, with altitudes that in most of the territory undulate between 200 and 400 m, interrupted here and there by valleys and mountains with little sloping slopes and sown with relatively extensive dams. Also from a physical point of view, the intervention region is characterized by agriculture, marked by a rural landscape where olive groves and cork oak forests predominate, which is an agricultural system that evolved from the Mediterranean forest, through human intervention, namely with the plantation of cork oaks and holm oaks.

The kind of experiment/intervention have already thought about

The Portuguese EBA will take olive (*Olive europaea* subsp. *europaea*) as study system. Within 10-12 intensively managed olive farms will be performed in-field management interventions consisting in sowing a mixture of seeds belonging to 9 native species. Using a similar number of control farms, the effect of these intervention on biodiversity and ecosystem functions will be investigated. Moreover, in a total of three olive farms ranging from organic to super-intensive, a vertebrate exclusion experiment is undergoing to quantify the economic impact of losing vertebrate-mediated biocontrol services in olive farms.

ESTONIA

Location

The SHOWCASE EBA in Estonia (EE) is located in the western and south-western coastal lowland next to Baltic Sea (except islands, see Figure below). Study areas are situated in two counties (Pärnu and Lääne county). More precisely in two urban (Pärnu and Haapsalu cities) and three rural municipalities (Häädemeeste, Lääneranna and Lääne-Nigula) covering the coastline of about 300 km. Pärnu and Haapsalu cities cover 857.9 km² (population density 59.0 inhabitants per km²) and 271.8 km² (47.4 inhabitants per km²), respectively (Statistics Estonia, 2021a). Häädemeeste, Lääneranna and Lääne-Nigula rural municipalities cover 494.3, 1,362.6 and 1,448.7 km² with population density 9.7, 4.0 and 4.8 inhabitants per km², respectively.



Location of study sites in Estonia.

What type(s) of farming?

The EE EBA consists of mix farming, and crop and/or livestock farming, managed both extensively and intensively. Many farmers manage coastal and other types of semi-natural grasslands by grazing and/or by mowing for nature conservation. Based on Statistics Estonia (2021b), the number of agricultural holdings having received area and animal-based European Union support is the biggest in Pärnu county with 1,305 holdings and comparable number is 383 holdings in Lääne county. The number of agricultural holdings participating in agri-environmental schemes (AES) is 1,201 in Pärnu county and 366 in Lääne county. In Pärnu county you can find the biggest number of holdings with organic farming (221). Corresponding number is 83 holdings in Lääne County. Total number of holdings with organic farming in Estonia is 1,938.

What kind of ecosystem ?

The EE EBA is located in the traditional coastal agricultural landscape of West-Estonian and The Gulf of Livonia Coastal Lowland (Arold, 2005). The West-Estonian Lowland is the largest landscape region (6035 km²) in Estonia. It is formed on limestone bedrock, while the Gulf of Livonia Coastal Lowland lies mainly on Devonian sandstones. Lime- and sandstone together with other environmental factors have led to the formation of diverse landscape and vegetation cover. Vegetation is characterised by sand beach ridges, dunes and wetlands rich in birds behind these, large area of coastal and floodplain grasslands as well as reedbeds. The lowland has the river with the biggest catchment area (about 3000 km²) in Estonia. Besides coastal and floodplain grasslands or other wetlands there are also a lot of species-rich alvars and wooded meadows. The area is also rich in forest containing pine forests, mixed spruce and deciduous forests and dry boreal, alvar forests. Many of those nature values (e.g. threatened habitats and species, ecosystems, cultural heritage etc.) are recognized as protected areas and/or NATURA2000 areas and their management follow specific regulations and restrictions apply. The key economic sector of the EE EBA is agriculture together with forestry and fishing, but also tourism.

The EBA

The EE EBA is located within coastline in Lääne County (population 20,2085 (Statistics Estonia, 2021a)) and in Pärnu county (85,760). SHOWCASE project includes at least 16 farms that are strongly involved in land management in the coastal areas for nature conservation (see foto's right).



The kind of experiment/intervention have already thought about

The EE EBA focus on impact of long-term management, continual grazing (and/or mowing) on biodiversity and agricultural output in the semi-natural grasslands within intensity gradient in coastal areas. Total 16 with grasslands extensively managed by grazing or mowing (with aids for farmers, managers of semi-natural habitats and/or Natura 2000 sites) and abandoned/unmanaged coastal grasslands (without any support).



Coastal grasslands managed by grazing in Pärnu (<https://goo.gl/maps/ZKMxJQS5kk5hfuEq7>) and Kavaru (<https://goo.gl/maps/6pAyzHxezWhShv47A>).

ROMANIA

Location

"Dealurile Clujului Est" Natura 2000 site is situated in the north of Cluj-Napoca (Transylvania), the second largest city in Romania. The main part of the protected area is situated in four communes: Borșa, Vultureni, Chinteni, Dăbâca. The commune of Borșa extends over an area of 62 km², and has about 1550 inhabitants in 4 villages (data for 2011). The commune of Vultureni has about 1500 inhabitants in 6 villages and covers an area of 71 km² (data for 2011). The commune of Chinteni has 2900 inhabitants in 9 villages and covers an area of 96 km² (data for 2011). The commune of Dăbâca has 1500 inhabitants in 3 villages and covers an area of 50 km² (data for 2011). Geographically, the area belongs to the so-called "Hills of Cluj", the south-eastern part of the Someș Plateau, which borders on the Transylvanian Depression. As the name implies, the region is characterised by hill chains with average heights of between 450 and 550 m (max. is "Dealul Nucului" with 667m), whereas the valleys of the left bank tributaries to the "Someșul Mic" are between 250 and 400 m high. In the research area, the valleys are orientated NW-SE, leading often to distinctive characters on the north and south facing slopes. The soils belong (most of its) to chernozemic soils (CZ) with its related subtypes: CZ ca, CZ ca gl. Landslide phenomena can be observed in the area – both so called "slumping hills" characteristic of Transylvania and active superficial landslides on some slopes. A particularity of the area is the presence of volcanic tuff "tuful de Dej" (in some places even at surface of the earth). As a cultural feature, most of the old houses are built with volcanic tufa. The mean annual temperature is 7-10°C, with average temperatures of 19-21°C in July and -1 or -2°C in January. The annual mean precipitation reaches 600-700 mm, with great fluctuations between years.

What type(s) of farming?

The agriculture is characterised by subsistence and semi-subsistence holdings (3-4ha), which in general own several small arable and grassland plots scattered over the commune. As well as arable farming, sheep and cattle keeping are carried out. One of the great problem in the studied area, as well as in most of the rural area of Romania, is the aging of the population. In the region there are Agri-environment measures with a package on the conservation *Maculinea* sp. with late cutting date.

What kind of ecosystem ?

"Dealurile Clujului Est" is a Natura 2000 site (ROSCI0295 code). It covers 19622.88 ha. It includes 2 Nature Reserves (IUCN IV): "Fânațele Clujului – La Copârșai" (i.e. "the Coffins") and "Fânațele Clujului – La Craiu". "Dealurile Clujului Est" Natura 2000 site is the only place where all of the four European *Maculinea* species can be found: Scarce large blue, Dusky large blue, Large blue and Dutch alcon blue. In some hay meadows from "Dealurile Clujului Est", the number of vascular plant species exceeds 95/10m², even beating the world record for plant diversity (in mesophilus meadows). Traditional agricultural activities support this diversity (e.g. mowing manually or with lightweight machines, natural fertilizers, grazing with a small number of animals, no grazing in winter). The Standard Form of the "Dealurile Clujului Est" Natura 2000 site includes 26 species, including *Catopta thrips*, *Leptidea morsei*, *Lycaena dispar*, *Maculinea nausithous*, *M. teleius*, *Lutra lutra*, *T. vulgaris ampelensis*, *Vipera ursinii rakosiensis*, *Iris aphylla* ssp. *hungarica*, *Pulsatilla patens*. The cultural landscapes of "Dealurile Clujului Est" has resulted from traditional human activities. Local land use (small plots with different uses) results in a mosaic of habitats - favourable for rare,

protected species.

The EBA

Due to population aging (especially) from rural areas, most of the traditional agricultural activities are gradually abandoned. As a direct consequence, there are changes in land use. A lot of areas are abandoned and/or grazed by sheep. Other areas are integrated in arable monoculture areas. The number of sheep in "Dealurile Clujului Est" has increased considerably in the past few years. For examples, in Apahida the number of sheep and goat has increased with 64%, in Bonțida with 65%, in Dăbâca has doubled (116%), and in Vultureni tripled (197%). It can be noticed that even in the case of UATs where sheep and goat flocks have been reduced or maintained compared to 2007, the pressure on meadows is still higher. In all UATs, the value of the Livestock Units/ha value exceeds the value of 0.5, and in 5 of the 9 UATs within the "Dealurile Clujului Est" site area, the value of the index is greater than or equal to 1. It is considered that 1 ha of can support 0.5 LVU over a 135-day grazing in semi-natural meadows (in the romanian hills area). Another problem is winter grazing. When snow layer is lacking, sheep flocks can be seen on the grasslands in the studied area. Due to climate change (warming), number of winter days without snow layer has increased. Winter grazing is conducted especially for fodder economy. That means less grassland will be mowed. The Management Plan of the "Dealurile Clujului Est" includes conservation measures for each protected species/habitat that has been identified on the site. Strategy for the conservation of biodiversity in the "Dealurile Clujului Est" is equivalent to implementing the Management Plan and Regulations of the Natura 2000 site. The Management Plan for the site is accepted by the Ministry of Environment but it is not in published yet. No Natura 2000 compensatory payments for farmers, only the AE *Maculinea* sp. package.

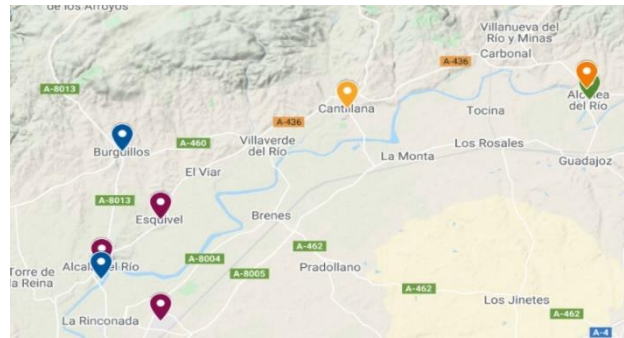
The kind of experiment/intervention have already thought about

We will study the *Maculinea* sp. butterfly population by changing mowing practices and looking at moths trough the light traps. Probable we will combine the results from different mowing periods with the results from scrub removal and/or different grazing system, with different LVU.

SPAIN

Location

The Spanish EBA is in the agricultural Guadalquivir valley, in the Vega del Guadalquivir county in Seville province. This area is well connected with Seville city where the Doñana Biological Station-CSIC center is located. There, Bartomeus lab (<https://bartomeuslab.com/>) conducts research on how drivers of global change are affecting biodiversity and ecosystem functioning, with a special focus on pollinators and plants. SHOWCASE experimental work will be developed in 19 fields located in San José de la Rinconada, Alcalá del Río, Esquivel, Cantillana, Alcolea del Río and Burguillos village.



Geographical location —markers indicate villages where field sites are located, colours indicate different cooperatives or companies— and impression of the Spanish EBA —plum orchard and detail of a pollinator *Andrena cf. thoracica*—

What type(s) of farming?

Farming in the Spanish EBA consists of stone fruit conventional orchards, mainly

What kind of ecosystem?

The Spanish EBA is located on the open flat agricultural valley of Guadalquivir river plain and riverside, a historically highly anthropised area. Nowadays, this area is characterised by productive landscapes, mainly by intensive fruit and vegetable farming. During the last decade has been a strong land cover transition towards citric orchards. There are few seminatural elements in the fields.

The EBA

Spanish EBA is called Guadalquivida (<https://www.beeproject.science/eba.html>). It consists of a new pilot community of stone fruits producers. The community includes farmers, agricultural technicians, and other sector stakeholders. It integrates two groups of participants: i) the field community that already includes six companies and cooperatives participating in the co-design that will be implemented in 15 fields, and ii) the broad community, with key informants interested in knowledge transfer. Spanish EBA is in an area where the stone fruit sector has suffered a restructuring due to economic and socio-political factors. During the last decade, the number of stone fruit fields has significantly decreased in favour of citric orchards. Also, field management has intensified. The participant farmers are those remaining after the sector restructuring and are interested in pro-biodiversity managements facing new market

demands and policy requirements. However, they are openly warring against organic farming. Our route to contact farmers has been through telephone calls to different cooperatives and companies.

The kind of experiment/intervention have already thought about

Since this EBA is a starting community, we are still valuing which measures will be implemented. We have a list of proposals to work in: simple tools to measure pollinator potential, cost-benefit assessment of canopies and other green infrastructures, optimising water use, agroecological effects of flower strips and green covers, biological pest control, labelling and market differentiation strategies. During the Autumn, the final design will be decided and will be implemented as of winter.

Description of EBAs: a global view

Synthesis

Key characteristics of the national EBA are summarised in the table below, which synthesize the current state of the network, the various types of farming systems, the state and kind of interventions, and how they will be managed and implemented, and the relationships with farmers and farm organisations.

Characteristic	EE	FR	HU-1	HU-2	NL	PT	RO-DCE	RO-STM	ES	SE	CH-1	UK
Sector			State owned Grassl. Public & private								PestiRed	
	Grassl.	Arable+Mixed	Arable	Arable	Mixed	Hort.	Grassl.	Grassl.	Hort.	Arable	Arable	Arable
Farms (expected no.)	>20	>20	1	18	20-30	12	8-10	10-15	>20	20	70	15
Intervention	restoration (removal of reed etc. + grazing) and/or	Flexible, incl. field margins; Pesticides	Flower fields	Over-seeding	Lupins / multiple	Flower patches?	removing scrub in Maculinea parcels, mowin,	mowing, cotrolled grazing and removing scrub	Cover crops?	?	Flower strips/ undersowings/ cover crops multi	?
Co-design	?	☑	☑	☑	no	?	☑	no	☑	☑	☑	☑
Scale	plot/field?	Plot/ field	Field/ landscape	Field	Field	Field	Field	?	Field	?	Field	Field?
Land use change	Int/Ab	Int	?	Ab	Int	Int	Int/Ab	?	Int	Int/Ab	Int	Int
Farmer organisation	no	no	no	no	☑	☑	☑	☑	☑	?	☑	☑
Other stakeholders	☑	☑	no	☑	☑	☑	☑	☑	☑	?	☑	☑
Demonstration farm	no	no	no	no	no	☑	☑	?	?	?	?	☑
Established initiative	☑	☑	☑	☑	☑	☑	☑	☑	no	☑	☑	☑
Dialogue started	☑	☑	☑	☑	☑	☑	☑		☑	☑	☑	☑

Livest. = Livestock, Hort. = Horticulture; Int. = Intensification; Ab. = Abandonment;

☑ = Yes

Farming systems and regions

As can be seen from the above table, the network of EBAs represents a gradient of farming systems (types and intensification) that range from intensive pure (almost) arable crops (CH, UK), intensive arable with some livestock/grasslands or forests (FR, SE, HU-2), mixed (arable crops and livestock) such as in the NL, grassland with some arable crops (HU-1), pure grassland (EE, RO-DCE, RO-STM) and finally, orchards (PT, ES).

Among the 12 EBAs, 9 EBA leaders have co-designed its implementation and two have not decided yet. Most interventions will be performed at the field scale (10 over 12) in landscape generally characterised by land use change because of intensification (8 over 12). EBAs will not only engaged farmers in SHOWCASE, farmer organisation and other stakeholders (citizens, NGOs ...) will also be involved.

There is also a huge variety of Region sizes (from highly packed, e.g. HU-1, to very large, e.g. UK), and of number of farms (from 1 to about 100). There is finally a diversity of history, with some EBAs being established since 15-20 years (FR), while some are still to being created (ES, PT).

Intervention types

In regard to experiment/interventions, some EBAs use top-down approaches, others have established a co-design approach, and other are starting, or will start co-designing with farmers. Three major pathways (non-exclusive) and several spatial scales for interventions are included in the EBA network:

1. Reducing intensity: By reducing pesticides, soil work, harvest intensity; or Reducing inputs=reducing costs (=improve gross margins) & improve Biodiversity (FR, ES, CH-1, NL (Lupin))
2. Managing ecological infrastructures: Grass margins, hedgerows, flower fields: that improve biodiversity and should either improve yields (pollination, soil quality) or reduce cost (pest control); or both (HU-1, NL (SNE), SW, PT, FR)
3. In highly extensive systems that are already very good for biodiversity but face risks of abandonment and/or conversion (eg, grassland ploughing) may consist in improving farmer's yield or income (including product selling) without affecting negatively biodiversity (HU-2, ES, RO-DCE, RO-STM)

A diversity of approaches to co-design have been adopted across the network with some EBA's using a fully co-design approach (e.g. UK...), others a partial co-design approach (e.g.) and others taking a more researcher-led approach (e.g.). All EBAs have initiated regular dialogues between stakeholder sand the Showcase teams.

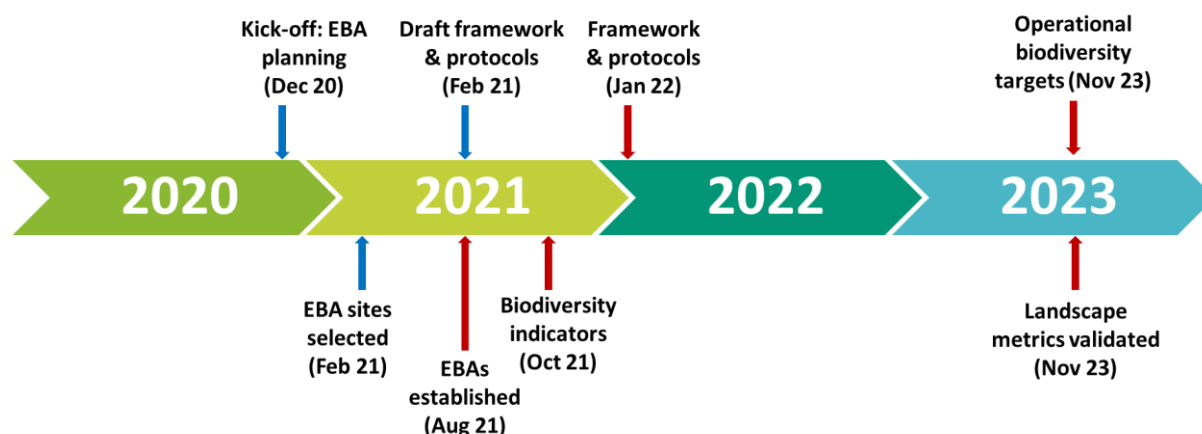
Links within and between EBAs will be strengthened through a programme of regionally tailored multi-actor workshops, multi-media knowledge exchange, peer-peer learning and sharing of best practices. Learning-by-doing, one of the management by specifically considering the spatial scale relevant for farmer/policy decision making.

Next steps

The EBA network acts as the platform for all the major WP1 activities which include:

1. Develop the EBA network (Task 1.1, this Deliverable)
1. Establish the EBA framework and protocols (Task 1.2)
2. Develop biodiversity and ecosystem service indicators (Task 1.3)
3. Test biodiversity indicators (landscape metrics) (Task 1.4)
4. Define operational biodiversity targets (Task 1.5)
5. Develop processes for sustaining EBAs (Task 1.6)
6. Deliver a roadmap to upscale EBAs (Task 1.7)

The timeline for these Tasks is given below:



The EBA network will also underpin major activities for the other Showcase WPs.

WP2 Incentives:

- Private & public goods (Task 2.2)
- Farmer motivations and awareness of biodiversity (Task 2.3)
- Farmer preferences for incentives (Task 2.4)
- Costs and benefits of Biodiversity actions (Task 2.5)
- Farmers as citizen scientists to monitor BD (Task 2.6)
- Modelling biodiversity benefits on farm (Task 2.7)
- Business models (Task 2.9)

WP3 Evidence:

- Co-developing novel interventions (Task 3.2)
- Assessing genetic diversity (Task 3.3)
- Production resilience under climate change (Task 3.4)
- Vertebrate biocontrol (Task 3.5)
- Citizen science toolbox (Task 3.8)

WP4 Communications:

- Improving communication within/between EBAs and other actors (Task 4.2)
- Showcase benefits of biodiversity to farmers (Task 4.4)
- Handbook for EBAs (Task 4.5)
- Communication and knowledge exchange with:
 - Citizen scientists (Task 4.3)
 - Public (Task 4.6)
 - Policy makers/advisors (Task 4.7)
 - Scientific community (Task 4.8)