

# CIHEAM'S CONTRIBUTION TO AGROBIODIVERSITY



## PROMOTING AGROECOLOGY AND CONSERVING AGRO-BIODIVERSITY: A PRIORITY FOR THE CIHEAM

According to the FAO<sup>1</sup>, Agrobiodiversity is defined as “the variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agro-ecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agro-ecosystems”.

The Mediterranean basin is the world's second largest biodiversity hotspot. It hosts 15,000-25,000 plant species (60% are endemic), and over 1,900 species of amphibians, birds, cartilaginous fishes, endemic freshwater fishes, crabs and crayfish, mammals, dragonflies and reptiles). Nowadays, protected areas cover only 9 million hectares, representing 4.3% of the region's total surface area, the largest protected area lying in the north (IUCN, 2008; FAO and Plan Bleu, 2018).

Mediterranean socio-agro-ecosystems have been shaped over centuries of interaction between humans and nature, and agricultural, ecological and even culinary knowledge have co-evolved under the influence of multiple historical and environmental factors, building up a priceless heritage.

Unfortunately, biodiversity, and the agri-food systems depending on it, is threatened by habitat fragmentation and degradation induced by human activities (e.g. overexploitation, deforestation, dam construction, wetland drainage, urbanisation, pollution, introduction of alien invasive species, etc.), but also by farmland abandonment and encroachment, as well as by external drivers such as global/climate change (IUCN, 2008; Migliorini *et al.*, 2018). Consequently, at the EU level for instance, almost a quarter of the species are threatened with extinction and the majority of ecosystems are degraded to the point where they are no longer able to deliver their valuable services.

Addressing biodiversity conservation at large scale and sustaining ecosystem service delivery in the long term calls for an integrated approach entailing the combined management of marine and terrestrial ecosystems, across rural/agricultural and even urban areas and landscapes, and much beyond protected areas (e.g. Natura 2000, nature reserves, and parks). This means promoting those farming systems that sustain biodiversity,

by rewarding them suitably for the many public goods and services they provide, and by boosting their socioeconomic viability (e.g. differentiating and increasing the added-value of their products, lifting regulatory obstacles, facilitating access to land, etc.).

In line with the UN Sustainable Development Goals (SDGs) and the EU Biodiversity Strategy adopted in 2011, one of the missions of the CIHEAM is to support agrobiodiversity conservation and agroecology practices.

In order to enhance agrobiodiversity and reduce the pressure of agriculture on the environment, the CIHEAM has been developing a holistic, knowledge-intensive approach to farming based on the principles of agroecology as a way to develop productive and resilient agricultural and sustainable food systems based on the benefits provided by ecosystems, considering nature and biodiversity as factors of production. In this process, biodiversity is both a resource to conserve and an indicator of ecosystem health, from the field to the landscape level.

The CIHEAM carries out a wide range of activities that contribute to achieve simultaneously food production, socioeconomic viability and resource conservation objectives. They consist in studying/mapping ecosystems and their services, and evaluating the effects of agricultural practices on those; fostering the exchange of know-how and the adoption of agroecological practices among farmers; ensuring the selection, production and safeguard of certified propagation material (e.g. citrus, stone fruit and grapevine germplasm); boosting agricultural innovation and farm viability to drive the uptake of sustainable agricultural practices across large scales; and adjusting the policy and regulatory frameworks to enable sustainable farming practices.

### WHAT IS THE CIHEAM?

Founded in 1962, the CIHEAM (*Centre International de Hautes Études Agronomiques Méditerranéennes*) is a Mediterranean Intergovernmental Organisation devoted to the sustainable development of agriculture and fisheries, food and nutrition security, and rural and coastal areas. It gathers 13 Member States from both shores of the Mediterranean (Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey) and operates through its four Institutes in Bari (Italy), Chania (Greece), Montpellier (France) and Zaragoza (Spain), and its headquarters in Paris. It collaborates with several international and regional institutions. The CIHEAM's actions are bottom-up and problem solving oriented, connected to the peculiar needs of the countries. With its Member States, public and private partners, the CIHEAM strives to fulfil its Strategic Agenda, CAPMED 2025. Its 5th objective addresses Agroecology.



### HNV-Link: High Nature Value farming Learning, Innovation and Knowledge ➤ [www.hnmlink.eu](http://www.hnmlink.eu)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 696391



**HNV-Link** is a **thematic network** funded under the Horizon 2020 Research and Innovation Programme, engaging in a **multi-actor and multi-scalar innovation process** **13 partners and 10 Learning Areas** across Europe, **and inspiring and spreading innovations that support High Nature Value (HNV) farms and communities** by enhancing their socio-economic viability, their ecological value and the services they provide to the society.

### WHAT IS HIGH NATURE VALUE (HNV) FARMING?

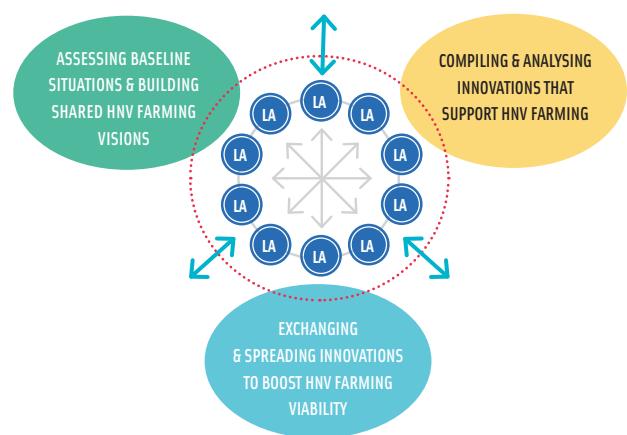
High Nature Value (HNV) **farming refers to farming systems/farmlands that support a high diversity of wildlife species and habitats and/or species of conservation concern**. It comprises mainly low-intensity livestock farming relying on permanent and wooded pastures and hay meadows, and in some areas includes low-intensity crop systems, traditional orchards and olive groves. HNV farming **maintains a diversity of land cover, including semi-natural vegetation, and a high density of features such as hedges, stone walls, terraces and ponds** that enhance landscape structure and connectivity. It occurs most frequently in areas where natural constraints hinder intensive production, **covering over 25% of the European farmland**. On top of producing quality food (e.g. grass-fed meat, artisan cheese) and conserving biodiversity (including traditional breeds/varieties), it supplies a wide range of public services (carbon storage, clean water, wildfire prevention, open landscapes, etc.) and contributes to countries' economies and identities.

**Engaging stakeholders in an innovation brokering process for HNV farming systems**

**The 10 Learning Areas (LA)**: Western Stara Planina (Bulgaria), Dalmatian Islands (Croatia), Thessalia (Greece), Causses et Cévennes (France), The Burren (Ireland), Sítio de Monfurado (Portugal), Eastern Hills of Cluj (Romania), La Vera (Spain), Dalsland (Sweden), Dartmoor (UK). Farmers, practitioners, advisers, NGOs, authorities, researchers, etc., have formulated collectively sustainable development visions, identified obstacles and opportunities, and shared solutions/innovations to enhance the viability of HNV farms.

### HNV-LINK OBJECTIVES & APPROACH

- To assess the current situation and trends of HNV farming systems (dynamics, challenges, innovation gaps, opportunities, etc.)
- To foster the commitment of local actors in developing shared HNV farming visions and sustainable development pathways
- To catalyse networking at the local, regional and EU levels to transfer innovations/practices that enhance the viability of HNV farms
- To strengthen HNV farming advisory services and education to answer the needs of the HNV farmers and build capacities
- To raise awareness of HNV farming benefits and advocate stronger policy support (e.g. through the CAP)



## HNV-LINK OUTPUTS

› available at [www.hnmlink.eu](http://www.hnmlink.eu)

- Guidelines for baseline assessments, study visits and innovation transfer
- Baseline Assessments of the Learning Areas Atlas showcasing the diversity of HNV farming systems
- Compendium of successful innovations from across the EU, that enhance HNV farms' sustainability in the long term
- Online interactive innovation map
- Cross-visits, local/regional workshops, and international conferences to foster cooperation and spread innovation
- Reports on the grassroots processes leading to "HNV farming visions" and local HNV farming innovations
- Educational materials for vocational and university teachers
- Project Booklet compiling all the project's achievements
- Research papers and participation to conferences
- Videos/slides shows on HNV-Link's YouTube and SlideShare channels
- Newsletters and press articles
- Policy recommendations for the future CAP
- Stronger policy support (e.g. through the CAP)

## TAKE-AWAY MESSAGES

- HNV farms are multi-functional and must be recognised and rewarded for their ecological, social and economic benefits.
- Plenty of HNV farming-friendly innovations exist and regional/national frameworks must enable their application/diffusion.
- Supporting HNV farmers' empowerment, organisation, and cooperation with other stakeholders is key.
- Agriculture, environment, food and rural development policies/regulations should suit better low-intensity farming.
- Under the CAP, eco-schemes (Pillar 1) and Agri-environment-climate Measures (Pillar2) should incentivise HNV farming and all semi natural pastures/grasslands grazed or producing fodder should be entitled to direct payments.
- Multi-actor networks such as HNV-Link play a key role in boosting innovation and policy change, by fostering co-innovation and by reconnecting researchers, practitioners, farmers and the society.
- It takes time to build momentum and for innovation to develop across themes: continuity of projects over several years is critical, as is the continuity of institutional cooperation and support.



HNV-Link held its Final Conference (Innovation to sustain HNV-Farming: who needs to do what?) on 31 January 2019 at CIHEAM Montpellier: DG Agri, DG Env, EIP-Agri & others reaffirmed the vital role of HNV farming in fulfilling EU biodiversity and rural development objectives, and presented a range of supportive measures/instruments in the new CAP.

This vibrant network will continue to support HNV farming and the biodiversity and ecosystem services depending on it.

## RECENT PUBLICATIONS

**Gouriveau F. et al., 2019.** Policy paper: What EU policy framework do we need to sustain High Nature Value (HNV) farming and biodiversity? 20 p.

**Poux X., et al., 2018.** What is the relevant approach for engaging territorial actors in a HNV innovation project? A strategic perspective – findings from HNV-Link H2020 Thematic Network. SISA International Workshop (6-8/11/2018, Riga).

**FUNDING:** EU Commission – H2020 programme

Budget: 2.2 M €- Dates: 2016 – 2019

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# OTHER CIHEAM PROJECTS RELATED TO AGROBIODIVERSITY



## PACTORES - PASTORAL ACTORS, ECOSYSTEMS SERVICE AND SOCIETY AS KEY ELEMENTS OF AGROPASTORAL SYSTEMS IN THE MEDITERRANEAN (2018-2021)

**Website:** <http://www.pactores.eu>

**Contact CIHEAM:** Roberto Capone ([capone@iamb.it](mailto:capone@iamb.it))

**Countries:** Algeria, Greece, Italy, Spain, Tunisia, Turkey

The aim is to examine the matches/mismatches between pastoral communities and social expectations seeing the Mediterranean agropastoralism as a complex socio-ecological system. Specific objectives are (i) to identify key bottlenecks for the viability of Mediterranean agro-pastoral communities by targeting best practices under policy, socioeconomic and environmental considerations, and (ii) to inform key audiences of the actual capacity of Mediterranean agro-pastoralists to provide multiple societal benefits.

## ZELKOVA - CONSERVATION OF ZELKOVA ABELICEA IN CRETE (2ND PHASE; 2018-2020)

**Website:** <http://www.zelkova.ch/content/zelkova-abelicea-crete/>  
<http://www.abelitsia.gr/en>

**Contact CIHEAM:** Kalaitzidis Chariton ([chariton@maich.gr](mailto:chariton@maich.gr))

**Countries:** Switzerland, UK, Greece, Georgia, Japan, Vietnam, United States, Poland, Italy, Iran, China, Azerbaijan, Costa Rica, Germany, Spain

The aim is to promote and enable the long term conservation of the natural populations of *Z. abelicea* in Crete through i) the implementation of in situ conservation actions such as fencing selected plots in all mountain massifs of Crete to examine the effect of excluding grazing and browsing on the growth of the species, ii) the implementation of complementary ex situ conservation actions such as the ex situ conservation of plant material in seed banks and ex situ plantations and iii) the implementation of public awareness and dissemination actions to promote and advertise the values of *Zelkova abelicea* to the general public and influence decision-makers.

## CROSS BORDER OLIVE - CROSS-BORDER COOPERATION FOR SUSTAINABLE DEVELOPMENT AND TOURISM, THROUGH VALORIZATION OF RURAL CULTURAL HERITAGE AND CONSERVATION OF NATURAL ASSET OF AREAS WITH ANCIENT OLIVE GROVES (2018-2020)

**Website:** <https://crossborderol.italy-albania-montenegro.eu/>

**Contact CIHEAM:** Calabrese Generosa J. ([calabrese@iamb.it](mailto:calabrese@iamb.it))

**Countries:** Albania, Italy, Montenegro

The aim is to promote sustainable tourism activities, conserve and protect natural resources in areas with ancient olive trees and olive orchards, and increase local and interregional awareness on the cultural heritage linked to traditional olive growing, rural activities and culinary traditions. It assists communities living in 6 pilot areas to value their surroundings by producing and displaying Parish Maps, to promote an appealing tourist offer.

## KASTANIA - PILOT ACTIONS FOR THE CONSERVATION OF THE GENETIC MATERIAL OF CASTANEA SATIVA IN THE PREFECTURE OF CHANIA (CRETE) THROUGH GENOTYPE PRESERVATION OF ITS LOCAL VARIETIES AND THE ENHANCEMENT OF THE MARKETABILITY OF CHESTNUT (2017-2020)

**Contact CIHEAM:** George Kazakis ([kazakis@maich.gr](mailto:kazakis@maich.gr))

**Countries:** Greece

The aim is to protect the indigenous varieties of chestnuts from the risk of genetic erosion and from various invasive phyto-pathological agents (fungi and insects) and to implement other activities towards the promotion, certification and standardization of the specific quality characteristics of the crop. Cretan chestnut is considered to come from three distinct local varieties with a unique taste, texture and nutritional properties, providing an important additional income for the farmers of the area. In recent years, the cultivation of chestnut, due to its high yields, has attracted the interest of producers, leading to unregulated imports of propagation material from the mainland or abroad, resulting in several risks related with the genetic erosion of local valuable varieties, the introduction of invasive pathogens and insects and the installation of new chestnut trees in inappropriate areas.

## TUNISIAN PHYTOGENETIC RESOURCES BETTER CONSERVED AND VALORIZISED (2016-2019)

**Contact CIHEAM:** Calabrese Generosa J. ([calabrese@iamb.it](mailto:calabrese@iamb.it))  
& Hmid Amine ([amine@iamb.it](mailto:amine@iamb.it))

**Countries:** Italy and Tunisia

The main objective is to reduce the impacts of climate change by strengthening biodiversity conservation programmes and genetic resources with greater focus on the protection of ecosystems. The project proposes (i) to create a «genetic chain» to preserve new varieties adapted to the changing conditions of the Tunisian environment; (ii) to strengthen human resource capacity and infrastructure / equipment of National Gene Bank of Tunisia; (iii) the recovery and the practical use of important genetic resources, with direct and active participation of Tunisian farmers and institutions, in the process of localization, conservation and evaluation of local genetic resources (mainly cereals, olives and fruit trees).



## SIMRA SOCIAL INNOVATION IN MARGINALISED RURAL AREAS (2016-2019)

**Website:** [www.simra-h2020.eu](http://www.simra-h2020.eu)

**Contact CIHEAM:** iamz@iamz.ciheam.org

**Countries:** Austria, Belgium, Czech Republic, Egypt, Finland, Greece, Italy, Lebanon, Netherlands, Norway, Slovakia, Spain, Switzerland, Tunisia, UK

The aim is to advance understanding of social innovation and innovative governance in agriculture, forestry and rural development, and how to boost them, particularly in marginalised rural areas across Europe, with a focus on the Mediterranean region (including non-EU) where there is limited evidence of outcomes and supporting conditions.

## CARE-MEDIFLORA - CONSERVATION ACTIONS FOR THREATENED MEDITERRANEAN ISLAND FLORA: EX SITU AND IN SITU JOINT ACTIONS») (MAVA-2) (2016-2018)

**Website:** <http://www.care-mediflora.eu/>

**Contact CIHEAM:** Panagiota Gotsiou (yiota@maich.gr)

**Countries:** Greece, Switzerland, Spain, France, Italy, Cyprus

CARE-MEDIFLORA aims to improve the conservation status of threatened Mediterranean plant species. It is a project implemented by institutions of six Mediterranean islands and the IUCN/SSC Mediterranean Plant Specialist Group.

## HEI PLADI - HIGHER EDUCATION INNOVATION IN PLANT DIVERSITY: FLEXIBLE LEARNING PATHS FOR EMERGING LABOUR MARKETS (2015-2018)

**Website:** <https://dibt.unimol.it/HEI-PLADI/home/>

**Contact CIHEAM:** Panagiota Gotsiou (yiota@maich.gr)

**Countries:** Italy, Malta, Greece, Poland, Portugal, Bulgaria

HEI-PLADI developed intellectual outputs supporting the use of ICT in learning procedures in the following topics: plant taxonomy, in situ and ex situ plant conservation, plant management (botanic garden) and GIS.

## NAT-AROMA - PILOT PROJECT FOR LONG TERM MONITORING AND EVALUATION OF THE NATURAL POPULATIONS OF NATIVE AROMATIC AND MEDICINAL PLANTS IN THE PREFECTURE OF CHANIA (2014-2017)

**Contact CIHEAM:** George Baourakis (baourakis@maich.gr)

**Countries:** Greece

A pilot programme is developed for the management of native aromatic and medicinal plants in the Prefecture of Chania, Crete with the aim of securing their sustainable use. It focuses on four plant species native to Crete, namely *Origanum vulgare* subsp. *hirtum* (oregano), *Salvia fruticosa* (sage), *Sideritis syriaca* subsp. *syriaca* (malotira, a local mountain tea) and *Origanum microphyllum* (Cretan marjoram). The situation of collections and exploitation/marketing of wild populations is assessed and evaluated and a long-term pilot programme for monitoring and assessing their conservation status and management is developed and put into force.

## CSMON-LIFE - MONITORING BIODIVERSITY BY A CITIZEN SCIENCE APPROACH FOR SOLVING ENVIRONMENTAL PROBLEMS (2014-2017)

**Website:** <http://www.csmon-life.eu>

**Contact CIHEAM:** Roberta Trevisi (trevisi@iamb.it)

**Countries:** Italy

The aim is to contribute to a new strategic approach, by enlarging and improving the knowledge base for biodiversity policies in Italy, by involving citizens in data collection and validation, thus accelerating the progress towards the objectives of the European 2020 Biodiversity Strategy, and contributing to the formation of new "green" jobs. The project will promote active collaboration among scientists, public administrations and citizens in discovering, monitoring and protecting biodiversity. It makes use of ICT, such as smartphone and tablets, to collect geo-referenced and validated biodiversity data, which will be integrated into the databases of the Italian national biodiversity network.

## METHODOLOGICAL STUDY TO IDENTIFY AND MONITOR OF CROP WILD RELATIVES (CROP WILD RELATIVES – CWR) IN RELEVANT AGRO ECOSYSTEMS IN THE MEDITERRANEAN BIO-GEOGRAPHICAL REGION (2014-2016)

**Contact CIHEAM:** Calabrese Generosa J. (calabrese@iamb.it)

**Countries:** Italy

The aim is to provide technical assistance to the Ministry of Environment by performing a Methodological study to identify and monitor Crop Wild Relatives (Crop Wild Relatives – CWR) in relevant agro ecosystems in the protected areas in view of climate change. Transferability to the whole Italian territory was ensured.

## BIODIVBALKANS - BIODIVERSITY CONSERVATION AND VALORIZATION: SUSTAINABLE RURAL DEVELOPMENT IN BALKAN MOUNTAINS (2012 - 2016)

**Contact CIHEAM:** Virginie Avignon (avignon@iamm.fr)

**Countries:** France, Albania, Kosovo

The aim is to cross environmental injunction of biodiversity conservation with economic objectives of rural development, in Albanian mountainous rural areas. The building process of an appropriate label of quality/origin/equity/sustainability can provide an effective tool for territorial development and conservation of agro-biodiversity.

## ENVIRONMENTAL IMPACTS OF OLIVE PRODUCTION SYSTEMS FUNDED BY THE PRIVATE SECTOR (MINERVA LTD) (2011-2014) AND FARMERS ACADEMY MINERVA (2015)

**Contact CIHEAM:** Ioannis Livieratos (livieratos@maich.gr)

In MINERVA, the aim was to measure agrobiodiversity, energy and CO<sub>2</sub> footprint and to compare them in three different farming systems in olive crops.

In the Farmers Academy MINERVA, a transfer of consultation and trainings of olive oil producers associated with the MINERVA Sustainable Horio Olive Oil Product was organised.



## NETWORKING

### Networking on Best Practices (BPs) for Mediterranean Grassland Habitat Types (Rangelands) 2015

**Website:** [http://ec.europa.eu/environment/nature/natura2000/platform/events/158\\_networking\\_best\\_practices\\_for\\_med\\_grasslands\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/platform/events/158_networking_best_practices_for_med_grasslands_en.htm)

**Contact CIHEAM:** Calabrese Generosa J. ([calabrese@iamb.it](mailto:calabrese@iamb.it))

**Countries:** Albania, Greece, Italy, F.Y.R. of Macedonia, Montenegro, Serbia, Cyprus, Slovenia, Spain, Portugal.

The network aims to share best practices for knowledge dissemination, Mediterranean grassland management, and bottom-up policy support (advice to local and regional administration and governments).

### MOAN - Mediterranean Organic Agriculture Network (since 1999)

**Website:** <http://moan.iamb.it>

**Contact CIHEAM:** Marie Reine Bteich ([bteich@iamb.it](mailto:bteich@iamb.it))

**Countries:** Albania, Algeria, Egypt, Bosnia and Herzegovina, France, Greece, Italy, Jordan, Lebanon, F.Y.R. of Macedonia, Montenegro, Morocco, Serbia, Syria, Tunisia and Turkey, Libya, Palestine, Malta, Slovenia, Spain, Portugal and Greece

MOAN is a platform for decision-makers to exchange data, knowledge and experience for the development of Mediterranean Organic Agriculture

## EDUCATION & TRAINING

### Masters/ Masters of science

- **Mediterranean Organic Agriculture (MOA)** (Coordinator: Dr. Lina Al Bitar, [albitar@iamb.it](mailto:albitar@iamb.it)) (<http://www.iamb.it/en/education/masters/moa>)
- **Geoinformation in Environmental Management** (Coordinator: Dr. Kalaitzidis Chariton, [chariton@maich.gr](mailto:chariton@maich.gr)) ([https://www.iamc.ciheam.org/en/education/master\\_of\\_science/details?dep=Geoinformation\\_in\\_Environmental\\_Management&id=190](https://www.iamc.ciheam.org/en/education/master_of_science/details?dep=Geoinformation_in_Environmental_Management&id=190))
- **Sustainable Agriculture** (Coordinator: Dr. Ioannis Livieratos, [livieratos@maich.gr](mailto:livieratos@maich.gr)) ([https://www.iamc.ciheam.org/en/education/master\\_of\\_science/sag](https://www.iamc.ciheam.org/en/education/master_of_science/sag))
- **Horticultural Genetics and Biotechnology** (Coordinator: Dr. Kalaitzis Panagiotis, [panagiot@maich.gr](mailto:panagiot@maich.gr)) ([https://www.iamc.ciheam.org/en/education/master\\_of\\_science/hob](https://www.iamc.ciheam.org/en/education/master_of_science/hob))
- **Agricultural management and territories** (Coordinator: Dr. Philippe Le Grusse, [legrusse@iamm.fr](mailto:legrusse@iamm.fr)) ([http://www.iamm.ciheam.org/uploads/attachments/750/4\\_MasterGAT\\_ENG.pdf](http://www.iamm.ciheam.org/uploads/attachments/750/4_MasterGAT_ENG.pdf))

### Trainings / Short courses

#### OK-NET ARABLE - ORGANIC KNOWLEDGE NETWORK ARABLE (2015-2018)

**Website:** <http://www.ok-net-arable.eu/>

**Contact CIHEAM:** Lina Al Bitar ([albitar@iamb.it](mailto:albitar@iamb.it))

**Countries:** Belgium, Switzerland, UK, Germany, Denmark, Italy, Austria, Hungary, Estonia, France, Bulgaria, Latvia

**On-line course:** «Challenges of Organic Arable Farming».

#### OAER-ARD ERASMUS+ (2015-2018)

**Website:** <http://oer-ard.mk/>

**Contact CIHEAM:** Ioannis Livieratos ([livieratos@maich.gr](mailto:livieratos@maich.gr))

**Countries:** Bulgaria, Greece, F.Y.R. of Macedonia

The aim is to gather experts and to create on-line OER tools that provide service to farmers and rural community in order to increase their agricultural production using environmentally-friendly methodologies.

## SOME RECENT PUBLICATIONS

- Trabelsi M., Mandart E., Le Grusse P., Bord J.-P. (2019). ESSIMAGE: a tool for the assessment of the agroecological performance of agricultural production systems. *Environmental Science and Pollution Research*, online, p. 1-24. <http://dx.doi.org/10.1007/s11356-019-04387-9>
- Gkisakis, V. D., Barberi, P. & Kabourakis, E. M. (2018). Olive canopy arthropods under organic, integrated, and conventional management. The effect of farming practices, climate and landscape. *Agroecology and Sustainable Food Systems*. <https://doi.org/10.1080/21683565.2018.1469066>
- Perrino E. V. and Calabrese G. (2018). Endangered vegetal species in southern Italy: distribution, conservation status, trends, actions and ethnobotanical notes. *Genetic Resources and Crop Evolution*, 65(8): 2107-2134. <http://dx.doi.org/10.1007/s10722-018-0678-6>
- Perrino E. V. Calabrese G. (2018). Vascular flora of vineyards in the DOC area "Gioia del Colle" (Apulia, Southern Italy): preliminary data. *Natura Croatica*, 27(1): 14. <https://doi.org/10.20302/NC.2018.27.3>