



AgrEcoMed

FOSTERING AGROECOLOGICAL TRANSITION

**NEW AGROECOLOGICAL APPROACH FOR SOIL FERTILITY AND
BIODIVERSITY RESTORATION TO IMPROVE ECONOMIC AND SOCIAL
RESILIENCE OF MEDITERRANEAN FARMING SYSTEMS**



Availability of field data for Methodology of agroecological practices selection

REPORT

CREA – Centro Politiche e Bioeconomia

OCTOBER 2023

Report **“Availability of field data for Methodology of agroecological practices selection”**

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Working Group

WP n. 5: “Strengthening the knowledge system and the cooperation between farmers”

Task 5.3 Availability of field data for Methodology of agroecological practices selection:

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Sommario

PROJECT	4
OBJECTIVE	6
METHODOLOGY	6
RESULTS	9
CONCLUSIONS	14
BIBLIOGRAPHY - SITOGRAPHY	16

PROJECT

The report on the "Availability of field data for Methodology of agroecological practices selection", carried out by CREA - Research Centre for Agricultural Policies and Bioeconomy, is part of the activities contemplated by the PRIMA project of transnational cooperation: "NEW AGROECOLOGICAL APPROACH FOR SOIL FERTILITY AND BIODIVERSITY RESTORATION TO IMPROVE ECONOMIC AND SOCIAL RESILIENCE OF MEDITERRANEAN FARMING SYSTEMS" of which CREA is a partner.

This activity is part of the broader Work package n. 5 "Strengthening the knowledge system and cooperation between farmers" which provides for the strengthening of the knowledge system and cooperation between Mediterranean farmers, between women and young people.

Today, the term 'agroecology' has entered the common glossary and is increasingly evoked by the productive world, institutions and researchers as a paradigm capable of meeting the main requirements of sustainability in the agri-food system, as it can ensure the production of food in line with respect for the environment, health and the rights of farmers and consumers (<http://www.pianetapsr.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/2521>).

It is in these last socio-cultural aspects that the differences between organic farming and agroecology can be traced. Basically, they are based on similar principles from the point of view of technical and disciplinary approach with a prevalent focus on environmental values in organic and socio-cultural values in agroecology (<https://www.firab.it/wp-content/uploads/2021/01/Manuale-Agroecologia-Territori-Bio.pdf>).

In terms of the development of the two founding paths, the agroecology movement was born and developed in Latin America, partly in opposition to organic farming because the legislation that regulated the sector, written to favour the export of products to northern markets, in fact prevented small and medium-sized farmers from being able to market their organic products as even locally due to certification costs that acted as an economic barrier (<https://www.firab.it/wp-content/uploads/2021/01/Manuale-Agroecologia-Territori-Bio.pdf>).

In addition to these aspects, the damages of industrial agriculture and the 'green revolution' are now evident: the collapse of biodiversity, soil desertification, water pollution and increased greenhouse gas emissions. This is why today this new school of thought is gaining acceptance, which promotes an alternative paradigm of agricultural development, based on more ecologically sound, biodiverse, resilient, sustainable and socially just forms of agriculture (<https://www.associazioneterra.it/news/cosa-e-agroecologia>).

If in fact, as early as the early 20th century, scientists and ecologists began to speak of agroecology, referring to the use of ecological principles in land cultivation, it was then in the 1970s that this concept acquired a more 'political' nature, thanks to the push of the farmers' movements opposing the green revolution. Agroecology thus became not only a range of techniques to produce food by favouring the preservation or increase of biodiversity, soil regeneration and the seasonality of crops. It has become a tool for changing power relations in

society, enhancing the dignity of labour, favouring local markets and territory over world trade, returning to considering food a right and its production subject to democratic debate (<https://www.associazioneterra.it/news/cosa-e-agroecologia>).

The principles of agroecology are now increasingly being applied around the world, reflected in a wide variety of practices and with results documented by a growing number of scientific articles, policy statements, campaigns and social movement mobilisations.

A large part of the practices and works refer to experiences gained within the framework of organic farming, whereby European organic farmers in particular are playing a pioneering role in substantially reforming the agri-food system in a sustainable way, including by benefiting from incentives to convert to organic farming and covering the costs of certification (<https://www.firab.it/wp-content/uploads/2021/01/Manuale-Agroecologia-Territori-Bio.pdf>).

Agroecology promoters aims to healthy landscape in which to grow the world's food. They are guided by an ethos of bio and cultural diversity featuring small farmer-centered applied research and policies that protect their livelihoods. Worldwide, scientists, grassroots organizations, NGOs, consumers, universities, and public agencies are working with farmers to construct sustainable and nutritious food systems based in agroecology.

"The European Youth Manifesto for Agroecology", the result of a discussion between young people from various European countries during the first edition of the "Agroecology Europe Youth Forum," held in France in September 2022, expressed their willingness to unite, create alliances and propose solutions to the multiple challenges that agro-food systems are facing.

Young people are calling for more spaces and opportunities for communication and knowledge exchange, more space for agronomic experimentation supported by psychological, economic, technical and skills support, sharing good practices at European level. (<https://www.agroecology-europe.org/wp-content/uploads/2022/12/IT-Young-Europeans-Manifesto-for-Agroecology-signatures-1-2.pdf>).

Indeed, young people are considered the best interpreters of an agriculture with high skill input and low fossil input. Today, there are many educated young people, who have also gained experience abroad, who decide to build a future in agriculture for themselves: with great environmental sensitivity, they are the best interpreters of the synthesis between traditional knowledge and innovation, extensively practicing organic farming and adopting new models of consumption, who are also able to communicate their activities effectively.

Identifying and analyzing good agroecological practices in Mediterranean countries is, therefore, the aim of this paper. The data and information on the empirical implementation of the agroecological approach will provide a basis for contributing to the construction of sustainable networks between young people and women, heterogeneous and inclusive, to foster the sharing of experiences and common ideas, and to be the driving force behind a paradigm shift that can no longer be postponed, one that considers agro-food production a historical, identity, cultural issue, connected to economies and territories.

OBJECTIVE

As part of task 5.3 - "Gender equality through the analysis of good ecological transition practices for women", CREA has started a bibliographic analysis aimed to reinforce the knowledge system on agroecology.

In the selection activity of good agroecological practices in the Mediterranean, attention was directed to virtuous cases characterized by the presence of young people and women.

METHODOLOGY

There are numerous experiences of agronomic practices that value rotations, positive associations, the protection of marginal areas, that bring together innovation and traditional knowledge, that succeed in regenerating soil fertility and promoting biodiversity. Often these experiences are carried out by young, female leadership.

This is demonstrated by the fact that in Italy young organic farmers and women farmers stand out among the prizewinners in Mipaaf calls for good practices in rural development or in the greater capacity for innovation in the organic farms they run. Agriculture is, in fact, increasingly 'female': in Italy, out of more than 1.145 million farms, about one in three (31.3%) is run by women. Looking, in particular, at organic farming, of the almost 50 thousand organic farms, 29.6% are run by women (BIOREPORT, 2019).

The aim of this work is to collect cases of interest from an agro-ecological point of view and to understand whether the centrality of women and young people is adequately documented in the literature. To this end, a bibliographic methodology was adopted: this made it possible to verify the presence of texts, documents and articles that demonstrate how this approach is now consolidated in Mediterranean countries and how its propagation is above all borne by women and young people.

The criteria that guided the identification and selection of good practices, through a search of documents, scientific articles, and academic treatises, refer to the following 'key themes':

- Medicinal aromatic plants and ancient cereal farming practices in the Mediterranean area
- Participation of women and young farmers in sustainability processes
- Crop rotations (officinal and cereal) applied in agroecological mediterranean farms.

The research focused on Mediterranean countries such as Italy, Spain, Portugal and Greece over a period of about fifteen years, from 2009 to 2023.

The bibliographical material gathered was catalogued according to the year of publication, the country to which it refers, but above all a keyword analysis was carried out to identify cases with common elements, similarities and differences in agroecological practices that can be found in different countries.

The main bibliographical references are listed below:

2011	Analysis of cropping patterns of medicinal and spices plants growing on prime arable land. Slovakia. https://www.cabdirect.org/cabdirect/abstract/20123090439
2013	Current status of the Wild Medicinal Plants in the Western Mediterranean Coastal Region, Egypt https://www.researchgate.net/profile/Kamal-Shaltout/publication/284210956_Current_status_of_the_wild_medicinal_plants_in_the_Western_Mediterranean_coastal_region_Egypt/links/5f2169aea6fdcccc43962d8e/Current-status-of-the-wild-medicinal-plants-in-the-Western-Mediterranean-coastal-region-Egypt.pdf
2015	Medicinal and local food plants in the south of Alava (Basque Country, Spain) https://www.sciencedirect.com/science/article/pii/S0378874115301835
2016	Crop rotation as an effective strategy for saffron cultivation. Saffron-fava bean-fallow period. 2005-2006, Enna, Sicily. Crop rotation as an effective strategy for saffron (Crocus sativus L.) cultivation - ScienceDirect
2016	Trade-Offs between Economic and Environmental Impacts of Introducing Legumes into Cropping Systems Trade-Offs between Economic and Environmental Impacts of Introducing Legumes into Cropping Systems - PubMed (nih.gov)
2009	Analysis of flowering, stigmas yield and qualitative traits of saffron (Crocus sativus L.) as affected by environmental conditions Analysis of flowering, stigmas yield and qualitative traits of saffron (Crocus sativus L.) as affected by environmental conditions - ScienceDirect
2019	The role of women in the Mediterranean region. Ilaria Sisto - Gender and Development Officer, FAO, Maurizio Furst - Gender and Development Specialist, FAO. https://newmedit.iamb.it/bup/wp-content/uploads/2019/07/nm1903i_Notes.pdf
2019	Capturing the diversity of Mediterranean farming systems prior to their sustainability assessment: The case of Cyprus. Reference to young farmers. https://www.sciencedirect.com/science/article/abs/pii/S0264837719324019
2019	Women farmers' participation in the agricultural research process: implications for agricultural sustainability in Ethiopia https://www.researchgate.net/publication/330682215_Women_farmers'_participation_in_the_agricultural_research_process_implications_for_agricultural_sustainability_in_Ethiopia
2019	Economic evaluation (efficiency) of investment in organically grown immortelle (Helichrysum italicum ssp. Italicum) in Bosnia and Herzegovina. The first report from Mediterranean. https://jcea.agr.hr/en/issues/article/2164
2020	Greenings and legume-supported crop rotations: An impact assessment on Italian arable farms. Greening and legume-supported crop rotations: An impacts assessment on Italian arable farms - PMC (nih.gov)
2020	Halphytes for Future Horticulture. Subscription website. https://link.springer.com/referenceworkentry/10.1007/978-3-030-17854-3_121-1
2020	Sustainable use of mediterranean medicinal-aromatic plants. https://www.sciencedirect.com/science/article/abs/pii/B9780128147009000042

2020	Growth and productivity of <i>Salvia officinalis</i> L. under Mediterranean climatic conditions depends on biofertilizer, nitrogen fertilization. https://www.sciencedirect.com/science/article/abs/pii/S0926669020310530
2020	EIP-AGRI Focus Group. Plant-based medicinal and cosmetic products. Mini Paper 3. Benefits of Medicinal and Aromatic Plants for farming/forest systems: multifunctionality, ecosystem services and social benefits. https://ec.europa.eu/eip/agriculture/sites/default/files/fg35_mp3_benefitsofmedicinalaromatingplantsforfarmingforestsystems_2020_en.pdf
2021	An Ethnobotanical Study of Medicinal Plants in Mersin (Turkey) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8294455/
2021	Bioherbicidal Potential of the Essential Oils from Mediterranean Lamiaceae for Weed Control in Organic Farming https://www.mdpi.com/2223-7747/10/4/818
2021	How an ancient harvest practice pushed EU's new farm reform to the edge. How an ancient harvest practice pushed EU's new farm reform to the edge – POLITICO
2021	Medicinal Plants in Traditional Herbal Wines and Liquors in the East of Spain and the Balaeric Islands https://www.frontiersin.org/articles/10.3389/fphar.2021.713414/full
2022	Premio Buone Pratiche - Legambiente https://agricoltura.legambiente.it/premio-buone-pratiche/
2023	European Commission. Organic Farming in the EU. 2.3 Social sustainability: organic farming attracts younger farmers. EU Agricultural Economic briefs (europa.eu)
2023	The Market Evolution of Medicinal and Aromatic Plants: A Global Supply Chain Analysis and an Application of the Delphi Method in the Mediterranean Area. https://www.mdpi.com/1999-4907/13/5/808
2023	Monitoring Genetic Erosion of Aromatic and Medicinal Plant Species in Alentejo (South Portugal). https://www.mdpi.com/2223-7747/12/14/2588
2023	Sustainable Growth of Medicinal and Aromatic Mediterranean Plants Growing as Communities in Shallow Substrate Urban Green Roof Systems https://www.mdpi.com/2071-1050/15/7/5940
2023	Cretan Dittany (<i>Origanum dictamnus</i> L.), a Valuable Local Endemic Plant: In Vitro Regeneration Potential of Different Type of Explants for Conservation and Sustainable Exploitation https://www.mdpi.com/2223-7747/12/1/182

Agroecology is a valuable ally in the fight against the environmental crisis, but it is also a valuable element in the creation of a truly sustainable economy. In this perspective, it is useful to refer to the good practices already implemented by many producers who are attentive to natural

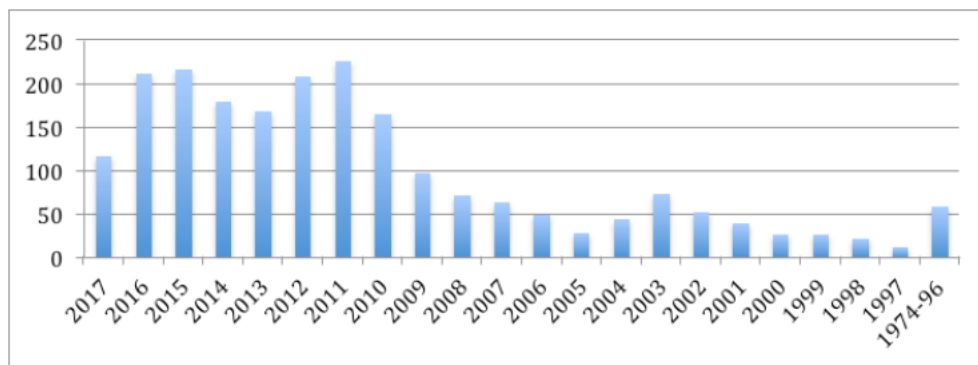
processes, to the complexity and local specificity of ecosystems, and who can innovate and experiment with new technologies without ever losing sight of the ancient knowledge of rural culture.

The project AgrEcoMed accompanies and analyses the agroecological transition of the district "Agroecological District of the Murge and Bradano" Territories are currently the scale on which the most significant progress is being made and the most tangible solutions found, particularly with a view to achieving the sustainable development goals. In the agroecological district the territory is seen as common area managed by a range of players and institutions.

RESULTS

Consulting the databases (Scopus, Web of science) that report scientific production worldwide, it is interesting to note how the topic of agroecology has become increasingly present, particularly from 2010 onwards (Fig.1).

Fig. 1 - Number of articles on the topic of agroecology from the 1970s to 2017



Source: Scopus database

Numerous articles describe practices identified in the Mediterranean area, starting with Italy, but also in Spain, Portugal, Greece, Bosnia, etc. The main ones are shown in schematic form in table 1, which offers an overview of the most successful agroecological studies and experiments.

Tab, 1 - Selection of some of the main good agroecological practices in the Mediterranean area through literature.

Reference Country		Good Practice	Keywords	Notes
Germany, Italy, United Kingdom, Romania, Sweden		Integration of crops with legumes: increases positive environmental impacts and at the same time reduces economic returns, thus leading to greater trade-offs between economic and environmental benefits.	Research, experimentation, crop rotation, legumes	To utilize the multiple benefits (economic and environmental) provided by legumes, their production must increase significantly.
Spain		Study on the use and knowledge of food and medicinal plants in the Basque Country	Food and medicinal plants, Traditional knowledge, Ethnopharmacology, Ethnobotany	The vast majority of all species are used for food purposes, i.e. exclusively as food or health food, while medicinal uses concern only 36 species.
Greece		Medicinal and aromatic Mediterranean plants in urban green roof systems	Research, experimentation, urban greenery, medicinal plants	The growth and flowering of numerous plant species within a plant community on extensive green roof systems is expected to be valuable for both researchers and practitioners working in this specific area.
Greece		La crescita e la produttività della <i>Salvia officinalis</i> L. in condizioni climatiche mediterranee dipendono dal biofertilizzante, dalla fertilizzazione con azoto e dalla densità di semina	Biofertiliser, sage, fertilization, medicinal plants	Mico-plus positively influences the growth characteristics and yield of sage. Nitrogen fertilization has a positive effect on height, leaf area index and yield. Plant density has a negative effect on height, leaf area index and yield. Sage seems to be a promising crop with satisfactory yields.
Italy	Sicily	To evaluate the effects of three different preceding crops (broad bean, saffron and fallow) and two sowing densities (30 and 45 corms m ⁻²) on flower yield, flower calendar and corms.	Research, experimental field, crop rotation, legumes, medicinal plants	Saffron can exploit the residual supply of broad beans as a preceding crop. It is possible to grow saffron with good yields after a break crop. The broad bean as a previous crop greatly promotes the stigmas and the replacement yield of the saffron bulb. In both years, the results clearly revealed that the highest flower yield

		production.		was obtained when saffron followed the broad bean.
Italy	Abruzzo	Cooperative with 400 members with sustainable production and certified organic attentive to social issues: it has promoted an empowerment project towards the autonomy of women with experiences of gender-based violence	Organic farming, women's empowerment, agricultural employment	The project supported by the cooperative provides interventions and concrete actions for the employment of women who have suffered violence, following a period of internship on the group's farms.
Italy	Apulian	In Melpignano (LE), the municipal administration has banned the use of phytosanitary products in urban areas and promoted the 'Mensa Etica a Km0' project Km0,	Organic production, young farmers	The 'Mensa Etica a Km0' project, a guarantee for small citizens and an incentive to organic production for young farmers.
Italy	Campania	The Tenuta Chirico company has been breeding cows, goats and buffaloes for 30 years, whose products are skillfully transformed into buffalo milk mozzarella, cow's milk cheese, smoked provola, yoghurt and buffalo milk ice cream, always respecting the most authentic traditions. Here too, the focus is on short supply chain and circular economy, while also looking at energy and emissions	Women, short supply chain, circular economy, alternative energy	The company has pioneered the production of energy from renewable sources with the first biogas plant in the Cilento region, built in 2013.
Italy	Toscana	Tuscan farm project based on	Respect for the environment,	The owner of the farm and her husband are promoters

		the protection of bees and the promotion of honey within a conscious and responsible supply chain.	supply chain, honey, women	of the protection of honey as a product that is increasingly in difficulty due to the climate crisis and loss of biodiversity.
Italy	Apulian	Foundation committed to the recovery of ancient grains on 500 hectares thanks to the synergy of local farmers through organic farming and respect for social values	Recovery of ancient grains, organic farming, respect for social values	
Italy	Veneto	Mayor who abolished the use of glyphosate for environmental protection at municipal level, implemented a pact for local sustainable development to create a biodistrict, multifunctional land management, recovery of the countryside, enhancement of sustainable tourism	Sustainable development biodistrict, multifunctionality sustainable tourism	
Italy	Lazio	Mayor who has abolished glyphosate, neonicotinoids, promotes integrated agriculture and the birth of the biodistrict with the aim of maintaining biodiversity in the countryside, as well as policies to reduce pollution of the land		Actions support of his own territory, an area of hazelnut groves, which was enduring a situation of strong pressure caused by an agriculture aimed at maximizing yields rather than efficient production

The information on the realities of the agricultural sector collected from studies and research, small farms, producers and cooperatives that fight to respect the environmental, social and cultural heritage of their territories, shows how multifunctionality and sustainability are often the keys to the agricultural transition.

Furthermore, the bibliographic research has highlighted how in Italy there are numerous realities that reflect the principles of agroecology characterized by the protagonism of women and young people.

The cases shown in the table represent only a few examples of the numerous experiments with agroecological practices in differentiated agricultural systems. It is evident, that among these there is a clear prevalence of crop rotation, i.e. diversification along the time axis in the form of cereal-legume or cereal-medicinal plant sequences. The resulting agro-ecological effect allows nutrients to be conserved and kept available from one season to the next, as well as interrupting the life cycle of pests, pathogens and weeds (Altieri, 2017).

Effectively the Medicinal and Aromatic Plants (MAPs) value chain is complex, with different industries involved in primary- and secondary-processed products and services. Documentation, conservation, evaluation, and sustainable exploitation of European MAPs has been the main concern for researchers, conservation managers, and policy makers, especially in the Mediterranean basin (a global biodiversity hot spot with high endemism rates). Due to complex phytochemical components and associated beneficial properties, native MAPs have been used in the Mediterranean since antiquity for nutritional purposes or for the treatment of various diseases and disorders in humans and animals. Currently, ex situ conservation of MAPs provides documented plant material for genetic improvement and comparative chemo diversity studies; enables the sustainable utilization of MAPs for low-input multipurpose cultivation schemes in arid lands and problematic soils; allows their exploitation either for human utilization and/or for animal feeds; guarantees the possibility of satisfying the needs and aspirations of both present and future generations.

Rotation practices between cereal and medicinal plant cultivation are growing and show good results as witnessed by the AgrEcoMed- wP2 project 'Farming and screening of alternative species (Medicinal ones) that better interpret and fit with the Mediterranean context and with

which it will rise crop rotation'. The medicinal plants used in rotation in this particular case were mint, helichrysum and garlic.

Agro-ecology is a resilient agriculture, i.e. a system that meets both food and development needs in the short and long term; it seeks not only persistence, but also adaptive changes or even transformations necessary to meet changing environmental conditions and human needs. If agroecological production systems become more widespread, more rural employment will be created, which is likely to be more stable and less seasonal than that offered by industrial agriculture.

In these processes, it is believed that the knowledge, values, visions and leadership of women and young people, often referred to as 'agroecology ambassadors', can play a crucial role in the agroecological transition. (https://www.repubblica.it/green-and-blue/2022/11/25/news/legambiente_ambasciatori_agroecologia-376106350/).

(https://www.slowfood.com/wp-content/uploads/2020/12/ITA_sfide_sociali_e_agroecologia.pdf).

CONCLUSIONS

The present study explored agroecological experimental cases and good practices to strengthen the knowledge system and stimulate innovation transfer interventions for the benefit of agro-food sector youth and women workers and land managers in rural areas.

These first results require further investigation, but already provide some reflections: women and young people in agriculture play an important role in the implementation of the agro-ecological transition process, but also in the development of innovative, sustainable and multifunctional activities that prove, in many cases, to be essential for achieving an adequate farm income.

Similarly, crop rotation is one of the most widely adopted tools for agroecological transition, as it helps to return nutrients to the soil without synthetic inputs. The practice also works to interrupt pest and disease cycles, improve soil health by increasing biomass from the root structures of different crops, and increase biodiversity on the farm. In particular, it is the rotations with medicinal plants and leguminous plants that can contribute significantly to the reduction of greenhouse gas emissions from several points of view. In fact, the usefulness of leguminous

plants, which can fix atmospheric nitrogen and transform it into organic nitrogen, is well known, saving synthetic nitrogen units to be administered during cultivation.

Just as it is well known that crop rotation benefits both medicinal herbs and cereals, such as wheat, barley and maize: on the one hand cereals tend to decrease weed development, leaving the field free for the cultivation of medicinal herbs, on the other hand research suggests that maize after medicinal herbs produces about 10% more than in the maize-maize rotation.

Policies at all levels should, therefore, take these trends into account to foster the innovative propensity and the drive towards agroecological transition of women and young people, guarantee them easier access to funding and tax concessions to realize them, as well as training and information also with respect to the topic of innovation in a sustainable key (<https://wikifarmer.com/it/rotazione-delle-colture-di-erba-medica/>).

Indeed, it is believed that stronger support for women's enterprises and, more generally, for those led by young people in agriculture would strengthen the agricultural economy and the development of the rural world.

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