

RECOMMENDATIONS

for the ecological transition of olive cultivation

A synthetic guide for olive farmers, mills
and politicians



Based on the results
of the SUSTAINOLIVE project

sustainolive.eu



**SUSTAIN
OLIVE**



PRIMA
Partnership for Innovation and Rural
Development in the Mediterranean Area



Co-funded by the
Horizon 2020 Framework
Programme of the European Union

This project is part of the PRIMA programme supported by the European Union



THE PROJECT



The main goal of SUSTAINOLIVE is to improve the sustainability of the olive oil sector, through the implementation and promotion of a set of innovative sustainable management solutions based on agroecological concepts, as well as through the exchange of knowledge and experiences among its multiple associates and end users.

the numbers



- 6 countries
- 22 partners
- 88 experimental farms
- Hundreds of field experiments
- 31 deliverables



an easy effective approach

Conventional olive farms

Comparison of multiple

ecological and socio-economic variables and processes

RESULTS

RECOMMENDATIONS



Olive farms applying sustainable management practices



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INCREASING **FERTILITY** AND **FUNCTIONAL QUALITY** OF THE SOIL

The SUSTAINOLIVE project has verified that soils of olive groves with little disturbance (e.g., minimum or no tillage) and with an inflow of a wide diversity of organic carbon sources (cover crops, shredded tree pruning remains, manure and/or composted olive mill pomace) develop highly diverse and active microbial communities, in some cases comparable with that of nearby forests.

This has an enormous value for the farmer, both in environmental and productive/economic terms.



Recommendations for OLIVE FARMERS

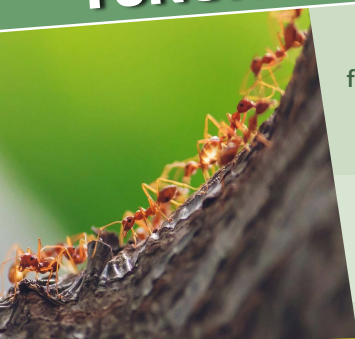
- ➔ Identify the **type of soil** and its physicochemical properties
- ➔ Minimize **soil tillage**
- ➔ Maintain a spontaneous or planted **cover crop**. Once cleared, apply the remains on top of the soil
- ➔ Allocate a percentage of the farm area to sowing **legumes**, especially in soils poor in nitrogen
- ➔ Apply **organic fertilizers**, locally available, such as composted olive mill pomace and manure
- ➔ Integrate **livestock** (e.g., sheeps) into the olive grove. They provide processed organic matter through droppings and help the control of the cover crops
- ➔ Intercropping by integrating **other crops** in the inter-rows area. Aromatic plants for honey production are a good option
- ➔ Avoid or minimize **chemical fertilization**, especially when it is not based on a nutrient balance or the real needs of the crop
- ➔ Avoid or minimize the use of **pesticides**, especially broad-spectrum ones

According to the results of SUSTAINOLIVE

The annual application of 430 kg of manure and 3400 kg of composted olive mill pomace per hectare would improve the organic carbon level of the soil by **18%** over a period of 30 years. Furthermore, the regular application of shredded remains of pruning for 30 years would improve the stock of soil organic carbon by **22%**.



INCREASING FERTILITY AND FUNCTIONAL QUALITY OF THE SOIL



According to the results of SUSTAINOLIVE

The application of sustainable management practices in olive groves can potentially increase the amount of nitrogen available to plants **by up to 30%**.

If the percentage of organic matter in an olive grove soil is raised **from 1 to 2.5%**, both total nitrogen and plant assimilable nitrogen (i.e., in the form of nitrates) contents can be doubled.

Establish an incentive system to reward olive farmers who demonstrate a **notable improvement** in soil properties linked to fertility (e.g. the percentage of organic matter)

Promote the use of bio-based fertilizers, by boosting their production and distribution, so that their use becomes **more profitable**

Encourage **active communication** between the academic sector and olive farmers to show how organic fertilization of olive groves is an economically viable alternative to chemical fertilizers

Promote **participatory events** that popularize the use of cover crops in olive groves (e.g. photographic or painting contests)

Produce easy-to-use **informative materials** that provide knowledge to olive farmers on the properties that define soil fertility

Set up a **minimum soil fertility and soil functional quality standards** that should be incorporated into any call for aid involving olive groves

Improve the organization and coordination of the **R+D+I system** and the effectiveness of **transfer and advisory services**

Recommended POLICY ACTIONS





REUSING NUTRIENTS AND PROMOTING A CIRCULAR OLIVE CULTIVATION

Increasing the levels of organic matter in the soil of olive groves implies that nutrients are retained, instead of being lost through surface runoff, leaching or erosion. Undoubtedly, maintaining a seeded or spontaneous herbaceous **cover crop** becomes crucial to achieve it.

The olive sector generates a **colossal amount of by-products** with high energy power that is **not being sufficiently valued**. For example, the 'orujillo' has a calorific value of 4200 kilocalories per dry kilogram.

According to our calculations

If the calorific value of the 'orujillo' produced in Andalusia during 2015 (around 913000 tons) were converted to equivalent liters of diesel, the 300 million European cars could travel 25 kilometers at a time. In other words, thanks to the energy stored in the Andalusian 'orujillo' for a year, **600000 cars could go around the world**.

Consider olive grove residues and by-products as **usable and profitable** raw materials

Develop agronomic practices that improve the **levels of organic matter** in the surface soil

Assess yield response to the application of fertilizers, avoiding routines or **non-specific fertilization calendars**

Know the **real nutritional status** of the crop, identifying nutritional excesses and deficiencies through foliar and soil analysis, and nutrient balance

Avoid the application of nitrogenous fertilizers in periods of **inactivity of the root system** (from November to January)

If there is no other option but to use chemical fertilizers, know their fertilizing capacity and their **release and assimilability** features

Avoid burning pruning remains (unless there are symptoms of infestation by pests, fungi or other pathogens), hedgerows and boundaries of riparian vegetation

Recommendations for OLIVE FARMERS

REUSING NUTRIENTS AND PROMOTING A CIRCULAR OLIVE CULTIVATION



Recommended POLICY ACTIONS

Accelerate the **administrative procedures** for the opening of facilities and equipments related to the recovery of waste and by-products from the olive oil sector

Incentivize facilities and equipments related to recovery and **valorization of olive grove residues and by-products**, especially when they are used in nearby olive farms or imply 'kilometer zero'

Encourage and reward oil mills that install **olive mill pomace composting plants**

Encourage olive farmers to use composted olive mill pomace and manure as **sources of organic fertilization**

Encourage olive farmers to maintain a **minimum herbaceous cover** area (between 35 and 50% of the total farm area is suggested)

Establish a structure that allows the **integral exploitation of olive pruning residues** (use of the olive branches remains for electricity generation and thermal uses, and the branches-leaves combination for composting)

According to results of SUSTAINOLIVE

The implementation of sustainable agronomic techniques not only reduces the application of external sources of nitrogen, but also halves the losses of this essential nutrient, since **the potential to recycle it efficiently by appropriate management practices is huge: up to 3.5 times more** in comparison with conventional olive groves model.

Usually, the nutritional diagnosis is carried out **once a year during the month of July**, although it is recommended to run a second analysis once the harvest is finished; so farmers can know the possible deficits that harvesting might have caused in olive trees.



REDUCING **SOIL EROSION**

The greatest **wealth** of olive farmers is the **soil** of their farms.

The best strategy to guarantee that olive trees have an adequate stock of nutrients and water, and prevent the land from being severely affected by erosion, is to invest in soil conservation.

Recommendations for OLIVE FARMERS

- ➔ Maintain a spontaneous or seeded **cover crop**
- ➔ Plan auxiliary constructions to reduce **the traffic of vehicles** through the olive grove
- ➔ Adjust the design of the plantation to the **slope** of the land. Thus, agricultural tasks can be carried out following level curves
- ➔ Avoid any preparatory work when the soil is **waterlogged or snowy** (or when the weather forecast indicates a high probability of precipitation)
- ➔ Avoid the use of heavy machinery that can excessively **compact** the soil
- ➔ Avoid carrying out tillage with **soil turning** in the direction of the maximum slope
- ➔ Minimize **tillage**, making shallow tillage and limiting the number of tillage passes that, whenever possible, will follow a cross pattern. Give preference to **tine harrows** over disc ones

In the less sustainable experimental olive groves studied in SUSTAINOLIVE, an average of **16.6 kg of organic nitrogen** per hectare are lost each year due to soil erosion.



That would be equivalent to spending **€40** on 36 kilograms of crystalline urea and throwing it down the drain.

REDUCING SOIL EROSION



According to estimates
of **SUSTAINOLIVE**

The economic losses associated with soil erosion in olive groves range **from €42 to €118 per hectare and year**, depending on the intensity of the erosive processes.

Recommended POLICY ACTIONS

- ➡ Pursue and punish harshly the impacts caused by the erosion of olive grove soils on **public infrastructures**
- ➡ Encourage the application of **corrective measures** with low environmental impact aimed at controlling erosive processes in olive groves that, in parallel, would help to enhance biodiversity:
 - Elimination or reduction of pre-existing **gullies** through non-impact technologies
 - Creation of **new natural boundaries** between farms
 - **Naturalization of spaces** on farms that, due to their orography or other conditions, are not suitable for cultivation
 - Implantation of **riparian vegetation** in watercourses, etc.
- ➡ Avoid **new authorizations** for planting olive groves on steep hillsides
- ➡ Promote **training actions** in olive cooperatives that educate and sensitize olive farmers in the development of agronomic practices that minimize or mitigate soil erosion

A **ton of soil** to replace erosion losses is currently valued at around **€55**.

When an olive grove loses 12 tons of soil per hectare and year, the cost of replacing it would amount to **€660 annually**.



OPTIMIZING CARBON ECONOMY

Contrary to popular belief, **not all olive groves behave as carbon sinks**. If no sustainable management practices are implemented such as those that imply enriching the soil with organic matter, olive grove soils can lose considerable amounts of organic carbon (in many cases as CO₂) and therefore, might have carbon balances.

It is true that providing the olive grove with a cover crop and patches of native vegetation does not translate into an immediate economic benefit (increased yield)...



...but it represents an excellent **investment for the future** by increasing the capital of carbon and nutrients available for further crops.

Optimize biomass production, especially by maintaining a spontaneous or planted **cover crop**, whose clearing is deposited on the soil

Apply locally available **organic fertilizers** such as composted olive mill pomace or manure

Avoid **burning tree pruning remains**. Instead, crush and deposit them on olive grove soils, especially in the inter-rows area where the effects of fertilizers do not usually reach

Apply intercropping in the inter-rows area of olive groves. Aromatic plants for honey production are a good option

Acquire awareness of the importance of **"carbon farming"** not only from a socio-environmental but also economic point of view

Reduce the consumption of **external inputs** (fertilizers and pesticides)

Reduce **machinery passes** and minimize **soil tillage**

Recommendations for OLIVE FARMERS



OPTIMIZING CARBON ECONOMY



According to estimates of SUSTAINOLIVE

If all Andalusian olive farmers applied the sustainable management practices that are economically and technically feasible, **1.7 million tons of CO₂** would be retained in the soil more than is currently retained, which is equivalent to the CO₂ that would be emitted if all European cars circulated for 40 km.

Recommended POLICY ACTIONS

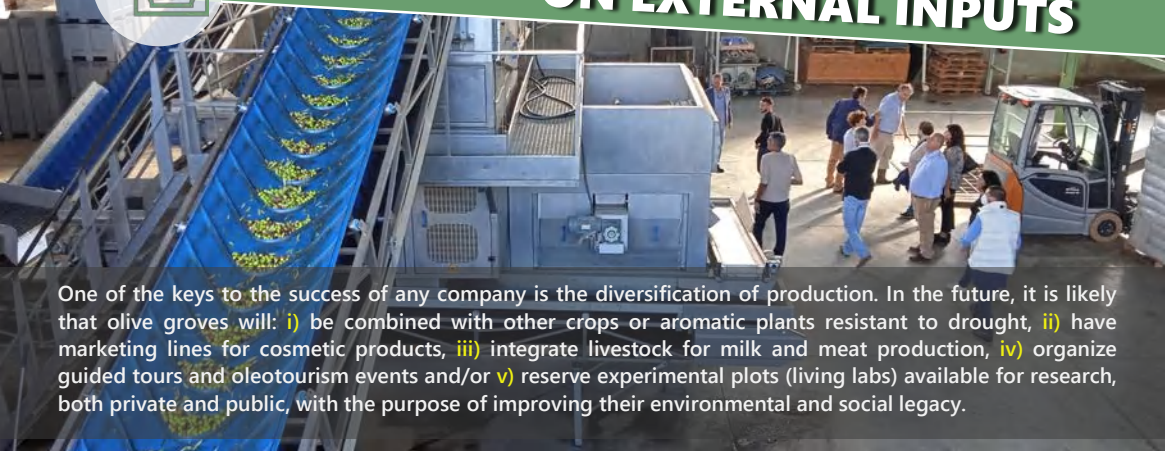
- ➔ Establish an incentive system that rewards olive farmers whose farms behave as **net sinks** of atmospheric CO₂
- ➔ Establish a penalty procedure for olive farmers whose farms act as **net sources** of CO₂
- ➔ **Prohibit the burning** of olive pruning remains at any time of the year, unless visual symptoms of pests and diseases are detected
- ➔ Financially support the acquisition of **low-emission** agricultural machinery
- ➔ Encourage economically the use of **environmental friendly plant protection** products
- ➔ Encourage olive farmers to maintain a **minimum herbaceous cover** area (between 35 and 50% of the total farm area is suggested)

If Andalusian farmers made the most of the different sources of organic matter available (cover crops, pruning remains, composted olive mill pomace, manure), the soils of the Andalusian olive groves could sequester an amount of CO₂ equivalent **to 6.7% of emissions** of this gas by the entire region of Andalusia during 2019.

If the 2.5 million tons of tree pruning generated annually in the Andalusian olive groves were completely burned, the result would be the emission into the atmosphere of **4.22 million tons of CO₂**, which would be equivalent to 36% of CO₂ emissions of the entire Spanish agricultural, livestock and fishing sector in 2020.



REDUCING THE DEPENDENCE ON EXTERNAL INPUTS

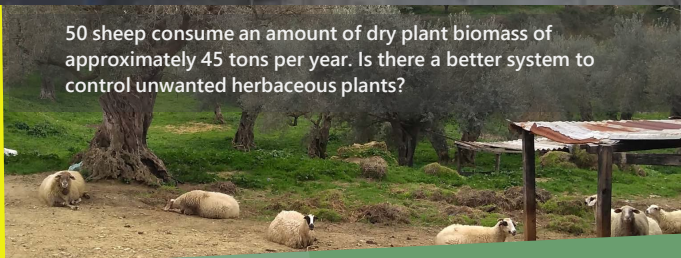


One of the keys to the success of any company is the diversification of production. In the future, it is likely that olive groves will: **i)** be combined with other crops or aromatic plants resistant to drought, **ii)** have marketing lines for cosmetic products, **iii)** integrate livestock for milk and meat production, **iv)** organize guided tours and oleotourism events and/or **v)** reserve experimental plots (living labs) available for research, both private and public, with the purpose of improving their environmental and social legacy.

European legislation establishes **increasingly strict limitations** on intensive livestock systems.

The growing sensitivity of society for animal welfare together with the concern of consumers for health, make sustainable animal-based food a safe bet.

50 sheep consume an amount of dry plant biomass of approximately 45 tons per year. Is there a better system to control unwanted herbaceous plants?



Recommendations for OLIVE FARMERS



- ➡ Optimize **biomass production**, especially by maintaining a cover crop. If **legumes** are intercropped, protein of plant origin could be produced, very valuable to be included in the feed of an eventual livestock herd
- ➡ Avoid **burning tree pruning remains**. Instead, crush and deposit them on olive grove soils
- ➡ Apply **organic fertilizers** (composted olive mill pomace and manure)
- ➡ Intercropping by integrating **other crops** in the inter-rows area of olive groves. Aromatic plants for honey production are a good option
- ➡ Fertilize only when necessary, according to the results obtained by **foliar and soil analyses** (give the olive trees the amounts of nutrients and at the right time they need)
- ➡ Integrate **livestock** into olive groves (in addition to providing organic matter through droppings, it will help control the cover crop and give the possibility of marketing other food products such as milk, eggs or meat)

Since 2001, the Spanish authorities have withdrawn 665 plant protection products from the market (35% of those currently authorized).



How should we interpret that only a few years after being authorized, an agrochemical product is withdrawn due to its effects on human health and/or the environment?

REDUCING THE **DEPENDENCE** ON **EXTERNAL INPUTS**



Recommended **POLICY ACTIONS**

- ➔ Encourage financially the use of locally available **organic fertilizers and plant protection** products
- ➔ Reward olive farmers who recirculate biomass from their olive groves and who use local **organic fertilizers**
- ➔ Encourage communication and the establishment of **synergies** among olive farmers and local livestock farmers
- ➔ Encourage the incorporation of **livestock** in olive groves, especially those involving protected autochthonous breeds
- ➔ Promote **training actions** that publicize the benefits and methods of implementation of **non-chemical alternatives** to conventional fertilization and plant protection products

Considering only Andalusia, the olive grove cultivation annually generates about 2.5 million tons of tree pruning remains, the equivalent to the weight of 170 Towers of Pisa. Applying this organic matter to the soil of olive groves would involve **savings in nitrogenous fertilizers valued at approximately 18 million euros.**

Thanks to savings in nitrogenous fertilizer (average €11 per hectare), a group of neighboring farmers who gathered 20 hectares of olive groves could **amortize a shredder valued at €2300 in just 10 years.**

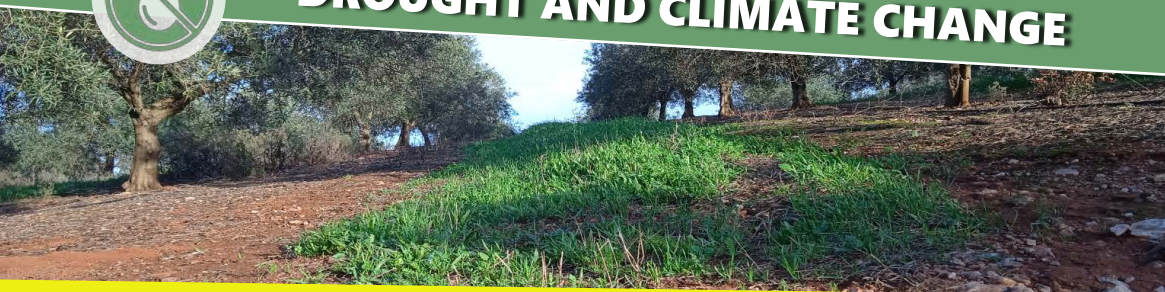
Burning the pruning remains means that all that money, equivalent to 324000 olive wages, **vanishes into the atmosphere.**

According to
estimates of
SUSTAINOLIVE

Fungicides (mainly copper-based) constitute a family of plant protection products with high risk for the environment and human health, followed by herbicides and insecticides. The search of natural substitutes for copper is essential to reduce the impact of olive cultivation.



INCREASING RESISTANCE TO DROUGHT AND CLIMATE CHANGE



A significant proportion of rainwater that falls on olive groves is concentrated between autumn and early spring, a period of time in which biological activity of olive trees (thus, the need for water) decreases. The maintenance of a **cover crop** as extensive as possible during these months is an excellent decision because it reduces water loss by surface runoff without implying, if it is properly controlled, a reduction in the amount of water available for olive trees.

Recommendations for OLIVE FARMERS



- ➔ Maintain a spontaneous or seeded **cover crop** and reduce soil tillage, at least until the end of March-beginning of April, depending on weather forecasts
- ➔ Apply a **rational fertilization** program, under technical advice
- ➔ Improve the **efficiency** of water supply and conduction systems, minimizing losses due to breaks in pipes and distribution channels
- ➔ Have irrigation water **control systems** (individual counters) that guarantee accurate information on the water flows actually used
- ➔ Improve **uniformity** in the application of irrigation (use of drip irrigation systems with proper maintenance)
- ➔ Employ controlled **deficit irrigation** strategies
- ➔ Optimize **irrigation schedules**, applying the amount of water appropriate at the most suitable time for cultivation
- ➔ Limit irrigation in the period **close to the olive harvest**
- ➔ In the case of new plantations, consider **climate forecasts** and maps of vulnerability to climate change
- ➔ Readjust **planting frames** to water availability predictions



INCREASING RESISTANCE TO DROUGHT AND CLIMATE CHANGE



When choosing early flowering varieties, high temperatures during oil accumulation can decrease the **amount of oleic acid** in the fruit, so it is advisable to choose varieties with a high content of such compound to mitigate this effect.



The roots of the cover crops contribute to retain the soil. The aerial part of the cover crops protects the soil from the impact of raindrops.

Both together prevent the loss of between 2 and 3 mm of superficial soil per year (**2-3 cm every 10 years**).

Recommended POLICY ACTIONS

- ➔ Harshly persecute and penalize olive farms that use **unauthorized sources** of water for irrigation
- ➔ Promote the use of **treated wastewater** for irrigation of olive groves, especially in sites with water shortage
- ➔ Promote the change toward **less water-demanding** or precision irrigation systems
- ➔ Limit **authorizations** for new olive grove plantations in areas with scarcity of water supply, especially in those considered most vulnerable to climate change
- ➔ **Combine olive varieties** with different levels of resistance to drought
- ➔ Allocate economic resources to the research of olive tree varieties **more resilient** to climate change
- ➔ Encourage the combination of olive trees with either shrub species with commercial value and adapted to **semi-arid conditions**, or short-cycle winter herbaceous plants
- ➔ Create **advisory programs for irrigators** that include training actions in cooperatives





INCREASING BIODIVERSITY

The greater the density of the **native vegetation patches** in an olive grove and surrounding areas, the greater the guarantee that biodiversity corridors will be created.



Thirteen species of **solitary bees** (they do not form hives) have been identified that nest in cavities on the soils of Andalusian olive groves. Therefore, they depend on the implementation of cover crops to survive.

Maintain **patches** of native vegetation ←

Maintain a spontaneous or seeded **cover crop** ←

Shred tree pruning remains and apply them on top of the soil ←

Intercropping by integrating **other crops** in the inter-rows area of olive groves. Aromatic plants for honey productions are a good option ←

Avoid the use of **pesticides**, especially broad-spectrum ones. In case there is no other option: ←

Reduce the number of **applications**, avoiding those of a "preventive" nature

Reduce the **dosage**

Select **less aggressive** products

Read the **technical data sheets** and **labels** of agrochemical products and avoid those involving a negative impact on biodiversity ←

Recommendations for OLIVE FARMERS



Any agronomic practice that contributes to create habitat (i.e., **shelter and food**) for the optimal development of the life cycle of natural enemies of pests can be considered as a "natural insecticide".

INCREASING BIODIVERSITY



According to some SUSTAINOLIVE estimates

By applying 6 liters per hectarea of glyphosate at 67.9 % in two times, the **human risk is multiplied by 7.5** compared to a 3 liters single application at 35 % of glyphosate.



Recommended POLICY ACTIONS

- ➡ Promote the heterogeneity of the landscape, especially **mosaics of native vegetation** that create corridors of biodiversity
- ➡ Promote communication between companies that produce **auxiliary fauna** and olive farmers
- ➡ Promote the **naturalization** of the surroundings of the planned **irrigation ponds**. Apart from boosting biodiversity, this leads to attractive habitats that promotes other leisure activities and rural tourism. For existing ponds, establish economic aid or free technical advice that allows naturalization, especially for those located in protected areas
- ➡ Require the presence of a minimum percentage of herbaceous **cover crop** in olive groves
- ➡ Promote and encourage the creation of a "**Network of olive groves for biodiversity**"
- ➡ Incentivize the installation of **support infrastructures** for nesting and refuge for fauna (ponds and drinking troughs, dry stone walls, nest boxes and posts, insect hotels...)
- ➡ Incentivize the application of certified organic plant protection products that do not generate socio-environmental **externalities**

During 2021, residues of **more than 100 pesticides** were detected in fresh foods marketed in Spain. Sixty per cent of these pesticides were capable of causing alterations in the human endocrine system and, therefore, in our reproductive capacity, even in very small doses.



CAPITALIZING SUSTAINABILITY



The growing **global awareness** about the climate crisis and the loss of biodiversity, especially in developed countries with greater per capita income, is pressing all economic sectors to make a transition towards a more sustainable production model.

According to results of SUSTAINOLIVE

If agriculture were included in the **CO₂ emissions market**, sustainable olive groves could expect an average annual income per hectare that would be €150 higher than that of olive groves that follow a conventional model.



EVOO was the food product in the Spanish market that achieved the **highest market share** in 2016 for the "organic" category, with more than **6%**. Forecasts predict progressive growth.

Recommendations for OLIVE FARMERS

- ➔ Catch the attention of **demanding consumers** who reward responsibility and healthy nature of food they purchase
- ➔ Participate as partners or collaborators in national or international **research projects** that require experimental sustainable olive farms
- ➔ Offset the foreseeable decreased production by a high quality olive oil, therefore with a **higher price**
- ➔ Participate in **oleotourism** initiatives or even create a specific oleotourism department within the farm or at the cooperative level
- ➔ Participate in **voluntary carbon markets**

The 2023 CAP **conditionality** standards establish a series of good agricultural and environmental practices. Olive farmers will have no alternative but to implement more sustainable management methods if they want to receive the full economic subsidy.



CAPITALIZING SUSTAINABILITY



European consumers demand **healthy and eco-friendly food**, even more so as a result of the pandemic. The olive sector must not only exploit the health benefits of EVOO to open new market niches and consolidate existing ones, but must become aware that the application of sustainable management practices in the olive grove provides added value affecting positively the **farmer's income**.



Recommended POLICY ACTIONS

- ➔ Establish advantageous **tax mechanisms** for olive farmers who are committed to sustainable management practices, especially certified organic ones
- ➔ Create a **quality label** (similar to the energy efficiency scale) that awards olive farms according to a range of sustainable management practices, which could be reviewable at intervals of 3 to 5 years
- ➔ Create economic and tax incentives for the **internationalization** of small olive farmers who produce organically or wish to transit towards organic farming (e.g., through aid to hire advisory services or specialized staff)
- ➔ Announce **prizes** for the municipalities or cooperatives that most notably increase their area of organic olive cultivations (or subjected to other environmental quality certificates)
- ➔ Increase the number of **controls** to verify the application of the measures established in the CAP eco-schemes
- ➔ Increase information and promote technical and economic aid to those olive farmers who would like to transform traditional cultivation system to an organic one. Intensifying the supporting actions during the **first years** of conversion would be highly recommendable
- ➔ Articulate measures that encourage food markets to position sustainably produced food in **preferential places** on sales lines

It may be thought that modifying olive grove management routines in favor of sustainability is a **voluntary decision** resulting from the individual sensitivity of each farmer.

However, it will soon become a decisive stake of the **European Union**, which will support and reward those farmers who are committed to the transition towards a responsible agricultural model and which will penalize those who continue with the old unsustainable practices.





IMPROVING COMMUNICATION STRATEGIES WITH OLIVE FARMERS AND SOCIETY

After decades of all kinds of presentations, talks, conferences and communication events, the educational community **should have obtained great results** regarding to the ecological transition of the agricultural sector in the Mediterranean basin. But this have not been the case.



It is time to **revolutionize the methodology** we use to communicate with farmers. Let's lose the fear of change and develop **original and motivating** tools and teaching methods that awaken farmers from the lethargy imposed by commercial brands and tradition.

Recommended POLICY ACTIONS

- ➡ Design and implement **environmental awareness programs** in the olive sector based on innovative, transgressive and participatory methodologies
- ➡ Promote **demonstrative studies** aimed at providing updated information to the farmer on the application of good environmental practices, with explicit references to productivity and profitability compared to conventional cultivation
- ➡ Create a **farmer service office** that provides information on organizations, training, subsidies and aid of interest related to the sustainability of olive farming
- ➡ Compile a **database platform with informative and didactic resources** (e.g., an URL or a mobile phone App) aimed at training in sustainable agroecological practices in the olive grove. Local organizations and entities (town halls, cooperatives, associations of integrated production, denominations of origin, etc.) should guarantee that farmers are aware of and have easy and fluent access
- ➡ Plan a **network of synergies** between olive farmers and universities, which allows both having a bank of experimental olive farms (**living labs**) and speeding up the flow of scientific knowledge to farmers
- ➡ Incentivize among local entities specific training actions in agroecology and environmental communication aimed at technicians responsible for the **institutional relationship** with the olive sector



IMPROVING **COMMUNICATION** STRATEGIES WITH OLIVE FARMERS AND SOCIETY



Recommended
POLICY ACTIONS

Most farmers will **never** have the opportunity to receive rigorous scientific information on the harms caused by herbicides and pesticides on their health and the environment.



Institutions and educators are responsible for providing to farmers and society this information in an **accessible language** and through an original and **stimulating methodology**.

Environmental problems are **not yet a priority** for many olive farmers. If we limit our speech solely to environmental impacts, we will not succeed in capturing the attention of a sufficient representation of farmers. However, if we **link health and environment**, most olive farmers will be willing to listen.



- ➔ Support olive **cooperatives** that implement training and awareness programs related to the ecological transition of olive grove cultivation (especially those that reach both producers and consumers)
- ➔ Incorporate into both formal and non-formal educational programs contents that deepen into **socio-environmental externalities** generated by the conventional olive cultivation model, as well as the benefits of sustainable olive groves on biodiversity, landscape and, above all, the health of farmers and consumers
- ➔ Promote **training activities** in olive oil producing municipalities that examine the differences between conventional and sustainable olive groves, with special emphasis on the benefits of the latter on biodiversity, landscape and the health of farmers and consumers
- ➔ Demand in any research project involving olive groves (regardless of the field or scope) the inclusion of a minimum package of **communication actions** that allow the results of the research to reach the actors of the olive sector (especially farmers) and society
- ➔ Promote workshops in **schools** from olive oil producing municipalities on the socio-environmental benefits of implementing sustainable management practices in olive groves





BE TRAINED, INFORMED, AND SKILLED



This year, Tomás will follow again the recommendations of the manufacturer of nitrogenous fertilizers (3 kg of fertilizer per olive tree), but he will select 3 groups of 9 olive trees each on which he will apply **smaller doses**. He will try to ensure that all the groups are homogeneous so that the only factor influencing olive production is the dose of fertilizer.

After harvesting, he will weigh the olives from the 3 groups of experimental olive trees and calculate the **average production** of each of them. Then, he will compare the yield with that obtained in nearby olive trees where the manufacturer's dose was applied. If things go well, the following Tomás' experiments will test the influence of the application of shredded remains of pruning and maintenance of cover crops on olive production.



Recommendations for OLIVE FARMERS

- ➔ Learn first-hand **examples** of other local olive farmers who apply sustainable management practices
- ➔ Participate actively in debate forums and training actions promoted by olive **cooperatives**
- ➔ Be wary of messages that come from untrustworthy or **compromised sources** (especially when commercial interests are involved)
- ➔ Participate in the wide range of online training and information events available related to agroecological approaches on olive farming, some linked to national and international **research projects**
- ➔ Acquire capacity in **sustainable agronomic techniques** for olive farming
- ➔ Let yourself be advised by **specialized technicians** with no conflicts of interest and, above all, by **researchers** in the sector
- ➔ Carry out simple **experimental tests** on the farm to take decisions about the most appropriate management practices



BE TRAINED, INFORMED, AND SKILLED



Recommended POLICY ACTIONS

- ➔ Promote olive farmers to receive **technical training** in olive grove sustainability (similar to that on handling plant protection products), organized into 3 levels: basic, intermediate and advanced. Link potential financial aid to the level reached
- ➔ Boost the role of olive cooperatives as a **uniting center** for training and information activities
- ➔ Promote training actions aimed at familiarizing olive farmers with the **scientific method** and learning to design their own field experiments (in order to test the impacts of applying sustainable management practices on their business)
- ➔ Encourage **synergies** between agricultural research centers and universities, and olive oil organizations and cooperatives, especially in terms of field experimentation and results analysis
- ➔ Include **specific topics on (self) experimentation** in olive farms within the programming of courses and university master's degrees related to olive farming



One of the **main priorities of public institutions** must be to promote that the scientific findings collected by the academy are transferred without problems to society.





**SUSTAIN
OLIVE**



PRIMA
PRACTITIONERS' RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA



Co-funded by the
Horizon 2020 Framework
Programme of the European Union

This project is part of the PRIMA programme supported by the European Union

It is time to stop perceiving the ecological transition of the olive sector only as a hard challenge. We are facing a great opportunity to transform olive cropping into a symbol of quality production and sustainability.



HOW TO CITE

Liétor Gallego, J. and R. García Ruiz. 2022. Recommendations for the ecological transition of olive cultivation. A synthetic guide for olive farmers and politicians. SUSTAINOLIVE project (PRIMA Foundation, 2019-23). University of Jaén (Spain)

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