

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

Organic farming in the Alps: a first analysis and some development scenarios

This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1900885> since 2023-04-21T12:34:26Z

Publisher:

Permanent Secretariat of Alpine Convention

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

ORGANIC FARMING IN THE ALPS: A FIRST ANALYSIS AND SOME DEVELOPMENT SCENARIOS



**Mountain Agriculture and
Mountain Forestry Working Group of the Alpine Convention**

Mandate 2021-2022



ALPENKONVENTION
CONVENTION ALPINE
ALPSKA KONVENCIJA
CONVENZIONE DELLE ALPI

IMPRINT

This report is the result of the joint work of Members of the Mountain Agriculture and Mountain Forestry Working Group (WG MAMF) under Italian Presidency.

Part 1 and Part 2 are to be attributed to Simonetta Mazzarino (main author) and Giorgio Matteucci (contributor). The Delegations of Austria and Switzerland contributed to the report and sent their contributions to the Alpine data collection for their respective countries.

The Members of the Working Group are:

Presidents: Simonetta Mazzarino, *Università di Torino, Dipartimento di economia e statistica “Cognetti de Martiis”* - University of Turin, Department of Economics and Statistics “Cognetti de Martiis”

Giorgio Matteucci, *Consiglio Nazionale delle Ricerche (CNR)- Istituto per la BioEconomia* – National Research Council of Italy (CNR) – Institute of BioEconomy

Supported by: Valentina Sgambato, EURAC, *Delegazione Italiana in Convenzione delle Alpi* – EURAC, Italian Delegation to the Alpine Convention

Austria:

Josef Fuchs, *Land Tirol* – Region of Tyrol

Philipp Gmeiner, *Bundesministerium für Landwirtschaft, Regionen und Tourismus (BMLRT)* - Federal Ministry of Agriculture, Regions and Tourism

Michael Prskawetz, *Bundesministerium für Landwirtschaft, Regionen und Tourismus (BMLRT)* - Federal Ministry of Agriculture, Regions and Tourism

Johannes Schima, *Bundesministerium für Landwirtschaft, Regionen und Tourismus (BMLRT)* - Federal Ministry of Agriculture, Regions and Tourism

Elisabeth Schwaiger, *Umweltbundesamt Österreich* - Environment Agency Austria

France:

Anne Castex, *SUACI Montagn'Alpes - Maison de l'agriculture et de la forêt* - SUACI Montagn'Alpes - House of Agriculture and Forestry

Nathalie Girard, *Chambre régionale d'agriculture Auvergne-Rhône-Alpes* - Auvergne-Rhône-Alpes Regional Chamber of Agriculture

Germany:

Thomas Huber, *Bundesministerium für Ernährung und Landwirtschaft (BMEL)* – Federal Ministry of Food and Agriculture

Beatrice Wegener-Lange, *Bundesministerium für Ernährung und Landwirtschaft (BMEL)* – Federal Ministry of Food and Agriculture

Carola Goedecke, *Bundesministerium für Ernährung und Landwirtschaft (BMEL)* – Federal Ministry of Food and Agriculture

Steven Dörr, *Bundesministerium für Ernährung und Landwirtschaft (BMEL)* – Federal Ministry of Food and Agriculture

Maximilian von Stern-Gwiazdowski, *Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten (StMELF)* - Bavarian State Ministry of Food, Agriculture and Forestry (StMELF)

Anton Dippold, *Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten (StMELF)* - Bavarian State Ministry of Food, Agriculture and Forestry (StMELF)

Italy:

Alessio Carlino, *Regione Friuli Venezia Giulia* – Region Friuli Venezia Giulia

Rinaldo Comino, *Regione Friuli Venezia Giulia* - Region Friuli Venezia Giulia

Roberto Zoanetti, *Provincia autonoma di Trento* – Autonomous Province of Trento

Luca Cetara, EURAC Research

Valentina Sgambato, EURAC Research

Thomas Streifeneder, EURAC Research

Liechtenstein: Maria Seeberger, *Amt für Umwelt* - Office for the Environment

Slovenia:

Marjetka Jošt, *Ministrstvo za kmetijstvo, gozdarstvo in prehrano* - Ministry of Agriculture, Forestry and Food

Tisa Kosem, *Ministrstvo za kmetijstvo, gozdarstvo in prehrano* - Ministry of Agriculture, Forestry and Food

Andrea Mugerle, *Ministrstvo za kmetijstvo, gozdarstvo in prehrano* - Ministry of Agriculture, Forestry and Food

Switzerland:

Daniel Baumgartner, *Bundesamt für Landwirtschaft* - Federal Office for Agriculture

Priska Dittich, *Bundesamt für Landwirtschaft* - Federal Office for Agriculture

Observers:

Gottfried Moosmann, ARGE ALP

Klaus Lintzmeyer, Club Arc Alpin

Alfred Ringler, Club Arc Alpin

Veronika Schulz, Club Arc Alpin

Elena Di Bella, Euromontana

Andrej Udovč, ISCAR

Anea Schmidlin, ISCAR

Nicolas Chesnel, Alpine Space Programme

Permanent Secretariat of the Alpine Convention:

Giulia Gaggia, Permanent Secretariat of the Alpine Convention

Permanent Secretariat of the Alpine Convention, [May 2022]

Herzog-Friedrich-Straße 15

A-6020 Innsbruck

Austria

Branch Office

Viale Druso/Drususallee 1

I-39100 Bolzano/Bozen

Italy

info@alpconv.org

SUMMARY

This report relates to Task 1 (Study on Organic Agriculture Stocktaking in the Alps) and Task 2 (Developing Organic Agriculture Scenarios for Alpine Regions) envisaged in the 2021-2022 mandate for the Mountain Agriculture and Mountain Forestry (MAMF) Working Group.

Organic farming is a good development opportunity for Alpine communities who want to qualify their food and products as respectful of the environment and its balance. Organic mountain products have undoubted advantages linked to a more balanced exploitation of soil, environment and natural resources, and undoubtedly combine advantages for the consumer, linked to better organoleptic and healthiness characteristics. Furthermore, the presence of an agricultural model based on pastures and on the production of milk and meat allows to maintain a pleasant landscape in the mountains and an environment suitable for sustainable tourist use, inducing the possibility of developing district economies diversified on many activities in the Alpine territories. These activities are not only strictly sporting but also linked to cultural events, leisure time, wellness, traditional cuisine and gastronomy, therefore they can have many relationships with the local agricultural sector.

The development of this model of agriculture has been very intense in the last 20 years in all Alpine Convention Countries, also driven by consumers who are increasingly attentive to their purchasing choices, albeit with different growth rates. Also inside the perimeter of the Alpine Convention spread and growth of this model has not been homogeneous in the various areas, as it was influenced by determinants (socio-economic and organizational conditions) with value and importance different in different Countries and territories. The propensity to adopt this model of agriculture, in fact, is mainly influenced by the possibility of obtaining a satisfactory and lasting income for farmers, which in turn depends on the possibility of effectively differentiating Alpine organic productions, by consumers' willingness to pay more for Alpine organic products and, more generally, on market demand. Market demand, in turn, is susceptible to exogenous macroeconomic variables, such as difficult economic growth and inflation, which by modifying the purchasing power of consumers can endanger this important production model for the Alps.

If these exogenous and negative influences will not prevail in the next decade, and if the availability of consumer spending will go on growing, we can envisage a positive scenario of growth of the territories and farms affected by this type of agriculture, on the basis of what happened in the AC countries in the last decade. However, it remains essential to continue promoting Alpine organic products in a way able to effectively emphasize the differences compared to other products, both non-organic and organic but of non-Alpine origin, perhaps outside the EU, and the common value represented by consuming products of local mountain origin. The EU regulation of organic farming, even in the presence of group certification, could represent a brake on the spread of the production method in the presence of muddled and unsuitable rules for small family farms. As always, the role and importance of future EU policy choices remains, which should take into consideration the possibility of declining measures and funding in order to favour Alpine farms in comparison with those located in areas with greater economic development and possibilities.

TABLE OF CONTENTS

1. PART 1 - STUDY ON STOCKTAKING ON ORGANIC AGRICULTURE IN THE ALPS (Task 1).....	7
Introduction	7
1.1 Characteristics of the Alpine agriculture.....	7
1.2 Challenges for Alpine agriculture in the long term.....	9
1.3 Organic farming: some technical characteristics.....	11
1.4 The organic farming in the Countries of the Alpine Convention.....	12
1.5 Some results from Task 1 activities	65
2. PART 2 - DEVELOPING ORGANIC AGRICULTURE SCENARIOS FOR ALPINE REGIONS (Task 2)	
Introduction	67
2.1 Important drivers on organic farming	67
2.2 Trend of organic farming in AC countries in the last decade	68
2.3 The organic surfaces under conversion as an indicator of the short-term scenario	19
2.4 A comparison between territories inside and outside the perimeter of the AC.....	20
2.5 The example of Piedmont (ITALY): focus on recent organic farming trend	22
2.6 Identification of possible scenarios for Alpine organic farming up to 2030.....	26
3. CONCLUSIONS AND RECOMMENDATIONS.....	30
3.1 Agriculture and organic farming in the Alps.....	30
3.2 The survey activity on organic stocktaking in the Alpine Convention Countries.....	30
3.3 Organic scenarios in Alpine regions under the action of main drivers.....	31
3.4 Prices for organic products.....	31
3.5 Market demand and consumers' spending.....	32
3.6 Exogenous macroeconomic drivers.....	32
3.7 Policies for mountain agriculture and Alpine organic farming.....	32
3.8 Business networks and district development model for Alpine territories.....	33
BIBLIOGRAPHY	35

1. PART 1 – STUDY ON STOCKTAKING ON ORGANIC AGRICULTURE IN THE ALPS (Task 1)

Introduction

The Alps represent a territory rich in ecosystems and biodiversity but also increasingly characterized by a great fragility (physical and socio-economic) that is highly dependent on existing climate changes and more unfavourable socio-economic conditions. The increase in temperatures, the slopes instability, the phenomena of soil erosion are critical physical factors that go together with social phenomena such as the aging of Alpine populations and the loss of agricultural surfaces (MacDonald et al., 2000). These elements, all together, are the basis of the degradation and abandonment of many mountain areas. Biological diversity, inherent not only to uncontaminated alpine habitats but still present in the traditional cultivation and breeding practices of our mountains, is a highly endangered value, to be preserved and protected with targeted actions because otherwise it cannot be recovered.

The biodiversity inherent vegetal cultivars and animal breeds characterize traditional Alpine agriculture (Sturaro et al., 2013). It constitutes not only an important genetic basin from which we can draw for the future, but also represents the first step from where important value chains are developed (fruit and vegetables, milk, meat, wood, and their processed products such as cheeses, wines, sausages, industrial and handicraft wood products) able to activating important collateral economies (districts), often based on sustainable tourism, essential for the local development and the permanence of young people in the territories.

So, alpine areas must be directed towards forms of agriculture which, by recovering elements from the past, can look at the future as more extensive and sustainable forms of production, which are also the basis of the beautiful landscape of our mountains. In this context, organic farming provides an opportunity for sustainable food production. The aim of this report is to present data and information useful for describing the situation of organic farming in the Alpine territories belonging to the Alpine Convention (AC) perimeter, to facilitate the identification of actions, projects and policies useful for its promotion and enlargement.

In this report we will not only refer to organic farming, but more generally to agriculture and forestry currently existing in the territories included within the AC perimeter, which are not always strictly alpine. These farming activities, regardless of whether they are strictly certified organic or not, in any case respond to an environmental friendly model. It is therefore important to guarantee over time the presence of agricultural and forestry activities managed in all these territories (both those strictly mountain at high altitude, and also those in the valley, close to the alpine environments) with a special consideration to the multiple effects (socio-economic but above all of protection and maintenance of the landscape and delicate ecological balances) these productive activities determine.

1.1 Characteristics of the Alpine agriculture

Mountain agriculture plays a key role in the Alps (Manrique et al., 1999 ; Laurent et al., 2003 ; Casini and Scozzafava, 2013), determining positive effects of various kinds: economic, social, hydrogeological, environmental, climatic, to the benefit not only of local populations but also of people living downstream of the Alpine territories. The main reasons can be summarized as follows:

- First, it is an economic sector producing value through agricultural commodities and food and wood productions. The food productions are unreproducible elsewhere, as their physico-chemical and organoleptic characteristics are strongly linked to the territories of origin and to the production techniques used (Martin et al., 2005; Eccel, 2022).
- In many Alpine areas, especially in the case of high mountain pasture management and pasture cheeses production, the production techniques are traditional, linked to the knowledge established over the centuries, and above all they are low-inputs based (Marongiu et al., 2010). This fact determines in vegetable and breeding processes lower average yields respect to more intensive production models, typical of lowland agricultural areas. At the bottom of the valleys, on the other hand, the agriculture practiced (especially when oriented towards more intensive fruit growing) responds more to profitability criteria. In any case, these are productive activities that characterize and enhance these areas, with products that are positively affected, in their organoleptic characteristics, of the cultivation environments close to the mountains (Andreotti, 2013).
- It is just implementing of low-input production models that allows a production activity to minimize the impact on the environment, determining on the contrary positive effects on slopes stability (e.g. by cultivating terraces), on maintaining soil fertility (e.g. by the recycling of organic matter from livestock and crop residue) and on animal welfare (e.g. by allowing free relaying of animals in the pastures in summertime and on permanent grassland in wintertime), on the protection of indigenous genetic resources that otherwise would not have the possibility of competing with new breeds and varieties with higher yields.
- Generally farming activities carried out in the mountains are diversified and often also involve the management of the woods (with activities of pruning for production purposes, collecting firewood or wood to be used in the piling of permanent crops, cleaning the brushwood, etc.), with fundamental effects for fire control.
- Finally, the production techniques used, despite affected by seasonal weather trends that often oblige some treatments to be intensified, are today strongly oriented towards integrated agriculture and/or organic farming protocols, which notoriously determine less pressure on the cropland and on the bordering ecosystems, fully compatible with natural areas and woods.

To summarize, mountain agriculture mostly implements low-input production and/or organic farming techniques, and for these reasons is undoubtedly a sustainable and fundamental production model. The techniques adopted (consolidated over time) and the constant and continuous presence of men guarantee balances for environment and ecosystems. On the contrary, the abandonment of mountain territories and of agricultural best practices favour landslides, slopes instability, forest fires, which locally implies material and social damage.

In the Alps, agricultural activity is mostly carried out by small family farms¹, according to productive specialization oriented towards animal husbandry or fruit-growing, but also non-specialized farms (with mixed-production) are very widespread. Even when prevalent activities are present, they often can be accompanied by viticulture, cereal farming, cultivation of small fruits or fresh vegetables. Generally these are businesses passed from

¹ It is important to underline the lack of up-to-date databases at a European level that allow to consider separately from all the universe the agricultural and forestry farms located inside the perimeter of the Alpine Convention. It is therefore difficult to support the information on the small physical and economic size of Alpine farms with statistical structural data. The publication "Mountain Agriculture" (Alpine Convention, 2017; p. 38, fig. 1.1 and 1.2) reports a comparison in relative terms between mountain UAA and mountain farms inside the AC perimeter and the national universe of AC Countries for 2010. The relative percentages of UAA appear systematically lower than the relative percentages of farms, indicating an average size in physical terms lower than the average size in the AC Countries. The only exception is represented by Slovenia, where the two percentages coincide (26%) and Italy, where the percentages of UAA is higher (8%) than the percentages of farms (6%). Nothing is reported on the economic dimension of the farms, which the operational experience of stakeholders indicates much more limited than in the agricultural areas of plains and not disadvantaged hills. These data are old but there is no particular evidence that situations have changed radically compared to 2010.

father to son; of course if a son/daughter is present and he/she is interested in going on with the business.

However, an agricultural system of this type presents a non-negligible bill to farmers. Farming in the mountains is undoubtedly more onerous in terms of physical effort and hours of work per hectare², above all for the more difficult accessibility of land which limits the possibilities of mechanizing many cultivation phases. Added to this, there is also a limited offer from the mechanical industry of machines. The mechanical industry has neglected this question for many years (Cerea and Mercatoni, 2016; Zambon and Monarca, 2017; Rodríguez-Pose, 2017; Franco et al., 2020), because it is not very profitable in terms of the number of machines required and because of the prices, which may be not suitable for small farms. More recently, some stakeholders and farmers from Trentino report that small agricultural machinery produced in China have made a timid appearance. According to some operators, they have numerous advantages in terms of operational characteristics and accessibility as price.

This problem, together with other economic and social reasons, are the basis of a difficult, not obvious generational turnover that has afflicted many of the Alpine areas for several decades. We cannot say how much this condition is widespread everywhere. Intelligent educational and effective support policies for local populations have been carried out by some Alpine countries for many decades (France, Switzerland, Austria, Germany are good examples), in terms of services provided. They have contributed to countering this phenomenon which instead afflicts many other Alpine (but not only Alpine!) areas, for example in Italy.

1.2 Challenges for Alpine agriculture in the long term

The challenge that mountain agriculture must face in the coming decades is to minimize its negative externalities, demonstrating that it is able to meet demand and remain environmentally and economically sustainable.

To overcome this challenge it is necessary to play both on the agricultural supply front, directing production towards models that are more attentive to the environment and the land-water-soil system, and also on the side of the demand for food, directing consumers towards food consumption models more attentive to the quality, the geographical origin of the food, and more sober in terms of calories ingested and the limitation of waste.

The most significant agriculture negative externalities (supported by a very rich bibliography which here is summarized in a few references) can be summarized as follows:

- a) production of greenhouse gases, such as CO₂, CH₄, N₂O (Wang et al. 2011 ; Stavi and Rattan, 2013 ; Coderoni and Bonati, 2013 ; ISPRA, 2020a, 2020b, 2022)
- b) pollution of groundwater (Arias-Estevez et al., 2008 ; Parris, 2011)
- c) possible damage to farmers, consumers and the environment (primarily entomofauna) due to the use of pesticides (World Health Organization, 1990; Hayes et al., 2006)
- d) impoverishment of ecosystems biodiversity due to the abandonment of traditional practices, the use of pesticides and the non-use of native varieties / breeds because of their lower productivity
- e) a not sparing use of irrigation water due to the use of varieties that are not very resistant to water stress.

While intensive livestock farming is the main responsible for negative externalities referred to in points a), b) and e), the chemistry used in agriculture (for fertilization, weed control and

² In the case of Alpine viticulture in Aosta Valley (heroic by definition) the number of hours required by the vineyard cultivation exceeds the work of a vineyard in the Langhe area by 2,5-3 times (depending on the type of training used, guyot or pergola), mainly due to the difficulty of accessing to agricultural machinery, which oblige farmers to do almost all the work required by hand (Mazzarino et al., 2021).

pest attacks) is most responsible for the imbalances produced on the environment, intended as the water-soil system and pressure on the indigenous populations of plants and animals, including insects responsible for pollination. It should be emphasized that literature on carbon foot print shows that the negative effect on the environment by using chemical fertilisers and pesticides is referred not only when they are used on the crops (determining the b), c) and d) externalities), but also during their production phase and, to a lesser extent, transport (externality a) (Audsley et al., 2006; Condor and Vitullo, 2010; Passeri et al., 2012; Coderoni and Bonatti, 2013; Zampori and Pant, 2019).

The response that mountain agriculture can give is based on choices that limit as much as possible the use of chemical fertilizers on crops, and in general mechanical work in the field that requires high power and therefore high fuel consumption; limit the livestock load per hectare, to have lower CH₄ emissions linked to enteric fermentations, and to limit the production of manure, which, if in large quantities may cause problems both in its storage at farm level - production of N₂O - and when it is distributed on the land - nitrate pollution of groundwater -; recovery of traditional practices; the adoption of targeted innovations. Some examples can be:

- livestock farming techniques based on grazing, free housing and use of locally produced feed ;
- site-adapted number of cattle per hectare;
- use of manure as a natural nitrogen source ;
- crops rotations, for good weed control and maintenance of microbial balances and nutrients in the soil ;
- diversification in the cultivation/breeding of varieties and breeds, in order to avoid excessive genetic homogeneity in fields and livestock, with impacts on crops diseases and local ecosystems ;
- minimum tillage and conservative agriculture, to limit the tillage of the land while preserving its structure;
- preference for native varieties and breeds, more rustic because selected over the centuries and adapted to mountain environments;
- introduction in the farm of IT innovations (smart farming, precision farming) and biological control of pests, aiming at reducing chemical inputs and interventions according to the actual needs of crops;
- maintenance of forests managed and land arrangements, such as terraces and steps, which in addition to offering a better control of soil erosion and slopes instability, allow to maintain micro-ecosystems useful for the survival of the small local fauna (birds, small reptiles and amphibians, almost always responsible for the control of the harmful insects)
- the recovery of spontaneous plant species to be used for food.

The actions that farmers must undertake to limit these negative externalities are management choices, therefore private choices, which have repercussions on business income and for this reason they must also be adequately supported by the final consumption of families, good incentive policies, targeted research activities, technological innovations.

Considering the above, either the organic farming, the low-input agriculture traditionally implemented in mountain areas (pastoralism *in primis*) and the precision farming seem to respond well to these needs. In the case of IT innovations, the availability of service companies or consortia, able to offer the service at affordable costs for the individual farm, is also a crucial factor. It is important for the future to make farmers aware of what business choices are the best for the farm and the general context in which it operates, while not lacking the necessary support from the public sector and market demand.

Consumers must be made aware - the pandemic from Covid19 has already started this process - of the importance that cultivation and breeding techniques have on their health and the balance of the natural environment. These concepts must be communicated effectively at the time of their purchase through the food label, so to make them available the information when they do their food shopping.

1.3 Organic farming: some technical characteristics

Considering the above, no doubt that low input farming is the best response that mountain agriculture can give to the environment and the communities. Organic farming is a low-input food producing method aiming to limit the use of agriculture chemical inputs such as fertilizers, insecticides, fungicides, and herbicides. This farming model also provides the non-use of antibiotics in the livestock farming for production of milk and meat (with the exception of curative purposes and with authorised drugs) (Stockdale, 2001; Hole et al., 2005).

The organic model is based on traditional agricultural practices widely used until the middle of the last century in most rural areas, which promote the reuse of by-products like manure, the carbon cycle, and the activities of nitrogen-fixing bacteria. Moreover, it takes advantages of natural ecological balances, keeping under control harmful insects through the intervention of predators naturally present in the wooded areas next to the cultivated fields (birds, small reptiles, predatory insects).

Practices traditionally used in organic farming are (Reg. CE 834/2007; Reg. UE 848/2018):

- use of manure and green manure to restore soil fertility;
- use of crops rotations to combat weeds and crop diseases;
- biological pest control ;
- use of very few low toxicity chemicals (sulphur, copper compounds), traditionally used in agriculture;
- use of native plant varieties and animal breeds;
- limited use of antibiotics and medicines for farmed animals, and a lower number of cattle for hectar.

Organic farming excludes the use of genetically modified organisms and do not encourage intensive cattle farming; on the contrary require farmers to consider the specific behavioural needs of animals in terms of space and moving, so encourage a high standard of animal welfare.

The advantages offered from this productive method are devoted to three different subjects:

- **consumers**, who can feed with products less polluted by chemicals and with higher organoleptic characteristics and nutritional value
- **producers**, who are less exposed to the carcinogenic action of chemical inputs
- **environment**, since organic agriculture encourages the maintenance of biodiversity and of water quality, the enhancement of soil fertility, the preservation of local ecological balances, the responsible use of energy and natural resources.

The production protocol provides that to become organic the farm faces a conversion period (two or three years, depending on the production address) during which its management respects the rules of organic production even if its products at this stage are not yet considered organic. Its products will be sold as organic not before of the end of the conversion period, after having passed the relevant controls.

The organic production model involves lower yields, and potentially higher production costs. This means that prices for organic products are on average higher than those for conventional agricultural products. To give consumers more security and confidence towards

organic food, organic farming has been regulated at EU level for many years. The set of EU rules and controls are quite complex since they involve the single stages of production, distribution, and marketing of organic food. The labelling involves the use of a brand with a specific logo, which is the same in all Member States.

The last European Union basic act on organic production and labelling is **Regulation (EU) 2018/848**, came into force since January 1st 2022^{3 4}:

- it establishes production rules, control systems and trading arrangements for EU producers
- it harmonizes the rules applicable to organic operators in Third Countries through the introduction of the conformity monitoring system
- it simplifies access to the organic farming scheme for small operators
- it reviews the rules on organic animal production and introduces production rules for new species
- it also applies to mixed production farms (with non-organic and organic farming), provided that the two ways of producing must be clearly and correctly separated.

Two implementing Regulations (Reg. (UE) 2020/464 and Reg. (UE) 2021/279) and five delegated Regulations (issued in 2020 and 2021) integrate this main act on organic farming. **Delegated Regulation (EU) 2021/715**, which amends Regulation (EU) 2018/848 regarding requirements for groups of operators interested in organic certification, seems to be particularly interesting for organic mountain farmers, whose small economic dimension not always justifies the cost related to single controls and single compulsory certification.

1.4 The organic farming in the Countries of the Alpine Convention

It should be emphasized that the main statistical sources available at European (EUROSTAT) and national level mostly do not provide disaggregated data to give a recent overview of the organic agriculture in the Alps. More precisely, in some Alpine Convention Countries, in particular Switzerland and Austria, data on organic farms and surfaces insistent inside the Alpine Convention perimeter (municipalities / regions / cantons) are available for recent years (as shown in the following reports of the respective Delegations), but for other Countries, such as Italy and Slovenia, this availability relates only to Agricultural Census data, available every 10 years. The latest available Census data are referred to 2010, too old to be used for a current organic farming stocktaking.

In the absence of data only referring to the municipalities included in the Alpine Convention perimeter, a general framework on organic farming in the Alps is provided for all the territory of the different Countries. For Switzerland and Austria this framework is also significant for their AC territories, as most of these Countries are included. For Italy, France, Germany, and Slovenia cannot reflect what happens in the Alpine areas only (this is true particularly for Italy⁵ and France). Despite these great limitations, we considered useful to provide a general overview of organic farming in all these Countries because it helps to appreciate the trend of the organic phenomenon over time and at national level.

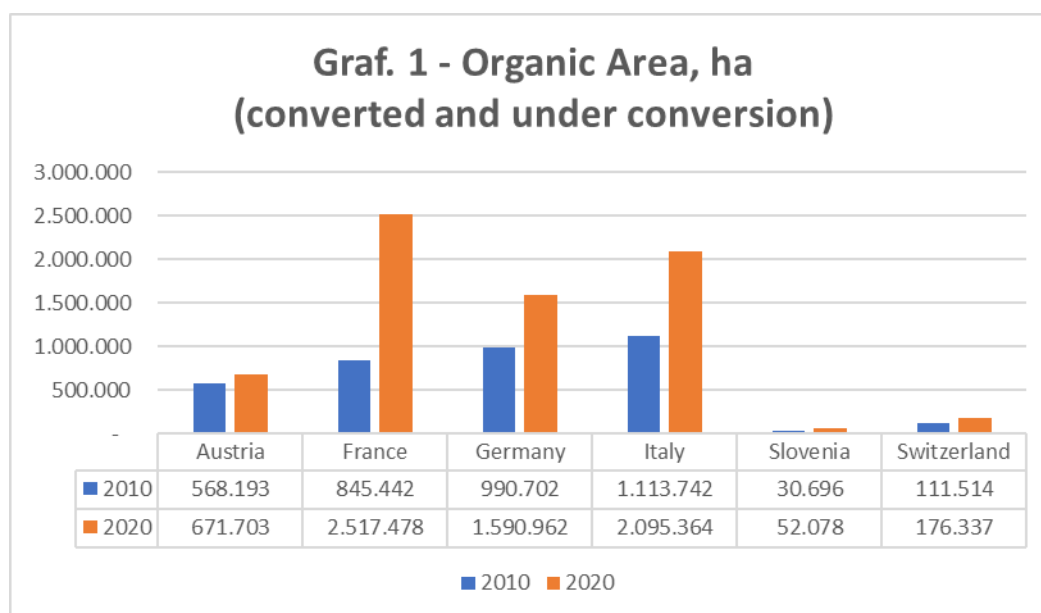
³ The new regulation provides for transitional periods for the implementation of some new rules, particularly on trade. Please refer to section 2 of Chapter IX of Regulation (EU) 2018/848, where provisions under previous Council Regulation (EC) 834/2007 and Commission Regulation (EC) 889/2008 may apply for a limited period.

⁴ The organic regulation of Switzerland is considered equivalent to the EU regulation.

⁵ In 2020 in Italy the organic surface was distributed as follows (SINAB database, 2022): North-West 5.2%, North-East 12.4%, Center 24.0%, South 33.1%, Islands 25.2%. In Italy, organic farming only marginally affects Alpine areas. One of the most important Italian regions for organic agriculture in the Alps is represented by Trentino Alto Adige (22.136 ha, 1.6% of the national organic area), with the two autonomous provinces of Trento and Bolzano. In this region the 59% of these areas is represented by meadows and pastures, the 28% by permanent crops, 12% by arable land and less than 1% by fresh vegetables (SINAB database, 2022).

In the space of a decade (2010-2020) the area devoted to organic farming (including areas under conversion) and the number of farmers increased in all six Alpine countries (Graf. 1 and 2).

In terms of area, it was very sensitive in France, Italy and Germany (respectively: +198%, therefore almost tripled; + 88%; + 61%), less evident, especially in absolute terms, in the other countries, but with a growing trend.

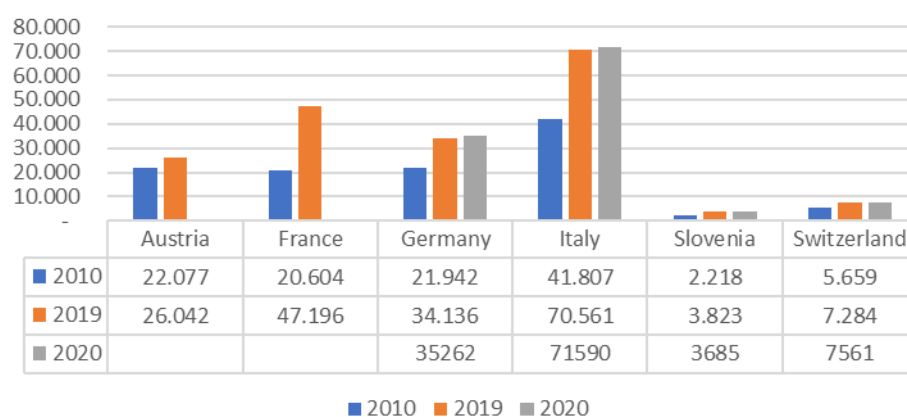


Source: EUROSTAT, 2022

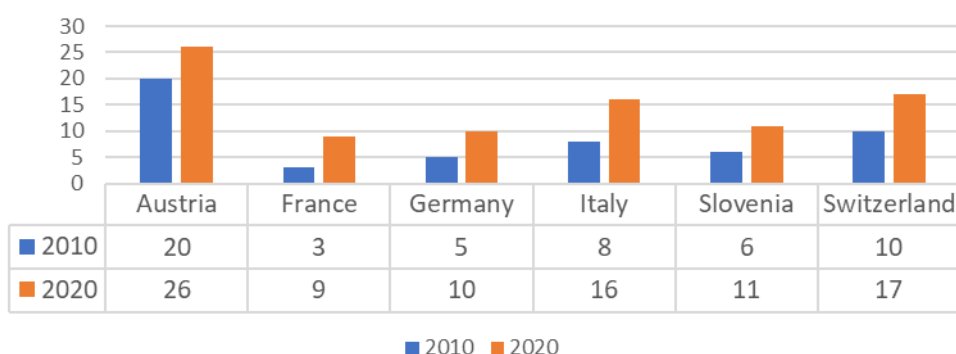
The producers' propensity to adopt organic protocols increased during this period in all the AC Countries, both in terms of number of producers (Graf. 2) and also in terms of share of organic surfaces on the total UAA (Graf. 3), in line with the growing demand for organic food, driven by the increase in consumption on the market (graf. 4).

In many cases the incidence on total farmland has doubled (Germany, Italy and Slovenia), and in one case (France) has tripled. Austria shows a less evident increase, which still allows to reach well in advance the goal set by the F2F Strategy of 25% of the total national farmland by 2030. Other countries (Switzerland and Italy), while still below this threshold, could be in a position to reach this target of 25% by 2030. Germany and Slovenia, on the other hand, will soon have to take targeted measures to push farmers' propensity towards the organic model, to be in line with the objectives proposed by the F2F Strategy.

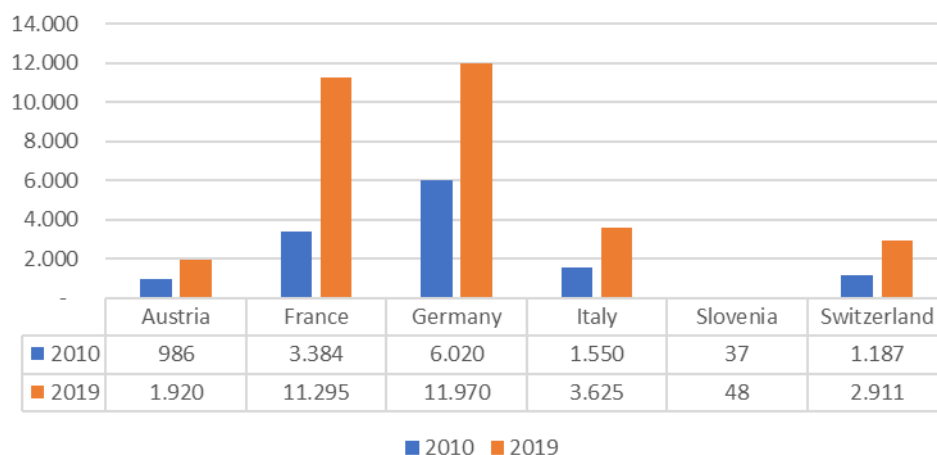
The average size per farm of organically cultivated surface tends to be medium-high (Graf. 5): the range goes from 14 hectares in Slovenia up to 45 hectares in Germany, with stable or slightly increasing trend in the period 2010-2020 in all the Countries, with the exclusion of France, where instead it has more than halved, due to the large increase in producers, rose to over 47,000 units.

Graf. 2 - Organic producers (farmers), n°

Source: EUROSTAT, 2022

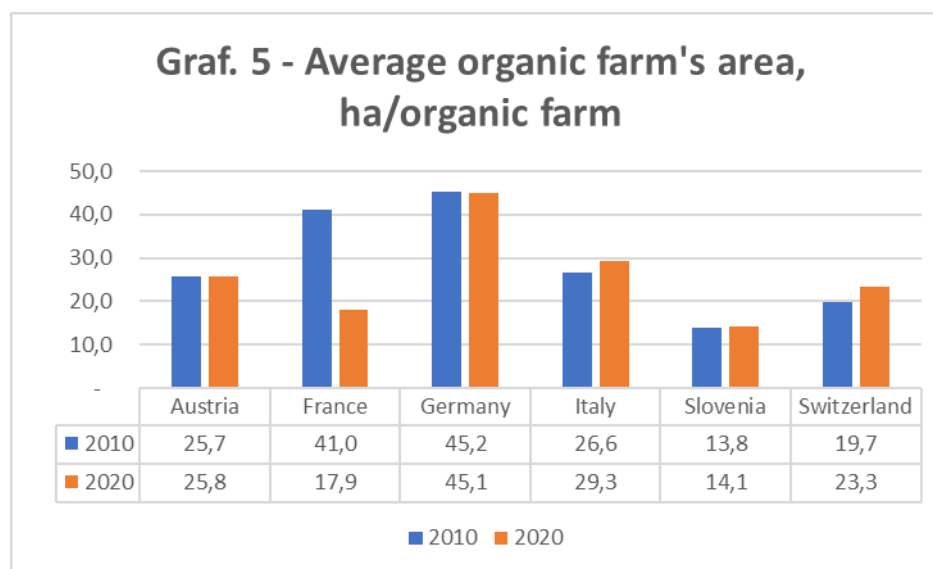
Graf. 3 - Organic area share on total farmland, %

Source: EUROSTAT, 2022

Graf. 4 - Organic Retail Sales, million euros

Source: FIBL, 2021

These relatively high average surfaces per farm are justified by the fact that often, especially in Alpine farms, the organic surfaces include natural meadows and pastures of large extension for grazing or haymaking, not subject to chemical treatments or fertilization. From this data, instead, we cannot deduce anything with respect to the average size of farms in terms of total UAA, nor if and to what extent the farms are completely organic or mixed conventional-organic. In Italy, for example, most of the organic farms are not so exclusively, as they are managed cultivation and breeding processes even in a conventional way.



Source: EUROSTAT, 2022

1.5 Some results from Task 1 activities

In Switzerland and Austria organic farming has become more and more important over the last 20 years, especially in mountain territories. The reason for such a positive evolution lies on many drivers that have, on the one hand, sensitized consumers towards healthier food, and, on the other, have been able to support farmers through policies and to adequately promote these products on the markets and at consumers, tourists and catering (collective and private).

In all Switzerland (data referred to 2020) organic farming represents 17% of the total UAA and 15% of farms; but inside the AC perimeter agriculture is more oriented to the organic model, bringing the two shares to 25% for surfaces and 20% for farms.

Inside the AC perimeter we can observe generally a lower intensity of livestock per farm, both for non-organic farming (24,3 adult cattle versus 27,8 for all Switzerland) and for organic-farming (22,5 versus 23,3), indicator of less intensive breeding techniques in mountain territories thanks to traditional mountain pasture and pastoralism techniques. Nevertheless the differences observed between organic and non organic farming and between all Switzerland and only the AC perimeter are quite small because all Swiss agriculture is based on low-input models, even when not organic. These data justifies the fact that in Switzerland a large number of cheeses and meat products have very good organoleptic requirements, precisely for these low intensity breeding techniques. So a large number of these products have obtained over time the protected designation of origin (PDO) mark, giving rise to important supply chains for the mountain territories in terms of value and jobs opportunities.

Most of the organic farms in Switzerland are family-owned and family-managed. Organic farms run by women in all the Country account for a little more 17% (6% for all Swiss farming); over 21% inside the AC perimeter. Farmer's average age shows a small but significative difference between organic (49 years) and non-organic model (51 years), both for all the Country and within the AC perimeter. The average age data is positive, indicator of a good generational turnover. In terms of gender, data show a major propensity for the organic model among younger tenants, involving more women.

In Austria there has been a growth of organic farming since the 90s of the last century, because in this country there has always been a greater sensitivity of consumers and administrations towards a more natural and healthy diet and agriculture. Organic area (672.000 ha) represents 26% share of total UAA, managed by 23% of the overall farms. But this share rise to 26% inside the AC perimeter, while outside it goes down to 19%.

Among the organic areas, just about 1/3 is represented by pastures, and 1/5 by arable land. Inside the Austrian AC perimeter organic livestock productions (cattle, pigs, milk) is larger than outside, indicating that in Austria Alpine territories represent the better conditions to obtain agriculture raw material for final consumption or for a further processing.

Very important for Switzerland and Austria is the certification and use of brands. The certification and the branding connected are obtained at different levels: EU regulation (Reg. EU 2018/848 and related regulations), national regulation (Swiss Organic Farming Ordinance, SR 910.18; Austrian Organic Farming Guideline), certification for large-scale retailers' chains, local / regional certification brands (es. 100% Valposchiavo).

It should be noted that the growth of this production model is also based on a strong horizontal integration between producers through various Producers' Associations both in Switzerland (BioSuisse, DemeterSwitzerland) and Austria (BioAustria and others less representative). They support farmers and procucers for changing in legislation, technical updates, control activities, certification, use of brands, and give producers a greater bargaining force, expecially with large retailers' chains.

2. PART 2 - DEVELOPING ORGANIC AGRICULTURE SCENARIOS FOR ALPINE REGIONS (Task 2)

Introduction

The state of organic farming in the Alpine territories is by no means a homogeneous reality. The conditions for its development are not only linked to the sensitivity and propensity of farmers to use this production model, but they also benefit from the sensitivity of the institutions to favour this way of producing and from the sensitivity of the market to go towards this type of consumption. Obviously, the lower yields obtained in the field and on farming livestock reflected on the prices of organic food, which are on average higher than those from conventional agriculture. This reduces the potential consumption basin. There are, however, a series of determining factors (drivers) that can specifically or negatively affect the production and consumption trends. What has been observed from the data presented in the first part of this report is precisely the result of different dynamics by these determinants that have evolved and acted differently in different national contexts.

The trend in consumer incomes, the competition by non-organic productions, the constraints and bureaucracy associated with certification, education and knowledge skills both from consumers and from farmers, the evolution and expansion of marketing channels for organic products, are just some examples of the drivers capable of modifying the future prospects of organic agriculture in general and of Alpine organic one in particular. The attention of TASK 2 focuses on the definition of possible scenarios for the development of organic farming and surfaces in the Alpine regions in the next decade, so this part of the report aims to outline the possible scenarios that organic farming could undergo as a function of possible evolutions of the main determinants, extrapolating the trends observed up to now regarding production in some AC countries.

It should also be emphasized that the good trends recorded in the last decade 2010-2020 (and accentuated by the COVID-19 pandemic) towards organic food obtained with more environmentally friendly production methods have radically changed in autumn 2022. The increase in inflation, the energy crisis and the trade exchanges crisis following the radically changed European international scene, all these elements have begun to have a very negative impact on families' expectations and consequently on their consumption, due to very uncertain economic and political prospects. The scenarios presented here obviously fail to consider conditions, which were completely absent in the production and consumption data relating to the last decade and which were, moreover, completely unexpected in Europe.

2.1 Important drivers on organic farming

Not all mountain farming is organic. There are many reasons that influence the choices of Alpine farmers towards (or not) the organic production model. Depending on the times required for determining their effect, they can be schematically divided into short and long-term drivers.

Among the short-term drivers there are certainly constraints and bureaucracy imposed by the organic production method for the certification. Not all Alpine farmers are encouraged (by size, skills, time required, and many other factors) to adopt it, particularly in the case of small farms. In general, the higher costs of organic production are linked to lower production yields and to the costs determined by the controls to obtain the certification. Particular attention should be reserved to the regulations (national and EU) for the organic production and its

application in mountain areas. Among the issues of relevance for the future we may recall the Group Certification for small farms and cooperatives. The Group Certification, which will be discussed later, could offer possibilities for simplification and cost reduction, but its success in mountain territories will depend on how this possibility will be implemented at European and national level.

It should be emphasized that these aspects linked to the certification restrictions can also act on farmers who had already organized themselves to produce organically. A good example comes from Aosta Valley (Italy), where in 2020 the only cooperative organized to produce organic Fontina d'Aosta (PDO cheese) saw the number of organic members (and consequently their deliveries in organic milk) to drastically decrease, due to heavy fines imposed because of an incorrect storage of organic feed.

Another potential short-term driver is represented by policies and funding declined in supporting the organic farming, both inside the Common Agricultural Policy (CAP) and at national / regional levels. In many regions and EU countries, the propensity of farmers to adopt the organic approach has grown, albeit at different rates, as can be seen from the increase in the national organic UAA. For the next programming of EU CAP, it has been proposed to move fundings for organic farming practices from the Second to the First Pillar, by inserting organic farming among the possible activities planned within the Ecosystems, but still leaving to Member States the freedom to decide on which Pillar to articulate the support. It will be necessary to verify if and to what extent the aids amount (in EU and countries) and if the new rules for access will be able to convince a larger number of producers in the Alpine areas.

Among the more long-term drivers there is the market demand and prices. If demand for organic food increases, this would drive production, but how much mountain areas can benefit is not easy to estimate. Prices are a very important factor for mass consumption and production. On average, prices for organic products are higher, but this is not the same everywhere and for all products. When market prices are indeed higher, there is greater satisfaction among producers, but demand remains tight. In other cases (here, again, the example of Fontina from Aosta Valley) the price for the organic product does not differ much from the homologous non-organic product, and this naturally discourages the commitment by producers.

In turn, demand must be supported by a healthy economy. We are struggling to emerge from a never seen economic and pandemic crisis. COVID 19 has made consumers aware of the importance that the environment has on the health of people and animals (wild and farmed), and therefore on the importance of a healthy diet with products from healthy environments, such as the mountains. Also, but not least, they have developed a greater sensitivity to agricultural farming "kind" to the environment. But we know very well that not all the families have incomes and knowledge allowing them to buy a food basket at a higher cost than a conventional one. Therefore, the economic performance of the various countries in the coming years will play a crucial role in the organic farming development in mountain areas.

2.2 Trend of organic farming in AC countries in the last decade

Some general data on organic farming in the six main countries within the perimeter of the Alpine Convention (AC) have been presented in the previous part, to better catch the organic farming trends in the decade 2010-2020. These data were extracted from the Eurostat database.

For at least twenty years the organic production model has been enjoying success in the world and in Europe, driven by a progressive appreciation by consumers of healthier and more environmentally friendly foods. In all AC countries, the organic surface area therefore increased considerably in the decade 2010-2020, with particularly marked growth in France, Italy and Germany. The crops mainly practiced in the different countries are different. In Italy, for example, in 2019 arable crops and vegetables prevail (49%), followed by fruit trees

(including vines, 28%) and secondary meadows and pastures (24%), while in France, for example, alongside arable crops and vegetables (56%), are widespread meadows and pastures (37%) (Gerini, 2021), outlining different organic food orientations induced also by processing chains that have different importance in the different Countries.

The data on surfaces in Italy (Graf. 1), however, cannot be considered representative also for the AC perimeter as most of the organic surfaces are located in Southern and Central Italy regions, while in those involving the Alps in 2020 they represented only 9,25% of Italian organic farming (SINAB data, 2022). In Switzerland and Austria these data are much more representative of what happens to organic farming within the AC perimeter. Here the growth trends of the surfaces are less evident, also because in these two countries the growth of the organic model started already before the observed decade.

The number of producers (farmers) also followed the same trend as the surfaces (Graph 2), favoured by the CAP of the last two programs (2007-2013 and 2014-2020) that gave good financing opportunities to organic farming through the implementation of Measure 11 of the RDP and considering organic farming practices equivalent to those envisaged by greening measure on First Pillar.

The greater propensity of producers towards this farming model is also perceived by observing the incidence of the organic surface on the total farmland (Graph 3), which increases in all countries, particularly in Italy, Switzerland and Germany.

These dynamics of the agricultural offer reflect a growing interest by consumers and the main distribution channels, which saw the volume of sales considerably grow in the period 2010-2019 (Graph 5), that more than tripled in France and roughly doubled in Italy and Germany. The effect of the Covid 19 pandemic has certainly contributed to maintaining this growing trend in the last two years because it has played an important role in raising awareness among consumers on the importance that a healthy diet has not only on human health, but also on the environment. Crops using fewer chemicals and farming using traditional practices have almost negligible impacts on ecological balance, on the quality of air, soil and deep / surface waters, and on the protection of pollinator insects.

2.3 The organic surfaces under conversion as an indicator of the short-term scenario

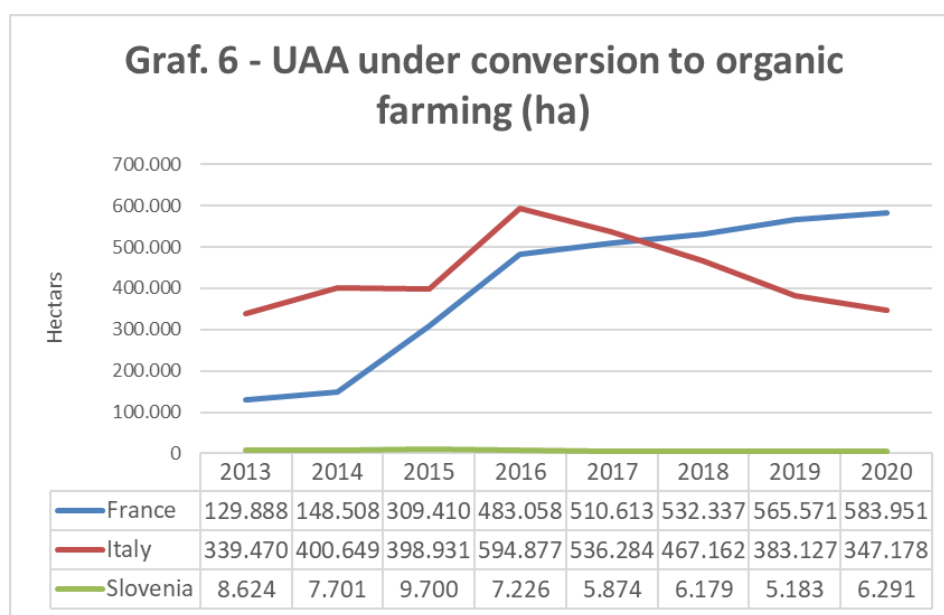
To understand what scenarios could develop over the next decade following the evolution of all these different drivers (organic and non-organic agricultural policy, demand, general economic and social conditions, organic regulation, consumer sensitivity) it is necessary to make assumptions about their possible changes in the various countries, in particular in the Alpine regions. Outlining possible scenarios is not easy if you do not have for all the AC perimeter up-to-date quantitative data and previous historical series to make statistical forecasting. In this context, we can only try to outline in qualitative terms which possible perspectives Alpine organic farming could have with more favorable, less favorable, or almost similar conditions to the most recent past, with respect to the levers above identified.

To start this exercise, a useful indicator of future farmers' propensity towards organic farming, albeit in the short term, is represented by the trend in surfaces under conversion. Using EUROSTAT data (as already mentioned, available only at national level) it can be observed that only 3 AC countries (France, Italy and Slovenia) make this information available (Graph. 6). This trend, actually, represents the overall effect of the forces that we have tried to outline just now, taking into account the reaction times required by the farmers' choices.

Although the graph is poor in national data, the heterogeneity of situations between the different countries is clearly observable, heterogeneity which we also find in the areas within the AC perimeter. In the period 2013-2020, the growth of organic surfaces was accompanied by a progressive increase also of the surfaces under conversion. In Italy, on the other hand, a first phase of increase in areas under conversion (which took place until 2016) was followed by another with their significant decrease, which caused a slowdown in the second

half of the decade in the rate of growing of the organic UAA at national level. In the case of Slovenia, no particular variations are observed for this data in the same period.

The decrease in areas in conversion in Italy is not so easily interpreted, although certainly the trend in national demand has had its effect. The average per capita consumption of organic food in value in Italy, despite having increased in absolute value, is in fact much lower than in AC Countries (such as Austria, Germany and Switzerland) (Willer et al., 2021), and in the last 5 years, as a result of the economic recession that mostly hit middle-income families, they grew in relative terms less than the consumption of conventional food (Meo, 2021).



Source: EUROSTAT, 2022

2.4 A comparison between territories inside and outside the perimeter of the AC

To better understand what effects the different drivers (and in general socio-economic and environmental conditions) produce on farmers' organic choices, it is very useful to make a comparison between the territories inside and outside the perimeter of the Alpine Convention. To do this, however, it is necessary to have annual data disaggregated by farms' location. In some countries (for example Italy), these data are only available by Agriculture Census.

For Austria and Switzerland, instead, municipal / regional data on organic farming are also available for years different from the Agriculture Census period. So, for these two countries it is easier to value the propensity of farmers in Alpine areas towards this model of agriculture compared with what happens outside the perimeter of the Alpine Convention.

Switzerland data available for the period 2000-2020 (Table 1) show a very positive growth trend for surfaces (+ 114%) and number of organic farms (+ 54%).

In the same period, there was a trend with a different rate inside and outside the AC perimeter, with much less marked growth in the Alpine areas, albeit still positive. This is observed both in the organic surfaces, both in the number of farms and also in the average UAA per farm.

This comparison indicates that even when market demand, policies supply by the institutions and farms' structures are in the best conditions to adopt this model of agriculture, the Alpine areas still present conditions of greater fragility, which make a little less easy its adoption.

Table 1 - Organic farming in Switzerland: a comparison between territories inside and outside the AC perimeter (2000-2020)						
	2000	2005	2010	2015	2020	Change 2000-2020, %
UAA for organic farming, ha						
overall	82.748	117.117	111.514	135.638	177.347	114,3
outside AC perimeter	28.421	39.003	38.764	51.707	80.023	181,6
inside AC perimeter	54.327	78.114	72.750	83.931	97.324	79,1
Organic farms, units						
overall	4.902	6.420	5.659	6.298	7.561	54,2
outside AC perimeter	1.619	2.023	1.885	2.297	3.211	98,3
inside AC perimeter	3.283	4.397	3.774	4.001	4.350	32,5
Average organic area per farm, ha/unit						
overall	16,9	18,2	19,7	21,5	23,5	39,0
outside AC perimeter	17,6	19,3	20,6	22,5	24,9	42,0
inside AC perimeter	16,5	17,8	19,3	21,0	22,4	35,2
Source: OFS, Relevé des structures agricoles, 2021						

In the case of Austria (see in this respect the contribution of the Austrian Delegation in the first and second part of this report) the market demand and the growing sensitivity of consumers on the one hand, the national political choices on the other, have had a driving role in the developing of the number of organic farms and surfaces in the last twenty years.

Faced with a general decrease in farms (functional moreover to a rationalization of production structures over this twenty-year period), the total number of organic farms has grown, and with it the organic areas. However, by comparing the situation inside and outside the AC perimeter, we can observe that their increase in absolute terms took place above all outside the AC perimeter, while inside the number first decreased and then went back to the initial values. However, inside the AC perimeter the number of non-organic farms continued to decline, increasing the incidence of organic farms in relative terms.

This certainly means that in mountain areas some more difficulties exist for the development of organic farming, but in these same areas this production model has allowed local organic farms to keep their business much more than non-organic ones.

In terms of funding received, in the period 2015-2020 organic farms received increasing funding (in relative terms) on the First and Second Pillar, thanks to an growing sensitivity of policy makers towards supporting this model of agriculture.

The enhancement of organic products, through certification and branding, have also contributed to develop a growing interest by consumers, facilitated in purchasing thanks to the expansion of distribution channels, both within large-scale and also more specialized distribution.

2.5 The example of Piedmont (ITALY): focus on recent organic farming trend

Piedmont is part of the perimeter of the AC and for this region (unfortunately not for all Italian area within the perimeter) data on agricultural activities (organic and conventional) referring to single municipalities are available starting from 2016. Therefore, in this period it was possible to evaluate the importance of organic farming for this region in terms of farms and areas, comparing what happened in all the region and only in the area included in the AC perimeter. The results of these comparisons are shown in the following tables.

In the last 5-6 years, organic agriculture has had a good expansion when compared to the agricultural sector as a whole (Table 2). Farms and organic surfaces increased significantly (+ 46,5% for farms, + 56,2% for organic UAA), against a sharp decrease in overall farms and a much more contained increase in total surfaces (+ 3,6%).

Table 2 - Organic farming in Piedmont, years 2016-2021

	2016	2017	2018	2019	2020	2021
Farms overall (n.)	50.776	48.795	47.372	46.190	45.028	43.785
UAA (ha)	869.556	888.135	895.465	901.474	898.390	901.218
Organic farms (n.)	1.593	2.071	2.157	2.246	2.280	2.333
Organic farms share (%)	3,14	4,24	4,55	4,86	5,06	5,33
Organic UAA overall (ha)	32.047	42.681	47.995	47.756	48.574	49.774
Organic UAA share (%)	6,32	8,77	10,19	10,43	10,89	11,45
UAA under conversion (ha)	7.417	15.566	15.877	12.836	8.822	7.486
Source: our elaboration on data from Anagrafe Agricola Unica, Regione Piemonte, 2022						

This trend was induced by several factors. On the one hand, the measures provided for in the RDP (Measure 11) have encouraged the use of this production model, also because it is considered equivalent to greening, and therefore decisive in the annual funding received by farms. In Piedmont mountain areas, in addition to meadows and pastures, the most represented crops are fruit trees, while the certified animals are mainly represented by cows for the production of milk (Mazzarino, 2019).

Consumer demand, favored by the expansion of sales channels (traditional and large-scale distribution) has also shown a progressive interest in organic food, despite limited growth in the regional economy. In any case, Piedmont (with less than 12% of UAA devoted to organic farming) is still very far from reaching the goal of 25% of the F2F strategy and it will have to implement strong initiatives (political, commercial, educational) to increase the propensity towards this model.

Despite these general trends, Piedmont represents very well how the different territories can have very different dynamics regarding the farmers' choices towards this production model.

The following tables take into consideration only the provinces interested by the AC perimeter, and clearly show that in the different areas (especially those within the AC perimeter) the farmers, who generally tend to be more reluctant to convert to this production model, made very different choices even in presence of similar economic and market conditions.

In general, in the period 2016-2021 the percentage shares of farms and surfaces increased in all the provinces (table 3), but with a very different trend, fluctuating for farms in all the

provinces (except for VCO), sometimes with a certain downsizing of the surfaces shares, especially in the last two years (Cuneo and Novara).

Table 3 - Organic farming in Piedmont (Italy): share of organic farms and organic surfaces in the different province inside the AC Perimeter (2016-2020)

Piedmont Provinces interested by the AC Perimeter												
	BIELLA		CUNEO		NOVARA		TORINO		VERBANO-CUSIO-OSSOLA		VERCELLI	
	farms share %	UAA share %	farms share %	UAA share %	farms share %	UAA share %	farms share %	UAA share %	farms share %	UAA share %	farms share %	UAA share %
2016	5,51	8,39	3,80	4,33	3,72	2,79	1,95	1,22	3,69	1,64	6,60	6,61
2017	5,42	12,41	8,35	5,11	5,44	3,62	12,62	2,12	8,47	2,74	2,63	7,76
2018	3,62	13,47	7,08	5,31	4,39	3,99	7,76	2,47	3,47	2,75	2,43	8,82
2019	3,05	13,17	7,19	5,72	4,01	3,73	6,86	2,44	4,45	3,34	2,04	6,87
2020	3,37	11,19	6,77	5,97	4,01	3,87	7,30	2,61	3,72	3,19	2,36	6,37
2021	4,24	11,67	6,68	6,43	3,68	3,26	6,96	2,66	4,04	3,73	2,63	6,84

Source: our elaboration on data from Anagrafe Agricola Unica, Regione Piemonte, 2022

These differences are accentuated and highlight very different situations when comparing the trends in organic agriculture between the Piedmont area outside and the one inside the AC perimeter (Table 4), and also with reference to the single provinces (Tables 5 and 6).

Table 4 - Organic farming in Piedmont (Italy): a comparison between territories inside and outside the AC perimeter (2016-2020)

	2016	2017	2018	2019	2020	2021	Change 2021-2016, %
organic farming UAA, ha							
overall	32.047	42.681	47.995	47.756	48.574	49.744	55,2
outside AC perimeter	21.236	29.885	35.335	34.877	35.466	35.546	31,3
inside AC perimeter	10.811	12.796	12.659	12.879	13.107	14.198	67,4
Organic farms, units							
overall	1.593	2.071	2.157	2.246	2.280	2.333	46,5
outside AC perimeter	879	1.236	1.344	1.403	1.403	1.443	64,2
inside AC perimeter	714	835	813	843	877	890	24,6
Average organic area per farm, ha/unit							
overall	20,12	20,61	22,25	21,26	21,30	21,32	6,0
outside AC perimeter	24,16	24,18	26,29	24,86	25,28	24,63	2,0
inside AC perimeter	15,14	15,32	15,57	15,28	14,95	15,95	5,4

Source: our elaboration on data from Anagrafe Agricola Unica, Regione Piemonte, 2022

In table 4 the differences in the period considered are observed in the rate of growth and in the percentage changes of surfaces and farms outside and inside AC perimeter. In the case of surfaces, organic ones have increased much more significantly in mountain areas (inside the perimeter), because in general farmers have used permanent meadows and pastures to increase the surfaces that can be easily certified as organic. But regarding to farms, the percentage variations in the period considered are less evident in the AC perimeter than in outside (not alpine area), and indicate that mountain farmers are less inclined to adopt this method, especially due to the complications that organic certification requires and the concern of not being able to carry out correctly all the required steps.

Inside the AC perimeter of the various provinces concerned, along the period considered the behavior of organic surfaces and farms was very different (tab. 5). Cases of relative success for organic surfaces, such as Turin and Vercelli were contrasted with cases of total failure of the model (Biella) or lukewarm acceptance (Cuneo), just in provinces where Alpine territories are widespread.

Table 5 - Organic surfaces (UAA, ha) in Piedmont (Italy): a comparison between four Provinces, among territories inside and outside the AC perimeter (2016-2020)

	2016	2017	2018	2019	2020	2021	Change 2021-2016, %
CUNEO Province (mountain share 73,83%)							
overall	11.350	13.668	14.349	15.473	16.143	17.403	53,3
outside AC perimeter	3.135	4.759	5.657	6.169	6.472	7.132	97,7
inside AC perimeter	8.215	8.909	8.692	9.304	9.671	10.271	25,0
TORINO Province (mountain share 65,70%)							
overall	2.464	4.382	5.149	5.083	5.434	5.621	128,1
outside AC perimeter	1.493	2.695	3.388	3.565	3.735	3.854	158,1
inside AC perimeter	971	1.687	1.761	1.518	1.699	1.767	82,0
BIELLA Province (mountain share 57,98%)							
overall	1.753	2.626	2.884	2.820	2.383	2.473	41,1
outside AC perimeter	521	1.076	1.318	1.374	1.280	1.406	169,9
inside AC perimeter	1.232	1.550	1.566	1.446	1.103	1.067	-13,4
VERCELLI Province (mountain share 38,5%)							
overall	6.732	7.899	9.025	7.005	6.541	7.045	4,6
outside AC perimeter	6.424	7.521	8.660	6.837	6.316	6.467	0,67
inside AC perimeter	308	378	365	168	225	578	87,7
Source: our elaboration on data from Anagrafe Agricola Unica, Regione Piemonte, 2022							

A similar behavior is observed for organic farms located inside AC perimeter (tab. 6), whose growth in the same period is systematically struggling to maintain the same rhythms recorded in the plains or hills.

Table 6 - Organic farms (N°) in Piedmont (Italy): a comparison between four Provinces, among territories inside and outside the AC perimeter (2016-2020)

	2016	2017	2018	2019	2020	2021	Change 2021-2016, %
CUNEO Province (mountain share 73,83%)							
overall	745	948	968	1032	1048	1078	44,7
outside AC perimeter	187	294	332	369	360	378	102,1
inside AC perimeter	558	654	636	663	688	700	25,5
TORINO Province (mountain share 65,70%)							
overall	223	311	340	353	371	378	69,5
outside AC perimeter	118	175	198	210	227	235	99,2
inside AC perimeter	105	136	142	143	144	143	36,2
BIELLA Province (mountain share 57,98%)							
overall	75	95	95	88	95	101	34,7
outside AC perimeter	20	37	41	40	42	49	145,0
inside AC perimeter	55	58	54	48	53	52	-5,5
VERCELLI Province (mountain share 38,5%)							
overall	159	177	192	184	165	172	
outside AC perimeter	154	171	188	179	160	165	7,1
inside AC perimeter	5	6	4	5	5	7	40,0
Source: our elaboration on data from Anagrafe Agricola Unica, Regione Piemonte, 2022							

The reasons for these difficulties in accepting the organic model in the Alpine areas are many and interrelated. In addition to the already mentioned distrust of the certification system (often really incompatible with the small economic size of companies), in Piedmont (but this thrue in general for Italy) there is no brand policy for organic products that is not the only logo of the EU regulation. So very often the consumer does not even recognize the origin of the organic food he/she buys, and does not even look for it. Finally, it should be remembered that the average per capita expenditure for organic food in Italy, despite having grown in recent years, still stands at very low values (60 euros per capita expenditure per year in 2019) and fails to tow for the offer (FIBL, 2021). For some years there has been an raising awareness in the main cities (Turin and other large ones) for school and public offices canteens, tending to offer more and more organic meals (using organic products also from distant areas), while at the catering level entirely organic restaurants are very little widespread.

2.6 Identification of possible scenarios for Alpine organic farming up to 2030

The possible scenarios for the development of organic farming (here evaluated in exclusively qualitative terms, and presented in Table 7) have been identified taking into account the possible evolution of the organic surfaces cultivated in the Alpine areas:

- ***scenario 1 – significant increase in cultivated areas***
- ***scenario 2 – steady trend of cultivated areas***
- ***scenario 3 – decrease in cultivated areas***

In doing this exercise, many elements were taken into account (but not in a statistically rigorous way). In particular the evolution of the surfaces realized in the past years up to today in the different national / local contexts has been tried to connect to the drivers before recalled. Some of them, such as the prices recognized for organic products /raw materials, consumer demand and consumer incomes, are characterized by a high variability of expression in the various national contexts. Various papers and data extrapolated from some publications have somehow allowed us to outline these three different scenarios that could be hypothesized for organic mountain agriculture in the next decade depending on the declination of these main drivers.

As already said before, this exercise did not take into account imponderable and unexpected factors such as those that characterized the international scene in the first months of 2022. These are events that can clearly interfere heavily with the choices and possibilities of consumption of families, even those of medium income which have notoriously represented the most promising consumption basin for organic products so far.

➤ ***Scenario 1 - Consistent development of organic surfaces per year (>5-10% per year)***

This scenario is the most optimistic, and takes a cue from what has happened in Austria and Switzerland in the last decade. The most relevant aspects for this type of scenario are represented by:

- i. a good sensitivity of consumers to go towards this type of consumption (demand), linked above all to a good spending power by the average consumer and a focus on preserving the mountain environment in an integral way;
- ii. good economic performances obtained by organic producers, able to give a satisfactory income to those who are already engaged in this type of production and to entice those who are not yet in it;
- iii. a great attention by policy makers to support this production model with different types of actions, especially in mountain areas.

The role played by consumers' demand is the key to the success of this model, because it is able, if positively triggered, to set points ii. and iii. in motion as well. A driving demand for organic consumption requires consumers able to sustain a higher food expense, therefore with medium and medium-high incomes. Furthermore, the role played by education is very important, both in terms of education skills for a healthy diet, and in terms of sensitivity to adopt diets that are more careful to environmental protection, and finally in terms of sensitivity to support economically (therefore by paying higher prices) production models more attentive to the environment. The skills mentioned above (health and environmental) must be acquired both in the family and at school, following activities and consumption models implemented at various levels, including in private and public canteens.

Tab. 7 – Possible scenarios for organic farming in alpine / mountains territories declined according to the main drivers and possible actions

Possible scenarios for organic agriculture in alpine / mountain areas	EU and national agricultural policy measures	Prices for farmers (value chain)	Consumers' Demand	Consumers' incomes
Scenario 1 – Consistent development of organic surfaces per year (> 5-10% per year)	<p>Increase in funding foreseen in the Measure11 of the regional RDP for farms located in mountain areas</p> <p>Increase in funding below a given farm UAA size / turnover, for farms located in mountain areas</p> <p>Projects / laws /funding at national level in favor of mountain organic producers (biodistrict)</p> <p>attention to include part-time farms and multi-active entrepreneurs in funding</p>	<p>Strengthening of the value chain through vertical integration (cooperatives)</p> <p>Prices for organic agricultural raw materials at least 35% higher than non-organic ones</p> <p>Branding (EU logo / local and regional branding)</p>	<p>Increasing in the average annual expenditure per capita on organic food</p> <p>(for low-consumption countries average annual expenditure increase should be at least 15%)</p> <p>Promotional actions to raise awareness of the consumption of low impact products on the environment and human safety</p>	<p>Increasing in national GDP</p> <p>Increasing in average per capita incomes</p> <p>inflation below 2-3%</p>
Scenario 2 – Weak development (<5%) of organic surfaces per year or steady trend	Current distribution of funding on Measure11 of the regional RDP part-time farms excluded from funding on M11	<p>Weak processing chains</p> <p>Prices for organic agricultural raw materials below 25% compared to non-organic ones</p>	Moderate growth in average annual expenditure per capita on organic food	<p>Steady trend in national GDP</p> <p>inflation below 2-3%</p>
Scenario 3 – Organic surfaces decrease	Current distribution of funding on Measure11 of the regional RDP	Prices for organic agricultural raw materials below 15% compared to non-organic ones	Non-increasing or decreasing in the average annual expenditure per capita on organic food	<p>Decreasing in national GDP</p> <p>inflation over 5%</p>

As regards point ii., it is very important that the commitment of the organic producer is remunerated in terms of income (or in remuneration for their own work) at a higher level than that corresponding to those who adopt more conventional models. Although it is not easy to find specific studies that objectively compare the incomes of conventional and organic farms located in homogeneous areas (Offermann & Lampkin, 2005), many papers show that organic producers are generally satisfied by their income, by the average higher prices on the market and by the fact that in general, there are no situations of excess supply with respect to demand (Jouzi et al., 2017; Carillo et al., 2008; Canavari et al., 2004). In general, it is very important that the price of the organic product (whether it is the final product or the raw material delivered to obtain the final product) is higher than that of the conventional homologous product, even if (due to the different production yields, different techniques and different work commitments) it is absolutely not certain that higher prices always correspond to higher incomes (Uematsu & Mishra, 2012).

A very important lever for orienting producers towards organic farming is undoubtedly the way organic regulation is declined. It is important that legislation on organic food ensures the consumer a high degree of safety with respect to what he/she buys. It is therefore important to maintain high standards of behavior required to organic producers, to prevent the level of quality assured to organic food decreasing in the long term. However, it should be emphasized that the commitment required by certification and compliance with regulations require to farmers a lot of time, administrative burdens, as well as direct costs (costs for checks by the certifying body, fully charged to the farm) and indirect costs (time for bureaucracy and legislative updates, possible fines in case of non-compliance, even if not serious). In the case of small farms (and perhaps not completely organic), these aspects often act as a brake on the adoption of the organic model.

In order these charges do not constitute a brake to the development of this scenario, greater flexibility in the application of rules and bureaucratic procedures (which are often more formal than substantial) would be desirable. From this point of view, the **group certification**, provided for by Reg. 2018/848 which entered into force from January 2022, could be an interesting opportunity for small organic mountain farms. However, even in this case, there are rules of behavior and constraints for the members of the group⁶ which imply strong organization, cohesion and non-opportunistic behaviors within the group itself. It will be necessary to verify in the next future what will be the reaction and the degree of acceptance by small mountain producers forward this new form of certification.

Finally, political decisions and programs implemented to support organic agriculture in "more difficult" contexts, such as mountain areas, will also play an important role in supporting this production model in farms more fragile than their counterparts located in more structured geographical contexts. It is not necessary to recall the weakness of many Alpine areas in terms of infrastructures, social conditions (schools, hospitals, connections to large cities, etc.), and connectivity to the web. It will be important providing for increased funds for organic agriculture for farms operating in alpine / mountain areas, because they are characterized by living and working conditions less attractive than other better structured areas. Moreover, the delays - in some Alpine regions of up to 3 years, such as Aosta Valley - with which the funding provided by the RDPs (also on M11) are recognized, fatally induce producers to let go of their organic farming projects.

Again about this regard, we would like to point out the importance of supporting pluri-active farmers in some Alpine areas who supplement their income by allocating their working time to different economic activities (agriculture, employment for local authorities, sporting and recreational tourism activities, accommodation and catering, etc.). In some geographic contexts (in particular this is true for Italy and Piedmont in particular) if these farmers could not have these complementary economic possibilities, they could not base their income solely on agriculture. Although they are not agricultural enterprises in strict sense, the EU programs to support mountain agriculture must take these realities into account and ensure that they can keep active, otherwise the areas actually

⁶ The constraints for the group members are economic (in the case of farmers the certification cost as single operator must be heavier than 2% of the organic turnover), physical (farm UAA not exceeding 5 ha), geographical (geographical proximity between the productive activities of the members), as well as the members organization and the procedures envisaged (internal control system for the group and sharing of structures or sites).

cultivated (organically or not) continue to decrease, and rural landscape will go on changing, covering the slopes with completely wooded areas.

➤ **Scenario 2 - Weak development (<5%) of organic surfaces per year or steady trend**

This scenario is inspired by contexts that in the past have proved to be less favourable to the development of organic agriculture model, such as the case illustrated in Piedmont alpine areas.

The reasons for an unsatisfactory growth of the model are obviously opposite to those seen for Scenario 1. In particular, we recall the problems related to certification in its classic meaning, to an insufficient diversification in CAP funding (First and Second Pillar) reserved for small mountain farms, including part-time ones (very present for example in the Italian Alpine territories), and the delays with which often the payments are cashed out by farms. The limited economic conditions of families / consumers can also play a role, even if many countries (France, Austria and Germany) have shown in recent years that organic Alpine products, being products of excellent quality and made in limited quantities, are niche products and they almost always find commercial outlets if adequately promoted with brand policies that emphasize quality and local origin, beyond the EU branding.

Another aspect on which attention must be paid is the lack or the insufficient development of local supply chains responsible for the transformation of local organic agricultural products, such as milk and meat. In Piedmont, for example, all the organic milk produced is almost entirely destined for fresh consumption, because the subsequent processing involves separate and distinct processing lines, and this considerably complicates the subsequent phases, especially if managed independently by the farmers. Even organic meat destined for slaughter (which in itself already implies many difficulties in the breeding process due to the limitation in the use of drugs) is difficult to find in most sales channels.

➤ **Scenario 3 – Organic surfaces decrease**

Scenario 3 is the worst, and reflects the numerous difficulties that small organic farms can face if they do not receive adequate attention from institutions, policy makers and market. The greatest fears are linked to the presence of a stagnant or regressing demand for organic food, due to major economic difficulties of the economic system as a whole (decrease in GDP, inflation, uncertain economic and political expectations at national and international level) which always produce restrictions on household consumption.

So far, situations like these have never occurred in the last 20 years, but the international situation that has arisen starting from autumn 2021 (energy price increases) and to follow from February 2022 (invasion of Ukraine and restrictions on international trade of energy materials and important agricultural inputs for animal husbandry) does not bode well.

We hope, in order to achieve the objectives of the F2F strategy, that the coming seasons will change what at the moment appear to be uncertain economic, political and market prospects.

3. CONCLUSIONS AND RECOMMENDATION

3.1 Agriculture and organic farming in the Alps

The Alpine territory is not only a natural environment suitable for the development of sports and leisure activities, but it is also an important productive space. Where agricultural and forestry activities have been maintained by applying traditional farming methods, with low input use and using species, breeds and cultivars suitable for mountain environment (Switzerland, Austria, Trentino-Alto Adige for Italy and many areas in the Alps French), the territories have maintained an excellent structure in terms of slope stability, fire control, ecological balances, rural landscape. This has made and makes Alpine territories attractive for tourists dedicated to winter and summer sports, but above all it also makes them accessible to those who, due to their age or personal needs, require relaxing and regenerating recreational spaces. It is therefore a natural and at the same time productive space to be preserved, also because it is the basis of strongly interrelated economies (quality food production, sporting attractions, wellness centres, cultural events, etc.), which in turn allow people (and young people) to stay and live in their territories.

Organic farming represents a certified production model, with limited use of chemical inputs and with a highly sustainable use of natural resources because it is based on the recycling of organic substances in the soil and crop rotation. Although its codification in terms of farmers' behaviour has a long history in the EU (Reg. (CEE) 2092/91), its definition and codification take as model the traditional agricultural practices applied over the centuries in agriculture, which, since the 1970s, were abandoned by most European farms to obtain higher production yields and incomes.

A very rich bibliography relating to the negative externalities produced by intensive agricultural models, with a high use of chemical inputs and, on the contrary, the benefits generated by the more extensive production models attentive to the environment, suggests that in the Alpine context, organic farming represents the optimal production model, able to respect the delicate ecological and morphological balances of the natural environment. However, it should be remembered that in Alpine territories, traditional cultivation, and breeding practices, even when not strictly certified as organic, are still very widespread among farmers, because local communities in general are strongly linked to traditional agricultural uses (breeds, cultivar, good practices) and to respect the common values. Only some areas at the lower valley, mainly oriented toward fruit crops, have been limitedly converted to more intensive forms of agriculture, with a greater intensity of use of chemical inputs.

These considerations lead to underline how important is, in the Alpine territories, not only to raise awareness of agricultural communities to adopt the organic production model, but more generally to preserve the implementation of low-inputs agriculture models in all their possible forms, that even without an organic certification, ensure a more sustainable use of natural resources and contribute to maintaining important ecological, economic, and social balances in the mountain areas.

3.2 The survey activity on organic stocktaking in the Alpine Convention Countries

The survey activity on territories and farms affected by organic farming, carried out during the 2021-22 mandate, presented many difficulties due to the lack of statistical data (EUROSTAT, FADN) disaggregated by altitude or by municipality at national level, such as to allow a comparative analysis between areas within and outside the AC perimeter of the AC countries.

Only Austria and Switzerland Delegations were able to provide updated data that showed an effective growth (both in absolute and relative terms) of the surfaces and of organic farms both with respect to conventional agriculture (Austria) and with respect to areas outside the AC perimeter (Austria and Switzerland).

For all the other AC countries, there was a very positive trend in organic farming, but relatively to the entire national area of each country. The data, although all converging towards a significative growth for the surfaces (in absolute and relative terms) and for the producers concerned (in absolute terms) in the various countries, only in the case of Austria and Switzerland can be considered significant for the organic stocktaking activity, as they are notoriously countries with a prevalently mountainous area. The same data cannot be considered significant for Italy and France, where organic farming involves large areas not included in the AC perimeter.

This lack of up-to-date structural data on organic farming within the AC perimeter suggests that, if AC Permanent Secretariat / Committee will be still interested in alpine agriculture (organic and otherwise) in the future mandates, it should promote the constitution of a transnational database (currently missing) that aggregates statistical data and information essential to build a precise picture of characteristics, strengths, but above all criticisms that can be found in the territories within the perimeter.

Therefore, it can be said that in countries such as Austria and Switzerland the spread of Alpine organic farming has grown on average, especially in the last decade, driven by a growing appreciation by consumers, but it is not possible to argue with numbers that the same happened on the whole AC perimeter. The analysis of some data referring to Piedmont (an Italian region that enters partly within the perimeter) shows very heterogeneous situations within the perimeter, with increases in surfaces and farms in some areas flanked by decreases in other parts of the Alpine territory. The development of organic farming in the various territories depends in fact on the propensity of farmers towards this production model, which is different and influenced by many factors, first and foremost the income results that can be obtained, in turn influenced by the farmers technical skills, by rules and regulation to obtain the organic certification, by their ability to join together and make network, from the interest that consumers show towards Alpine organic products, and from the support offered by institutions and policy makers.

3.3 Organic scenarios in Alpine regions under the action of main drivers

The definition of possible scenarios for Alpine organic agriculture (which have been developed taking into account the possible future increase of organic surfaces, also in relation to the objective set by the “Farm to Fork” strategy by 2030) was carried out by focusing attention on some important drivers that can have influence on the evolution of organic agriculture in the perimeter: the prices producers will be able to obtain on the market for their organic products; the market demand; the trend of some macroeconomic variables that have direct influence on consumers’ purchasing power; the policies and measures implemented at local, national and community level to promote the organic model among farmers.

For the (most desirable) scenario of increasing the organic farming areas, an appreciable rate of yearly increase was assumed higher than 5-10%, in consideration of the average development rates presented by historical series of some of the countries concerned, and considering that the growth rate also depends on the values currently achieved by the organic surfaces in the various contexts.

3.4 Prices for organic products

This scenario highlights the importance of the price recognized to producers, which must be significantly higher than the corresponding price of the non-organic product (at least 35% more), even if this is not in itself a guarantee of satisfactory income (in organic farming yields are lower and there are additional certification costs, not present in non-organic productions). In turn, the price depends on what develops downstream the farm. The presence of supply chains with a strong agricultural component (vertical integration), well organized on a technical and marketing level, the possibility of using territorial brands (PDO, PGI) and / or other labelling systems able to

highlight the Alpine origin (even if non-organic) of raw materials, cheeses, meat products, are fundamental levers to differentiate from competing products and that strongly can influence the producers' income. Let's not forget that organic food can also come from other production areas and countries (even outside the EU), and it exerts competition on organic Alpine products, which therefore must be clearly distinguishable by the consumers.

3.5 Market demand and consumers' spending

Another fundamental lever is represented by demand, intended as consumers' interest and willingness to purchase organic products. Organic products of Alpine origin, mostly available in non-massive quantities, are placed in medium-high price segments, therefore they address to a consumer with a non-low income. Organic food demand is related to the propensity to buy, outlined by the average consumer spending on organic products, and by the number of consumers interested, connected to the average per capita income, which in the same country can change significantly from region to region, and between large cities and small urban centres. Notoriously Austrian and Swiss consumers (but also those located in Northern Europe) have for years matured knowledge and preferences towards products obtained with the organic method, for the reasons widely illustrated in the report, and this has strengthened producers to adopt this productive method. In other countries this has happened much less, although the Covid-19 pandemic has highlighted the importance of consuming food produced with less impact on the environment. Furthermore, in many countries organic food is readily available even on the shelves of large retailers, and not only in specialized shops, according to a range of private organic labels that go beyond the simple EU label.

So, market demand in the future will play a crucial role in the development of organic agriculture, including Alpine agriculture. It is therefore necessary to raise knowledge and awareness of consumers that consuming organic Alpine products can certainly cost more (even compared to "conventional" organic food) but allows to eat healthier, to consume products with better organoleptic characteristics, and above all, to take care of the alpine environment. Equally important is the labelling of organic Alpine products, which must not only serve to ensure the application of organic standards required by regulations, but has to provide additional information to the consumer about origin, nutritional values, making easy and immediate to distinguish the Alpine products from other organic (but also non-organic) products of more uncertain origin.

3.6 Exogenous macroeconomic drivers

Unfortunately, there are also some drivers completely beyond the control of producers but representing a potential risk for the commercial outlet of highly qualified niche products such as Alpine organic products. Macroeconomic variables such as GDP trend, the slowed economic growth, inflation, are factors that heavily affect the families spending power and purchasing choices. Inflation affects more, on average, the food basket acting as a brake on less essential consumption and weakening more low-income families. Inflation is a phenomenon that is reappearing in the euro area after at least two decades of absence, and together stagflation (inflation accompanied by economic decline), is the primary cause for concern for consumers as well as producers. It is difficult for small mountain farms to contrast these events with effective production and marketing strategies, we can only hope they can survive these negative cyclical moments with the help of targeted policies.

3.7 Policies for mountain agriculture and Alpine organic farming

Policies supporting mountain farms are fundamental: for their survival in times of collective difficulty and for their strengthening when general economic conditions are better. Policy makers must

consider the mountain agriculture fragility, because of the operational context (more difficulties for farms mechanization), and the small size of farms in terms of surfaces and turnover. On the other hand, it is important recognize to mountain farming (and to organic farming as well) the positive externalities that farmers determine with their work, that market is unable to fairly recognize through the products price.

Political leverage is therefore another fundamental driver that must be dosed with adequate measures, according also to contingent needs. The previous CAP programs have given great support to organic farming, through measure 11 of the RDP, enhancing funding under the conversion period and supporting costs during the production period. However, it would be very useful for the future if this measure (and others related to the First and Second Pillar) could also be implemented in the case of micro-units and part-time farms located in mountain. The part-time farms represent a reality (often not well surveyed) present in many Alpine areas because mountain agriculture, due to the reduced income capacity it can provide, is also based on units that often seek to diversify their business with multiple economic activities (multi-active farms), with perhaps the possibility of integrating between them (agriculture-hotel / restaurant services-services related to sport and leisure). Taken together, they count for little compared to Alpine agricultural production, but all together they play an important role for the mountains, in terms of territorial coverage, landscape and their presence in the local communities (that mostly are becoming depopulated).

3.8 Business networks and district development model for Alpine territories

Another important opportunity for the mountains (and therefore a useful political line) will be the possibility of creating projects and initiatives that develop or strengthen the intersectoral relationships that mountain agriculture and the forestry sector have with other economic sectors (sport, tourism and leisure, cultural events, agri-food industry, traditional cuisine and catering, handicraft, spa, furniture industry, energy production from by-products, etc.), creating the conditions for a multisectoral district economy. The development of relationships and networks between companies active in different sectors (sport, tourism, agriculture and forestry sector, craftsmanship, food industry) will be desirable, to create synergies among them and to allow that the growth of a sector become a stimulus also for other economic sectors. To make it possible, it is necessary to encourage partnership projects which, alongside local institutions, also involve the private sector. From this point of view, the Leader experience of previous CAP programs certainly offers useful ideas for action.

Recommendations

For a further and wider support to organic farming in Alpine areas, the following needs will be important for the coming years:

1. Maintaining high attention on supporting incomes of Alpine farmers, through the declination of the First and Second Pillar measures that favour proportionately more mountain farmers (even part-time and pluri-active ones). To safeguard traditional mountain farming, supporting pastoralism and transhumance because these practices allow to maintain a load of livestock in the territories proportionate to the production capacities of the territories, to obtain products (milk, meat, cheeses, and other derived products) with organoleptic characteristics superior to the corresponding products obtainable with other production models, and because they have a beneficial effect on the landscape.
2. Declining rules for EU organic certification, taking into account the small size of mountain farms, in order not to increase difficulties encountered so far by small farms. Organic regulation is important not to lower the quality level, but the small size of farms often is not compatible with complex verification and registration procedures. Group certification could be a possible way for

mountains farmers, but it is necessary to verify that the proposed procedures respond adequately to the simplification needs of small farms.

3. Going on with promotion and marketing actions on both the products and the Alpine territories. Alpine organic products require appropriate promotion strategies, on site (fairs, exhibitions, etc.) and in the large cities adjacent to the Alpine territories. Citizens must be aware that their choice for local agricultural products represents a correct style of purchase and food, with a low environmental impact. Taking advantage of the Covid-19 effect, Alpine territories must be promoted as preferential destinations for experiencing wellness and relaxation, strengthening confidence with local products. Awareness-raising campaigns in schools are also needed to raise citizens aware of the importance of safeguarding Alpine agriculture.
4. The labelling of Alpine products (organic and otherwise) is a focus point in the promotion strategies. EU organic product certification is important but not enough. It is important that the consumer easily recognizes the Alpine product and its local origin, and he understands the meaning of a higher price, synthesis of harsher working conditions, lower production yields, non-constant over time, of a higher product quality, and of ecosystem services provided to all the community.
5. Making living conditions (economic and social) in Alpine areas comparable to those existing in the cities, to stop young people from escaping away from the mountains, choosing medium or large cities as their life and work destination.
6. Promotion of inter-sectoral projects and actions, to develop economic relationships and give life to districts and networks of cooperation among companies operating in different economic sectors.
7. Through the collaboration between universities, research centres and local institutions, it is possible to underline a new role that Alpine farms can play in safeguarding biodiversity. Some examples can be referred to the selection and domestication of ecotypes of spontaneous plants, traditionally used for therapeutic purposes, in herbal medicine, for liqueurs, etc., whose indiscriminate collection in the past has put natural populations and habitats at risk.

BIBLIOGRAPHY

PART 1 – STUDY ON STOCKTAKING ON ORGANIC AGRICULTURE IN THE ALPS (Task 1)

- Andreotti C. (2013), *Qualità delle produzioni frutticole di montagna*, Italus Hortus, 20 (2): 45-60
- Arias-Estevez M., Lopez-Periago E., Martinez-Carballo E., Simal-Gandara J., Mejuto J-C., Garcia-Rio L. (2008), *The mobility and degradation of pesticides in soils and the pollution of groundwater resources*, Agriculture Ecosystems and Environment, 123: 247-260
- Cardillo, C., Cimino, O., Gabrieli, G., Giampaolo, A., Vieri, S., & Pagliai, M. (2013), *La meccanizzazione agricola in Italia: aspetti tecnici, economici, ambientali e sociali*, Collana Studi e Ricerche, INEA-CREA
- Casini L. (2009), *Guida per la valorizzazione della multifunzionalità dell'agricoltura*, Firenze University Press
- Casini L., Scozzafava G. (a cura di) (2013), *La multifunzionalità dell'agricoltura nelle zone montane marginali: una valutazione qualitativa, quantitativa e monetaria degli impatti ambientali, economici e sociali*, Firenze University Press
- Cerea G., Marcantoni M. (a cura di) (2016), *La montagna perduta. Come la pianura ha condizionato lo sviluppo italiano*, FrancoAngeli, Milano
- Convenzione delle Alpi, Piattaforma Agricoltura di Montagna (2017), *Agricoltura di montagna. Segnali alpini 8*, Segretariato Permanente Convenzione delle Alpi
- Eccel, E. (a cura di) (2022), *Bioagrimont: la biodiversità agraria e alimentare associata alle produzioni agricole e zootecniche di montagna, la conservazione in situ e la tutela del paesaggio agrario*, Fondazione Edmund Mach, S. Michele all'Adige (TN)
- ESPON (2004), *The territorial impact of CAP and rural development policy*, ESPON Project 2.1.3, Final Report, August.
- www.espon.lu/online/documentation/projects/policy_impact/1861/fr-2.1.3.pdf
- Hayes T.B., Case P., Chui S., Chung D., Haeffele C., Haston K. et al. (2006), *Pesticide mixtures, endocrine disruption, and amphibian declines: are we underestimating the impact?* Environ Health Perspect, 114: 40–50. doi:10.1289/ehp.8051
- Hole D.G., Perkins A.J., Wilson J.D., Alexander I.H., Grice P.V., Evans A.D. (2005), *Does organic farming benefit biodiversity?* Biological Conservation, 122: 113-130
- ISPRA (2020a), *Italian Greenhouse Gas Inventory 1990-2018. National Inventory Report 2020*, report 318, Roma
- ISPRA (2020b), *Italian Emission Inventory 1990-2018. Informative Inventory Report 2020*, report 319, Roma
- ISPRA (2022), *Italian Emission Inventory 1990-2020. Informative Inventory Report 2022*, report 361, Roma
- Laurent C., Maxime F., Mazé A. Tichit M. (2003), *Multifunctionality of agriculture and farm models*, Economie Rurale, 273/274: 134-152
- MacDonald D., Crabtree J.R., Wiesinger G., Dax T., Stamou N., Fleury P., Gutierrez Lazpita J., Gibon A. (2000), *Agricultural abandonment in mountain areas of Europe: Environmental*

- consequences and policy response*, Journal of Environmental Management, 59, 1: 47-69. <https://doi.org/10.1006/jema.1999.0335>
- Manrique E., Olaizola A., Bernués A., Maza M.T., Saez A. (1999), *Economic diversity of farming systems and possibilities of structural adjustment in mountain livestock farms*, Option Méditerranéennes, 27: 81-94
- Marongiu S., Cesaro L., Latruffe L., Desjeux Y. (2010), *L'Efficienza tecnica delle aziende agricole di montagna: analisi dei dati RICA e confronto fra montagna Italiana e Francese*, Colloque joint ASRDLF - AISRe: Identité, Qualité et Compétitivité Territoriale - Développement économique et cohésion dans les territoires alpins, Association de Science Régionale de Langue Française (ASRDLF), Sep 2010, Aoste, Italy, 25 p.
- Martin B., Verdier-Metz I., Buchin S., Hurtaud C., Coulon J.B. (2005), *How do the nature of forages and pasture diversity influence the sensory quality of dairy livestock products?* Animal Science, 81 (2): 205-212. doi: 10.1079/ASC50800205
- Mazzarino S., Chenal G., Letey M., Francesia C. (2021), *Valutazioni economiche della viticoltura alpina - Manuale Tecnico*, IAR, Aosta, 48 p.
- Parris K. (2011), *Impact of Agriculture on Water Pollution in OECD Countries: Recent Trends and Future Prospects*, International Journal of Water Resources Development, 27: 33-52
- Pellizzi, G. (2000), *Sull'evoluzione della meccanizzazione agricola in Italia nel XX secolo*, Rivista di Storia dell'Agricoltura, 40(1): 53-86
- Rodriguez-Pose A. (2017), *The revenge of the places that don't matter (and what to do about it)*, Cambridge Journal of Regions, Economy and Society, 11 (1): 189-209
- Stavi I., Rattan L. (2013), *Agriculture and greenhouse gases, a common tragedy. A review*, Agronomy for Sustainable Development, 33: 275-289. <https://doi.org/10.1007/s13593-012-0110-0>
- Sturaro E., Marchiori E., Cocca G., Penasa M., Ramanzin M., Bittante G. (2013), *Dairy systems in mountainous areas: farm animal biodiversity, milk production and destination, and land use*, Livestock Science, 158, 1-3: 157-168
- Velasquez B.E. (2001), *Il concetto di multifunzionalità in agricoltura: una rassegna*, QA Rivista dell'Associazione Rossi-Doria, FrancoAngeli, 3: 75-112,
- Zambon I., Monarca D. (2017), *Processi di Meccanizzazione nel Contesto Rurale per lo Sviluppo Sostenibile*, Convegno "LA MECCANICA AGRARIA OGGI" Bolzano, 23-24 novembre
- World Health Organization (1990), *Public Health Impact of Pesticides Used in Agriculture*, England

PART 2 - DEVELOPING ORGANIC AGRICULTURE SCENARIOS FOR ALPINE REGIONS

(Task 2)

Andreotti C. (2013), *Qualità delle produzioni frutticole di montagna*, Italus Hortus, 20 (2): 45-60

Arias-Estevez M., Lopez-Periago E., Martinez-Carballo E., Simal-Gandara J., Mejuto J-C., Garcia-Rio L. (2008), *The mobility and degradation of pesticides in soils and the pollution of groundwater resources*, Agriculture Ecosystems and Environment, 123: 247-260

Cardillo, C., Cimino, O., Gabrieli, G., Giampaolo, A., Vieri, S., & Pagliai, M. (2013), *La meccanizzazione agricola in Italia: aspetti tecnici, economici, ambientali e sociali*, Collana Studi e Ricerche, INEA-CREA

Canavari M., Stanzani N., Pirazzou C. (2004), *Analisi di costi e redditività in aziende frutticole biologiche*, Rivista di frutticoltura e di ortofloricoltura, 66.2: 35-39

Carillo, F., Doria, P., & Madau, F. A. (2008). *L'analisi della redditività delle colture agrumicole attraverso l'utilizzo dei dati RICA*, INEA

Casini L. (2009), *Guida per la valorizzazione della multifunzionalità dell'agricoltura*, Firenze University Press

Casini L., Scozzafava G. (a cura di) (2013), *La multifunzionalità dell'agricoltura nelle zone montane marginali: una valutazione qualitativa, quantitativa e monetaria degli impatti ambientali, economici e sociali*, Firenze University Press

Cerea G., Marcantoni M. (a cura di) (2016), *La montagna perduta. Come la pianura ha condizionato lo sviluppo italiano*, FrancoAngeli, Milano

Convenzione delle Alpi, Piattaforma Agricoltura di Montagna (2017), *Agricoltura di montagna. Segnali alpini 8*, Segretariato Permanente Convenzione delle Alpi

Eccel, E. (a cura di) (2022), *Bioagrimont: la biodiversità agraria e alimentare associata alle produzioni agricole e zootecniche di montagna, la conservazione in situ e la tutela del paesaggio agrario*, Fondazione Edmund Mach, S. Michele all'Adige (TN)

ESPON (2004), *The territorial impact of CAP and rural development policy*, ESPON Project 2.1.3, Final Report, August.

www.espon.lu/online/documentation/projects/policy_impact/1861/fr-2.1.3.pdf

Furlan, S., Pietromarchi A. (2018), *Certificazione di gruppo. Il futuro dei biodistretti*, FIRAB, Regione Veneto

Gerini O., *Rivoluzione Bio 2021. I numeri chiave della filiera*, SANA, Bologna, available at: <https://www.sinab.it/reportannuali/presentazioni-sana-2021>

Hayes T.B., Case P., Chui S., Chung D., Haeffele C., Haston K. et al. (2006), *Pesticide mixtures, endocrine disruption, and amphibian declines: are we underestimating the impact?* Environ Health Perspect, 114: 40–50. doi:10.1289/ehp.8051

Hole D.G., Perkins A.J., Wilson J.D., Alexander I.H., Grice P.V., Evans A.D. (2005), *Does organic farming benefit biodiversity?* Biological Conservation, 122: 113-130

ISPRA (2020a), *Italian Greenhouse Gas Inventory 1990-2018. National Inventory Report 2020*, report 318, Roma

ISPRA (2020b), *Italian Emission Inventory 1990-2018. Informative Inventory Report 2020*, report 319, Roma

- ISPRA (2022), *Italian Emission Inventory 1990-2020. Informative Inventory Report 2022*, report 361, Roma
- Jouzi Z., Azadi H., Taheri F., Zarafshani K. et al. (2017), *Organic farming and small-scale farmers: Main opportunities and challenges*, Ecological Economics, 132: 144-154
- Laurent C., Maxime F., Mazé A. Tichit M. (2003), *Multifunctionality of agriculture and farm models*, Economie Rurale, 273/274: 134-152
- MacDonald D., Crabtree J.R., Wiesinger G., Dax T., Stamou N., Fleury P., Gutierrez Lazpita J., Gibon A. (2000), *Agricultural abandonment in mountain areas of Europe: Environmental consequences and policy response*, Journal of Environmental Management, 59, 1: 47-69. <https://doi.org/10.1006/jema.1999.0335>
- Manrique E., Olaizola A., Bernués A., Maza M.T., Saez A. (1999), *Economic diversity of farming systems and possibilities of structural adjustment in mountain livestock farms*, Option Méditerranéennes, 27: 81-94
- Marongiu S., Cesaro L., Latruffe L., Desjeux Y. (2010), *L'Efficienza tecnica delle aziende agricole di montagna: analisi dei dati RICA e confronto fra montagna Italiana e Francese*, Colloque joint ASRDLF - AISRe: Identité, Qualité et Compétitivité Territoriale - Développement économique et cohésion dans les territoires alpins, Association de Science Régionale de Langue Française (ASRDLF), Sep 2010, Aoste, Italy, 25 p.
- Martin B., Verdier-Metz I., Buchin S., Hurtaud C., Coulon J.B. (2005), *How do the nature of forages and pasture diversity influence the sensory quality of dairy livestock products?* Animal Science, 81 (2): 205-212. doi: 10.1079/ASC50800205
- Mazzarino S. (2019), *Agricoltura biologica: un'opportunità per la montagna*, Città del Bio, Torino
- Mazzarino S., Chenal G., Letey M., Francesia C. (2021), *Valutazioni economiche della viticoltura alpina - Manuale Tecnico*, IAR, Aosta, 48 p.
- Meinshausen F., Richter T., Blockeel J., Huber B. (2019), *Group Certification. Internal Control Systems in Organic Agriculture: Significance, Opportunities and Challenges*, Research Institute of Organic Agriculture, FiBL
- Meo R. (2021), *Rivoluzione Bio 2021. Il mercato bio alla ricerca di nuovi stimoli*, SANA, Bologna, available at: <https://www.sinab.it/reportannuali/presentazioni-sana-2021>
- Offermann F., Lampkin N. (2005), *Organic Farming in FADNs – Comparison Issues and Analysis, in Towards a European Framework for Organic Market Information*, Proceedings of the Second EISfOM European Seminar, Brussels, November 10 & 11, Research Institute of Organic Agriculture FiBL, Frick, Switzerland
- Parris K. (2011), *Impact of Agriculture on Water Pollution in OECD Countries: Recent Trends and Future Prospects*, International Journal of Water Resources Development, 27: 33-52
- Pellizzi, G. (2000), *Sull'evoluzione della meccanizzazione agricola in Italia nel XX secolo*, Rivista di Storia dell'Agricoltura, 40(1): 53-86
- Rodriguez-Pose A. (2017), *The revenge of the places that don't matter (and what to do about it)*, Cambridge Journal of Regions, Economy and Society, 11 (1): 189-209
- Stavi I., Rattan L. (2013), *Agriculture and greenhouse gases, a common tragedy. A review*, Agronomy for Sustainable Development, 33: 275-289. <https://doi.org/10.1007/s13593-012-0110-0>
- Sturaro E., Marchiori E., Cocca G., Penasa M., Ramanzin M., Bittante G. (2013), *Dairy systems in mountainous areas: farm animal biodiversity, milk production and destination, and land use*, Livestock Science, 158, 1-3: 157-168
- Uematsu H., Mishra A. K. (2012), *Organic farmers or conventional farmers: Where's the money?* Ecological Economics, 78, 55-62

- Velasquez B.E. (2001), *Il concetto di multifunzionalità in agricoltura: una rassegna*, QA Rivista dell'Associazione Rossi-Doria, FrancoAngeli, 3: 75-112,
- Willer H, Trávníček J, Meier C., Schlatter B. (2021), *The world of Organic Agriculture* FIBL & IFOAM
- World Health Organization (1990), *Public Health Impact of Pesticides Used in Agriculture*, England
- Zambon I., Monarca D. (2017), *Processi di Meccanizzazione nel Contesto Rurale per lo Sviluppo Sostenibile*, Convegno "LA MECCANICA AGRARIA OGGI" Bolzano, 23-24 novembre