ENI CBCMED
Cooperating across borders in the Mediterranean

Project funded by the EUROPEAN UNION

REGIONE AUTÒNOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

MedBEESinessHubs

MedBEESinessHubs Project C_A.1.2_0035

OUTPUT / ACTIVITY

A3.1.2 "Regional study on the economic value of networking around the honeybee products

ITALY/ SARDINIA

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MedBEESinessHubs

WP3: The bee waggle dance - collecting information for business clusters on the honeybee products

O3.1 Existing situation analysis (study reports) on the economic potential of honeybee handcrafting

Responsible Partner: Arab Italian Cooperation Chamber

Subcontractor: 06 Services Srl

A3.1.2 Regional study on the economic value of networking around the honeybee products: Case of Sardinia

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1. **The beekeeping unique characteristics in the region – an overview**

The importance of beekeeping is now universally recognized and the effects of pollination are considered indispensable for world agriculture as well as, more generally, for the environment and for mankind. A sector with limited economic value but of inestimable importance for agriculture, held responsible in Europe, according to the European Commission, for 80% of the pollinations of agricultural products. According to the latest FAO survey, world honey production stands at around 1.85 million tons. Global production has increased by 23% in the last decade. However, in 2018 there was a slight decrease compared to 2017 (-1.5%).

Italy holds the world record for honey varieties, in fact it has over 50. In Europe, 84% of cultivated species and 78% of wild flower species depend on animal pollination. According to the European Commission, over 15 billion euros of annual agricultural production depends on the pollination of insects.[1]

The data of international foreign trade, referring to 2019, attest the value of the total honey import to be around 1.8 billion euros, approximately 70% of which in 10 countries. Italy ranks 9th among importers in terms of volume (7th by value), but is also present in a more secluded position among exporters (23rd position by volume, 20th by value).

Italy is the fourth European country in terms of number of hives (1.6 million), after Spain (3 million hives), Romania and Poland (respectively 2 and 1.7 million hives), with an increase of 7.5% in 2019 compared to the previous year. The Italian production of honey recorded by ISTAT is just under 8 thousand tons for a value of over 64 million euros, but it should be considered that Istat takes into consideration beekeeping only on the occasion of the general agricultural censuses which, not being conceived to establish the consistency of beekeeping farms, they only detect part of the farms structured in the agricultural sector, where these coincide with the availability of land.

[1] FAO, 2019

Therefore, the numerous beekeepers are excluded, who regardless of their professional connotation, do not associate beekeeping with an agricultural activity but who also, in keeping bees alive, in the most disparate natural or agricultural environments, in fact ensure an indispensable and capillary pollination. The actual Italian production of honey, according to ISMEA-National Honey Observatory estimates, for the year 2019 is about 15 thousand tons, against an expected national production of 23 thousand tons.

The first estimates for 2020 indicated a slight increase compared to 2019 with a national production of about 17 thousand tons. However, production remained well below the production potential, if we also consider the increase in the number of hives in 2020.

2. The flora and the ecosystem that support the bees

The flora of Sardinia is typically Mediterranean, greatly influenced by the climate characterized by mild winters and dry summers. The forest vegetation is characterized mainly by evergreen formations formed by holm oak and cork trees and deciduous forests such as oak and chestnut. Bushy formations of arbutus, mastic, juniper, wild olive, cyst, myrtle, phillyrea, heather, broom, rosemary, viburnum, euphorbia are identified with the "Mediterranean maquis". These formations, of great ecological interest, are the most representative of the Mediterranean area. In degraded soils, the maquis gives way to "garrigue", consisting of species such as thyme, helichrysum, cysts, and euphorbia.
The favorable environment of Sardinia has allowed the diffusion of numerous plant and animal endemisms of extraordinary naturalistic value, which often show typical characteristics of the islands, such as the smaller size of the specimens compared to similar species present in larger geographical regions, or peculiar characteristics due to long isolation.

At regional level, and in perspective of an adequate exploitation of forest nectar resources, the study of the nectar secretion represents a basic approach for the evaluation of the of the beekeeping interest of forest species. An important case on which some experimental data already exist is represented by the strawberry tree, source of the famous bitter honey, which is one of the most important resources in the forest and whose exploitation whose exploitation requires adequate technical and phenological knowledge to optimize the beekeeping use, considering the unfavorable flowering period (autumn-winter). It is then necessary to consider, more in general, the study of the melliferous potential of more complex forest floristic associations, in order to quantify their economic potential and rationalize their rationalize their beekeeping exploitation.

Honey is undoubtedly a product closely linked to the territory of production as its composition and organoleptic characteristics derive mainly from the type of flora harvested. Composition and organoleptic characteristics derive mainly from the type of flora foraged by bees, that is the raw materials from which honey originates, by bees, that is the raw materials from which honey originates. Besides vegetation, there are other elements linked to the territory that influence the characteristics of the product: the type of soil, climate and human activities with particular reference to the possible effects on the healthiness of the product.

The forest environment in Sardinia represents an ideal condition for the achievement of uncontaminated and valuable melliferous productions and, in perspective, for the recognition of specific geographical and territorial names, useful for a better commercial exploitation of the product. The territorial indication is in fact recognized by the Italian Law 753/82 on honey (G.U., 19/10/82) which establishes that honey may be marketed with an indication geographical origin: regional, territorial or topographical, if it comes entirely from the origin indicated. There is also the Community regulatory framework (REG CEE 2081/92) which offers the possibility of benefiting from more prestigious and internationally recognized quality marks, such as DOP (Denomination of Origin) and IGP (Protected Geographical Indications).

In Sardinia, the flora of beekeeping interest includes more than 200 species, among which several trees and shrubs of forest interest. Some introduced species, such as the Chestnut (Castanea sativa L.) and the Eucalyptus (Eucalyptus spp.), are of great nectariferous interest. While among the shrubs the strawberry tree (Arbutus unedo L.) stands out for the production of bitter honey, other species such as heather (Erica arborea and E. multiflora), rosemary (Rosmarinus officinalis L.), myrtle (Myrtus communis) and rockrose (Cistus spp.) should not be underestimated. In the area of small shrubs and suffrutics, there are other important species such as Thyme (Thymus erba-barona and T. capitatus), Maro or Gattaria (Teucrium marum) and Wild Lavender (Lavandula stoechas).

The favorable environment of Sardinia has allowed the diffusion of numerous plant and animal endemisms of extraordinary naturalistic value, which often show typical characteristics of the islands, such as the smaller size of the specimens compared to similar species present in larger geographical regions, or peculiar characteristics due to long isolation. In Sardinia there is the subspecies Apis mellifera ligustica, considered the most important in the world from the productive point of view, particularly docile and very industrious. However, some studies have shown that in the past (about thirty years ago) an ecotype, or perhaps a subspecies, of Apis mellifera differentiated from the ligustica was widespread and certainly better specialized to exploit the melliferous peculiarities of Sardinia (early flowering-asphodel and later flowering-arborberry tree).

The study of the honeys produced in Sardinia, already adequately deepened in comparison to many other Italian regions, would require a commitment to better characterize the production of forest honeys in order to differentiate them from the botanical and qualitative

point of view in order to allow an adequate valorization on the market. One adequate tool for this purpose may be represented by the adaptation of the software DataBees (honey section) for the computerized management of melissopalynological and chemical-physical data of honeys produced in forestry.

3. The beekeeping sector of the region in numbers

In Sardinia there are three thousand beekeepers who breed with rational methods about 60.000 hives. Honey production is around 18.000-20.000 quintals and represents about 11% of the total national production. Beekeeping is widespread in all provinces, in particular in Cagliari with 46% of operators. The most suitable areas are Campidano di Cagliari, Sarrabus-Gerrei and part of Sulcis-Iglesiente. Gallura, Ogliastra, Barbagia and Nurra are

less important in terms of quantity but excellent in terms of quality. The Agency provides various types of consultancy services dedicated to companies operating in beekeeping.

The introduction of the Beekeeping Database, to which all beekeepers must be registered by declaring the hives held and their geographical position, has allowed to validate the estimates made over the years regarding the consistency of Italian beekeepers and hives, highlighting a high number of beekeepers and hives and a higher than expected number of beekeepers with VAT numbers.

Honey production comes from over 1.66 million beehives, of which approximately 783,000 permanent and 657,000 nomads; a small residual share is then represented by hives that are not better classified. 74% of the total hives (1,232,831) are managed by commercial beekeepers who raise bees by profession. The large prevalence of hives held by beekeepers with VAT number underlines the high professionalism of the sector and the importance of the sector in the agro-economic context.
In 2019, over 187,000 hives produced organic honey, while 1.39 million hives produced conventional honey. In the first 6 months of 2020 they rose to 208 thousand and 1.45 million respectively.[2]

Geographically, the production is widespread in all regions of the boot (*lo stivale*). The most productive region is Piedmont, with over 5,000 tons estimated, followed by Tuscany with over 3,000 tons and Emilia-Romagna with over 2,000 tons.
From the average production data estimated by region, it emerged an average yield per hive, for professional companies practicing nomadism, of about 13 kg / hive for the Northern and Central regions and about 25 kg / hive for the Southern and Southern regions. Islands, which results in an average national yield of about 18 kg / hive.

Italian agricultural enterprises, among the most multifunctional in Europe, are increasingly evolving towards the diversification of business functions and sources of income and thanks to these activities, in addition to economic sustainability, they have often reached good levels in terms of environmental sustainability. and social, producing collective goods, and also fulfilling "public" functions (positive externalities).[3]

[2] Anagrafe Nazionale Api, 2019
[3] RRN Rete Rurale Naturale Magazine, 2020

And this is precisely the case of the numerous farms engaged in the field of beekeeping which, in addition to the direct production of income through the sale of honey and other products such as royal jelly, pollen, wax and propolis, play an important social function, difficult to quantify economically, consisting in the provision of essential ecosystem services such as:

- pollination of agricultural and forest crops;
- safeguarding the environment through the pollination of spontaneous plants;
- the collection of information on the state of health of the territories with relative measurement;
- the establishment of a model of non-destructive exploitation of the territories;
- the development of sustainable production and consumption models;
- the eco-systemic supervision of degraded or marginal areas.

All the functions listed are perfectly in line with the European strategy on the Green Deal which aims at climate neutrality by 2050, recognizing the actors of the agro-forestry and fisheries system as a fundamental part of the transition towards a more sustainable and efficient future. the use of resources. Already today, the EU sectoral policy supports beekeeping through three-year national programs, developed in collaboration with the representative organizations of the sector, which provide for co-financing of 50% of the costs incurred by the Member States.

The 2021-2027 programming foresees the confirmation of the contributions to the beekeeping sector within the CMO (Common Market Organizations), but the sectoral interventions (fruit and vegetables, wine, olive oil, beekeeping, hops) will be moved from Reg. 1308/2013 to the general regulation on the CAP, together with direct payments and Rural Development, with the aim of ensuring better coherence of actions.

In this context, the market prospects for the sector are also positive. According to Euromonitor data, in fact, the prices of honey worldwide from 2013 to 2019 increased by 25 percent, while those of sugar, in the same period, decreased by 30 percent. This dynamic, in large part, is attributable to the growing demand for natural sweeteners by both end consumers and the confectionery industry. Italian beekeeping can also focus on increasing interest from younger entrepreneurs who are inclined to innovation and on the growing professionalization of operators with about 76% of Italian hives being managed by commercial beekeepers with VAT number.

The future objective for the institutions and for the operators in the sector can only be the creation of optimal conditions to allow Italian beekeeping companies to face with optimism a dynamic but increasingly competitive market (+ 31% of imports of natural honey in the five-year period from 2014 to 2018). In this direction, tools such as mandatory labeling indicating the country of origin - and not only whether the product comes from the EU or not - and the increase in controls on counterfeits, in particular honey from third countries, could be useful.

From 2015 to 2019, spending on domestic purchases of honey grew by 8.8% against a 4% increase in volumes. This dynamic, however, is the balance between a three-year period of extremely positive results (from 2015 to 2017, an increase in volumes of 11% and expenditure of 13%), and the retreat accused in the two-year period 2018 and 2019. After a negative 2018 with losses of 5% of volumes sold to large-scale distribution, 2019 certainly cannot be defined as better, in fact all the indicators show a distancing of the consumer from the product, in addition to the reduction in volumes purchased (still a - 2% of volumes) in fact, there is also a decrease in the number of purchase deeds and a smaller number of families who have purchased the product at least once a year.

In relation to this latter indicator, it should be emphasized that honey has a penetration index, (i.e. a ratio between purchasing households and the universe of households) that is still very low, which from 36% in 2017 drops to 33% in 2019, indicating that only one in three households consumes honey throughout the year.

The average consumer price records a gradual growth over the years which is also reflected in the partial data for 2020 (+ 1.4% in 2019 after + 1.7% of this in 2018). Worldwide honey prices from 2013 to 2019 increased by 25%, while sugar prices fell by 30% over the same period. This dynamic is largely attributable to the growing demand for natural sweeteners by both end consumers and the confectionery industry.

At a territorial level, in the five-year period 2015-2019 there was a strong expansion of expenditure in the areas of the Center North, with the North East showing an increase of 12.5% in 2019 over 2015, while the trend is much more moderate in the South where expenditure increases are only 3.5%. In terms of volume, the increases in the five-year period 2015-2019 are more contained: only the Center recorded a + 8% in five years, while

the positive changes in the other three macro-areas remain below 3.5%. In the first nine months of 2020, on the other hand, the South is the macro-area that records the best performance with double-digit increases, both in terms of spending and volume (respectively + 23% and + 24%), followed by the North East as well, with increases of more than 20% both in value and in volume; the growth in volumes purchased in the Center (+ 7.1%) and in the North West (+ 6.4%) is more attenuated, but moderate.[4]

In the five-year period 2015-2019, in a context of 4% growth in volumes, the greatest boost in purchases came exclusively from families with adult and advanced age members, who in addition to covering more than 70% of consumption, had increased their purchases 10% (+ 16% for elderly couples). Furthermore, all the increases in purchases were attributable exclusively to high-income families (+ 18% compared to a 2.4% decline in low-income families).

In 2020 the picture is reversed, in a health emergency the attention of the consumer to health aspects is accentuated and honey is considered a health product, therefore consumption grows by 13%, acquiring appeal especially among young people and the very young. It is those that Nielsen classifies as the "new families" and families with adolescent children to record the best performances, with increases in volume purchases of 56% and 32% respectively. In 2020, honey was no longer considered a product only for the rich, but rather the "low-middle-income families" are the ones who increase their purchases the most (+25% against the +7.7% of high-income families).

Large Organized Distribution is the main honey sales channel with the “Supers" playing a primary role covering 43% of the total, the Hypermarkets with 28% and the Discounts with 21%. The Small Retail trade is flanked by large retailers with a 6% incidence for free services and 2% for traditional retail. A part of the production is then sold for direct sales in the company, this last important channel is difficult to detect since the information available today on the consumption of honey in Italy derives from the monitoring of sales by receipt only between consumers and organized distribution which escapes the direct sales. In the first nine months of 2020, the growth in honey sales of 13% in volume was mainly contributed to by supermarkets, where more than 700,000 kg more than last year were involved.
However, the greatest dynamism in 2020 is in the traditional channels which, while still representing a small slice of the market, recorded sales increases of 35%, followed by

[4] Ismea Nielsen Consumer Panel, 2020

supermarkets, where sales in terms of spending increased by 22% (+18% in volume). Sales in discount stores were also positive (+12%), while the performance of Iper and Liberi Servizi was less exciting, with lower-than-average volume growth.

4. Beekeeping economic figures and employment in rural regions

The figure of the beekeeper is defined in Italy under the heading of “breeder and specialized worker of insect farms” (6.4.2.6.0) and its main characteristics are:

- collecting products from farms (honey, silkworms, etc.)
- make farm products (honey, royal jelly, wax, propolis, silk cocoons, etc.)
- check the progress of work or production and the quality of the process or product
- carry out checks on animals and on the growth of the species ('check the state of health of the animals, etc.)
- clean the rooms or premises
- promote and sell products to the public
- prepare the necessary equipment for processing
- plan and schedule work or activities
- participate in training and refresher courses
- arrange insects on farms
- carry out ordinary or extraordinary maintenance activities on equipment, plants or machinery (repairing machinery and equipment)
- feed the animals with manual or automatic systems
- graft the larvae

As we can see, the beekeeper is one of the rare occasions of a professional figure involved in a so called closed circle profession, where the job implies knowledge of the whole “value chain”.

Beekeepers employed per area

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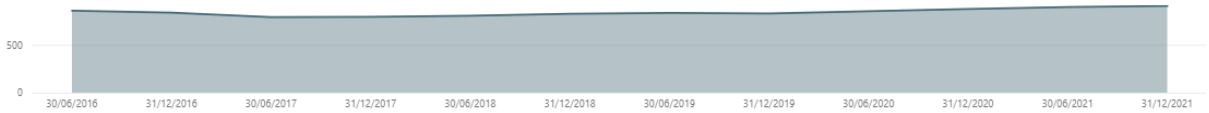
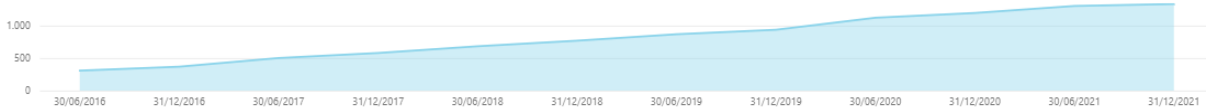
SARDEGNA	**2.238**
A.S.L. CAGLIARI	446
A.S.L. CARBONIA	210
A.S.L. LANUSEI	142
A.S.L. NUORO	446
A.S.L. SASSARI	318
ASL 5 - ORISTANO	357
ASSL OLBIA	304
ASSL SANLURI	238
Totale	**2.238**

Beekeepers employed 2016-2021 (commercial purpose)



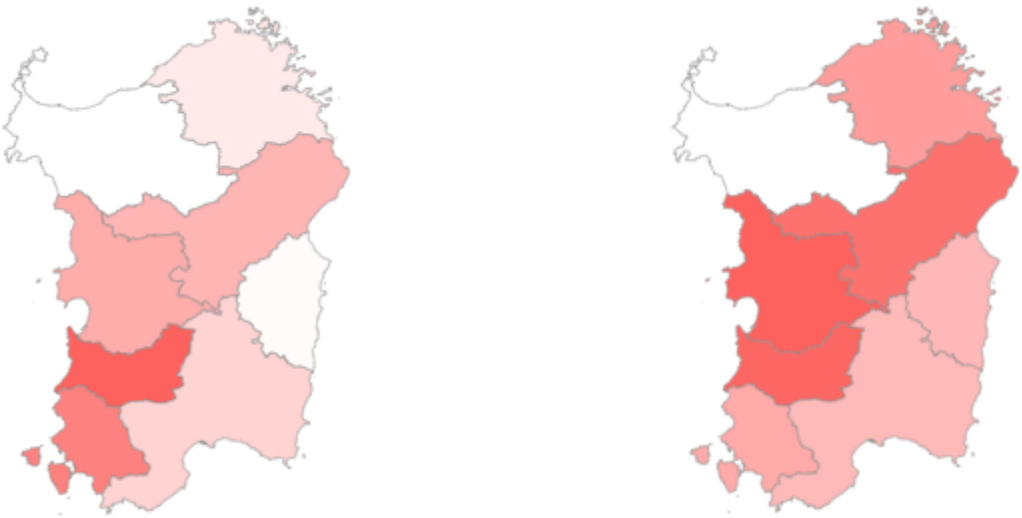
Beekeepers employed 2016-2021 (self-consumption)



Beekeepers density (per sq KM)

Total: 0.0923/sq Km

Commercial purpose: 0.0373/sq Km



Examining the distribution of hives in the territory, a strong aggregation is found in some areas with peaks of density from 13 to 25 hives / sq km, clearly higher than the average values highest reported in Europe (Greece: 11.4 sq km hives). This aggregation covers 2.302 sq km, equal to about 10% of the total regional surface, divided into 6 areas in which it stands about 1/3 of the total assets: Gallura, Planargia, Sarcidano, Medio-Campidano, Cagliaritano, Sarrabus.

- Italy: 3.7 hives per sq. Km
- Europe: 4.2 hives per sq. Km.

The average number of hives per farm (52 hives) is higher than the national average (23 hives).

Professional beekeeping (beekeepers who manage more than 150 hives) is carried out by 8% of beekeepers (99 beekeepers) who manage more than 60% of the hives (about 40,000 hives). The analysis of the data relating to the year 2018 confirms the good specialization of the companies and of operators, found that about 10% of beekeepers declare a consistency greater than 100 units. Regional Beekeeping Program Three-year period 2020/2022 14/24 The main production address of Sardinian beekeeping companies is the production of honey. Production which can be estimated at about 15,000 quintals (considering an average beehive production of About 25 kg).

As for the commercial channel, beekeepers manage to get the highest price with direct sales to consumers (31% of production); the second best option is the sell honey to packaging companies (24%) and distribution (16%) or to industry food. A substantial part of the honey

of Sardinia is sold by the beekeepers directly to consumers in the local market (42%). The other beekeeping productions are still practically of little importance in Sardinia the production of pollen and royal jelly remain marginal, still relegated to productions occasional, despite the efforts on the dissemination of profuse production methods by the Laore Sardegna Agency. (RAS Regional Beekeeping Program 2020/22).

5. A SWOT analysis of the beekeeping sector in the region

Strenghts - Strong Environmental Relevance (Indicator of the state of health of the territory and protection of spontaneous plant species through pollination) - Powerful network effects - Robust cultural heritage - Growing presence of biological productions	**Weaknesses** - High climate dependency - Prone to adulteration - Reduced use/diffusion of quality and origin certifications - Hobbyists often indistinct from professionals
Opportunities - New entrants and youth interest - Space for innovation	**Threats** - Climate change - Inexperienced new entrants - Strong pricing competition by uncontrolled foreign productions

SECTOR NEEDS

In view of a better understanding of the beekeeping sector, it was decided to implement in the questionnaire a series of questions aimed at uncovering problems and needs in their most practical aspect.

The main purpose of this section is to identify shortcomings, areas for improvement, causes of discomfort or inefficiency, or more generally elements that may affect the genuine development of business related to the sector, but also to find possible opportunities on which to intervene later through targeted actions.

With a view to providing an analysis that is as accurate as possible, the proposed questions were:

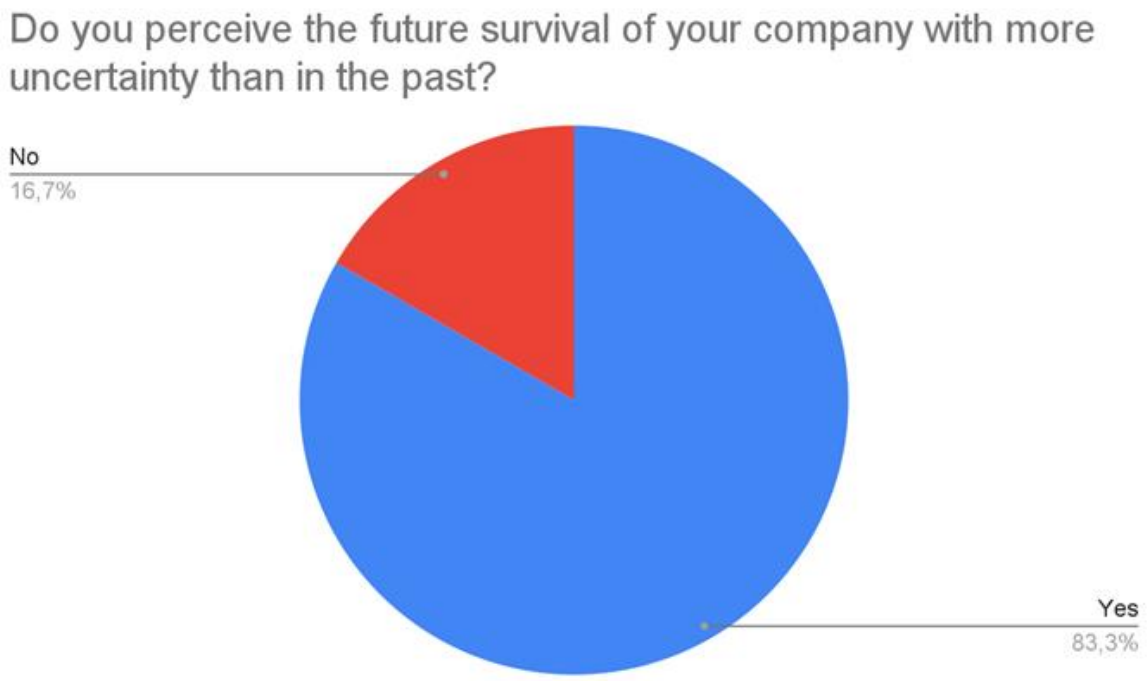
- a table in which candidates were asked to rate on a Likert scale from 1 to 5 the factors that influenced production in the year 2021;
- an open-ended one supplementary to the previous one;
- a specific question, i.e., a table asking candidates to rate on a Likert scale from 1 to 5; a set of proposed needs/needs.

In this regard, in order to choose the options to be proposed, the interviews carried out with the team members of Apiaresos and Apimed, associated partners of the project, were fundamental:

- frequent opening of new realities in the field that are characterized by particularly small size and lack of solidity (we point out the bee registry as a reference point for mapping initiatives already operating in the area updated according to municipalities);
- deficit in the financial and business knowledge of several new businesses;
- product crisis - sometimes the supply produced is insufficient to satisfy demand;
- crisis of consolidated activities - it is noted that the realities already present in the territory need greater economic support.

The above-mentioned, citing these fundamental points in order to offer a more updated picture of the beekeeping panorama located in the Region of Sardinia, give a rather uncertain idea about the future, especially in view of the years 2020 - 2021, as confirmed by 83,33% of the candidates.

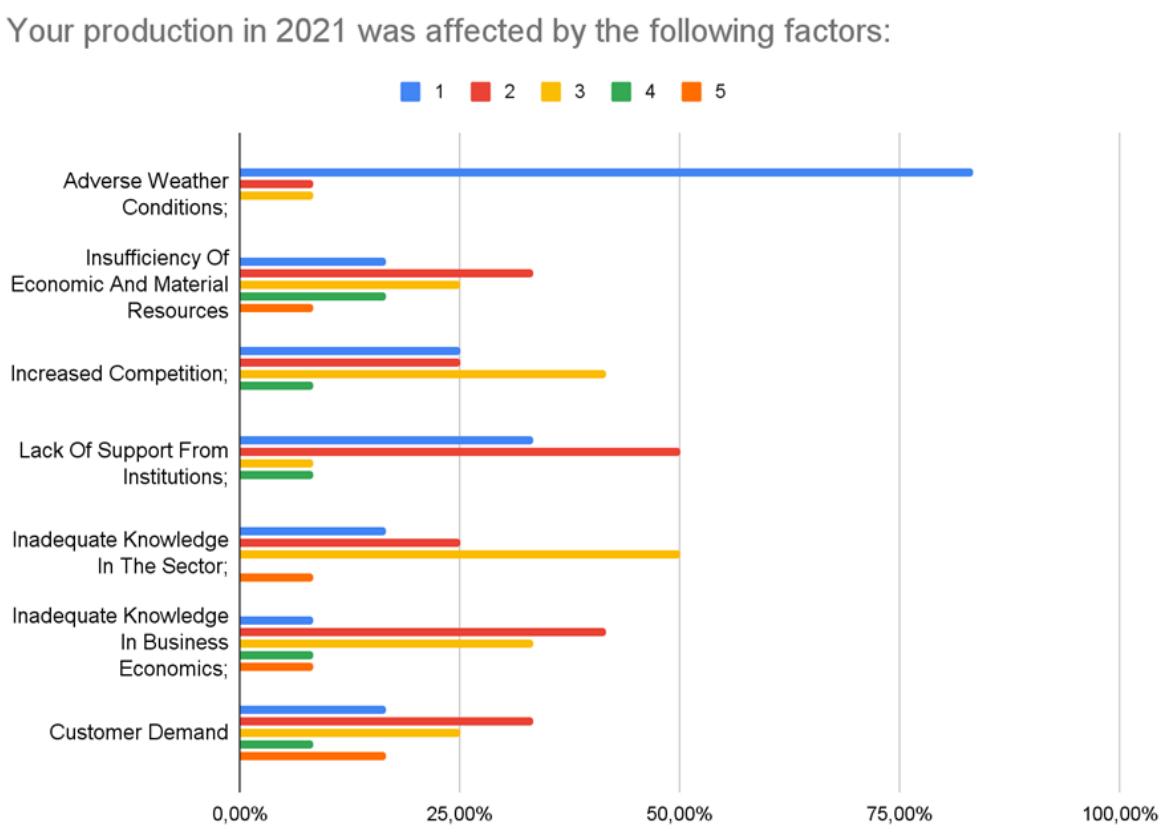
According to the analyzed data, this is the most faithful view of a prevalence of beekeepers, who represent 75% of respondents to the questionnaire, leaving the remaining percentage parcelled out among producers of services related to beekeeping, consortium service or production of other raw materials.



Entering into the analysis of the issues, it was requested to give a grade to the factors that affected production in the year 2021, a particularly complex period for the economy in general and especially for the economy related to rurality, as a result of the pandemic.

- Adverse weather conditions;
- Insufficiency of economic and material resources
- increased competition
- Lack of support from institutions;
- Inadequate knowledge in the field;
- Inadequate knowledge in business economics;
- demand of the customers

of which below graphical representation percentage.



According to the questionnaires examined, the factors which most negatively affect production are:

- adverse weather conditions, according to more than 90% of respondents, of which more than 80% define it as strongly negative;
- lack of support from institutions, with an incidence of 83.33%;
- inadequate knowledge of business economics and client demand, for half of the candidates.

On the other hand, client demand is a balanced variable, with positive and negative evaluations, both at 25%.

According to the interviewees, the increase in competitors and inadequate knowledge in the sector do not have a sufficiently significant effect on variations in production, but this could be verified in the face of a more complex and extensive analysis.

The previous considerations are confirmed in the next question, in which the candidates were given a free space to deepen or implement considerations about the problems they feel most invalidating.

Once again it is the adverse climate to have the prevalence, there is a tendency to specify in some cases both the extreme conditions of heat, drought and abundant rainfall that have seen the protagonist especially last year, but also the particular pollution generated by pesticides and the uprooting of trees.

Among the open-ended questions, some candidates also mention the lack of support from institutions, which, as will be seen in the part dedicated to the analysis of the questions on needs, is considered relevant by over 75% of the candidates.

In particular, areas of intervention are highlighted as being:

- Making bureaucratic processes more streamlined;
- providing greater financial assistance;
- encourage consumption of products linked to the sector;
- intervene on the indiscriminate cutting of trees and pathologies linked to beehives;
- facilitate the free movement of goods worldwide, information that suggests the desire to extend the boundaries of demand certainly beyond the Region of Sardinia.

In the next question, respondents were asked to vote among a number of potential needs that they felt were not at all, not very, neutral, fairly, and very relevant.

- Greater economic support
- Increased institutional support

- Improved publicity
- Regulation of competition
- Greater technological support

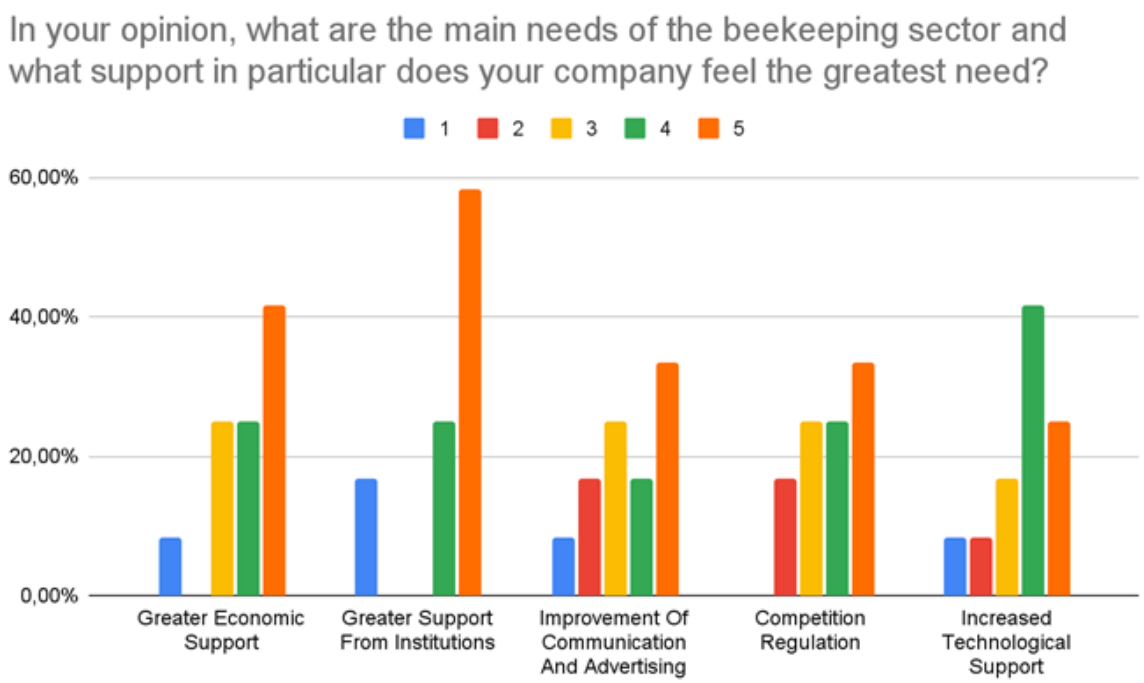
Confirming the findings above, for more than 75% of applicants the need for institutional support is evident (of which 58% consider it strongly necessary).

Then, 66.7% also consider technological efficiency to be important.

In this respect, during the interview with the president of Apiaresos, an interesting point of reflection emerged on the implementation of eco-sustainable technologies in the production of honey and bee-related products. In this sense, in view of the necessary investments, better results could be obtained in terms of energy and economic consumption, as well as creating a renewable plant that can also combat adverse weather conditions.

As the chart below shows, the various other needs that follow institutional support are disparate and evenly distributed among the various levels of evaluation.

More specifically, the items "improvement of publicity" and "regulation of competition" do not appear to be needs on which to intervene as a priority and should be integrated with more detailed analysis.



They can, however, all be identified as potential areas for improvement that, with the support of funding, projects, and networking activities could address some of the shortcomings.

ADD NEEDED

5.1 Survey Results

A questionnaire was disseminated to the stakeholders which had as its objective the concrete identification of problems and needs of the actors in the area related to the beekeeping sector.

The questions, divided into 3 sections plus two modules to which candidates can access only in the face of specific answers, aim first of all to offer a snapshot of what these actors are and how they identify themselves, to analyze critical issues and ideas for action and to hypothesize possible networking solutions.

More specifically, the questionnaire is structured as follows:

- registry;
- geographic area;
- beekeepers;
- production;
- networking.

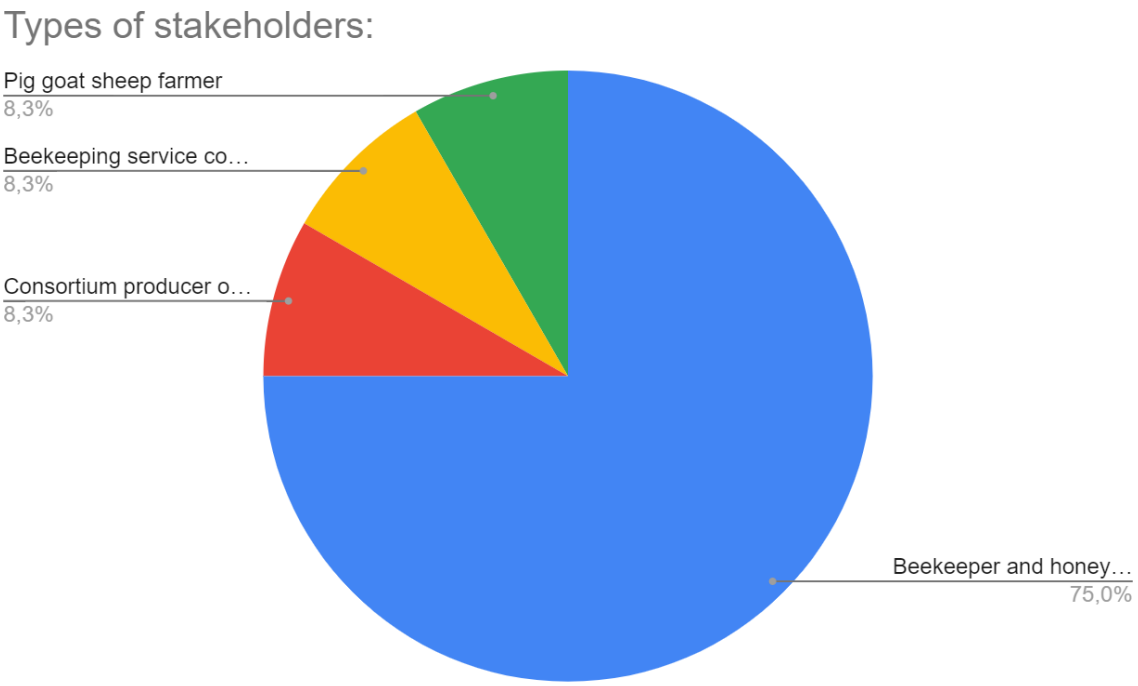
Registry

The registry section is composed of 5 qualitative questions that aim to analyze the general features of the responding beekeeping activities.
The first question asks candidates to specify which type of stakeholder they belong to by drawing on a list that includes:

- Beekeeper and honey processor
- Manufacturer of beeswax candles
- Artisan wax-based cosmetics
- Royal jelly producer
- Honeycomb processor or similar products
- Company of services related to beekeeping
- Research institute
- Policy maker

From what emerged from the answers given, 75% of the candidates hold the profession of beekeeper and honey processor, the remaining 25% is divided between different professional figures including an organizer of consortium products, service companies related to agriculture and ovi farmer - goat - pig.

Upon answering "beekeeper and honey processor" the candidates will open the section called "Beekeepers" which will be discussed in later phases.



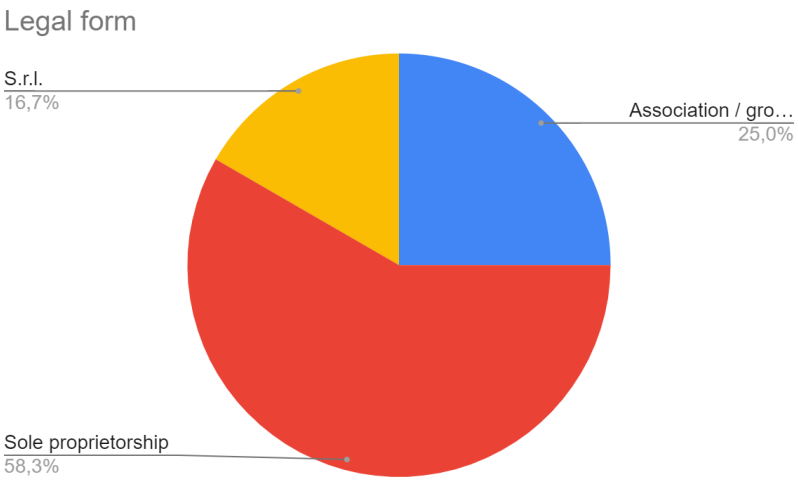
Of these professional figures:

beekeepers and honey processors - the majority, i.e. 44%, have an experience in the sector between 6 and 10 years, only in 22% of cases, however, we talk about extremes: on the one hand, a management of over 21 years , on the other hand, a young reality under 5 years old. In only one case there is a company life between 11 and 20 years.
company of services related to beekeeping - experience in the sector of 6 - 10 years
consortium producer organization - experience in the sector for over 20 years.

Below we are interested in studying the legal form of the candidates, among 5 proposed alternatives:

- sole proprietorship
- partnership
- s.r.l.
- association / group of associations
- cooperative
- consortium

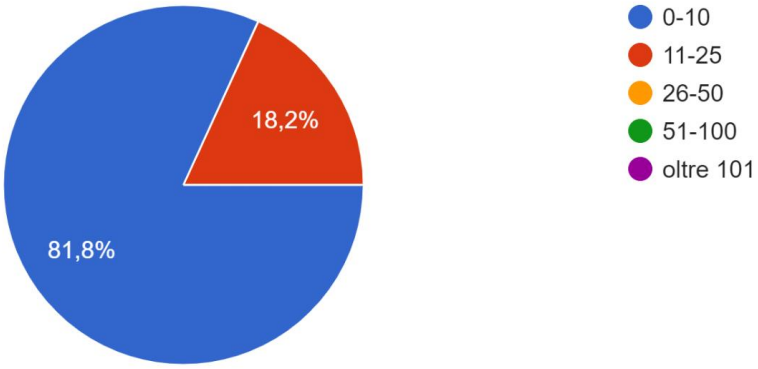
of which to follow a summary diagram:



In order to investigate a conditioning between the core business and the legal form, cross analyzes were carried out between the two variables.
Out of 9 beekeepers and honey processors who replied to the questionnaire, 6 were established with an individual company, and all of them had maintained this legal form for a minimum of 6 years; in two cases they are instead brought together as an association or group of associations of relatively young age (interval 1 -5 years) and in only one case it is an s.r.l.

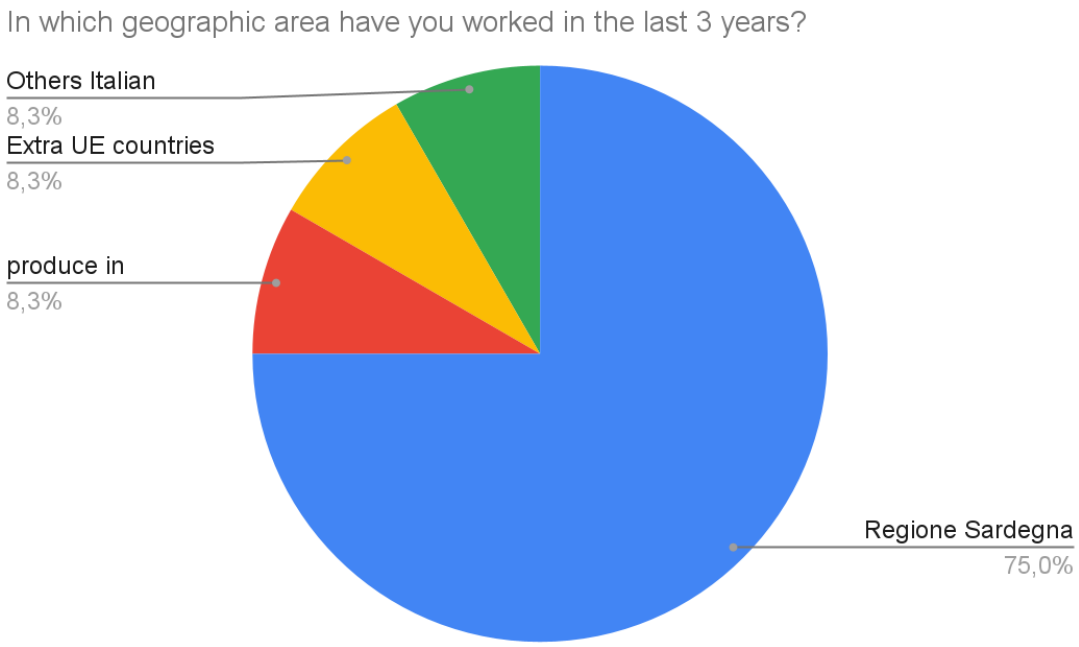
The other categories of activities are legally constituted in various ways between associations / groups of associations, sole proprietorship and s.r.l.

The company dimension of the aforementioned activities, which are generically classified as micro and small enterprises, was then examined in depth; in fact, in over 80% of cases, less than 10 employees are involved and in the remaining part from 11 to a maximum of 20. Here is the following graph:

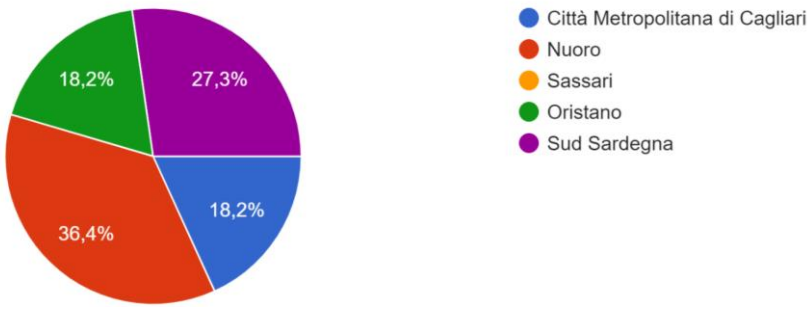


The last question proposed by the personal data section aims to question candidates on the geographical area affected by their services in the last 3 years.
It was also decided to investigate this aspect as it emerged from the interview with the associated partners that the geolocation of the demand can be seen as a problem or an opportunity:

- sometimes many entrepreneurs in the beekeeping sector are forced to allocate their products to territorial demand only because they do not have the right technological support and skills to expand their diffusion. In this case, they may run the risk of inflating the offer of the product, not being able to position it on the market at the price that allows the right profit margin and discourage the purchase;
- some companies are already active on the foreign market, but find problems related to price competitiveness (the prices of my Italian are higher than the Chinese one, for example) and to the national bureaucracy linked to trafficking on extra national territory.



As shown in the pie chart above, 75% of the interviewees work in the Region of Sardinia and are distributed throughout the territory as follows:



Beekeepers

The section opens by selecting "beekeepers and honey processors" as the answer in the first question in the registry.
The goal is to provide a small insight into the quantities of hives and honey produced, in fact the section is divided into two open questions.

In both cases, the processing of the answers is done by grouping the open answers into classes.

Compared to the first question, "How many hives in production did you have in 2021?", The answers were as follows:

Classes of hives	Beehives in production in 2021
0 – 50	50%
51 – 150	8%
151 – 500	16%
more than 500	8%

It is immediately evident how the majority of honey producers and beekeepers have kept a fair number of hives in production in 2021, in a range between 0 and 50. Among the six belonging to this modal class, 4 candidates are less than 10.

The second question, on the other hand, focuses more on the quantities produced. Here too, to avoid excessive heterogeneity in the open responses, it was decided during the processing phase to group the responses into classes, as shown in the following table.

Honey volume (in kg)	Beekepers
0 - 500	6
501 - 1500	1
1501 - 5000	1
oltre 5001	2

Here the first class is also the densest, making it a modal class, with 6 candidates responding. It should be noted that, of these, 4 produced quantities of honey less than 100 kg.

From what emerges in the section, the majority of respondents have hives and produce fairly small amounts of honey, consistent with a more local trade. The activities with productions

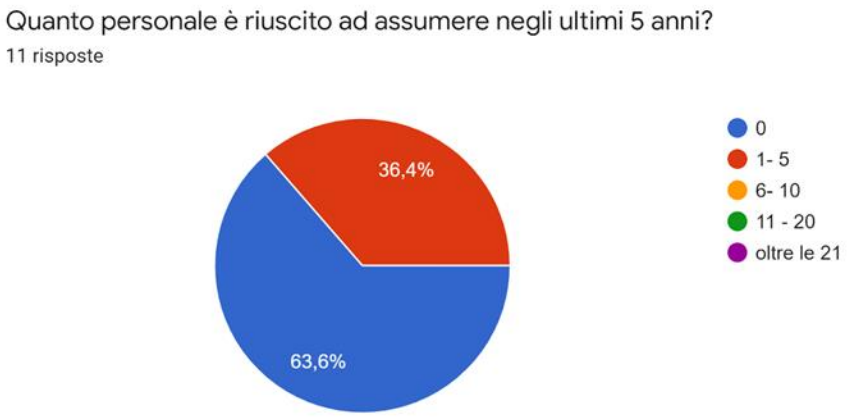
over the maximum thresholds coincide, in fact, with those who have moved their market outside the regional and national borders.

Production

In this section, the interviewees are presented with a series of questions aimed at providing a snapshot of the current situation in the beekeeping sector, highlighting the problems related to it and defining a series of possible areas of intervention.

There were 7 questions, including multiple choice qualitative and quantitative questions and open answers.

As a first question, it was asked to specify how many staff have been hired in the last 5 years, choosing such a wide panorama both to avoid that the pandemic period affected too much the results of the questionnaire, and to monitor a possible growth of the company.



From what emerged from the responses, the majority (over 60%) of the businesses have not hired any additional staff in the last 5 years; of these, 75% are sole proprietorships with fewer than 10 employees.

The remainder of respondents appear to have hired between 1 and 5 new staff. These cases mainly concern activities that trade with other EU countries or that are identified with a legal form of association, limited company or sole proprietorship.

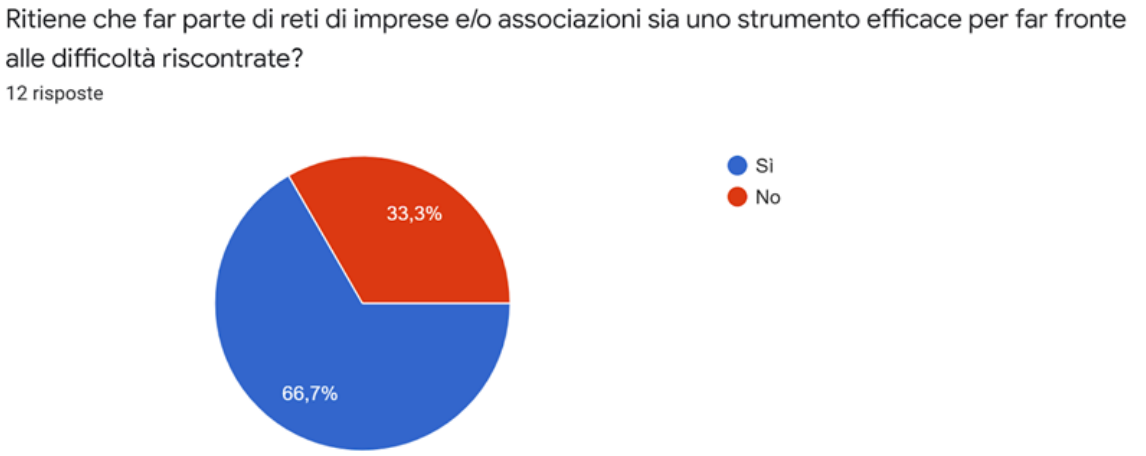
For the elaboration of the section, refer to the needs analysis.

Networking

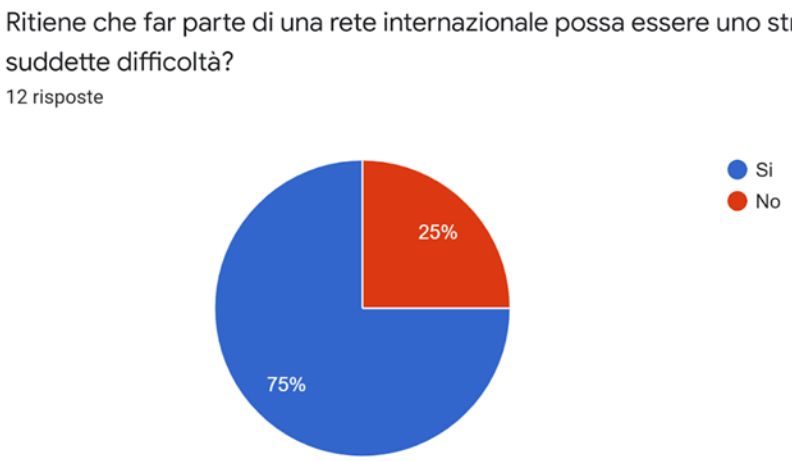
In this last part of the questionnaire, candidates are asked to express their opinions on the networking activities they are already undertaking and to express their appreciation of others proposed by the team. The section consists of 4 questions (plus an additional one on the treatment of personal data to which all candidates have confirmed).

For the first question the candidates were asked to express their opinion on the effectiveness of the network of companies and/or associations.

The majority, 66.7%, voted for a positive option, recognizing the usefulness of networking.



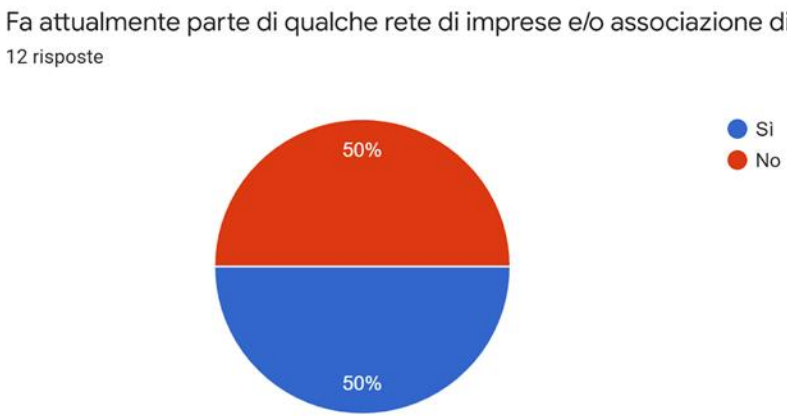
Next, a similar question to the previous one was proposed but with the specification of the international network, in light of the fact that some candidates expressed themselves as already operating on the foreign market with the desire to go beyond regional and national borders and also because it is an output of the project:



75% report the effectiveness of the international tool.

Of the respondents who rated the first question positively, only one did not confirm the effectiveness of an international network. Among those who did not, however, half confirmed ineffectiveness for both a national/regional and international network.

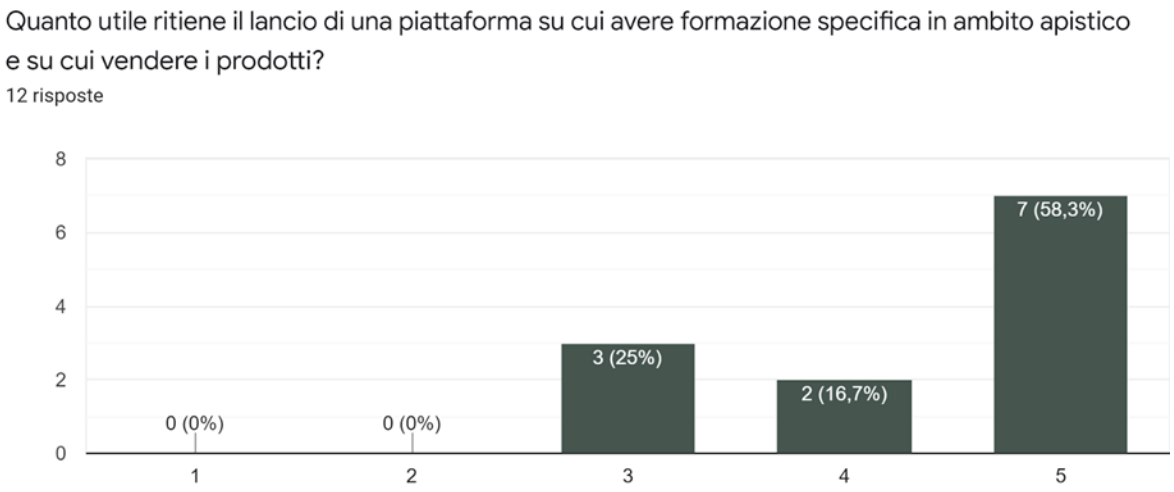
Finally, it was asked if the candidates were already part of a business network and it turned out that the collective is split exactly in half on this choice.



Cross-referencing the responses to these 3 questions shows that:

- 33.33% responded to all three positively;
- 25% consider the idea of networking valid, but are not yet part of a network
- in 8.3% of cases, the idea of networking was considered positive, but not international, by a candidate who is not currently part of a network;
- in 16% of the responses, the candidates consider it more important to be part of an international network than a regional/national network, and in one case they already belong to a network, in the other they do not;
- in only one case did the respondent, in light of being part of a network of companies/associations, not consider this to be useful;
- in one case, no form of association or networking is considered useful.

As a final question, the respondents were asked to rate on a likert scale from 1 to 5 how useful they thought it would be to launch an online platform, as envisaged by the project, on which to integrate training in technical and business economics with a view to making it an ecommerce of goods and services related to beekeeping.



Overall, evaluations were positive: 58.3% described it as very useful, 16.7% as useful, with a total of 75% of candidates expressing a positive opinion of it, and the remaining 25% maintaining a neutral opinion.

6. The region's product portfolio on honeybee products and the honey types available

Sardinian beekeeping is characterized by an extremely variable level of professionalism, ranging from specialized companies to farms where beekeeping is an additional activity and involves a large number of small producers, with a widespread distribution throughout the regional territory.
Honey production in Sardinia is very important. In fact, between 18 and 20 thousand quintals of honey are produced every year, 11% of the whole national production!The other beekeeping productions in Sardinia are still of little relevance. The production of pollen and royal jelly remain marginal, still relegated to occasional production, despite the efforts of the Laore Agency of Sardinia to disseminate production methods.
Therefore the honey remains the main honeybee product in Sardinia. Even more interesting than the quantity is the quality of the products. Thanks to the great extension of the natural areas and to the climate, bees have at their disposal many different flowers to produce many varieties of honey. There are many types of Sardinian honey, many of which exist only in this region, almost all related to the scents of the Mediterranean scrub.

The traditionality and the typicality of the product is linked to two main factors: the grazing is carried out exclusively in areas of spontaneous vegetation, in the periods in which there is the flowering of the characteristic botanical species and, when there is no "competition" of pollens of other essences of the local maquis and in areas not contaminated by chemical pollutants. The richness of spontaneous vegetal species growing in Sardinia guarantees a wide range of honey, with refined and unique flavors.

One of Italy's most ancient foods is abbamele or abamele, produced exclusively in Sardinia. Abbamele is obtained from honeycomb, honey, and bee pollen. Honey is manually extracted from the honeycombs and the honeycombs are crumbled and dipped into warm water. Once melted, the wax is separated from the honey and pollen and the remaining syrup is heated for the caramelization of sugars. Abbamele can be eaten with cheese, fresh fruit, or even pasta or vegetables.

There are many companies dedicated to beekeeping, i.e. the breeding of domestic bees for the production of honey and wax: over time, these types of production have in fact become quite commercial, feeling the need to specialize and expand the range of products. So this sugary substance elaborated by bees, honey, has taken on a wide variety of flavors: orange and lemon flavor in citrus honey, unmistakable for its consistency in asphodel honey, rich in essences in thousand flowers honey, balsamic eucalyptus honey, which joins the classic acacia, chestnut and linden honey. Strawberry tree honey, characterized by a strong and bitter taste, is the result of an original idea enriched with pieces of dried fruit: walnuts, almonds or peanuts.

In Sardinia we find:
- Sardinian monofloral honey
To make this honey, bees forage for only one type of flower.
- Sardinian multi-flower honey
The classic millefiori or polyfloral honey, obtained from the nectar of mixed flowers.
- Sardinian honeydew honey

One of the rarest, prepared not from the nectar of flowers but from the sap of plants. This is possible only when the liquid gushes from the stems because of the sting of parasites.
They all bring with them flavors and scents of the local vegetation.
Asphodel, Arbutus and Thistle are those whose name is immediately associated with Sardinia, but very characteristic are also Eucalyptus, Cistus, Citrus and Sulla honey. Very rare are Rosemary honey and Wild Lavender honey.
In the hinterland of the island is also produced a less Mediterranean honey: chestnut honey.
Finally, there is a Sardinian non-floral honey: honeydew honey.
Sardinian honey: types

Mediterranean Scrub Honey, Sardinian Wildflower Honey

In Sardinia millefiori is typically a honey of Mediterranean scrub, characteristic vegetation of the island. Arboreal heather, lavandula, asphodel, wild thistles and rosemary together create an original and delicious mix.
Its main characteristic is to change flavour every year giving to the one who tastes it a continuous surprise, while keeping the characteristic aroma which distinguishes it from millefiori honey from other regions. If the honey contains more wild lavender, its taste will be sweeter and softer, whereas if heather and wild thistles predominate, the taste will be spicy and richer. Sardinian wildflower honey will change according to the area and the season in which it is harvested: the maquis of the coast is different from the maquis of the mountainous areas and different species bloom according to the season.

Strawberry tree honey or bitter honey

The arbutus plant, in Sardinian lion or lioni, is very common in all Sardinia, especially in the mountains. The red fruits look very inviting and could be misleading, but their sour taste can sweeten only when the berry is very mature.Like eucalyptus honey, strawberry tree honey is very amber colored, but when it crystallizes it becomes light hazelnut. By crystallizing it becomes a fine and creamy paste, without the typical granularity of other honeys.

Asphodel honey

Asphodel, in Sardinian arbutzu, scrarìa or iscrarea, is a bulbous plant, very common and loved in Sardinia. It is impossible not to have noticed it in the countryside in springtim.It blooms from February to May, covering whole meadows with a candid mantle. Usually in non-cultivated areas, by rivers and on hillsides. Asphodel honey is golden in color, lighter and brighter than citrus honey.

Thistle Honey

Thistle is one of the most common plants in Sardinia and it mainly grows near rivers, in pastures and in the wildest countryside. The thistle blooms in the period from March to May, with flowers ranging from white to purple in a thousand warm or cold shades. Sardinian thistle honey has a very amber color and when it crystallizes it tends to lighten of different shades. Crystallization occurs shortly after harvesting and tends to be very compact.

Eucalyptus Honey

Eucalyptus honey is produced by bees thanks to the flowers of the eucalyptus, a tree imported to Sardinia from the distant Australia because it helped to drain some swampy areas. A very large plant, which in our territories reaches up to 25 meters in height. It blooms at the beginning of the summer and produces a lot of nectar of which bees are greedy. Eucalyptus honey is slightly amber colored, but it can be more or less dark according to the period in which it is extracted. The honey extraction is performed in the summer (July-August). The first operation consists in taking the honeycombs from the hives and deposit them in the laboratory.

Citrus fruit honey

Citrus plants arrived in Sardinia, thousands of years ago, imported by the Saracens. They then easily spread throughout the territory, but they are mostly concentrated in the Campidano and Sarrabus areas, in particular in Villacidro, San Sperate and Muravera. The plants bloom in spring and their white flowers are particularly elegant. Citrus honey is golden yellow in color and becomes ivory-yellow only during crystallization, which occurs a few months after extraction.

Honey of cistus

The cistus is one of the most common shrubs in the Sardinian Mediterranean maquis. In springtime, it can be recognized by its beautiful, fragile-looking flowers that seem to be made of fabric. White or deep pink, sometimes they bloom already a bit creased. Cistus honey is very dark, tending to red. It has a strong and vaguely salty taste.

Wild Lavender Honey
A truly niche production, which comes exclusively from the State Forest of Filigosu at Oschiri, managed by the Sardinian Forestry Authority. Wild lavender or lavandula stoechas is an aromatic plant which in springtime makes particular purple flowers bloom. It is mostly found near woods, in cool areas and richer in water than the average Sardinian.

Chestnut Honey
Chestnut is widespread in Sardinia in the mountain areas, especially in the Barbagia of Ollolai, Belvì and Seulo. Flowering takes place between May and June. Chestnut honey is very dark and has an intense flavor reminiscent of caramel and brown sugar. It will please thistle honey lovers It is produced very little and especially in the Nuoro area.

Acacia Honey
Acacia is not very common in Sardinia and in fact this honey is produced only in Gallura and in very small quantities. The flowers bloom in May and last for a short time, making the production of monofloral honey difficult. Acacia honey is the clearest and most transparent.

Honey from sulla
Sul is a leguminous plant, cultivated for animal feed and in alternation with cereal crops because it is an excellent nitrogen fixer in soils. In the month of May it has beautiful dark red flowers. Also the honey of sulla, like the acacia one, is almost colorless and has a delicate and not intrusive taste, which is good everywhere. Unfortunately, very little is still produced.

Rosemary Honey
Rosemary plant does not need any introduction, it is one of the most used aromatic plants in Italian cooking. Its purple flowers show off from March to October. Rosemary honey is a clear honey, ranging from straw yellow to ivory white when crystallized. It is aromatic and vaguely salty. It has antiseptic and balsamic properties. Sardinia is one of the few Italian regions with a significant, but still small, production.

6.1 LOCAL ECONOMIC IMPACT

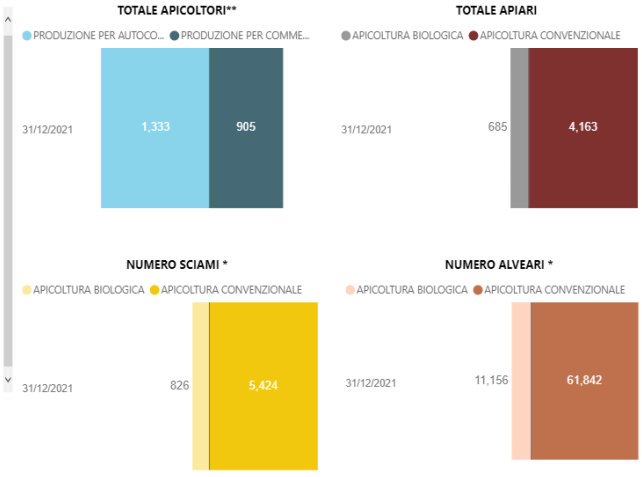
MedBEESinessHubs

This section is intended to provide an assessment of the current value of beekeeping production in the Sardinia region and an analysis of the economic damage to entrepreneurial beekeeping as a result of heavy production losses determined by the particular adverse weather conditions that affected the entire Italian peninsula during spring 2021.

DATA RIFERIMENTO	31/12/2021			
REGIONE	NUMERO APICOLTORI**	NUMERO APIARI	NUMERO ALVEARI*	NUMERO SCIAMI*
ABRUZZO	2.198	3.770	50.702	7.541
BASILICATA	568	1.479	24.317	4.310
CALABRIA	1.794	7.597	148.373	15.140
CAMPANIA	1.914	4.647	95.951	14.234
EMILIA ROMAGNA	5.648	15.711	151.842	22.186
FRIULI VENEZIA GIULIA	1.887	4.332	37.095	6.820
LAZIO	4.103	6.606	74.100	14.807
LIGURIA	2.830	4.580	33.584	8.863
LOMBARDIA	8.206	19.087	183.964	15.792
MARCHE	3.245	6.203	76.898	8.517
MOLISE	794	1.569	19.487	3.379
PIEMONTE	6.933	25.629	212.760	51.990
PUGLIA	1.250	2.621	31.783	12.782
SARDEGNA	2.238	4.848	72.998	6.250
SICILIA	2.222	11.447	140.478	19.659
TOSCANA	7.036	15.501	138.456	22.946
TRENTINO - ALTO ADIGE (BZ)	4.013	4.875	44.627	2.845
TRENTINO - ALTO ADIGE (TN)	2.341	4.943	30.257	5.272
UMBRIA	2.961	4.527	45.999	2.720
VALLE D'AOSTA	618	1.517	6.461	938
VENETO	8.470	15.830	107.336	21.256
Totale	68.347	167.319	1.727.468	268.247

** Il numero di apicoltori indicato in tabella rappresenta il numero di attività di apicoltura con apiari ubicati nello specifico territorio; tuttavia, poichè un apicoltore può avere apiari in diversi Comuni, il numero indicato per una Regione non corrisponde alla somma degli apicoltori nei Comuni di competenza, così come il totale nazionale non corrisponde alla somma degli apicoltori nelle diverse Regioni

Dati elaborati il 15/01/2022



* Il numero di alveri e di sciami è relativo all'ultimo censimento registrato in BDN per ciascun apiario

Source: Italian National Zootechnical Registry, 2022

Although with the inevitable elements of approximation given the characteristics of the sector and the great territorial variability of production, the assessment of the economic damage includes:

- estimated loss of production in kg per hive for the main honeys spring (acacia, citrus, sulla, millefiori and other spring honeys);
- estimate of the loss of revenue per hive resulting from this decrease in production;
- evaluation of the higher costs incurred in the hive for the nutrition of rescue;

To estimate the value of the loss of production, the following were taken as a reference:

- Expected production, i.e. the beehive production which is considered normal reach in years not characterized by conditions of disasters e determined on the basis of knowledge on the individual territorial realities for type of honey (source: National Honey Observatory). It is an indicator essential for a realistic assessment of the annual loss of production / revenue compared to the actual production potential for typology / territory.

- Potential average production, production resulting from the statistical analysis of data from the National Honey Observatory. It is the result of the territorial production average for the 2015-2020 period plus one coefficient equal to 1.5 X Standard Deviation and whose determination was assessed on the basis of the degree of variability of the yields recorded for year / territory; it allows to compare the expected production with the data resulting from the historical averages.
- Average production, average production estimated in 2021, measured by the network of monitoring of the National Honey Observatory.
- Estimated production loss, obtained as the difference between average production potential and average production 2021;
- Average price, average of regional prices at the origin for the period 2015- 2020, including VAT, sourced from ISMEA. The non-production valued at the average price at the origin allows to obtain the Loss of revenue per hive.
-

The historical data of the yields on which the analysis was carried out derive from the activity of monitoring carried out over the years by the Observatory on the national territory and refer to the average beehive production obtained in the suitable areas of each region for the honeys considered, by professionally run beekeeping companies.
The analysis shows that in 2021 all spring honeys suffered production drops important, with more significant losses for acacia honey and citrus honey, or the two main productions of the sector characterized by a strong production specialization in the Northern and Southern regions respectively. For honey citrus fruit, which has an average market price of 5.64 € / kg, the loss of revenue estimated is on average about 105 € / hive.[5]

Citrus Honey - Estimated value of lost revenue per hive for 2021

Expected Production	Production Average Potential (2015-2020)	Average Production 2021	Estimated Missed Production	Average Price (2015-2020)	Missing Revenue per Hive
kg/hive	kg/hive	kg/hive	kg/hive	€/kg	€/hive
25.00	17.15	0.00	17.15	5.64	96.79

Source: Osservatorio Nazionale Miele, 2022

[5] Osservatorio Nazionale Miele, 2022

The analysis also extended to other typical spring products, such as on and the spring wildflower. In fact, the damages for non-production of honey are indeed registered for the generality of spring honeys and have also affected regions and areas affected by spring productions other than acacia and citrus. Regarding the honey of sulla, 2021 was a particularly bad year in all suitable regions, with average yields much lower than expected. The lack of revenue estimated is on average € 97 per hive. In years of scarce citrus production, the Southern beekeepers are used to move the hives on the bloom of the on in the attempt to recover a harvest that this year failed for both productions.

Sulla - Estimated value of lost revenue per hive for 2021

Expected Production	Production Average Potential (2015-2020)	Average Production 2021	Estimated Missed Production	Average Price (2015-2020)	Missing Revenue per Hive
kg/hive	kg/hive	kg/hive	kg/hive	€/kg	€/hive
20-25	20.50	7.50	13.00	5.72	74.32

Source: Osservatorio Nazionale Miele, 2022

Except for some crops obtained in some limited areas, even the production of spring wildflowers has been cleared or greatly reduced. With this typology we also intend to include crops such as cherry, heather and dandelion which in years of low yields often make up the wildflower spring pre-acacia together with other nectars. These are harvests with expected productions generally inferior to those of the main honeys such as acacia and citrus fruits, which they therefore determine a lesser income loss but which have an impact significantly on the overall economic damage. Also, the lack of these collected at a critical moment for the development of families negatively affects the subsequent production trend.

Wildflower and other spring honeys - Estimated value of lost revenue per hive for 2021

Expected Production	Production Average Potential (2015-2020)	Average Production 2021	Estimated Missed Production	Average Price (2015-2020)	Missing Revenue per Hive

kg/hive	kg/hive	kg/hive	kg/hive	€/kg	€/hive
15-20	20.89	2.50	18.39	5.32	97.81

Source: Osservatorio Nazionale Miele, 2022

The asphodel harvest was severely compromised by frosts and drought in the coastal and flat areas of Sardinia. Where was it possible to get a harvest, yields did not exceed 3 kg / hive. Compared to the first estimates for the supers, the production of heather honey was slightly lower, estimated at 6-10 kg / hive in limited areas, such as the interior of the Gutturu Mannu park in southern Sardinia and some other suitable areas of the island. The harvest of wildflowers is also generally poor (0-5 kg / hive).
As far as citrus honey is concerned, in none of the regional areas invested with citrus groves it was possible to obtain significant productions. Once the honey has been extracted, yields of 0 to 3 kg / hive of citrus honey are estimated, sometimes with the presence of other nectars that could declassify the production from citrus monoflora to millefiori. As regards the other spring productions, it was possible to collect about 8-15 kg / hive of thistle honey in the suitable areas of southern Sardinia and 5-10 kg / hive of sulla in Medio Campidano and Marmilla.

Overall 2021 production results by honey type:

CITRUS - In none of the regional areas invested in citrus groves it was possible to obtain significant productions. At the end of the honey extraction, yields of 0 to 3 kg / hive of citrus honey are estimated, sometimes with the presence of other nectars that could declassify the production from citrus to windflower monoflora.

SULLA - Estimated yields of 5-10 kg / hive in Medio Campidano and Marmilla.

ASPHODEL - The asphodel harvest, in the coastal and flat areas of Sardinia, has been severely compromised by frosts and drought. Where it has been possible to obtain a harvest, yields do not exceed 3 kg / hive.

THISTLE - Harvests of around 10-12 kg / hive of thistle honey were recorded.

CORBEZZOLO - An extremely disappointing year for the arbutus honey harvests with zero yields in suitable areas, due to the dry weather which negatively affected the nectar availability of the plants.

ERICA - In limited areas within the Gutturu Mannu park in southern Sardinia and in some other suitable areas of the island, heather honey yields are around 6-10 kg / hive. EUCALYPTUS - Eucalyptus yielded less than expected in almost the entire region with an average of between 15 and 18 kg / hive.

SPRING WILDFLOWER - The spring wildflower harvest was generally low (0-5 kg / hive).

HONEY TYPE	Estimated Average Production (kg/hive)
Acacia	Not suited
Citrus	0
Sulla	7.5
Linden	Not suited
Chestnut	Not suited
Asphodel	3
Thistle	11
Corbezzolo	0
Erica	9
Eucalipto	16.5
Windflower (spring)	2.5
Windflower (summer)	Not suited

Source: Source: Osservatorio Nazionale Miele, 2022

7. Marketing and packaging

As for the sales and marketing aspect, it starts by differentiating the product. Honey sold on the market is distinguished by many aspects:

- ***Variety:***
- Monofloral honey
- Multifloral
- Color and consistency:
- In relation to floral origin,
- consistency can be liquid, semi-liquid or dense
- Brand:
- local,
- national
- Commercial
- Packaging, honey is sold in different formats:
- single-dose,
- squeezer,
- glass jars in different formats
- Production method
- conventional
- biological
- The geographical origin
- honeys of Italian origin,
- mixture of honeys from the EU
- mixtures of honeys not originating in the EU
- mixtures of honeys originating and not originating in the EU.

It is very important to define these variables, whose information is also reported on the label, in order to define a marketing strategy oriented to the absorption of a product which has seen in the last years a strong decrease in purchase.
All the derivatives of the hive must be sold with the necessary information so that the consumer has a guarantee of the healthiness, goodness, properties of these products.

With respect to potential sales, three reference markets can be defined:
- That of the food and pharmaceutical industry as a very ancient natural remedy. Moreover, in cosmetics are used all the products of the beehive: honey, pollen, propolis, royal jelly, wax, poison, which are recognized different properties.
- that of domestic consumption
- that of non-domestic consumption: the use of honey in commercial and collective catering.
Across markets, there is a segmentation based on four consumption patterns on which, as above, will depend sales strategy and product communication:
- nutritional: the nutritional value of honey
- traditional: both as a rediscovery of origins and traditions and as a preservation of eating habits
- taste and quality: based on product differentiation
- health: research of healthy and genuine food.

When looking at bringing potential consumers closer to a domestic use of bee products, one can focus on revitalizing a product perceived as ancient, covering it with a unique and healthy aspect, emphasizing the idea of traditionality and genuineness, enticing the consumer to pay a premium price as well.
As will be discussed further on in the discussion of sales channels, this has an impact both on sales dynamics - in the case of domestic consumption, retail sales in stores or via e-commerce are preferred - and on the choice of functional packaging.

In this case, the scaled down consumption that a private individual can make, may require the use of the glass jar or squeezer.
For many regular consumers, honey represents an alternative medical device to be used in case of illness or simple malaise (anti-aging effect, sore throat, cancer prevention), a trend that implies a particular importance of certifications of higher quality levels as a demonstration of the product's credibility.
In this particular context, it is honey itself that becomes a lever of communication to guarantee the healthiness of the pharmaceutical treatment.
The elements to enhance the value of honey in this key are the geographical origin
organic production, the ethical value of honey as a product of bees that have a fundamental ecosystem role.

As for non-domestic consumption, the main levers are price and packaging, as in the case of consumption outside the home, often in squeezer or single-dose packages.

To play an important role on the profitability of the beekeeping company, determining a higher or lower income, are the different sales channels: the price of honey, in fact, can vary according to the latter and the buyer.
The following is a reference to the average price of wildflower honey.
I canali di vendita possono essere distinti in tre principali categorie:

- Retail sale
- Wholesale sale

In general, several sales channels are used at the same time.
At the marketing level, communication aimed at enhancing the value of a product whose traditional, healthy and natural characteristics are its standard-bearers.
Honey is an undifferentiated product, for which it can be complex to make communication innovations. MieliThun and Mielizia have succeeded in turning the sector around, increasing the value of the product, creating new opportunities for consumption and consequently increasing sales.
Mielizia has focused on large-scale distribution and bars: by creating a consortium of small producers (dedicated to organic farming) and developing a project in collaboration with Libera Terra (the brand for organic products on land freed from the Mafia), they have enriched the product with important ethical values.

Thun has focused on quality, on the concept of cru (quintessential honeys) and sensory pathways... they have also worked a lot with the newsletter to build customer loyalty and have been able to create small, outstanding events (e.g. Honey Parks) even within large events such as Salone del Mobile or Salone Internazionale del Gusto.

Retail sale means the direct sale of the product to the final consumer, usually a private person. This category includes the sale in markets, the sale in a proprietary store and the online sale generally associated to other food products, therefore the preferred format for distribution is glass jars.
In any case, beekeepers are free to choose the price they think is best for their product and there is no single standard; generally the price at markets ranges from 9€ to 14€ per kilo for a national millefiori.

As far as e-commerce is concerned, it is possible to use both an online site and sales platforms such as Amazon or Ebay and here the formats and packaging can be varied according to the amount of the order and how much the brand decides to personalize.
The advantage of creating an online site is having a "store" open 24 hours a day and anywhere in the world, at a price that is currently much lower than in the past.

The biggest disadvantage, however, is the need to outsource the service or having to learn from scratch how to manage an online platform with constant sales, and therefore having different skills ranging from online marketing to web development.
The risk is to favor those companies with an already strong brand with a wide and established customer base and a diversified product portfolio.
Small beekeepers, on the other hand, may be advised to advertise on social networks or on existing e-commerce platforms such as Amazon or Ebay, which, for a percentage of sales, eliminates the problem of technical management and marketing. The selling price on e-commerce is generally higher than on other sales channels and ranges from 10€ to 16€ per kilo.

Sale through retailers

Sale via retailers is when the beekeeper sells his packaged honey to a trader who will sell it to the final consumer.
to a trader who will sell it to the final consumer.
In a nutshell, the small trader who sells honey buys a certain periodical quantity of jars, the size of the order can vary according to the type of activity and the company size of the retailer, at a lower price than the retail one. Typically, we are talking about orders ranging from 15 kg to 200 kg of honey.

In this case, as far as advertising is concerned, the retailer could accept to display posters or flyers and in this way he would become both a sales and marketing channel. The selling price to the retailer in Italy ranges from 8€ to 10€ per kilo but can vary according to the agreements made.

Wholesale

Wholesale is the sale of a large quantity of unpackaged honey to wholesalers.

In this context, marketing, packaging and the value of packaging to encourage sales are put in the background. Instead of these, for the loyalty in the commercial relationship, the advantages of pricing and logistics between companies will take priority. Generally, metal drums of 25 kg or 300 kg are sold. Wholesale is recommended to professional beekeepers with a large number of hives who prefer to invest their time only in the beekeeping activity and who have no interest in selling their honey under their own brand. In Italy, the wholesale price of millefiori honey in 2018 is about €6 per kg.

8. Regional tourism products and services based on the honeybee

Starting from the main theme of honey, it is possible to get to know another side of Sardinia with a great touristic potential: concerning bee products, various attractions emerge for tourists that can range from food and wine tourism to entertainment at fairs and festivals to one or more naturalistic type.

Honey is a great protagonist in the Sardinian land, considering that Guspini has long been included among the Honey Towns recognized by the world of Italian beekeeping.

In these cities that tell the history, nature, flavours and traditions linked to the different Italian honeys, fairs and events related to the artisanal sector of bee products are held: particularly important are the events organised in the summer in the cities of Guspini and Monti.

The city of Monti is famous in the world of honey as the 'capital of bitter honey': that of strawberry tree for which Sardinia is the most significant producer in the world. Also a land of 'Vermentino' wine, it encourages gastronomic, cultural and naturalistic tourism where the vineyards frame the nuraghi.

Italy is in fact the only country in the world to boast over 60 different types of honeys, each of which finds its identity of origin in the many and different regional blooms that make up the Italian environmental heritage, primarily the areas of our maquis. Mediterranean.

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The culture of honey boasts thousands of enthusiasts who, in various events throughout the island, have the opportunity to learn about it from the aspect linked more to the production of honey itself, and to closely related products, such as pollen or wax. 'bees, for example.

Usually the aforementioned occasions for festivals and fairs allow the tourist to live a more complete experience on bee products.

The territory of Arbus, as well as all of Sardinia, has an ancient tradition in the production of honey and in the breeding of bees. The rich vegetation that characterises the area and which explodes in a thousand colors and scents in spring allows the production of many varieties of unifloral honeys.

From the classic wildflower to more typical honeys of the island: asphodel honey, eucalyptus honey, thistle honey and orange honey. The strawberry tree honey, with its unmistakable strong and slightly bitter flavor, is considered the most valuable.

Honey, in addition to being an important food, is used for its balsamic, soothing and healing properties (for example against cough and anemia). Excellent to be enjoyed together with cheeses, it is also a fundamental ingredient in the local confectionery art: nougat, pardulas (cheese), zippulas (pancakes).

The Montevecchio Honey Festival is another important tourist opportunity of the Sardinian summer. During the event, which takes place outside the management building, you can do various honey tastings, but also visit the mineral exhibition, attend book presentations and take excursions to the Sardinian deer territories.

Above all, it will be possible to meet the producers personally who will explain the properties and secrets of honey and its production.

The small towns of Sardinia host ethnographic museums considered small jewels, such as the Fluminimaggiore Windmills Museum with a small collection of traditional rustic cork beehives, and the entomological exhibition inside the village of Ingurtosu where visitors can discover ancient beekeeping traditions.

Still from the point of view of the food and wine heritage, one of the oldest foods in Italy is the abbamele or abamele, produced exclusively in Sardinia. Abbamele is obtained from comb, honey and bee pollen. The honey is manually extracted from the combs and the combs are crumbled and immersed in warm water. Once melted, the wax is separated from the honey and pollen and the remaining syrup is heated to caramelise the sugars. Abbamele can be eaten with cheeses, fresh fruit, but also pasta or vegetables.

9. Honey in the local/ traditional gastronomy

As mention in the Capter 6, Sardinia is the region which is rich in the different honey tradition. Honey is a part of Sardinian culture and the very important traditional food. There are many diffent types of honey and it is used in different traditional gastronomy. One of the well known traditional local honey is Corbezzolo honey. What is particular about this honey is that instead of the sweetness one would expect, this extremely rare honey, born in the mountains of Sardinia, is surprisingly bitter, with notes of leather, liquorice and smoke. Nomadic beekeepers have been setting up beehives in the region to collect this aromatic treat – derived from the white, bell-shaped flowers of the wild strawberry tree – for more than 2,000 years.

Used in traditional medicine as a sleep inducer, cough sedative and anti-diarrheal, thanks to its astringent and anti-inflammatory properties, it could also be anti-tumoral: A 2019 study conducted by researchers at the Polytechnic University of the Marche and the Universities of Vigo and Granada in Spain, published in the Journal of Functional Foods, concluded that corbezzolo honey reduces growth and division of colon cancer cells grown in the lab.

The corbezzolo's fruits ripen slowly, changing colour several times during the process, from yellow to orange to ripe red. But it's the shrub's mildly sweet, white flowers – which bloom from October until December – that the bees pollinate and whose nectar they transform into a honey with an extraordinary flavour profile that encapsulates the smells and flavours of Sardinia.

The flowers' petals unfold slowly; a curiously delicate process that a heavy downpour can easily bring to a halt. And because the flowering takes place in late autumn when the weather can be cold, rainy and windy, the bees sometimes struggle to even make it out of their hives to collect the precious nectar. The bell-shaped flowers produce about half as much nectar as other flowers, so the bees have to work extra hard to collect enough. These three key factors make corbezzolo honey so precious that it's hard to find outside Sardinia.

No one knows exactly what gives the honey its uniquely bitter taste, though some believe it's due to the presence of glycoside arbutin (a molecule that binds with sugars in plants) in the nectar of the strawberry tree's flowers.Corbezzolo honey encapsulates the Mediterranean island it calls home, with its earthy notes of other wild Sardinian flora and

tinge of minerality, reflective of the surrounding sea. Mediterranea create every year a new and rich spicy taste.

10. Needs and expectations of the local honeybee MSMEs and the people in building up a bee-business

In view of a better understanding of the beekeeping sector, it was decided to implement in the questionnaire a series of questions aimed at uncovering problems and needs in their most practical aspect.

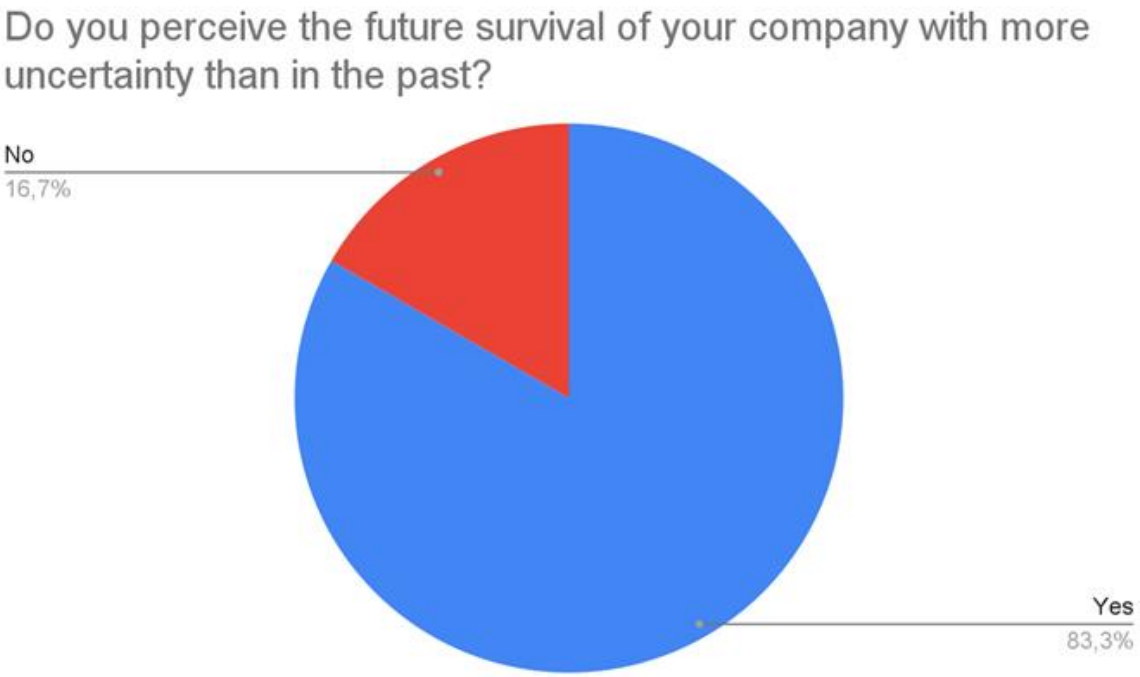
The main purpose of this section is to identify shortcomings, areas for improvement, causes of discomfort or inefficiency, or more generally elements that may affect the genuine development of business related to the sector, but also to find possible opportunities on which to intervene later through targeted actions.

With a view to providing an analysis that is as accurate as possible, the proposed questions were:

- a table in which candidates were asked to rate on a Likert scale from 1 to 5 the factors that influenced production in the year 2021;
- an open-ended one supplementary to the previous one;
- a specific question, i.e., a table asking candidates to rate on a Likert scale from 1 to 5; a set of proposed needs/needs and of what kind of investments are needed by bee-business SMEs?

- What kind of training requirements do bee-businesses have in technical issues of bee keeping/ bee processing and/or in the business aspect of running their bee-business?

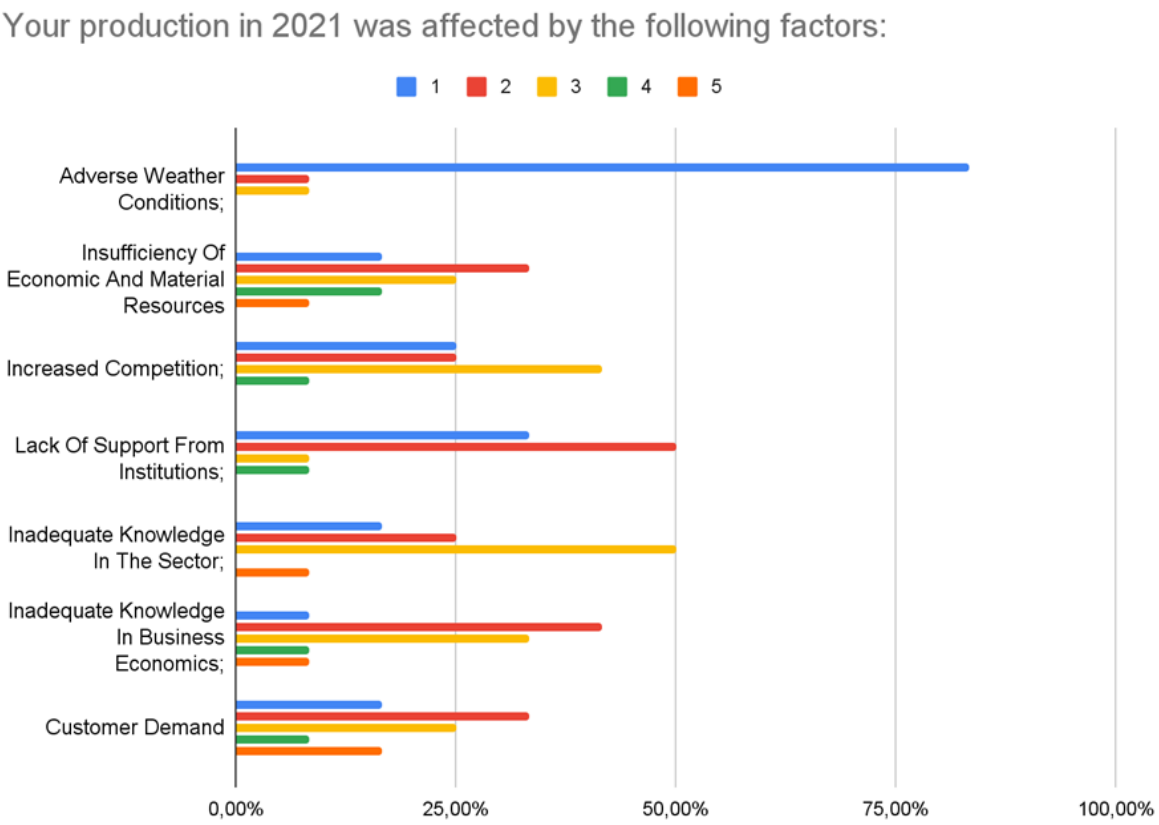
According to the analyzed data, this is the most faithful view of a prevalence of beekeepers, who represent 75% of respondents to the questionnaire, leaving the remaining percentage parcelled out among producers of services related to beekeeping, consortium service or production of other raw materials.



Entering into the analysis of the issues, it was requested to give a grade to the factors that affected production in the year 2021, a particularly complex period for the economy in general and especially for the economy related to rurality, as a result of the pandemic.

- Adverse weather conditions;
- Insufficiency of economic and material resources
- increased competition
- Lack of support from institutions;
- Inadequate knowledge in the field;
- Inadequate knowledge in business economics;
- demand of the customers

of which below graphical representation percentage.



According to the questionnaires examined, the factors which most negatively affect production are:

- adverse weather conditions, according to more than 90% of respondents, of which more than 80% define it as strongly negative;
- lack of support from institutions, with an incidence of 83.33%;
- inadequate knowledge of business economics and client demand, for half of the candidates.

On the other hand, client demand is a balanced variable, with positive and negative evaluations, both at 25%.

According to the interviewees, the increase in competitors and inadequate knowledge in the sector do not have a sufficiently significant effect on variations in production, but this could be verified in the face of a more complex and extensive analysis.

The previous considerations are confirmed in the next question, in which the candidates were given a free space to deepen or implement considerations about the problems they feel most invalidating.

Once again it is the adverse climate to have the prevalence, there is a tendency to specify in some cases both the extreme conditions of heat, drought and abundant rainfall that have seen the protagonist especially last year, but also the particular pollution generated by pesticides and the uprooting of trees.

Among the open-ended questions, some candidates also mention the lack of support from institutions, which, as will be seen in the part dedicated to the analysis of the questions on needs, is considered relevant by over 75% of the candidates.

In particular, areas of intervention are highlighted as being:

- Making bureaucratic processes more streamlined;
- providing greater financial assistance;
- encourage consumption of products linked to the sector;
- intervene on the indiscriminate cutting of trees and pathologies linked to beehives;
- facilitate the free movement of goods worldwide, information that suggests the desire to extend the boundaries of demand certainly beyond the Region of Sardinia.

In the next question, respondents were asked to vote among a number of potential needs that they felt were not at all, not very, neutral, fairly, and very relevant.

- Greater economic support
- Increased institutional support

- Improved publicity
- Regulation of competition
- Greater technological support

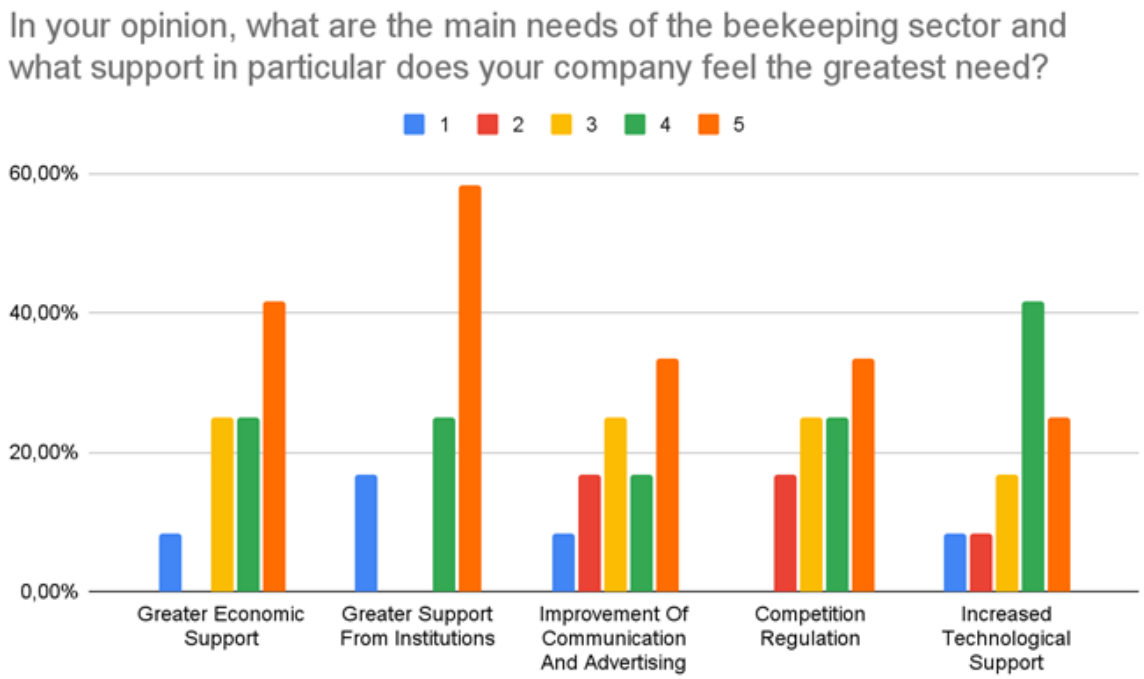
Confirming the findings above, for more than 75% of applicants the need for institutional support is evident (of which 58% consider it strongly necessary).

Then, 66.7% also consider technological efficiency to be important.

In this respect, during the interview with the president of Apiaresos, an interesting point of reflection emerged on the implementation of eco-sustainable technologies in the production of honey and bee-related products. In this sense, in view of the necessary investments, better results could be obtained in terms of energy and economic consumption, as well as creating a renewable plant that can also combat adverse weather conditions.

As the chart below shows, the various other needs that follow institutional support are disparate and evenly distributed among the various levels of evaluation.

More specifically, the items "improvement of publicity" and "regulation of competition" do not appear to be needs on which to intervene as a priority and should be integrated with more detailed analysis.



They can, however, all be identified as potential areas for improvement that, with the support of funding, projects, and networking activities could address some of the shortcomings.

Conclusion

In conclusion, this report intends to offer a regional study on the economic value of networking around honey bees products, providing a multiple step analysis.

Starting from a general overview offering some data below, the team has met with some experts and administered a questionnaire to Sardinian actors to study a regional photography about the sector and the need linked to the most relevant problems found.

Then, the survey's results were used to create a SWOT analysis and a measure of the local economic impact.

Main national characteristics:
Italy:

- Italy, together with France, has an average of 27 hives per beekeeper.
- Italy holds the world record for honey varieties, in fact it has over 50.
- Honey production comes from over 1.66 million beehives, of which approximately 783,000 permanent and 657,000 nomads; a small residual share is then represented by hives that are not better classified.
- The actual Italian production of honey, according to ISMEA-National Honey Observatory estimates, for the year 2019 is about 15 thousand tons, increased to 17 tons during 2020, against an expected national production of 23 thousand tons.

For more details, we recommend reading the correspondent report section.

Following, a questionnaire was disseminated to the stakeholders which had as its objective the concrete identification of problems and needs of the actors in the area related to the beekeeping sector. The majority (75%) of respondents are beekeepers and honey processors.

According to the questionnaires examined, the factors that affect production most negatively are:

- adverse weather conditions, according to over 90% of respondents, of which over 80% define it as highly negative;
- lack of support from the institutions, with an incidence of 83.33%;
- inadequate knowledge of corporate economics and customer demand for half of the candidates.

With respect to the questions, on the other hand, more focused on needs, the interviewees were asked to vote among a series of potential needs that they considered not at all, little, neutral, quiet and very relevant.

It is found that more than 75% of the candidates need more support from the institutions (for 58% it is a strongly felt desire). Subsequently, 66.7% also consider technological efficiency to be important.

A SWOT analysis is represented in the section that follows that survey.

Finally, data are provided that confirm the setback that the local panorama of the production of products derived from bees has suffered. The context presented is that of the Sardinia region and the problems remain the same as those expressed by the respondents to the questionnaire.

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