

# Local biodiversity in natural areas around the Mediterranean Rim as a potential source of profit in economic and social activity

## *Lessons from the MEDISS project's experience<sup>1</sup>*

by Olivier BAGARRI

***Even though the experience described in this article does not directly concern Mediterranean forests, it nevertheless shows how the quest by many companies for natural quality can lead to the development of a sustainable sector of economic production. Thus, growing aromatic plants can drive a dynamic in rural localities while at the same time bringing added value to Mediterranean biodiversity.***

Home to more than 5,000 recorded species of vascular plant, the Mediterranean area is recognised at a worldwide level as a biodiversity hotspot. While more than 20% of these species are the object of conservation orders on account of their rarity, many plants or their extracts are used for profit in such various economic sectors as the food industries, the perfume and cosmetics industries or the pharmaceutical and medical sectors. This is especially the case for perfume, aromatic and medicinal plants (PAMP).

For such products, the Mediterranean Rim functions simultaneously as a territory for production and as a hub for their marketing and consumer sales. Even more, the Mediterranean Rim is one of the world's most important tourist areas and such products as those mentioned, which often contribute to the hallmark image of their territories (lavender in Provence, bergamot in Calabria, origano and saffron in Greece, everlasting flower in Croatia...), appear so much the more strategic.

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1- MEDISS is a project for Mediterranean cooperation co-financed by the European Union within the framework of its MED 2007 - 2013 (FEDER) programme, the French government and the Provence-Alpes-Côte d'Azur Regional Government Council.

In the current morose agricultural context which sees farmers looking to diversify their crops, the development of such products represents for many natural areas which boast a wealth of biodiversity a challenge in terms of competitiveness and jobs.

This has, in fact, been one of the main lessons to come out of the MEDISS project whose aims included the identification and modelling of the elements making up this economic sector in order to facilitate its development on a European scale.

## Perfume, aromatic and medicinal plants and their markets

### *The main plants produced in Europe*

The main PAMP plants produced in southern Europe and in Mediterranean countries are shown in the table 1 below.

Depending on the market for which these plants are produced, they are sold in various forms by their producers:

– **Fresh plants:** essentially plants going to supply markets involved in the food industries. In France, they can be found on supermarket shelves either packaged or loose, fresh or frozen. The pharmaceutical industry also has a demand for small quantities of

fresh plants for the production of homeopathic or phyto-therapeutic medicines. Also, some extracts are produced by the perfume industry using fresh plants supplied by local growers (rose concretes produced by companies at Grasse from petals gathered on the day). In the production scheme, as soon as the amounts produced become significant, the facilities for their transformation must be as near as possible to the source in order to limit transport, which is costly, and to preserve the quality of the products. The companies dealing with the transformation thus form partnerships with the local producers to ensure their supplies and organise the harvesting.

– **Dried plants:** plants when dried are easier to handle and last longer. They are available from specialist producers or others grouped in cooperatives or collectives. The drying method will depend on the nature of the plants and the targeted market, the time of harvest and the amount to be treated. There are a variety of techniques used which call for different levels of investment. For some markets, the plants are also cleaned of bacteria through ionisation or heat treatment. In fact, the levels of bacteria, moisture and infestation by insects must be perfectly controlled.

– **Essential oils:** some plants contain essential oils which are extracted by steam in distilleries located in the areas of production. The operation is often carried out by the producers themselves using shared or, more rarely, their own equipment. In France, the lavender and hybrid lavandin are produced by a network of around one hundred distilleries. The size of their equipment varies, depending on the amount to be treated. Hence, some distilleries in Piedmont in Italy are equipped with small apparatuses of 200 litres to distil limited quantities of assorted plants.

### *The markets and their features*

Annual total sales worldwide of aromatic and medicinal plants are worth some 64 million dollars. This market is of particular interest to several highly competitive industries that generate jobs, especially around the Mediterranean:

– **Food industries sector:** uses aromatic plants fresh, dry and frozen. They are sold as

Aromatic	Perfume
Coriander	Hybrid lavandin
Fennel	Lavender
Caraway	Rose
Thyme	Jasmine
Mint	Geranium
Basil	Bergamot
Marjoram	Clary sage
Mustard	Cist
Common sage	
German camomile	
Spearmint	<b>Medicinal</b>
Peppermint	
Melisse	Artichoke
Dill	Valerian
Bay (laurel)	Echinacea
Oregano	Gingko biloba
Saffron	St John's wort
Rosemary	Thistle

**Table 1:**  
Main plants produced in southern Europe and in Mediterranean countries.

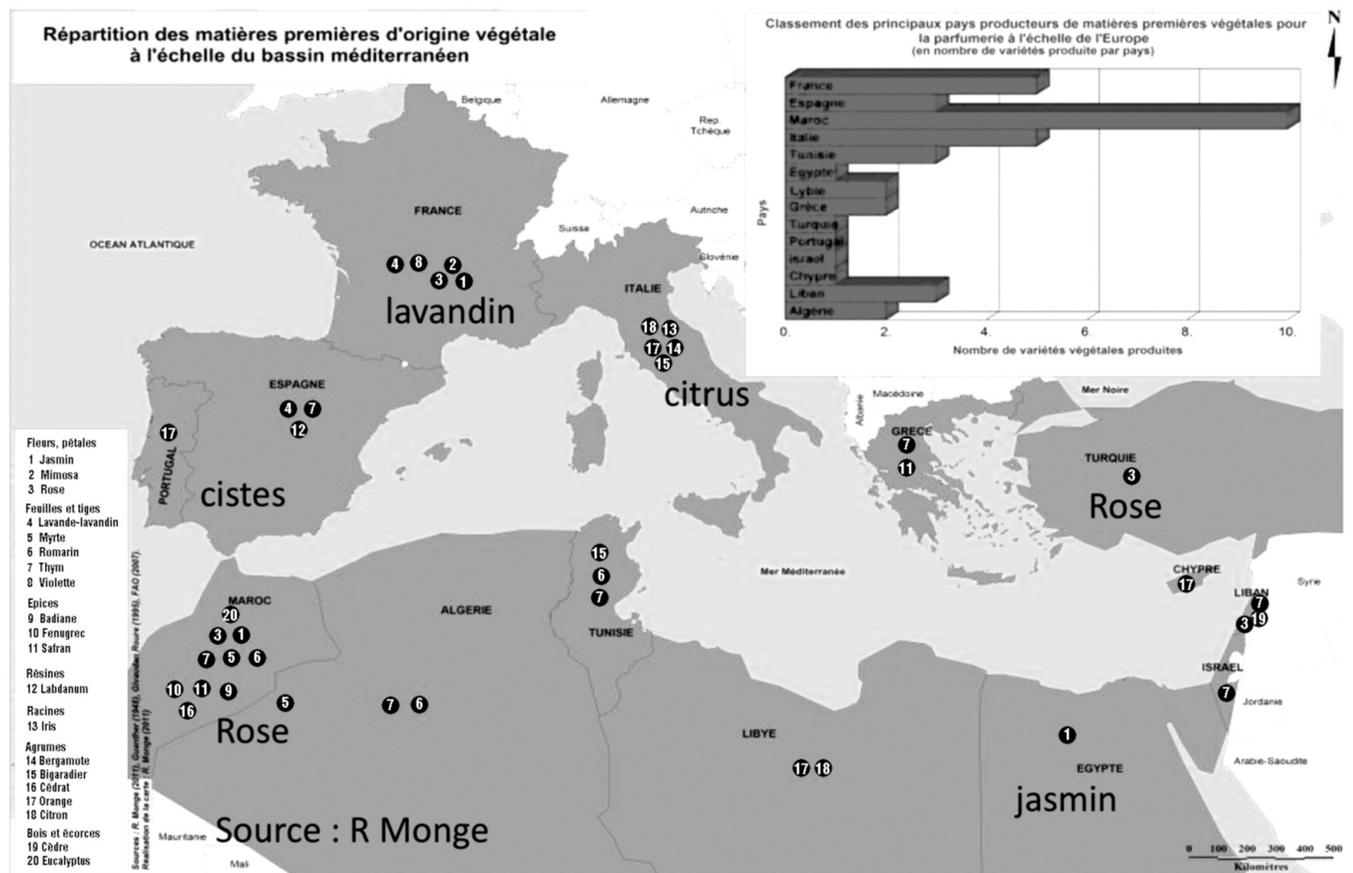
such to the consumer or are used in pre-cooked dishes. For this market, the taste characteristics are important. To guarantee consumer health and safety in accordance with regulatory requirements, a buyer's main criteria are the quality of the cleaning, the level of microbes and the presence of agricultural treatment residues and heavy metals. This is an international market which is very competitive so that European producers must concentrate on certain plants for which they are able to remain competitive. This sector also uses essential oils and flavour extracts.

- **Pharmaceuticals sector:** uses plants in every form but also transforms them into extracts. Most of the plants used have been described in the European Pharmacopoeia which defines each plant and its recognised qualities. Plants are used for their physiological effects. Prices are under less pressure than in the food industries sector. Due to the legislation regulating pharmaceuticals, the industrial firms resort essentially to prod-

ucts which meet the demands of their own quality schemes (traceability, transparency of production methods...). The amounts of each plant used vary: for example, one kilogramme for a homeopathic product to several thousand tonnes for the opium poppy which is the raw material for morphine.

- **Cosmetics sector:** uses essential oils, concretes and absolutes, obtained after extraction with solvents (often hexane) from perfume plants, for use in alcohol-based perfumes. Such products may be rectified in order to eliminate constituents that are not recommended in cosmetics. Purchase of these products depends on their sensory qualities. They have high added value and so are analysed to verify their origin, quality and unaltered nature. In this sector, natural products are in keen competition with synthetic equivalents. The cosmetics industry also uses plant extracts for their physiological properties (anti-oxidants, toners...). Claims made for the effects of some plants are closely linked to the image of the plant

Figure 1: Distribution of plant raw material around the Mediterranean Rim.



itself, especially in relation to its place of origin (bergamot from Calabria, Tuscan iris, lavender from Provence...). This sector uses a vast range of plants but in small quantities.

- **Detergent and hygiene sector:** essential oils are used to perfume detergents and household products. The industry requires standardised essential oils for incorporation into their manufactured products but, given the natural origins of essential oils, their characteristics vary. Such variations can, however, be mitigated by blending batches from different producers. The knowhow for this lies with the intermediary dealers; they form the market for the cheapest essential oils which are in direct competition with synthetic products. This is the main market for the essential oil from hybrid lavandin (from 4 to 5 times cheaper than that from lavender) and demand fluctuates as a function of the price of synthetic linalool. (Linalool is the main constituent of the essential oil from both lavender and lavandin. Its market price is thus determined by the rate for the synthetic form).

- **Animal food sector:** plants and essential oils are used in this sector to enhance the taste of the products. Some plants are

used above all for their known effect on animals. In this market, price is the determining criterion for buyers.

**Economic and social impact of PAMPs – the French example**

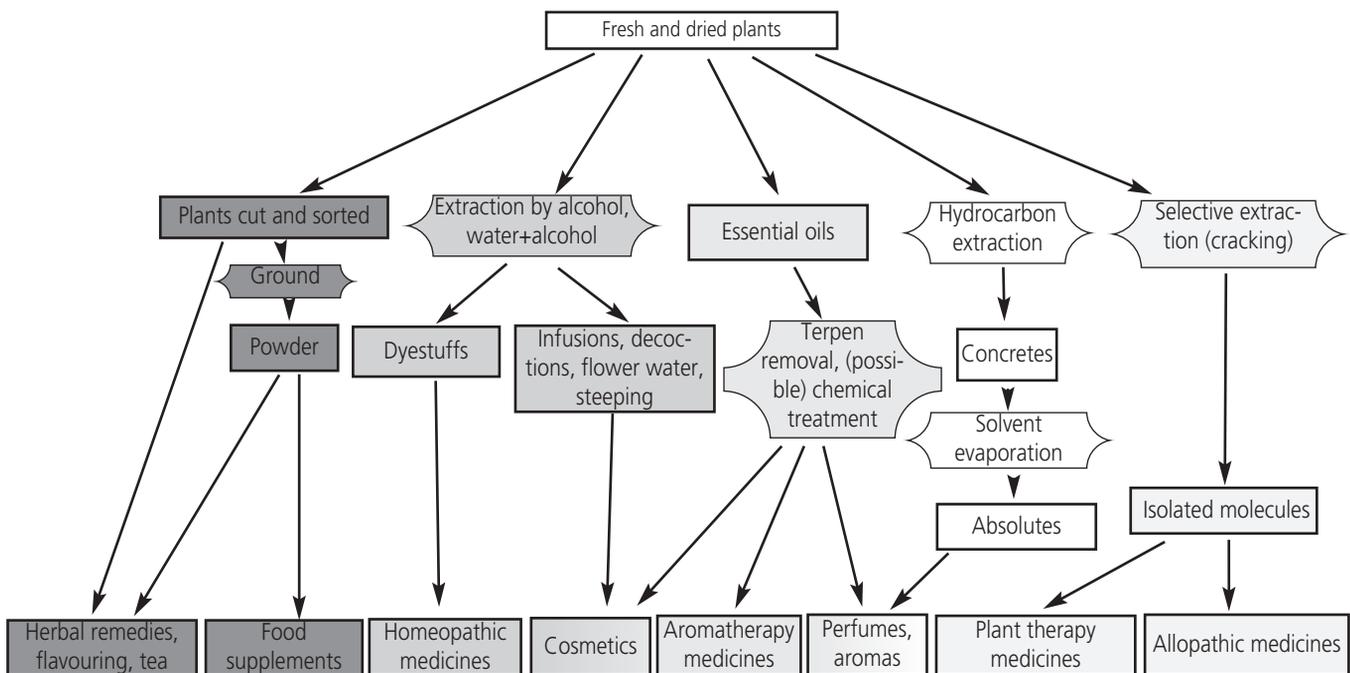
In 2007, FranceAgriMer, the national body in charge of products from agriculture and the sea and partner in this MEDISS project, attempted to evaluate the economic and social worth of the production of perfume, aromatic and medicinal plants.

This study was based on information from all stakeholders involved in the sector (seed producers down to the sale of finished products) but also included the tourism sector when it was directly linked to the products involved (museum of lavender, herbal plant festivals, guided tours of production sites etc.).

The study showed that the PAMP sector generated throughout France, especially in rural areas, no less than 25,000 jobs, 10,000 directly, 15,000 indirectly. Additionally, it showed that the overall turnover reached 1.7 million euros, contributing significantly to the competitiveness of regional economies.

**Figure 2:** Main transformations and uses of aromatic and medicinal plants.

**MAIN TRANSFORMATIONS AND USES OF AROMATIC AND MEDICINAL PLANTS**



In this context, it is not surprising that a growing number of rural areas are showing interest in turning their natural resources into profit. It is for this reason that FranceAgriMer sought to define, within the framework of this MEDISS project, the key structural elements involved in developing a competitive and sustainable Mediterranean PAMP sector.

### Key elements for a competitive and sustainable PAMP sector

A large number of aspects need to be considered when launching an area-wide project for the development of an economic sector. Making profitable use of biodiversity requires taking into account a wide range of economic, social and environmental factors.

The research undertaken by FranceAgriMer<sup>(2)</sup> within the framework of the MEDISS project made it possible to identify no less than nine factors which should be taken into account when setting up comprehensive production and sales activities for the perfume, aromatic and medicinal plants sector.

The chart below shows the key elements identified (See Fig. 4).

**The producers:** it is important to consider the types of farm structure in the area involved, as well as the context in which the producers find themselves. PAMP crops are crops for diversifying production; so it is easier start things up with producers already working but who are looking for a by-line product to bolster the economic viability of their farms. PAMP crops will be more or less attractive for a farmer in the light of the per-hectare income (s)he already makes with the main crops. This parameter needs to be kept in mind so as to verify that producers will really be interested in the development of PAMP production.

The types of farm structure to be considered:

- the method of production: organic or conventional;

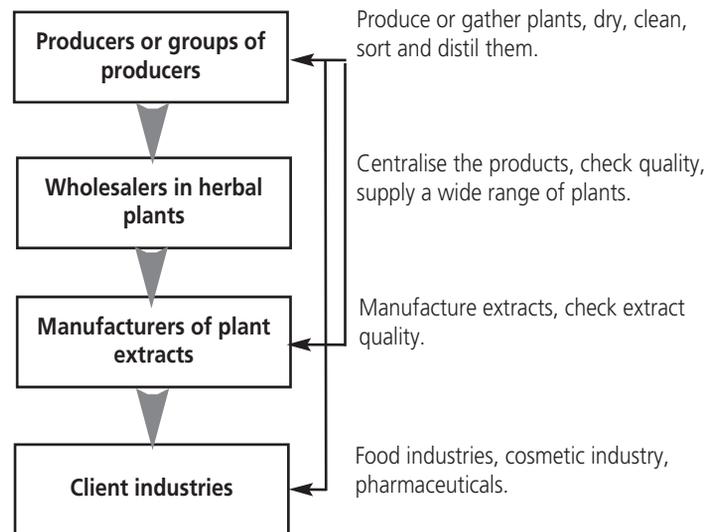
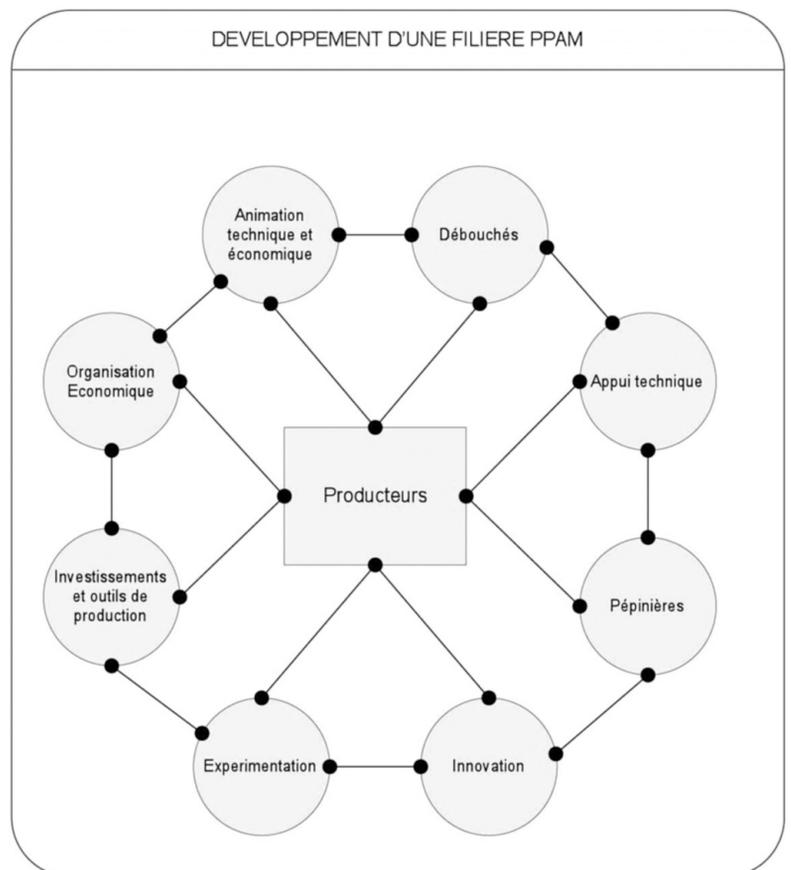


Fig. 3: Organisation of the PAMP sector.

Fig. 4 (below): Key elements for developing a sustainable and competitive economic sector.



2 -The research study was carried out by Ms Elisabeth Vidal, biochemical engineer with FranceAgriMer.

- the equipment and labour available: the presence of equipment suited to PAMP production will alleviate the burden of investment and facilitate the integration of a producer into a particular branch or sector;

- the size of the farms and the plots: some PAMP supply niche markets in small amounts. This cannot interest producers wanting to work big areas of land.

Advice generally tends towards setting up small groups of several producers. The existence of an economic organization (even if for other products) can facilitate collective dynamic centred on a shared project (see §Economic organization).

**The products and their sale:** on the whole, companies tend to favour nearby local sources of supply whenever possible. By doing so they have better control over:

- The origin of their raw material (cosmetics firms use this point as a sales pitch);

- The quality and safety for health of their supplies;

- Interruptions in the supply line.

Any project must identify possible sales opportunities for its products with the companies working in the sector and in the light of market trends. This step should be taken at the very start of a project because expected commercial outlet will determine which plants, products, quantities and quality should be produced.

**Production facilities and investment:** there is very little equipment specifically suited to PAMP crops and their harvesting. Often the standard agricultural tools and vehicles are adapted by the producers and their technical bodies in collaboration with manufacturers of equipment in the light of the plants involved. The degree of mechanization will depend on the areas under cultivation.

**Technical and economic back-up:** development projects must be sustained by a dynamic which can count on active back-up. Gathering technical data and information about markets often requires the help of partners with technical or economic knowhow. Such help is especially useful in relation to funding the project and putting together applications for government or private grants. Also, crop trials may be carried out to demonstrate feasibility. Since the producers themselves are seldom either available or competent for providing such assis-

tance, projects which include built-in provision for such back-up clearly stand a better chance of achieving their goals.

**Experimentation:** in the PAMP sector, experimentation in primary production usually focuses on:

- optimizing production costs,

- trials for new crops,

- selection of varieties,

- mechanizing cultivation, harvesting and initial transformation,

- treatment against pests and diseases,

- trials of producer-based initial transformation processes.

Within the framework of development projects, the need for experimentation can occur at different levels and over a short or longer term. In all cases, a project must have the wherewithal, both internal and external, to respond to such needs. As things stand, the limited output of the PAMP sector means that there are not always agricultural research centres with the requisite means to tackle the specific demands of the PAMP sector.

**Plant nurseries:** among the PAMP, certain varieties and/or cultivars are particularly sought after. Seed origin and the plants used must be absolutely traceable and identifiable by the competent parties and/or organisations. Given the highly specific nature of demand, the amount of plant material available is not large and the increase in areas under crops must be well planned in advance to ensure the sufficient supply of seeds and plants, which may need several years to become available. Development projects must, therefore, include facilities for reproducing plants and seeds.

**Technical back-up:** the PAMP sector generally has limited technical information to call on because it does not have the resources to accumulate knowledge for every plant species. Thus, producers need hands-on technical advice when confronted with a particular problem (attack from pests, proliferation of weeds...) or seeking to change methodology (dates and methods of harvesting, controlling health-related aspects on the farm premises...) in order to ensure their products meet buyer specifications. Such back-up is usually given by specialist technicians or, at the beginning of a project, by other producers with some previous experience in PAMP production.

**Economic organisation:** the market for plants fluctuates considerably and is subject to ever-increasing pressure from complex and strict regulations. To supply clients and keep a market, a producer must be quick to react to change in demand and must supply a customer with the required quantities and quality. Given the downstream market's structure and stringent demands, a producer must be able to propose to a client, case by case, a range of products, uniform quality, sufficient quantities and guaranteed supply, all of which are difficult to ensure for an individual producer. Producers who are not PAMP specialists would be well advised to work together to group their products and thus adapt their offer more rapidly to demand. The commonest form of such collective action is the cooperative.

**Innovation:** potential innovation in this sector concerns:

- plants: the selection of varieties can lead to new products and enhance the competitiveness of the upstream source of supply. The introduction of new plants having properties with commercial value on downstream markets can lead to innovative uses in products based on plants,

- transformation processes: awareness of the impact of transformation processes on the environment has driven innovation in projects. In the agricultural sphere, projects are currently under way to improve energy consumption in distilleries, optimize solar drying equipment, modify reapers to reduce the transport of straw...

Such research has been pursued further by the industry which is seeking to replace extraction by solvents by techniques free of organic solvents or, at least, by using solvents less harmful to the environment than the petroleum-based equivalents.

## Conclusion

The demand by worldwide corporate industries (cosmetics, pharmaceuticals, etc.) for natural quality has opened the door in the last twenty or so years to the increased profitable use of biodiversity, notably around the Mediterranean Rim.

In this context, the demand for perfume, aromatic and medicinal plants is on the increase and this market is of growing inter-

## Help for the saffron sector in France's Provence

Saffron is a spice produced in many places around the world. Iran is the leading producer while in Europe, Spain and Greece are the main producer countries. The spice is constituted of the dried pistils of the *Crocus sativus*. Growing this crocus is relatively easy and does not require a specific soil or climatic context. Prices on international markets fluctuate between €500 and €1,000/ kg. European producers are not competitive because harvesting the flowers then removing the pistils can only be done by hand. Thus, the production costs in Europe are bumped up by the price of labour. Even so, growers in France have been developing production for their local markets which can sustain prices close to €30,000/kg for direct retail sales on a local level. Plots are carefully sized, sometimes only a few square metres, to avoid recourse to outside or paid labour. The prices recorded are very attractive, enticing not only farmers but, also, non-professionals (pensioners, amateur cooks...) who are looking for a money-earning sideline. As a result, organizing supply has become difficult: at issue is the organization of production with a view to supplying niche markets for which grower suppliers have widely divergent needs and interests.

It is in this context that the European University of Taste and Aroma (*Université Européenne des Senteurs et des Saveurs*) has given its backing to the saffron producers in Provence by helping them not only to discover new outlets (cosmetics, pharmaceuticals...) but to design a real development strategy for the saffron sector. Today, the Association of Producers of Saffron de Provence is France's biggest in terms of membership and the Provence-Alpes-Côte d'Azur Region has become the biggest producer of saffron.

<http://www.safraniersdeprovence.fr/>

est for rural areas looking for a development project. Such crops are in fact the perfect illustration of a multipurpose Mediterranean agriculture which is indispensable for the economic stability of numerous natural areas.

However, these plants remain small crops for diversifying production and their profitability depends on the availability of human and technical resources that can be adapted and made available to growers and others involved in the initial transformation processes.

It is for this reason that it is vital to take into account the key strategic factors identified within the framework of the MEDISS project which underlie the creation of sustainable and enduring economic activity across the PAMP sector.

The challenges and rewards are significant at a regional level and various stakeholders in different fields (agriculture, research,

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FranceAgriMer

tourism, industry) have already begun working together on shared projects in this sector.

Action aimed at bolstering and furthering the sustainable development of these crops should have an impact on the French Mediterranean coast and should enable the areas behind the initiatives to assert their presence elsewhere around the Mediterranean Rim.

The forthcoming European policies for regions and inter-regional collaboration, now being finalized for the period 2014-2020, are expected to manifest great awareness of the challenges and opportunities.

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## Summary

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The demand by worldwide corporate industries for natural quality (cosmetics, pharmaceuticals, etc.) has opened the door in the last twenty or so years to the increased profitable use of biodiversity, notably around the Mediterranean Rim.

In this context, the demand for perfume, aromatic and medicinal plants is on the increase and this market is of growing interest for rural areas looking for a development project. Such crops are in fact the perfect illustration of a multipurpose Mediterranean agriculture which is indispensable for the economic stability of numerous natural areas.

However, the implementation of such undertakings for generating economic benefit necessitates a real understanding of the specific features of the perfume, aromatic and medicinal plants sector, in terms of both the commercial outlets and the stakeholders' organisational structure.

This has been one of the main lessons to come out of the MEDISS project whose aims included the identification and modelling of the elements making up this economic sector in order to facilitate its development on a European scale.

## Résumé

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La recherche de naturalité de nombreuses industries globalisées (agroalimentaire, cosmétique, pharmaceutique, etc.) a ouvert la voie depuis plus d'une vingtaine d'années à une plus grande valorisation de la biodiversité, notamment en Méditerranée.

Dans ce contexte, la demande en plantes à parfum, aromatiques et médicinales tend à se développer et ce marché intéresse de plus en plus de territoires ruraux en quête de projets de développement. En effet, ces cultures sont l'illustration même d'une agriculture méditerranéenne multifonctionnelle indispensable à la stabilité économique de nombreux espaces naturels.

La mise en place de telles démarches de valorisation nécessite cependant d'appréhender correctement les spécificités des filières de plantes à parfum, aromatiques et médicinales, tant au niveau de leurs débouchés qu'en ce qui concerne la structuration de leurs acteurs.

Tel a été l'un des principaux enseignements du projet MEDISS qui s'est attaché à identifier et à modéliser les éléments constitutifs de la filière, afin d'en permettre le développement à l'échelle méditerranéenne.