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TRUMAP Project

Networking and Dialogue on Black Truffles and Medicinal and Aromatic Plants in Turkey and Spain

Diagnosis of the Socioeconomic Characteristics of the Medicinal and Aromatic Plants (MAPs): present status of the MAPs sector in Spain and Turkey with respect to MAPs collection, cultivation, marketing and consumption

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A1. Diagnosis of the Socioeconomic Characteristics of the Medicinal and Aromatic Plants (MAPs): What is the present status of the MAPs sector in Spain and Turkey with respect to MAPs collection, cultivation, marketing and consumption?

1. Introduction

A diagnosis of the MAPs sector has been done in Spain (specifically in Catalonia region) and Turkey (in the regions of Denizli, Mugla and Antalya) in order to gather information of the cluster surrounding the wild collection and cultivation of these species.

The cluster investigation consisted of data collection to identify actual and potential stakeholders involved, production models, operating structures of producers, marketing channels, market mechanisms and applied legislation. A survey has been implemented to producers in order to obtain specific data on the production facilities.

All this information has been discussed for each country and finally some conclusions comparing the countries has been elaborated.

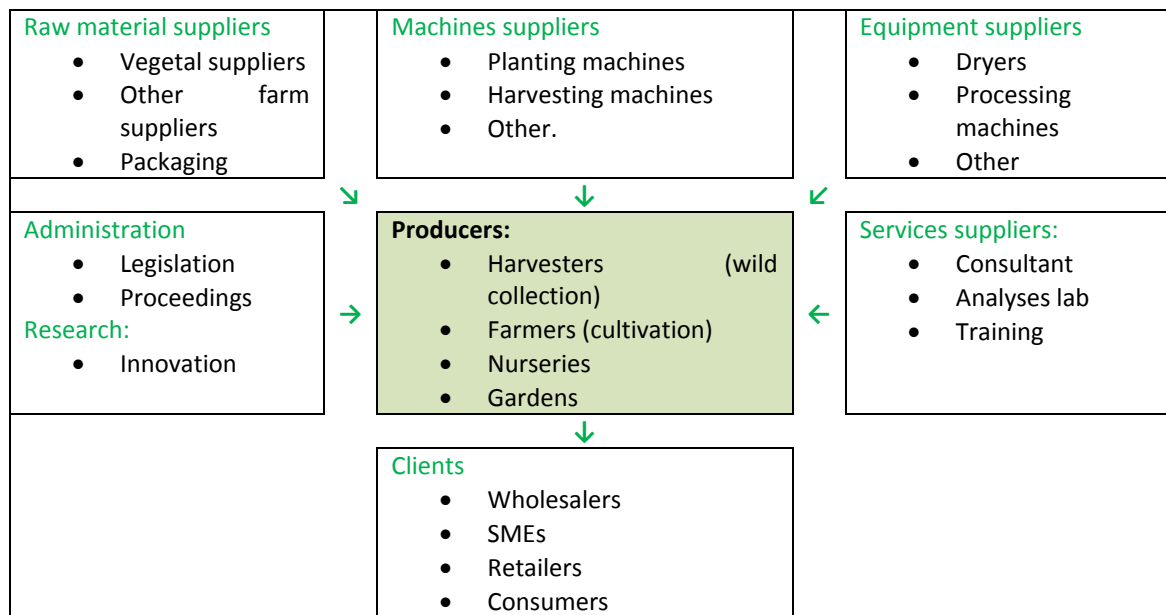
MAPs cluster

A cluster could be defined in different sense within the value chain:

- **Geographical cluster:** A business cluster is a geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular field.
- **Sectoral cluster:** A cluster of businesses operating together from within the same commercial sector.
- **Horizontal cluster:** Interconnections between businesses at a sharing of resources level e.g. knowledge management.
- **Vertical cluster:** a supply chain cluster

In our analyses the geographical cluster is referred to the selected regions in each country and the sectoral cluster to the MAPs industrial uses (medicinal, food, cosmetic, perfumery, education) and consumer uses (education, tourism, etc.).

The horizontal and vertical clusters could be interpreted from this diagram:



2. Diagnosis of MAPs cluster in Catalonia (Spain)

Medicinal and aromatic plants in Catalonia



Catalonia region (31.895 km² – 6,3% Spain territory)

Many MAPs species are known by Catalan people, mainly from local flora, but also other plants that have been introduced in the gardens. Among these, we can outline the following:

Abies alba, *Achillea millefolium*, *Allium schoenoprasum*, *Anemone hepatica*, *Anethum graveolens*, *Arctostaphylos uva-ursi*, *Arnica montana*, *Artemisia absinthium*, *Artemisia dracunculus*, *Asperula cynanchica*, *Betula pendula*, *Calendula officinalis*, *Celtis australis*, *Crataegus monogyna*, *Crocus sativus*, *Echinacea purpurea*, *Equisetum arvense*, *Foeniculum vulgare*, *Fraxinus angustifolia* subsp. *oxycarpa*, *Fraxinus excelsior*, *Gentiana lutea*, *Humulus lupulus*, *Hypericum perforatum*, *Hyssopus officinalis*, *Jasonia saxatilis*, *Juglans regia*, *Juniperus communis*, *Laurus nobilis*, *Lavandula angustifolia*, *Lavandula x hybrida*, *Lavandula latifolia*, *Lavandula stoechas*, *Lippia citriodora*, *Matricaria chamomilla*, *Malva sylvestris*, *Melissa officinalis*, *Mentha sativa*, *Mentha x piperita*, *Mentha pulegium*, *Mentha spicata*, *Ocimum basilicum*, *Origanum majorana*, *Origanum vulgare*, *Papaver rhoeas*, *Petroselinum crispum*, *Pimpinella anisum*, *Pinus sylvestris*, *Plantago lanceolata*, *Plantago major*, *Prunus spinosa*, *Rosa canina*, *Rosmarinus officinalis*, *Ramonda myconi*, *Ruta graveolens*, *Salvia lavandulifolia*, *Salvia officinalis*, *Sambucus nigra*, *Santolina chamaecyparissus*, *Satureja montana*, *Satureja fruticosa*, *Silene saxifraga*, *Stevia rebaudiana*, *Tilia platyphyllos*, *Tilia cordata*, *Thymus vulgaris*, *Valeriana officinalis*, etc.

There is a strong traditional use of MAPs in Catalonia region, and many ethnobotanical data have been registered in several studies and publications. Urban people is becoming more and more interested for recuperating this knowledge and MAPs gardens and training activities are flourishing.

Plants are used for food use (as seasonings and elaboration of drinks), for medicinal purposes (mainly as herbal teas but also as phytomedicines) and for external use (as cosmetics). Consumers have a large variety of commercial products as there are an important cluster of herbal products laboratories near Barcelona area. Many producers take advantage of this increasing demand and are offering handicraft products of high quality.

Wild collection of MAPs in Catalonia

MAPs are already collected from the forest or woodlands in Catalonia, but in less amounts than at the beginning of the XXth century. The species collected from the wild are the following:

- Commercially in large amounts: *Gentiana lutea* (root) and *Arctostaphylos uva-ursi* (leave), for beverages and medicinal purposes.
- Commercially in small amounts: *Fraxinus angustifolia* subsp. *oxycarpa* leave, *Juglans regia* leave, *Betula pendula* leave, *Arenaria rubra* plant, *Tilia* sp. flower, *Silene saxifraga*, *Sambucus nigra* flower, *Jasonia saxatilis*, *Equisetum arvense*, *Abies alba* cones, *Pinus sylvestris* sprouts, *Rosmarinus officinalis* leaves, *Thymus vulgaris* flowering tops, *Achillea millefolium* flower, *Asperula cynanchica*, *Papaver rhoeas* petals, *Plantago* sp. leaves, *Anemone hepatica* leaves, *Artemisia absinthium* plant, *Crataegus monogyna* flowering tops, *Matricaria chamomilla* flowers, *Malva sylvestris* flowers, *Satureja fruticosa*, *Fraxinus excelsior* leaves, *Silene vulgare*, *Sanguisorba minor*, *Lavandula latifolia* flowering tops, etc. to complement the species cultivated by farmers or to supply herbalist shops.
- For domestic purposes: *Thymus vulgaris* (for soups and herbal teas), *Hypericum perforatum* (for medicinal oil), *Rosmarinus officinalis* and *Arnica montana* (for medicinal alcohol or external use), *Origanum vulgare* (as condiment), *Satureja montana* and *Foeniculum vulgare* (for seasoning olives), *Prunus spinosa* fruits and *Juglans regia* green nuts (for alcoholic beverages), *Sambucus nigra* flower and *Matricaria chamomilla* flower (teas and beverages), *Lavandula latifolia* (for scented bags), *Ramonda myconi* leaves (for cough teas, medicinal oil), etc.

The more usual seasons for the wild collection are:

- Winter: *Rosmarinus officinalis*, *Plantago* sp.
- Spring: *Thymus vulgaris*, *Hypericum perforatum*, *Juglans regia*, *Sambucus nigra*, *Rosmarinus officinalis*, *Arctostaphylos uva-ursi*, *Pinus sylvestris*, *Papaver rhoeas*, *Plantago* sp. *Anemone hepatica*, *Artemisia absinthium*, *Crataegus monogyna*, *Matricaria chamomilla*, *Malva sylvestris*, *Satureja fruticosa*, *Ramonda myconi*.
- Summer: *Satureja montana*, *Foeniculum vulgare*, *Lavandula latifolia*, *Jasonia saxatilis*, *Abies alba*, *Tilia* sp., *Achillea millefolium*, *Asperula cynanchica*.
- Autumn: *Prunus spinosa*, *Gentiana lutea*

It is difficult to know the exact hectares used for collection, as many times no permit is needed. Even statistics are not a reliable source of information, as each region (Autonomous Community) give different data (some only production other only surface of collection. The last survey (Anuario de Estadística Forestal 2011), gave a total of 5.634,61 t of aromatic plants collected from the wild in Spain, covering a surface of only 3.949 ha. No data is pointed out in Catalonia region.

If this data is compared with the Organic production statistics, then we find that more than 38.184 ha are registered for doing organic collection. From these, nearly 20.008 ha are in Catalonia (being productive 14.255 ha).

Only the collection of *Gentiana lutea* is regulated in Catalonia (*ORDRE de 5 de novembre de 1984, sobre protecció de plantes de la flora autòctona amenaçada a Catalunya*), so permit from Department of Natural Environment, of the Ministry of Agriculture, Livestock, Fisheries, Food, and the Natural Environment of the Government of Catalonia, is needed. Collection of this species, jointly with *Arctostaphylos uva-ursi* takes place in Pyrenean counties (Vall d'Aran, Pallars Sobirà, Cerdanya) in the North of Catalonia region. Collection is forbidden in Natural protected areas. Sometimes are public (belonging to the municipality), mainly in the Pyrenean mountains, and other are private.



Figure 1. Natural Parks (number 2 is a National Park) in Catalonia

<http://parcsnaturals.gencat.cat/en/index.html>



Figure 2. Natural protected areas in Catalonia - Pla d'espais d'interès natural (PEIN)

In Catalonia, according to the Centre de la Propietat Forestal (Forest Ownership Centre)¹, in 2012 existed 2.033.160 ha of forest surface, representing the 64% of the total surface of Catalonia region. 73% of the forests are private and only 27% public (belonging to municipalities and other administrations). 45,91% is forest land covered with trees, 22,34% forest land without trees, 31,25% are crops and 0,5% other non forest covers.

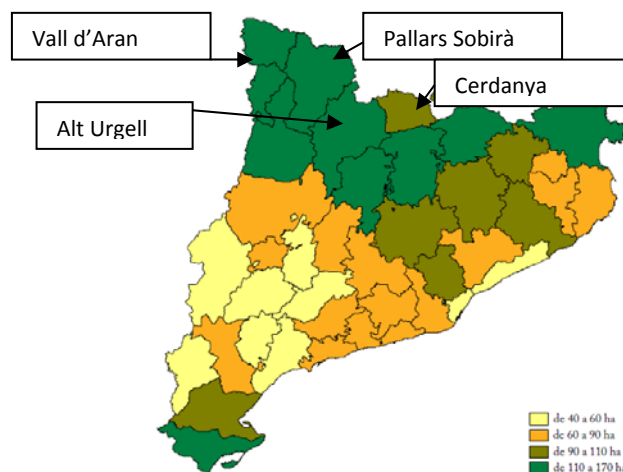


Figure 3. Distribution by counties of the forest property size

In a survey done in 2004², the species collected from the wild in Catalonia were:

Table 1. Main MAPs species collected from the wild in Catalonia (2004)

<i>Species</i>	<i>Area of collection</i>	<i>Quantity harvested (dry)</i>	<i>Botanical part</i>	<i>Season of collection</i>
<i>Gentiana lutea</i>	Cerdanya Vall d'Aran	8 t/year	Root	Autumn
<i>Arctostaphylos uva-ursi</i>	Pallars Sobirà	2,6 t/year	Plant	Spring, Autumn
<i>Tilia platyphyllos</i>	Pallars Sobirà	10 kg/year	Flower and bract	June
<i>Sambucus nigra</i>	Pallars Sobirà	15 kg/year	Flower	June
<i>Silene saxifraga</i>	Pallars Sobirà Vall d'Aran	42 kg/year	Planta	Summer
<i>Jasonia saxatilis</i>	Pallars Sobirà	10 kg/year	Plant	Summer
<i>Equisetum arvense</i>	Pallars Sobirà	10 kg/year	Plant	Summer
<i>Fraxinus angustifolia</i> subsp. <i>oxycarpa</i>	Alt Urgell	100 kg/year	Leave	
<i>Juglans regia</i>	Alt Urgell	100 kg/year	Leave	
<i>Betula pendula</i>	Alt Urgell	100 kg/year	Leave	
<i>Arenaria rubra</i>	Alt Urgell	100 kg/year	Plant	

Source: Fanlo, 2007

The type of harvesters doing the MAPs collection are both self-employed (if direct selling to end consumer) and employed (if commissioned by wholesalers), but they do not belong to any association neither cooperative.

The most common transformation done with wild MAPs is drying, and there is not any distillation as performed in the south of Spain. The species collected in large amounts, like as *Gentiana lutea* and *Arctostaphylos uva-ursi*, are bulk traded. Some herbalists commission groups of collectors, and then once gathered the fresh herb they dry the vegetal material in their facilities. On the other hand, some farmers collect directly, and then do the drying, packaging and selling of herbal teas. And in some special cases (e.g. Espècies a mà), the harvester manufactures seasonings (salt with wild herbs).

Cultivation of MAPs in Catalonia

Spanish statistics only gather information of few species: *Capsicum* sp., *Crocus sativus*, *Pimpinella anisum*, *Mentha* sp., *Cuminum cyminum*, *Glycyrrhiza glabra*, *Humulus lupulus*, *Lavandula* sp., *Chichoria intybus* and other industrial plants (eg. Mainly medicinal like as *Papaver somniferum*). But there are many other MAPs cultivated nowadays for small producers.

According to the implemented survey (2016) to 89 identified producers, the most cultivated MAPs species in Catalonia, in relation to the number of farmers producing them, are:

- **In field conditions:** *Crocus sativus* (43), *Mentha* sp. (31), *Lavandula* sp. (24), *Lippia citriodora* (18), *Melissa officinalis* (17), *Salvia officinalis* (16), *Rosmarinus officinalis* (14), *Origanum vulgare* (13), *Thymus vulgaris* (13), *Satureja montana* (11), *Calendula officinalis* (10), *Matricaria chamomilla* (9), *Thymus* sp. (9), *Ocimum basilicum* (8), *Origanum majorana* (8), *Artemisia dracunculus* (7), *Hyssopus officinalis* (7), *Hypericum perforatum* (5), *Laurus nobilis* (5), *Stevia rebaudiana* (5).
- **In greenhouse conditions:** *Thymus* sp. (12), *Mentha* sp. (11), *Rosmarinus officinalis* (11), *Lavandula* sp. (10), *Salvia* sp. (10), *Origanum* sp. (8), *Stevia rebaudiana* (7), *Lippia* sp. (7), *Santolina chamaecyparissus* (6), *Calendula officinalis* (5), *Nepeta* sp. (5), *Ocimum* sp. (5), *Vitex agnus-castus* (5).

According to the National Statistics (Anuario de Estadística Agraria 2014), in 2013 **21.829 ha** were cultivated with MAPs in Spain with a production of 38.805 t, standing out *Pimpinella anisum* (2.658 ha), *Lavandula* sp. (2.045 ha), pepper for paprika (*Capsicum* sp.) (1.553 ha) after the 13.940 ha of other industrial crops. The main regions producing MAPs in Spain were Andalucía (9.187 ha), Castilla la Mancha (7.109 ha), Castilla y León (2.631 ha) and Extremadura (1.119 ha). But there are only reflected **3 ha** in Catalonia (2 of saffron and 1 of lavender). This is far away from the reality.

Even in the Organic production statistics (2014) show different numbers. In 2013, 1.781,33 ha was registered for organic cultivation in Spain, being really productive 1.655,43 ha. From this, Catalonia have registered 35,31 ha, being productive nearly **26 ha of MAPs in organic production**.

From the gathered data of the identified stakeholders, we can assure that in Catalonia there are more than **75 ha of MAPs cultivation**. From these, around 10 ha are *Cannabis sativa*, 8 ha *Melissa officinalis*, 5 ha *Lavandula latifolia*, 5 ha *Salvia officinalis*, 3 ha *Crocus sativus*, 2 ha *Humulus lupulus* and 0,6 ha *Lippia citriodora*. On the other hand, around **5 ha of greenhouses** are also devoted to the MAPs cultivation.

Table 2. MAPs cultivation (surface, yield and production) in Spain

2013	Surface			Yield		Production (tons)
	(hectares)			(kg/ha)		
	Dry land	Irrigated Land	Total	Dry land	Irrigated land	
Pepper for paprika (dried)	–	1.553	1.553	–	2.785	4.327
Saffron (toasted stigma)	58	108	166	7	14	2
Aniseed	2.473	185	2.658	525	977	1.478
Mint (fresh)	–	15	15	–	2.000	30
Cumin	766	62	828	818	2.203	763
Liquorice	–	75	75	–	3.500	263
Hop (dried)	–	539	539	–	1.610	868
Lavender and Lavandin	1.882	163	2.045	3.799	5.968	8.124
Cichory (fresh root)	2	8	10	15.000	30.000	270
Other industrial crops	6.466	7.475	13.940	821	2.326	22.680
Total Spain	11.647	10.183	21.829	20.970	51.383	38.805

Source: Anuario de Estadística agraria 2014

Table 3. Registered surface of organic cultivation for MAPs in Spain

Type of cultivation / Province	Registered cultivated surface (ha)	Productive surface (ha)	Estimated production according to surface (tons)
Andalucía	245,7471	172,6733	552,4890
Aragón	375,0000	367,8700	301,9521
Asturias	0,0330	0,0330	0,1250
Baleares	6,9947	6,9947	5,5958
Canarias	0,9895		
Castilla la Mancha	166,1100	150,5200	301,0400
Castilla y León	65,3581	58,2517	119,8230
Cataluña	35,3128	25,9788	4,2311
Extremadura	11,2350	11,2350	22,4700
Galicia	13,9436	13,9436	
Murcia	478,8700	466,1100	699,0000
Navarra	143,3640	143,3640	150,6786
La Rioja	0,1160		
Comunidad Valenciana	237,4697	237,4697	11,8734
Medicinal, aromatic and condiment plants	1781,5270	1.655,4273	2.209,5948
Galicia	0,1300	0,1300	0,1500
Cataluña	0,2000		
Hop (<i>Humulus lupulus</i>)	0,3300	0,3300	0,1500

Source: Agricultura ecológica. Estadística 2013 (Madrid, 2014).

Table 4. MAPs species produced in Catalonia indicating the number of producers

In field conditions

Achillea millefolium (2), Alcea rosea (1), Anethum graveolens (3), Anthemis nobilis (1), Allium schoenoprasum (3), Aloe sp. (1), Aloe vera (1), Apium graveolens (1), Arnica montana (4), Artemisia abrotanum (1), Artemisia dracunculus (7), Calendula officinalis (10), Cannabis sativa (1), Coriandrum sativum (2), Crocus sativus (43), Cupressus sempervirens (1), Cymbopogon citrates (1), Echinacea sp. (1), Echinacea purpurea (2), Equisetum arvense (1), Eruca sativa (2), Eucalyptus globulus (1), Filipendula ulmaria (1), Foeniculum vulgare (1), Gentiana lutea (1), Glycyrrhiza glabra (1), Gingko biloba (2), Hedera helix (1), Helichrysum italicum (1), Hypericum perforatum (5), Hyssopus officinalis (7), Humulus lupulus (4), Juniperus communis (1), Laurus nobilis (5), Lavandula sp. (6), Lavandula angustifolia (12), Lavandula latifolia (2), Lavandula stoechas (2), Lavandula x hybrida (2), Leontopodium alpinum (1), Levisticum officinale (1), Lippia citriodora (18), Malpighia punicifolia (1), Malva sylvestris (1), Matricaria chamomilla (9), Melissa officinalis (17), Mentha sp. (9), Mentha x piperita (7), Mentha pulegium (9), Mentha sativa (3), Mentha spicata (2), Mentha suaveolens (1), Monarda didyma (1), Myrtus communis (1), Ocimum basilicum (8), Olea europaea, leave (1), Origanum hirtum (2), Origanum majorana (8), Origanum vulgare (13), Perilla frutescens (1), Petroselinum crispum (4), Pimpinella anisum (1), Rhodiola rosea (1), Ribes sp. (1), Ribes nigrum (2), Rosmarinus officinalis (14), Rubus idaeus (1), Ruscus aculeatus (1), Ruta graveolens (1), Salvia sp (1), Salvia lavandulifolia (1), Salvia officinalis (16), Salvia sclarea (3), Sambucus nigra (4), Santolina chamaecyparissus (2), Santolina rosmarinifolia (1), Satureja montana (11), Satureja fruticosa (3), Stevia rebaudiana (5), Symphytum officinale (1), Taraxacum officinale (3), Thymus sp. (3), Thymus mastichina (4), Thymus vulgaris (13), Thymus serpyllum (1), Thymus zizis (1), Urtica sp. (1), Urtica dioica (3), Vaccinium macrocarpon (1), Vaccinium myrtillus (1), Valeriana officinalis (1)

In greenhouse conditions (to produce cut herb or alive plant in container)

Abelmoschus sp. (1), Achillea sp. (1), Achillea millefolium (3), Acorus calamus (1), Agastache sp. (3), Agrimonia eupatoria (1), Alcea rosea (1), Alliaria officinalis (1), Allium sp. (4), Allium schoenoprasum (3), Althaea sp. (1), Althaea officinalis (2), Aloe sp. (4), Aloe vera (1), Amaranthus sp. (2), Anethum graveolens (1), Angelica archangelica (1), Annona muricata (1), Anradera cordifolia (1), Anthemis nobilis (1), Anthriscus cerefolium (3), Arbutus unedo (1), Arctium lappa (1), Arctium majus (1), Arctostaphylos uva-ursi (1), Artemisia sp. (4), Artemisia annua (1), Artemisia dracunculus (1), Asparagus sp (1), Asperula odorosa (1), Asphodelus fistulosus (1), Atropa belladonna (1), Bellis perennis (2), Bidens aurea (1), Borago officinalis (3), Calamintha nepeta (1), Calendula officinalis (5), Capparis sp. (1), Capparis spinosa (1), Capsella bursa-pastoris (1), Centella sp. (1), Centella asiatica (1), Chelidonium majus (2), Chenopodium sp. (1), Chrysanthemum sp. (2), Coriandrum sativum (3), Crambe maritima (1), Crataegus sp (2), Crataegus monogyna (2), Crithmum maritimum (2), Curcuma longa (1), Cymbopogon citratus (3), Cytisus scoparius (1), Datura stramonium (1), Digitalis sp. (1), Digitalis purpurea (2), Echinacea sp. (1), Echinacea purpurea (1), Elettaria cardamomum (1), Epilobium sp. (1), Epilobium parviflorum (1), Equisetum sp. (1), Equisetum arvense (1), Eryngium sp. (1), Escholtzia californica (1), Eucalytus sp. (2), Euphorbia lathyris (2), Foeniculum sp. (1), Foeniculum vulgare (2), Fraxinus sp. (1), Galium aparine (1), Ginkgo biloba (2), Glycyrrhiza glabra (2), Gynostemma pentaphyllum (2), Gynura procumbens (1), Hedera (1), Helichrysum sp. (3), Helichrysum thianschanicum (1), Hibiscus sabdariffa (1), Hieracium sp. (1), Hippophae rhamnoides (1), Houttunya cordata (1), Humulus lupulus (1), Hypericum sp. (2), Hypericum perforatum (3), Hyssopus sp. (1), Hyssopus officinalis (3), Iris sp. (1), Inula sp. (1), Jasminum sp. (2), Jasminum grandiflorum (1), Jasonia saxatilis (1), Juniperus sp. (1), Kalanchoe sp. (4), Laurus sp. (1), Laurus nobilis (4), Lavandula sp. (6), Lavandula angustifolia (3), Lavandula latifolia (1), Leonurus cardiaca (1), Leontis leonorus (1), Lepidium latifolium (2), Lycium barbarum (1), Linum sp. (1), Lippia sp.

(2), *Lippia citriodora* (5), *Lonicera japonica* (1), *Malva* sp. (1), *Malva sylvestris* (1), *Marrubium* sp. (1), *Marrubium vulgare* (2), *Matricaria* sp. (2), *Matricaria chamomilla* (1), *Medicago sativa* (2), *Melissa officinalis* (4), *Mentha* sp. (6), *Mentha aquatica* (1), *Mentha pulegium* (2), *Mentha rotundifolia* (1), *Mentha x piperita* (1), *Monarda didyma* (2), *Moringa oleifera* (2), *Myrtus* sp. (1), *Myrtus communis* (1), *Nepeta* sp. (4), *Nepeta cataria* (1), *Nerium oleander* (1), *Nicotiana tabacum* (1), *Ocimum* sp. (2), *Ocimum basilicum* (2), *Ocimum teuniflorum-sanctum* (1), *Oenothera biennis* (2), *Ononis spinosa* (1), *Origanum* sp. (4), *Origanum vulgare* (4), *Oxalis acetosella* (1), *Passiflora* sp. (1), *Peganum harmala* (1), *Pelagornium* sp. (2), *Perilla frutescens* (2), *Petroselinum* sp. (1), *Petroselinum crispum* (4), *Peumus boldus* (1), *Phlomis fruticosa* (1), *Phyllanthus niruri* (1), *Pinus* sp. (1), *Pistacia* sp. (1), *Plantago* sp. (2), *Plantago lanceolata* (1), *Plecthranthus* sp. (1), *Portulaca oleracea* (2), *Potentilla* sp. (1), *Potentilla reptans* (2), *Prunella vulgaris* (1), *Prunus* sp. (1), *Prunus spinosa* (1), *Punica* sp. (1), *Punica granatum* (2), *Rheum rhabarbarum* (1), *Rhus* sp. (1), *Ricinus communis* (1), *Rosa* sp. (1), *Rosmarinus officinalis* (11), *Rubus* sp. (2), *Rumex* sp. (2), *Ruscus* sp. (1), *Ruta* sp. (1), *Ruta graveolens* (2), *Salix* sp. (2), *Salvia* sp. (5), *Salvia officinalis* (5), *Sambucus* sp. (1), *Sambucus nigra* (2), *Sanguisorba major* (1), *Santolina chamaecyparissus* (6), *Saponaria* sp. (2), *Saponaria officinalis* (2), *Satureja* sp. (3), *Satureja montana* (3), *Sempervivum tectorum* (1), *Sideritis* sp. (1), *Silybum marianum* (1), *Solidago virgaurea* (1), *Spilanthes* sp. (1), *Stevia rebaudiana* (7), *Symphytum officinale* (2), *Tagetes* sp. (4), *Tanacetum* sp. (3), *Teucrium* sp. (1), *Teucrium chamaedrys* (1), *Thymbra* sp. (1), *Thymbra capitata* (1), *Thymus* sp. (4), *Thymus baeticus* (1), *Thymus citriodorus* (1), *Thymus serpyllum* (1), *Thymus vulgaris* (5), *Tilia* sp. (2), *Trifolium pratense* (1), *Tropaeolum majus* (3), *Tubhagia violacea* (1), *Turnera diffusa* (1), *Uncaria tomentosa* (1), *Urtica* sp. (1), *Urtica dioica* (1), *Urtica urens* (1), *Valeriana officinalis* (1), *Verbascum* sp. (1), *Verbena* sp. (1), *Verbena officinalis* (2), *Veronica* sp. (1), *Vinca* sp. (1), *Vinca major* (1), *Viola* sp. (3), *Viola odorata* (1), *Viola tricolor* (2), *Viscum album* (1), *Vitex agnus-castus* (5), *Ziziphus lotus* (1).

In greenhouse (to produce plantlets)

Artemisia dracunculus (1), *Helicrhysum triaschanicum* (1), *Lavandula angustifolia* (1), *Lavandula dentata* (1), *Lavandula silver frost* (1), *Lippia citriodora* (1), *Mentha arvensis* Banana Mint (1), *Mentha Berries&Cream* (1), *Mentha x piperita* (1), *Mentha x piperita citrata* Orange Mint (1), *Mentha x piperita "Chocolate"* (1), *Mentha x piperita citrata* Lemon (1), *Mentha x piperita f.citrata* Basil (1), *Mentha x piperita f.citrata* Grapefruit (1), *Mentha species Francesa* (1), *Mentha species Strawberry Mint* (1), *Mentha suaveolens rouge* (1), *Mentha suaveolens ssp marroc* (1), *Mentha x gracilis* Ginger Mint (1), *Mentha x rotundifolia* Apple mint (1), *Mentha x rotundifolia* Pineapple Mint (1), *Mentha x sativa* (1), *Mentha spicata* (1), *Rosmarinus officinalis* (1), *Rosmarinus officinalis Murcia* (1), *Rosmarinus prostrata* (1), *Salvia Maxima* (1), *Salvia officinalis "Grizzia"* (1), *Salvia officinalis "Icterina"* (1), *Salvia officinalis "Purpurascens"* (1), *Salvia officinalis "Tricolor"* (1), *Santolina chamaecyparissus* (19), *Stevia rebaudiana* (1), *Thymus "faustini"* (1), *Thymus citriodorus* (1), *Thymus citriodorus aureo variegata* (1), *Thymus vulgaris "Compacta"* (1)

Source: own data (survey 2016)

In the survey (2016) have been identified 89 companies producing herbs in Catalonia in different ways: 62 have field plantations, 8 are producing in greenhouses, and 19 are MAPs gardens (some have several activities).

The majority of these field plantations have been established in the last 10 years, and the average is around 1,2 ha/plantation (75 ha among 62 plantations). If we remove the 4 plantations with more surface (11, 10, 8,5 and 5,5 ha), we have a usual surface of 0,70 ha per plantation (40 ha among 58 plantations).

Plantations characteristics

From 89 producers, only 55 provided information on the land ownership. The status of the plantations is the following: 32 have private property, 13 rented land, 4 both own and rented land, 3 given land and 3 have permission of the forest owner to do wild collection.

So, from 55 producers, more than **58% of them have private property**.

From 89 producers, only 63 producers provided information on the plantation maintenance. Then, 38 are family business, some of them with employees, 19 are limited societies with employees. 6 are other types of organisations (special center of disabled people, group of producers, social franchise, etc.).

So, more than **60% are family business**.

From 89 producers, only 83 provided information on the production system: 12 are using conventional techniques (1 also integrated cultivation and 1 also have a botanical garden), 61 are using organic techniques (1 also conventional ones and 7 combining with wild collection), 11 doing wild collection (7 combining with organic cultivation) and 16 have botanical gardens (some of them also have small cultivations). No data is obtained from 7 producers.

So, from 83 producers, more than **73% of them are doing organic cultivation**, 14% conventional cultivation, and 13 % wild collection. It is remarkable that **19% have a botanical MAPs gardens**.

17 producers are supplying MAPs vegetal material: 2 saffron bulbs, 13 seedlings and 4 seeds. Only 4 of them are specialized as a nursery and the rest of them are also cultivating.

From 89 identified producers, only 70 provided information on the type of raw material obtained: 39 are producing dry herb (from these 8 are also producing alive plants, 6 fresh herbs, 2 essential oils and 1 seeds), 28 are producing alive plants mainly for gardening (8 also producing dry herb, 2 fresh herbs, 1 essential oils and 1 seeds), 9 are producing fresh herbs (6 also producing dry herbs, 2 alive plants and 1 honey), 6 are producing essential oils (2 combining with dry herb production, 1 with alive plants and 1 with honey production), 4 are obtaining honey (1 combining with essential oil production and 1 with fresh herb production) and 3 are obtaining extracts (mainly for cosmetic purposes). 2 are also producing seeds.

So, from 70 producers, nearly **56% are obtaining dry herb** as a raw material and 40% alive plants.

From 89 producers, only 31 provided information on the type of farming machine used in the crops: 18 have tractor and 13 motorized plough, 12 have planting machine and only 9 harvester machine. Other indicated machinery is: brush cutter (2), fertilizer spreader, farming bicycle, cultivator and diverse farming tools. Some nurseries also commented: substrate mixer and seeder. 4 producers do not have any farming machines as they are doing wild collection or doing the farming works by hand (small crops).

So, from 31 producers, about **58% have tractor**, 42% motorized plough, nearly 39% planting machine and 29% harvester machine.

From 89 producers, only 39 provided information on the type of transforming equipment used to process the raw material:

- 34 producers have **dryer equipment**, thus main obtained raw material is dry herb. The preferred type of dryer is using natural air, in a closed room with shelves (20 producers). Only 9 producers have a convection dryer, by hot flow air, and 4 producers have a solar dryer
- Only 4 producers have **steam distiller**.
- 28 producers have **processing machinery** for transforming the dry raw material: 8 threshing, 6 cutter, 6 mill, 3 sieve, 2 grinder. Only one person indicated that is doing the processing manually.
- 6 producers have **packaging machinery**, like as 4th range packaging of mixer-packager in bags, and only 1 indicated labeling machinery.
- Other types of processing machinery (mainly for processing cosmetics) are: cans for maceration, filters and balances.

So, from 39 producers, **87% have dryer** (most used system natural air), and nearly 72% processing machinery (mainly threshing, cutters and mills), as the most current raw material obtained is dry herb. Only 10% of the producers have steam distillatory and 15% packaging machinery.

Entrepreneurial model

According to our survey in Catalonia (2016) to 89 producers, 59 provided information on the type of commercialization: 13 are selling in bulk, 48 in retail and 21 are providing also services (14 training/education, 5 botanical garden, 7 tourism, 3 field visits and 3 restaurant).

So, from 59 producers, more than **81% are manufacturing end products**.

48 producers are manufacturing different products:

- 23 seasonings (mainly dry herb condiment, but also salt with herbs, herbal bouquets, aromatic vinegars and oils)
- 21 herbal teas.
- 14 cosmetics
- 3 perfumes
- 6 scented bags and other decoration products.
- 5 plants in pot.
- 3 seedlings
- 2 food products (pasta with herbs, vegetal patés, chocolates with herbs...)
- Other products: syrup, natural dyes, cut culinary herbs, food supplements and ingredients for brewery (hop).

So, from 48 producers, nearly **48% are manufacturing seasonings**, **44% herbal teas** and 29% cosmetics, 19% perfumes and scented products, and 17% alive plants (in pot and seedlings).

From 89 producers, 68 producers provided information on the sector where the selling is addressed.

In relation to products:

- 30 to food sector.
- 21 to herbalist sector.
- 16 to cosmetic sector.
- 3 to pharmaceutical sector.
- 2 to decoration sector
- 5 to gardening (plants in pot for amateur producers).
- 4 to agriculture (seedlings for professional producers).
- 1 to environment (seedlings for reforestation).

In relation to services:

- 19 to botanical sector.
- 18 to tourism sector.
- 9 to education sector.

So, from 68 producers, **44% is addressing to food sector**, 31% to herbalist sector and 23,5% to cosmetic sector. On the other hand, 28% of the producers are addressing to botanical field and 26,5% to tourism.

From 89 producers, 61 producers provided information on the product distribution:

- 48 are doing direct selling to end consumer (by own shop, market fairs or e-commerce).
- 30 are commercialising by a retailer.
- 11 are selling to a wholesaler.
- 10 are using the services of a broker/distributor.
- 7 are distributing the product by a cooperative
- 2 are providing the product in a restaurant.
- 1 is exporting.

So, from 61 producers, nearly **79% are selling directly to end consumer**.

Prices

It is difficult to obtain prices, as there are many references, origins and qualities.

As most producers are obtaining dry herb we have obtained data of this raw material. In general, the price that the producer obtain is increased by 2,5 times when the wholesaler sells in bulk, 5 times when the wholesaler sells to the retailer and 8 times when the product is sold to the consumer by the retailer.

That's why, many producers try to elaborate and trade to the end consumer: to have more added value.

Table 5. Dry herb prices of different MAPs in Catalonia (Spain)

2014	Producer Price sale (in bulk) €/kg	Wholesaler Price sale (in bulk) €/kg	Wholesaler Price sale (retail) €/kg	Retailer Price bag 100 g €/kg
<i>Echinacea purpurea</i>	6-12 €	19 €	30 €	-
<i>Lippia citriodora</i>	3-7 €	6-15 €	20 €	49 €
<i>Matricaria chamomilla</i>	3 €	8 €	15 €	20-30 €
<i>Melissa officinalis</i>	3-4 €	6-15 €	18 €	30 €
<i>Mentha x piperita</i>	2-4 €	4-15 €	10 €	32 €
<i>Mentha pulegium</i>	2-3 €	5 €	10 €	25 €
<i>Rosmarinus officinalis</i>	1-2 €	3 €	6 €	15-20 €
<i>Salvia officinalis</i>	3-4 €	5-10 €	10 €	20-30 €
<i>Thymus vulgaris</i>	2-4 €	4-15 €	14 €	24 €

Source: de Pedro, F. (2014)

Guidance to producers

There is not any formal training on MAPs production (regarding plantation establishment) neither processing. Only the CTFC is providing some information transfer (brochures, websites, technical seminars) and technical and market assessment. Sometimes, the Agriculture VET schools organize courses on MAPs production, but most of the times the teachers are CTFC technicians.

IRTA (Catalan research center on agriculture and food technology - <http://www.irta.cat>), Agronomic and Forestry High Schools (in Barcelona - <http://www.esab.upc.edu> and Lleida - <http://www.etsea.udl.cat>), and VET agronomic and forest schools (Escoles Agràries) - <http://agricultura.gencat.cat/ca/ambits/formacio-innovacio/> can provide extension service to solve problems related to irrigation, soil management and weed control .

The existing technical information on growing MAPs that are disseminated to interested farmers are mainly brochures and websites edited by CTFC - <http://apsb.ctfc.cat> , or Technical seminars through the Annual Plan of Technology Transfer of the Department of Agriculture, Livestock, Food and Environment of the Government of Catalonia - <http://agricultura.gencat.cat/ca/ambits/formacio-innovacio/dar-transferencia-tecnologica/>.

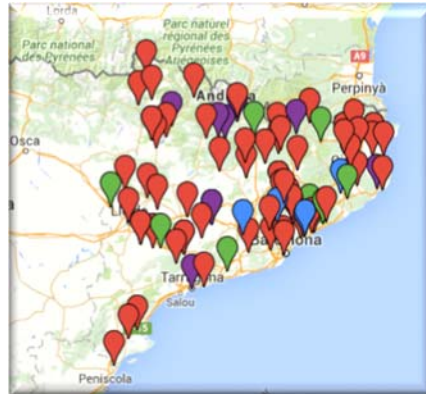
In relation to non-profit groups, associations or forums, sharing experiences and offering support and information among MAPs growers, from 2000-2010 existed the Catalan Association of MAPs producers (ACPPAM) but nowadays is inactive. After that some groups of producers have been created in order to share information and to organize the commercialization: Parc de les Olors network - <http://parcdelesolors.com/> , Herbes del món - <https://lesherbesdelmon.wordpress.com/> , Safracat (association of organic saffron producers promoted by Aromis <http://www.aromis.cat>) and Safrà de les Garrigues (cooperative of saffron producers promoted by Naturges - <http://naturges.com/>).

Stakeholders in the MAPs value chain

MAPs producers

In a survey done between May and June 2016 to 122 contacts, 89 producers were identified and 50 provided specific information (the remaining was obtained from the websites public information).

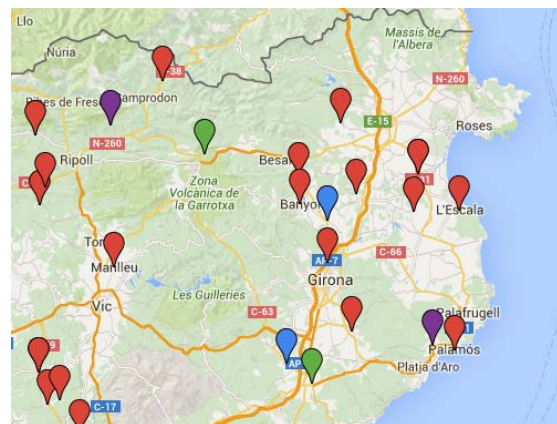
From the 89 identified producers, 35 are located in Barcelona (BCN) province, 25 in Lleida (LL), 20 in Girona (GI) and 9 in Tarragona (TGN).



legend: wild collection, cultivation, garden, nurseries



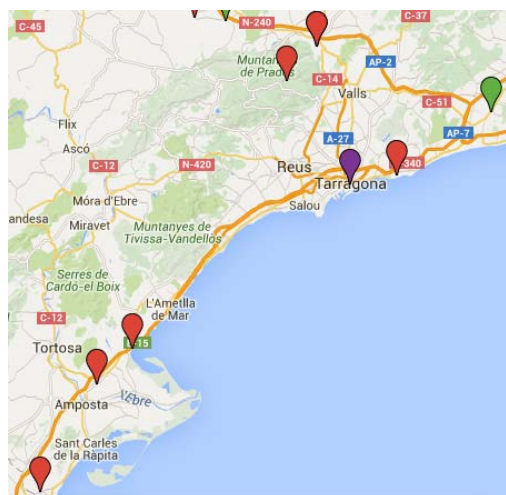
Barcelona province



Girona province



Lleida province



Tarragona province

Figure 4: MAPs producers in Catalonia (Spain)

In table 6 there is the list of the MAPs producers in Catalonia, providing information on the type of production implemented by each stakeholder (wild collection, conventional cultivation, organic cultivation, nurseries and gardens), the raw material obtained (fresh herb, dry herb, essential oil, alive plant, etc.), the elaborated products (seasonings, herbal teas, food, seedlings, plant in pot, etc.) and the services supplied (training, tourism, consultation, botanical garden , etc.)

Table 6. Existing MAPs producers in Catalonia (Spain) in 2016

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
<i>Agrícola Fortuny, S.C. - Aromàtiques Ecològiques el Drac Verd</i>	17474-Torroella de Fluvià - GI	Organic cultivation	Dry herb	Seasonings	
http://www.eldracverd.com				Herbal teas	
<i>Akarona</i>	25591-Peramea - LL	Wild collection	Dry herb	Cosmetics	
http://akaronasabonsnaturals.blogspot.com.es/				Natural dyes	

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
<i>Alba Falgàs Camps</i>	17474-Torroella de Fluvià - GI	Organic cultivation			
<i>Aldrufeu & Associats</i>	17421-Riudarenes - GI	Nursery	Alive plant	Seedlings	Training
http://www.aldrufeu-associats.com				Plant in pot	Field visits
<i>Ana Gayoso Orpinell</i>	17466-Garrigoles - GI	Organic cultivation			
<i>Antoni Castillo Ripoll</i>	08717-Argençola -BCN	Organic cultivation			
<i>Arnica i Flora, SC</i>	17868-Molló - GI	Organic cultivation	Dry herb	Cosmetics	
http://www.arnicaiflora.es				Herbal teas	
<i>Aromik</i>	17531-Gombrèn -GI	Organic cultivation	Dry herb	Seasonings	
				Herbal teas Plant in pot	
<i>Aurora del Camp SCP</i>	08329 Teià - BCN	Organic cultivation	Alive plant	Bulk product	
http://www.auroradelcamp.com					
<i>Bernau Herbes de l'Urgell</i>	25218 –Fonolles - LL	Conventional cultivation	Dry herb	Bulk product	Field visits
http://www.bernauherbes.com				Seasonings Herbal teas	
<i>Bioplanta Can Tria</i>	08304 Mataró - BCN	Organic cultivation	Alive plant	Plant in pot	
http://agrobotigacantria.blogspot.com.es					
<i>Botànic Cal Riera</i>	08180-Moià - BCN	Garden			Botanical garden
http://botaniccalrieramoia.blogspot.co.uk					
<i>Cal Pinyater</i>	08450-Llinars del Vallès - BCN	Garden			Botanical garden Tourism
http://calpinyater.blogspot.com.es					
<i>Cal Portalé, SCP - Parc de les Olors del Claverol</i>	25517-Claverol - LL	Organic cultivation	Dry herb	Seasonings	Tourism
http://www.allotjamentrural.cat				Herbal teas	Restaurant Training
<i>Can Caponet</i>	08186-Llicà d'Amunt - BCN	Organic	Dry herb	Scented	Tourism

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
http://www.cancaponet.com/		cultivation	Honey	products	
Carex	17844-Cornellà de Terri - GI	Nursery	Alive plant	Seedlings	
http://www.carex.cat				Plant in pot	
Carlos Gabernet Gaxas	08348-Cabrils - BCN	Organic cultivation			
Cecilia Useleti Almenara	25460-Cervià de les Garrigues -LL	Organic cultivation			
Centre Especial d'Ocupació del Maresme de Mataró	08303-Mataró - BCN	Organic cultivation	Fresh herbs	Seasonings	Training
http://www.fundaciomaresme.cat/canparcala/			Honey		
Concaromis, S.L.	43400-Montblanc - TGN	Organic cultivation	Dry herb	Seasonings	Field visits
http://www.aromis.cat			Essential oil		
Cosmetics Giura-Tort, SCP	17251-Calonge - GI	Organic cultivation	Extracts	Cosmetics	
http://www.cosmeticsgiura.com/		Wild collection			
Cristina Butron	17852-Serinyà	Organic cultivation	Dry Herb	Herbal teas	
E.I. Sambucus SCCL	08560-Manlleu - BCN	Organic cultivation	Dry herb	Seasonings	Restaurant
http://www.sambucus.cat				Herbal teas	Training
Ecoherbes Botanic, S.L.	43895-L'Ampolla - TGN	Organic cultivation	Fresh herb	Seasonings	Botanical garden
http://www.ecoherbes.com			Dry herb	Herbal teas	Training
Ecològic Pallars	25636-Gurp - LL	Organic cultivation	Alive plant	Seedlings	
				Seeds	
El Raig d'Or	08587-Alpens - BCN	Conventional cultivation	Essential oil	Cosmetics	
http://elraigdor.blogspot.com.es/			Honey	Perfumes Scented products	
El Tossal de les Garrigues	25155 L'Albagés - LL	Organic cultivation	Dry herb	Bulbs	Field visits

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
http://www.eltossaldelesgarrigues.com			Alive plant	Seasonings	
<i>El Vergel de las Hadas</i>	08211-Castellar del Vallès - BCN	Organic cultivation Nursery	Dry herb	Herbal teas Seedlings	Training
http://www.vergeldelashadas.com			Essential oil Alive plant		
<i>Especies a mà</i>	43007-Tarragona - TGN	Wild collection	Dry herb	Seasonings	
http://www.especiesama.com					
<i>Essències de Tuixent</i>	25717-Tuixent - LL	Wild collection	Floral essence	Cosmetics	Training
http://www.essenciesdetuixent.com/					
<i>Fragàncies del Montseny</i>	08348-Cabrils - BCN	Organic cultivation	Essential oil	Cosmetics. Perfumes	Training
http://www.fraganciesmontseny.com					
<i>Hans Diemel</i>	17741-Cistella - GI	Cultivation	Essential oil	Bulk product	
<i>Herbes de la Conca</i>	43400-Montblanc - TGN	Organic cultivation	Dry herb	Bulk product Seasonings Herbal teas Food	Training
http://www.herbesdelaconca.com					
<i>Herbes del món</i>	08717-Argençola - BCN	Organic cultivation Wild collection	Fresh herb Dry herb Alive plant	Seasonings Herbal teas Cosmetics Seeds	
http://lesherbesdelmon.wordpress.com					
<i>Herboristeria Nogué</i>	25717-Vansa i Fórnsols - LL	Organic cultivation Wild collection	Dry herb	Seasonings Herbal teas	Botanical garden Training Tourism
http://www.herbesossera.com/					
<i>I-magina divulgació, SL. - Parc de les Olors de Vall de Ros</i>	08416-Riells de Fai - BCN	Organic cultivation	Dry herb Alive plant	Bulk product Seasonings Herbal teas Cosmetics	Botanical garden Training Tourism
http://www.parcdelesolors.com					
<i>Jordi Fonts</i>	08180-Moià - BCN	Cultivation	Honey		

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
<i>Josefina Fortuny Morera</i>	25620-Tremp - LL	Organic cultivation			
<i>Josep Carles Gil Querol</i>	43530-Alcanar - TGN	Organic cultivation			
<i>Josep Maria Orra Capdevila</i>	17512-Les Lloses - GI	Organic cultivation			
<i>Lagrimus</i>	25724-Martinet - LL	Wild collection	Extracts	Cosmetics	
http://www.lagrimus.com/				Food (syrops)	
<i>L'Armengol SCP</i>	08517-Sagàs - BCN	Conventional cultivation	Dry herb	Bulk product	
<i>Les Feixes de Cal Margarit</i>	25795-Montant de Tost - LL	Conventional cultivation	Essential oil	Cosmetics	
http://www.feixescalmargarit.com				Perfumes	
<i>Les herbes de Can Riera</i>	08338-Premià de Dalt - BCN	Organic cultivation	Fresh herb	Cut fresh herb	
http://www.lesherbesdecanriera.com			Dry herb Alive plant	Scented products Plant in pot	
<i>L'Hort de la Sinia</i>	43893-Altafulla - TGN	Organic cultivation	Dry herb	Seasonings	Botanical garden
http://www.hortdelasinia.com				Herbal teas Cosmetics Scented products	Training Consultancy
<i>Lluch recol·lectors</i>	17861-Ogassa - GI	Wild collection	Dry herb	Bulk product	
<i>Lluís Fisas Ollé</i>	08750-Molins de Rei - BCN	Organic cultivation			
<i>Lupulina.Cat</i>	17244-Cassà de la Selva - GI	Organic cultivation	Dry herb	Bulk product	Field visits
http://www.lupulina.com					
<i>Manuel Arjó Pacheco</i>	25530-Vielha e Mijaran - LL	Organic			

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
		cultivation			
Mas Titot	17468 Vilademuls - GI	Organic cultivation	Alive plant		Training Tourism
https://esperxatsalhort.wordpress.com/category/plantes-aromatiques-i-medicinals/					
Milfulles	17840-Sarrià de Ter - GI	Organic cultivation	Fresh herb	Seasonings	Training
http://www.milfulles.net		Wild collection	Dry herb	Herbal teas	
Montserrat Mateu Serraviñals	08183-Castellterçol - BCN	Organic cultivation			
Natural Subirats	08739-Subirats - BCN	Organic cultivation	Dry herb	Bulk product	
http://www.naturalsubirats.com				Seasonings Herbal teas	
Naturges-Ponent, SCP	25155-L'albagès - LL	Conventional cultivation	Dry herb	Seasonings	
http://www.naturges.com/			Alive plants	Bulbs	
Naturhemp	43896-L' Aldea - TGN	Conventional and organic cultivation	Dry herb	Bulk product	
			Alive plants	Seeds	
Neus Comes Pon	25636-Gurp - LL	Organic cultivation			
Pamies Horticoles SL	25600-Balaguer - LL	Organic cultivation	Dry herb	Herbal teas	
http://www.pamiesvitae.com		Nursery	Fresh herb Alive plant	Cut fresh herb Plant in pot	
Parc de les Olors d'Araós	25573-Araós - LL	Organic cultivation	Dry herb	Seasonings	Field visits
http://pardelesolors.com/parc-daraos/					
Parc de les Olors d'Ivars de Noguera	25122-Ivars de Noguera - LL	Organic cultivation			Botanical garden
http://pardelesolors.com/parc-de-les-olors-divars-de-noguera-la-noguera/		Garden			Training Tourism
Parc de les Olors de Cal Forner	08673- Viver i Serrateix - BCN	Conventional cultivation	Dry herb	Scented products	Traning

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
http://parcdelesolors.com/parc-de-les-olors-de-cal-forner-bergueda/					Tourism
<i>Parc de les olors de Cal Romà</i>	43428-Les Piles - TGN	Organic cultivation	Dry herb	Seasonings	Botanical garden
http://parcdelesolors.com/parc-cal-roma-les-piles-la-conca-de-barbera/		Garden			Training Tourism
<i>Parc de les Olors de Cal Vilanova</i>	08729-Castellet i la Gornal - BCN	Garden	Dry herb	Herbal teas Scented products	Botanical garden
http://parcdelesolors.com/parc-de-les-olors-de-cal-vilanova-alt-penedes/					Training
<i>Parc de les Olors de Can Gessé</i>	25100-Almacelles - LL	Garden		Cosmetics	Botanical garden
http://parcdelesolors.com/parc-de-les-olors-can-gesse-almacelles/					Training
<i>Parc de les Olors de Les Baselles</i>	25450-L'Albi - LL	Garden			Botanical garden
http://parcdelesolors.com/parc-de-les-olors-les-basselles/					Training
<i>Parc de les Olors de Linyola</i>	25240-Linyola - LL	Conventional cultivation	Dry herb	Herbal teas Food	Botanical garden
http://parcdelesolors.com/linyola-pla-durgell/		Garden			Training
<i>Parc de les Olors de Mas de Caret</i>	43459-Farena - TGN	Conventional. Garden	Dry herb	Herbal teas	Botanical garden
http://parcdelesolors.com/mas-de-caret-montblanc/					Traning Tourism
<i>Parc de les Olors de Molí del Casó</i>	08695-Bagà - BCN	Garden	Fresh herb		Botanical garden
http://parcdelesolors.com/parc-moli-del-caso-baga-el-bergueda/					Training Tourism Restaurant
<i>Parc de les olors de Serrat</i>	08187-Santa Eulàlia de Ronçana - BCN	Organic cultivation	Dry herb	Bulk product	Training
http://parcdelesolors.com/parc-del-serrat/					Field visits
<i>Parc de les Olors del Baix Empordà</i>	17230-Palamós - GI	Organic cultivation	Dry herb	Bulk product Herbal tea	Botanical garden
http://parcdelesolors.com/parc-el-surolí/		Garden			

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
<i>Parc de les Olors Prat de Sala</i>	25541-Vilaller - LL	Conventional cultivation	Dry herb	Seasonings	Botanical garden
http://parcdelesolors.com/prat-de-sala-alta-ribagorca/		Garden		Herbal tea	Training
<i>Parc de les Olors: Can Gruart</i>	17411-Vidreres - GI	Garden			Botanical garden
<i>Parc de les Olors: El Secret del Bosc</i>	08358-Arenys de Munt - BCN	Garden			Botanical garden
http://parcdelesolors.com/parc-secret-del-bosc/					
<i>Parc de les Olors: Escala - Empúries</i>	17130-L'Escala - GI	Organic cultivation			Botanical garden
http://parcdelesolors.com/parc-lescala-empuries/		Garden			
<i>Parc de les Olors: Sant Joan de les Fonts</i>	17857-Sant Joan de les Fonts	Garden			Botanical garden
<i>Phytoterapia, S.L.</i>	08023-Barcelona - BCN	Organic cultivation	Extracts	Food supplements	
http://www.phytoterapia.com/					
<i>Ramon Vinyes Reig</i>	08614-L'Espunyola - BCN	Organic cultivation			
<i>Riera-Villagrasa SL</i>	08338-Premià de Dalt - BCN	Organic cultivation	Alive plant	Cut fresh herb	
http://www.rieravillagrasa.com		Nursery	Fresh herb	Seedlings	
				Plant in pot	
<i>Riuverd-Empresa d'inserció SCCL</i>	25280-Solsona - LL	Organic cultivation	Dry herb	Seasonings	
http://www.riuverd.cat		Wild collection		Herbal teas	
<i>SAT 1477 AUREA</i>	08784-Piera - BCN	Organic cultivation	Alive plant	Plant in pot	
http://www.aureavivers.com		Nursery			
<i>SAT Vivers La Vinya 5476</i>	08359-Sant Iscle de Vallalta - BCN	Organic cultivation			
<i>Sergi Rosselló</i>	Lleida - BCN	Conventional cultivation			

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
Smart Rural Lab SL	25726-Lles de Cerdanya - LL	Organic cultivation			
Solchem Nature, SLU	08015-Barcelona - BCN	Organic cultivation			
http://www.solchem.es					
SOM	17834-Porqueres	Organic cultivation	Dry herb		
http://obrador.cooperativaintegral.cat		Wild collection			
Spicegarden	08348-Cabrils - BCN	Conventional cultivation	Alive plant	Seedling	
http://www.spicegarden.eu/		Nursery		Plant in pot	
TaüllOrgànics, S.L.	25528-Taüll - LL	Organic cultivation	Dry herb	Cosmetics	Training
http://www.taullorganics.com					Field visits
Tres Turons	08211-Castellar del Vallès - BCN	Organic cultivation	Dry herb	Bulk product	Botanical garden
http://www.vivertresturons.com		Nursery	Alive plant	Seedling	Training
Vegetalia	08183-Castellcir - BCN	Organic cultivation	Fresh herb	Seasonings	Botanical garden
http://www.vegetalia.com		Garden	Dry herb	Food	Training
Violeta Zafra Pedrosa	08221-Terrassa - BCN	Organic cultivation			

Source: own data (2016)

Businesses surrounding the MAPs production

In Catalonia there is a large industry consuming MAPs and MAPs derivatives (essential oils, essences, additives, extracts, etc.), but they do not use to buy directly to the producers, as they can only provide non processed raw material (dry herb and essential oil).

Herbal raw material in bulk (normally at a very low price) could be purchased by wholesalers, herb conditioners or essential oils and extracts manufacturers. In Table 7 there is the list of different enterprises buying MAPs raw material to local producers in Catalonia.

Table 7. Enterprises buying MAPs to local producers in Catalonia (Spain)

MAPs enterprises	Location	Botanicals in bulk	Herb conditioners	Essential oils	Extracts
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Amorós Nature http://amorosnature.com/	17450- Hostalric - GI				
Herbocat - Manantial de Salud http://www.manantial-salud.com/	08001- Barcelona - BCN				
Productos Plantarom SL. https://www.facebook.com/productos.plantarom	25240- Linyola - LL				
Sotacingles, SL (L'Herbolari de Sau) http://www.herbolariodesau.com/	08519- Vilanova de Sau - BCN		Herbal teas		
Tegust Nature, S.L. http://www.tegust.com	17111- Vulpellac - GI		Herbal teas		
Fitomins http://www.fitomins.com/	43596- Horta de Sant Joan - TGN		Cosmetic plants		
Cultius aromàtics Almirall http://www.cultiusaromatics.cat/	08799- Olèrdola - BCN		Seasonings		
Aromes.cat http:// www.cosmeticadelbosque.com	17244- Cassà de la Selva		Scented products		
Ernesto Ventós, SA http://www.ventos.com	08960-Sant Just Desvern				
Euromed SA http://www.euromed.es	08100- Mollet del Vallès - BCN				

Source: own data (2016)

Sometimes, some manufacturers and laboratories are able to purchase MAPs raw material to the producer, but they demand a wide catalogue of herbs, in few quantities and more processed (grinded, chopped, cut, etc.). Most of these enterprises could be find in the member lists of the professional associations. In the table 8, there is the list of associations dealing in Catalonia, of national and regional scope, according to the type of enterprises (producers, industry, and retailers). There are also included others associations dealing with MAPs, more related to the uses of plants.

Table 8. MAPs associations dealing in Catalonia (Spain) in 2016

MAPs associations	Location	Producers	Industry	Retailers	Others
National associations					
Asociación Nacional Interprofesional de plantas aromáticas y medicinales (ANIPAM) http://www.anipam.es	19004 – Guadalajara	National Interprofessional Association of Aromatic and Medicinal Plants			
Asociación de empresas de dietéticos y complementos alimenticios (AFEPADI) http://www.afepadi.org/	08011- Barcelona- BCN		Association of dietetic and food supplements enterprises		
Asociación de fabricantes y comercializadores de aditivos y complementos alimentarios (AFCA) http://www.afca-aditivos.org	08015 Barcelona – BCN		Association of additives and food supplements 26 manufacturers and traders		
Asociación española de elaboradores y envasadores de especias y condimentos http://www.asociaciondeespecias.com/L	08037 – Barcelona – BCN		Spanish association of 26 manufacturers and packagers of spices and seasonings		
Asociación española de fabricantes de productos de química fina (AFAQUIM) http://www.afaquim.org	08018- Barcelona – BCN		Spanish association of fine chemistry products manufacturers		
Asociación española de fragancias y aromas alimentarios (AEFAA) http://aefta.com	28046- Madrid		Spanish association of fragrances and food flavours		
Asociación española de té e infusiones (AETI) http://asociacionteinfusiones.es	28010- Madrid		Spanish association of tea and herbal teas		
Asociación Mediterránea de Aromas y Fragancias (AMAF) http://www.amaforg.org/	08015 Barcelona – BCN		Mediterranean Association of Flavours and Fragrances		
Asociación nacional de perfumería y cosmética (STANPA) http://www.stanpa.com/	08010- Barcelona – BCN		National association of perfumery and cosmetics		
Farmaindustria http://www.farmaindustria.es/	08037- Barcelona – BCN		Association of pharmacy industry		
Sociedad española de químicos cosméticos (SEQC) http://www.e-seqc.org	08009- Barcelona – BCN				Spanish scientific association of perfumery and cosmetics professionals
Sociedad española de fitoterapia (SEFIT) http://www.sefit.es	Barcelona – BCN				Spanish Scientific association of phytotherapy
Catalan Associations					
Safrà de les Garrigues	25460 – Cerverà de les Garrigues – LL	Cooperative of saffron producers			
Safracat	43400- Montblanc – TGN	Association of saffron producers			

Gremi d'herbolari i alimentació dietètic de Catalunya http://www.assocdietherb.com	08007- Barcelona			Association of herbalist shops of Catalonia	
Associació Etnobotànica Rusticana http://blocs.xarxanet.org/lesremeieres/	17166- Susqueda – GI				Ethnobotanical association
Associació Flora Catalana http://www.floracatalana.net	08571-Sant Vicenç de Torelló - BCN				Non profit association on Catalan flora and ethnobotany
Associació Jardí Botànic Plantes Medicinals Gombren http://jardibotanic-gombren.cat	17531- Gombren- GI				MAPs Botanical garden association
Dolça revolució https://dolcarevolucio.cat/language/ca/	25600- Balaguer – LL				Association to enhance the use of medicinal plants

Source: own data (may-june 2016)

Finally, there are other auxiliary business surrounding the MAPs producers, like as farm inputs, machineries and equipments suppliers, or services suppliers.

In the first case, many of the MAPs producers (nurseries) are also supplying vegetal material to the farms, but no businesses exist to provide specialised machineries and equipments for the MAPs production. This has to be find abroad or designed by the own producer. Only a solar dryer builder has been found.

For service suppliers, there are several professionals providing consultancy (on cultivation, products registration, etc.) and training/education on MAPs uses to the public in general. Only two research groups are working with MAPs primary sector (production and ethnobotany), and specialised research on medicinal compounds and properties are implemented by Pharmacy and Chemistry Universities (Universitat de Barcelona, Universitat Autònoma de Barcelona, Universitat Politècnica de Catalunya, etc.), who can also provide analysis services. List of identified enterprises are shown in table 9.

Table 9. MAPs services suppliers in Catalonia (Spain) in 2016

MAPs enterprises	Location	Research	Consultancy	Training on uses	Other
Fitomon http://www.fitomon.com/	25200-Cervera – LL		Products registration		
Mònica Fanlo monica.fanlo@gmail.com	Barcelona – BCN		MAPs cultivation		
Naturalwalks http://www.naturalwalks.com	17401-Arbúcies – GI		Wild edible plants		
Sotacingles, SL (L'Herbolari de Sau) http://www.herbolariodesau.com/	08519-Vilanova de Sau – BCN		Exhibition organiser		
3QT Química Total Consultoria, S.L.P. http://www.quimicatotal.net/	Aribau, 168 1º 1ª – 08036 Barcelona - BCN		Green chemistry		
Les Remeieres(proyecto de la Xarxa de Professionals i Usuaris Sccl) http://www.lesremeieres.com	17166- Susqueda - GI				
Carme Bosch http://www.carmebosch.cat	17244-Cassà de la Selva - GI				Study visits

EcoglobalBCN http://ecoglobalbcn.blogspot.com.es	Barcelona - BCN				Health and wellness
Essència Espai de Benestar http://www.essenciaespaidenbenestar.com	43008- Tarragona - TGN				
Grup d'Etnobotànica dels Països Catalans – EtnoBotCat http://www.etnobotanica.cat/?page_id=139	Barcelona - BCN	Ethnobotany			
Centre Tecnològic Forestal de Catalunya – Non Wood forest department – Group of MAPs http://apsb.ctfc.cat	25280 – Solsona - LL	Cultivation Wild collection			
Coeco – Ricard Guiu rguiu@coeco.coop	25600- Balaguer				Solar dryer builder

Administration surrounding MAPs production

For the wild collection activity, there is a general Forestry legislation that regulates the collection of non wood forests products including the MAPs, but giving general indications on the species and habitat preservation. For sustainable collection, international guidelines should be followed. Some species are forbidden or controlled if threatened in specific protected areas. The wild collection is recorded as economic activity.

There is no legislation regulating the cultivation of MAPs in Spain (only for drug plants), and producers should follow the recommendations of international guidelines. The cultivation of MAPs and the distillation is recorded as economic activity, and some species are considered for crop insurances.

The manufacturing and commercialization of herbal teas, seasonings, food supplements, cosmetics and herbal medicines are regulated by national and European laws. The elaboration of herbal teas and seasonings are recorded as economic activities.

Table 10. Existing legislation governing the collection, production and commercialization of MAPs in Catalonia

Legislation / Norm	Regulation area	Type of products	Type of regulation
Regional (Catalonia)			
<i>Decret 302/2004, de 25 de maig, pel qual es crea i s'aprova el funcionament del Registre d'Indústries Agràries i alimentàries de Catalunya (RIAAC)</i>	Manufacturing	Food	Administrative proceeding
Description: Decree 302/2004, of 25 May, establishing and approving the operation of the Register of Agricultural and Food Industries of Catalonia (RIAAC)	Species concerned	N/A	
<i>Classificació Catalana d'Activitats Industrials Agràries i Alimentàries (segons CCAE 2009):</i>			Administrative proceeding
<i>10.830.01 Elaboració i/o envasament de plantes aromàtiques i medicinals per elaborar infusions</i>	Manufacturing	Food, medicinal	
<i>10.842.00. Elaboració d'espècies</i>	Manufacturing	Food	
<i>20.530.01. Primera destil·lació de plantes aromàtiques</i>	Manufacturing	Perfumes	
Description: Catalan Classification of Agricultural and Food Industrial Activities (according to CCAE 2009):	Species concerned	N/A	

Legislation / Norm	Regulation area	Type of products	Type of regulation
10.830.01 Preparation and / or packaging of medicinal and aromatic plants for making infusions 10.842.00. Preparation of spices 20.530.01. First distillation of aromatic plants			
<i>Quadern de Normes Tècniques de la producció agroalimentària ecològica</i>	Agriculture Manufacturing Trade Other (organic)	Food	Guidelines
Description: Notebook Technical Standards for organic food production	Species concerned		
<i>Decret 172/2008, de 26 d'agost, de creació del Catàleg de flora amenaçada de Catalunya</i>	Environment/biodiversity	Other (wild products)	Legislation (Statutory laws)
Description: Decree creating the catalog of endangered flora of Catalonia	Species concerned	VULNERABLE: <i>Lycopodium clavatum</i> , <i>Leontopodium alpinum</i> subsp. <i>alpinum</i> , <i>Berberis vulgaris</i> subsp. <i>seroi</i> , <i>Thymus lascosii</i> , <i>Thymus willkommii</i> , <i>Menyanthes trifoliata</i> , <i>Salix daphnoides</i> , <i>Saxifraga vayredana</i> . PROTECTED IN SPECIFIC AREAS: <i>Equisetum hyemale</i> : ribera de la Garona, massís del Montseny; <i>Cistus ladaniferus</i> : Gavarres, serra de Collserola; <i>Drosera rotundifolia</i> : massís de Cadiretes; <i>Ephedra major</i> : ports de Tortosa; <i>Lavandula pedunculata</i> : muntanyes de Prades; <i>Convallaria majalis</i> : serra d'Aubenc; <i>Adonis vernalis</i> : tossals d'Isòvol i Olopte;	
<i>ORDRE de 5 de novembre de 1984, sobre protecció de plantes de la flora autòctona amenaçada a Catalunya. (Correcció d'errades en el DOGC núm. 516, p. 500, de 27.2.1985)</i>	Environment/biodiversity, Forestry	Food, medicinal. Other (ornamental)	Legislation (Statutory laws)
Description: Order on the protection of plants of the threatened native flora in Catalonia	Species concerned	PROTECTED (collection forbidden): <i>Taxus baccata</i> . COLLECTION ALLOWED (authorisation mandatory): <i>Ilex aquifolium</i> , <i>Gentiana lutea</i> , <i>Chamaerops humilis</i>	
<i>ORDRE de 28 d'octubre de 1986, per la qual es regula el verd ornamental nadalenc i es protegeix el boix grèvol. (Correcció d'errada en el DOGC núm. 842, p. 1984, de 22.5.1987)</i>	Environment/biodiversity, Forestry	Other (ornamental)	Legislation (Statutory laws)
Description: Order which regulates the ornamental green and protects the Christmas holly.	Species concerned	PROTECTED (collection forbidden): <i>Ilex aquifolium</i> , <i>Taxus baccata</i>	
Llei 6/1988, forestal de Catalunya. TITOL 4: Aprofitaments forestals. CAPITOL 1: Aprofitaments en general. Article 49	Forestry (wild collection)	Food, Medicinal, Perfumes	Legislation (Statutory laws)
Description: Law 6/1988, forest Catalonia. TITLE 4: collection. CHAPTER 1: exploitation in general. article 49	Species concerned	N/A	
<i>Decret 44/2012, de 24 d'abril, pel qual es crea el Sistema Integrat de Dades d'Explotacions Agràries de Catalunya</i>	Agriculture	General	Legislation (Statutory laws)
Description: Decree establishing the Integrated Data of Farms of Catalonia	Species concerned	N/A	
National (Spain)			
<i>Real Decreto 31/1983, de 16 de noviembre de 1983, por el que se aprueba la Reglamentación Técnico-Sanitaria para la Elaboración, Circulación y Comercio de especies vegetales para infusiones de uso en alimentación</i>	Manufacturing Hygiene and Safety Trade	Food	Legislation (Statutory law)
Description: Royal Decree establishing the technical-health regulations for the preparation, distribution and trade of plant species for use in food infusions	Species concerned	<i>Illicium verum</i> , <i>Pimpinella anisum</i> , <i>Citrus aurantium</i> , <i>Rosa canina</i> , <i>Eucalyptus globulus</i> , <i>Hibiscus sabdariffa</i> , <i>Lippia citriodora</i> , <i>Foeniculum vulgare</i> , <i>Malva sylvestris</i> , <i>Matricaria chamomilla</i> , <i>Anthemis nobilis</i> , <i>Santolina chamaecyparissus</i> , <i>Origanum majorana</i> ,	

Legislation / Norm	Regulation area	Type of products	Type of regulation
		<i>Melissa officinalis, Mentha x piperita, Mentha pulegium, Rosmarinus officinalis, Salvia officinalis, Sambucus nigra, Tilia argenteum, Tilia officinalis, Thymus vulgaris, Verbena officinalis, Smilax officinalis</i>	
<i>Real Decreto 1354/1983, de 27 de Abril, por el que se aprueba la Reglamentación Técnico-Sanitaria para la elaboración, circulación y comercio de Té y derivados. (B.O.E. 27.05.1983). Modificado por Real Decreto 1256/1999, de 16 de julio (B.O.E. 24.07.99)</i>	Manufacturing, Hygiene and Safety, Trade	Food	Legislation (Statutory law)
Description: Royal Decree on the technical-health regulations for the preparation, distribution and trade of tea is approved and derivatives.	Species concerned	<i>Camellia sinensis</i>	
<i>Real Decreto 2242/1984, de 26 de Septiembre, por el que se aprueba la Reglamentación Técnico-Sanitaria para la elaboración, circulación y comercio de Condimentos y Especies. (B.O.E. 22.12.1984). MODIFIED BY: a) Real Decreto 40/2010, de 15 de enero, por el que se modifica el Real Decreto 2242/1984, de 26 de septiembre, por el que se aprueba la reglamentación técnico sanitaria para la elaboración, circulación y comercio de condimentos y especias. b) Real Decreto 135/2010, de 12 de febrero, por el que se derogan disposiciones relativas a los criterios microbiológicos de los productos alimenticios.</i>	Manufacturing, Hygiene and Safety, Trade	Food	Legislation (Statutory law)
Description: Royal Decree on the technical-health regulations for the production, distribution and trade of condiments and spices.	Species concerned	<i>Myristica Fragans, Allium sativum, Allium Ceba, Cinnamomum zeylanicum, Cinnamomum Casia, Cinnamomum Burmani, Capparis spinosa, Capparis ovata, Crocus sativus, Caryophyllus aromaticus, Carum carvi, Pimpinella anisum, Apium graveolens, Illicium verum, Elettaria Cardamomum, Coriandrum sativum, Cuminum cyminum, Juniperus communis, Foeniculum vulgare, Capsicum annum, Capsicum longum, Piper nigrum, Capsicum frutescens, Capsicum baccatum, Capsicum fastigiatum, Pimenta officinalis, Piper nigrum, Vainilla planifolia, Vanilla pompona, Satureja hortensis, Artemisia vulgaris, Lavandula spica, Artemisia dracunculus, Menta arvensis, Laurus nobilis, Origanum majorana, Thymus mastichina, Menta x piperita, Menta viridis, Menta aquatica, Origanum vulgare, Origanum virens, Petroselinum sativum, Menta pulegium, Rosmarinus officinalis, Salvia officinalis, Salvia lavandulaefolia, Thymus vulgaris, Thymus zygis, Thymus piperella, Acorus calamus, Curcuma zedoaria, Alpinia officinarum, Zingiber officinale, Sesamun orientale, Sesamun Indicum, Brassica juncea, Brassica nigra, Sinapis alba, Myristica fragans, Schinus terebinthifolius, Ocimum basilicum, Peucedanum graveolens, Trigonella foenum-graecum, Nigella sativa</i>	
<i>Real Decreto 191/2011, de 18 de febrero, sobre Registro General Sanitario de Empresas Alimentarias y Alimentos (RSIPAC).</i>	Manufacturing	Food	Administrative proceeding
Description: Royal Decree on the General Sanitary Inspection of Food and Food Enterprises (RSIPAC).	Species concerned	N/A	
<i>Real Decreto 1712/1991, de 29 de noviembre, sobre el Registro General Sanitario de Alimentos</i>	Manufacturing	Food	Legislation (Statutory laws)

Legislation / Norm	Regulation area	Type of products	Type of regulation
Description: Royal Decree on the General Health Register of Food	Species concerned	N/A	
<i>Real Decreto 697/1995, de 28 de abril, por el que se aprueba la Clasificación Nacional de Actividades Económicas 2009 (CNAE 2009) - CNAE-2009 code:</i>			Administrative proceeding
0128_Cultivo de especias, plantas aromáticas, medicinales y farmacéuticas	Agriculture	Food, Medicinal, Perfumes	
0230_Recolección de productos silvestres, excepto madera	Forestry	Wild products	
1083_Elaboración de café, té e infusiones	Manufacturing	Food	
1084_Elaboración de especias, salsas y condimentos	Manufacturing	Food	
4637_Comercio al por mayor de café, té, cacao y especias	Trade	Food	
Description: Royal Decree for approving National Classification of Economic Activities 2009 (CNAE 2009) – CNAE-2009 code: 0128 Cultivation of spices, aromatic plants, medicinal and pharmaceutical 0230 Gathering of wild products, except wood 1083 Manufacture of coffee and tea 1084 Manufacture of condiments and seasonings 4637 Wholesale of coffee, tea, cocoa and spices	Species concerned	N/A	
<i>Real Decreto 1487/2009, de 26 de septiembre, relativo a los complementos alimenticios</i>	Manufacturing	Food	Legislation (Statutory laws)
Description: Royal Decree on food supplements	Species concerned	N/A	
<i>Ley 29/2006, de 26 de julio, de garantías y uso racional de los medicamentos y productos sanitarios. Artículo 51. Medicamentos de plantas medicinales</i>	Trade	Medicinal	Legislation (Statutory laws)
Description: Law on guarantees and rational use of medicines and medical devices. Article 51. Drug medicinal plants	Species concerned	N/A	
<i>Real Decreto 1345/2007, de 11 de octubre, por el que se regula el procedimiento de autorización, registro y condiciones de dispensación de los medicamentos de uso humano fabricados industrialmente. PARTE III. MEDICAMENTOS ESPECIALES: Medicamentos a base de plantas.</i>	Manufacturing	Medicinal	Legislation (Statutory laws)
Description: Royal decree establishing the procedure for authorization, registration and dispensing conditions of medicinal products for human use manufactured industrially is regulated. PART III. SPECIAL MEDICATIONS: Herbal Medicines.	Species concerned	N/A	
<i>Real Decreto 1599/1997, de 17 de octubre, sobre productos cosméticos</i>	Manufacturing	Cosmetic	Legislation (Statutory laws)
Description: Royal Decree on cosmetic products	Species concerned	N/A	
<i>Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad</i>	Environment/biodiversity	Other (ethnobotany)	Legislation (Statutory laws)
Description: Law on Natural Heritage and Biodiversity	Species concerned	N/A	
<i>Ley 43/2003, de 21 de noviembre, de</i>	Forestry (wild collection)	Other (wild products)	Legislation (Statutory

Legislation / Norm	Regulation area	Type of products	Type of regulation
Montes			laws)
Description: Law on Forestry	Species concerned	N/A	
<i>Real Decreto 367/2010, de 26 de marzo, de modificación de diversos reglamentos del área de medio ambiente para su adaptación a la Ley 17/2009, de 23 de noviembre, sobre el libre acceso a las actividades de servicios y su ejercicio, y a la Ley 25/2009, de 22 de diciembre, de modificación de diversas leyes para su adaptación a la Ley de libre acceso a actividades de servicios y su ejercicio</i>	Forestry (wild collection)	Other (wild products)	Legislation (Statutory laws)
Description: Royal Decree amending various regulations in the area of environment for adaptation to Law 17/2009 of 23 November, on free access to service activities and their exercise, and Law 25/2009, of 22 December, amending various laws to adapt to the Law on free access to activities and exercising	Species concerned	N/A	
<i>Orden AAA/59/2016, de 21 de enero, por la que se definen los bienes y los rendimientos asegurables, las condiciones técnicas mínimas de cultivo, el ámbito de aplicación, los periodos de garantía, las fechas de suscripción y los precios unitarios del seguro de explotaciones de cultivos industriales no textiles, comprendido en el trigésimo séptimo Plan de Seguros Agrarios Combinados.</i>	Agriculture	Food Medicinal Perfumes Other (insurances)	Legislation (Statutory laws)
Description: Order by which goods and insurable income are defined, the minimum technical farming conditions, the scope, the warranty periods, the subscription dates and unit prices insurance holdings non-textile industrial crops, within the thirty-seventh Combined Agricultural insurance Plan.	Species concerned	<i>Papaver somniferum, Capparis spinosa, Aloe vera, Crocus sativus, Pimpinella anisum, Lavandula angustifolia, Lavandula x hybrida, Mentha sp., Glycyrrhiza glabra, Humulus lupulus. Other aromatic and culinary plants.</i>	
<i>Ley 17/1967, de 8 de abril, por la que se actualizan las normas vigentes sobre estupefacientes y adaptándolas a lo establecido en el convenio de 1961 de las Naciones Unidas</i>	Agriculture Trade	Medicinal Other (drugs)	Legislation (Statutory laws)
Description: Law 17/1967, of 8 April, by which the existing rules on narcotics are updated and adapted to the provisions of the 1961 Convention of the United Nations	Species concerned	<i>Cannabis sativa, Papaver somniferum</i>	
CÓDIGO ALIMENTARIO ESPAÑOL, aprobado por Decreto 2484/1967, de 21 de septiembre (BOE de 21 de octubre, p. 14382). CAPÍTULO XXIV ("Condimentos y Especies")	Manufacturing	Food	Legislation (Statutory laws)
Description: SPANISH FOOD CODE, approved by Decree 2484/1967 of 21 September (BOE of October 21, p. 14382). CHAPTER XXIV ("Seasonings and Spices")	Species concerned	See annex of the food code	
<i>Real Decreto 1220/2011, de 5 de setiembre, pel que es modifica el Real Decreto 289/2003, de 7 de marzo, sobre comercialización de los materiales forestales de reproducción.</i>	Forestry	Other (vegetal material)	Legislation (Statutory laws)
Description:	Species concerned		

Legislation / Norm	Regulation area	Type of products	Type of regulation
Royal Decree which amends Royal Decree 289/2003 of 7 March on commercialization of forest reproductive material.			
European			
<i>Decisión de la Comisión de 22 de febrero de 2000 por la que se deniega la comercialización de Stevia Rebaudiana Bertoni: plantas y hojas secas como nuevo alimento o nuevo ingrediente alimentario con arreglo al Reglamento 258/1997 del Parlamento Europeo y del Consejo</i>	Trade	Food	Legislation (Statutory laws)
Description: Comission Decision denying the commercialization of Stevia rebaudiana Bertoni: plants and dried leaves as a novel food or novel food ingredient under Regulation 258/1997 of the European Parliament and the Council	Species concerned	<i>Stevia rebaudiana</i>	
<i>Directiva 2002/46/CE del Parlamento Europeo y del Consejo, de 10 de junio de 2002, relativa a la aproximación de las legislaciones de los Estados miembros en materia de complementos alimenticios</i>	Manufacturing	Food	Legislation (Statutory laws)
Description: Directive of the European Parliament and of the Council of 10 June 2002 on the approximation of the laws of the Member States relating to food supplements	Species concerned	N/A	
<i>Directiva 2004/24/CE del Parlamento Europeo y del Consejo de 31 de marzo de 2004 por la que se modifica, en lo que se refiere a los medicamentos tradicionales a base de plantas, la Directiva 2001/83/CE por la que se establece un código comunitario sobre medicamentos para uso humano</i>	Trade	Medicinal	Legislation (Statutory laws)
Description: Directive of the European Parliament and of the council amending, as regards traditional herbal medicinal products, Directive 2001/83/EC on the Community code relating to medicinal products for human use	Species concerned	According to the monographs of the by the European Medicines Agency's Committee on Herbal Medicinal Products (HMPC)	
<i>DECISIÓN DE LA COMISIÓN de 9 de febrero de 2006 que modifica la Decisión 96/335/CE, por la que se establece un inventario y una nomenclatura común de ingredientes empleados en los productos cosméticos</i>	Manufacturing	Cosmetic	Legislation (Statutory laws)
Description: Communication of the Commission concerning the date of mandatory application of the updated inventory and common nomenclature of ingredients employed in cosmetic products	Species concerned	See list in the law annex	
<i>Reglamento (CE) No 1223/2009 del Parlamento Europeo y del Consejo de 30 de noviembre de 2009 sobre los productos cosméticos (versión refundida)</i>	Manufacturing	Cosmetic	Legislation (Statutory laws)
Description: Regulation of the European Parliament and of the Council on cosmetic products	Species concerned	N/A	
<i>Reglamento (CE) No 834/2007 del Consejo de 28 de junio de 2007 sobre producción y etiquetado de los productos ecológicos y por el que se deroga el</i>	Agriculture Manufacturing Trade Other (organic)	Food	Legislation (Statutory laws)

Legislation / Norm	Regulation area	Type of products	Type of regulation
<i>Reglamento (CEE) no 2092/91</i>			
Description: Council Regulation on organic production and labeling of organic products	Species concerned	N/A	
<i>Reglamento (CE) No 889/2008 de la Comisión de 5 de septiembre de 2008 por el que se establecen disposiciones de aplicación del Reglamento (CE) no 834/2007 del Consejo sobre producción y etiquetado de los productos ecológicos, con respecto a la producción ecológica, su etiquetado y su control</i>	Agriculture Manufacturing Trade Other (organic)	Food	Legislation (Statutory laws)
Description: Commission Regulation laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labeling of organic products with regard to organic production, labeling and control	Species concerned	N/A	
<i>EMA Guideline on good agricultural and collection practice (GACP) for starting materials of herbal origin</i>	Environment, Forestry, Agriculture, Manufacturing, Hygiene and safety	Medicinal	Guidelines
<i>Tea & Herbal Infusions Europe. Guidelines for good agricultural and hygiene practices for raw materials used for herbal and fruit infusions (GAHP)</i>	Agriculture, Manufacturing, Hygiene and safety	Food	Guidelines
<i>Decret Legislatiu 3/2010, de 5 d'octubre, per a l'adequació de normes amb rang de llei a la Directiva 2006/123/CE, del Parlament del i Consell de 13 de desembre de 2006 relatives als serveis en el mercat interior (DOGC 5729 de 06/10/2010), modifica art. 49.2 de la Llei 6/1988</i>	Forestry (wild collection)	Food, Medicinal, Perfumes	Legislation (Statutory laws)
Description: Legislative Decree for the adequacy of rules with the force of law to Directive 2006/123 / EC of the Parliament and of the Council of 13 December 2006 on services in the internal market	Species concerned	N/A	
International			
<i>Directrices de la OMS sobre buenas prácticas agrícolas y de recolección (BPAR) de plantas medicinales</i>	Environment Forestry Agriculture Manufacturing Hygiene and safety	Medicinal	Guidelines
Description: WHO guidelines on good agricultural and collection practices (GACP) for medicinal plants	Species concerned	N/A	
<i>International Organisation of Spice Trade Associations. General Guidelines for Good agricultural practices on Spices and Culinary Herbs</i>	Agriculture, Manufacturing, Hygiene and safety	Food	Guidelines
<i>UNE-ISO - Especies y condimentos (varios documentos)</i>	Manufacturing Other (quality)	Food	Standards (Technical norms)
Description: ISO - Spices and condiments (various documents)	Species concerned	<i>Satureja hortensis, Satureja montana, Ocimum basilicum, Carum carvi, Pimpinella anisum, Crocus sativus, Coriandrum sativum, Juniperus communis, Cuminum cyminum, Artemisia dracunculus, Laurus nobilis, Origanum majorana, Origanum vulgare, Mentha spicata, Mentha piperita, Capsicum annuum, Rosmarinus officinalis, Salvia officinalis, Apium graveolens, Foeniculum vulgare, Mustard, Thymus vulgaris,</i>	

Legislation / Norm	Regulation area	Type of products	Type of regulation
UNE-ISO - Aceites esenciales (various documents)	Manufacturing Other (quality)	Cosmetics Perfumes	Standards (Technical norms)
Description: ISO - Essential oils (various documents)	Species concerned	<i>Citrus aurantium, Citrus limon, Lavandula latifolia, Artemisia dracunculus, Rosmarinus officinalis, Hyssopus officinalis, Carum carvi, Petroselinum crispum, Thymus zygis, Coridothymus capitatus, Thymus mastichina, Apium graveolens, Pimpinella anisum, Mentha x piperita, Cuminum cyminum, Mentha spicata, Salvia lavandulifolia, Foeniculum vulgare, Chamomilla recutita, Lavandula x hybrida, Juniperus communis, Coriandrum sativum, Mentha arvensis, Levisticum officinale, Pinus pinaster, Ocimum basilicum, Lavandula angustifolia, etc.</i>	
<i>Estándar Internacional para la Recolección Silvestre Sostenible de Plantas Medicinales y Aromáticas (ISSC-MAP)</i>	Environment/biodiversity Forestry	Medicinal	Standards (Technical norms)
Description: International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP)	Species concerned	N/A	

Source: own data

Needs for the Catalan MAPs sector

Catalonia region has a huge industry sector dealing with MAPs and products derived from MAPs, so the primary production of MAPs could be interesting to supply this industry in bulk. The problem is that the manufacturing enterprises want a wide catalogue of plants and processed, and sometimes it is difficult for a small producer to comply with these requisites. Even if they try to sell in bulk to the wholesaler, it demands huge quantities of plant at a very low price, that is below the production costs. That's why producers are addressing their entrepreneurial model to the manufacturing and direct selling to the consumer. This has also been enhanced due to the fact that the people living in the urban area of Barcelona are willing to consume fresh products of quality, km 0 and also to have experiences related to the traditional use of the plants (back to nature and to the authentic).

Each MAPs production stakeholder has special needs:

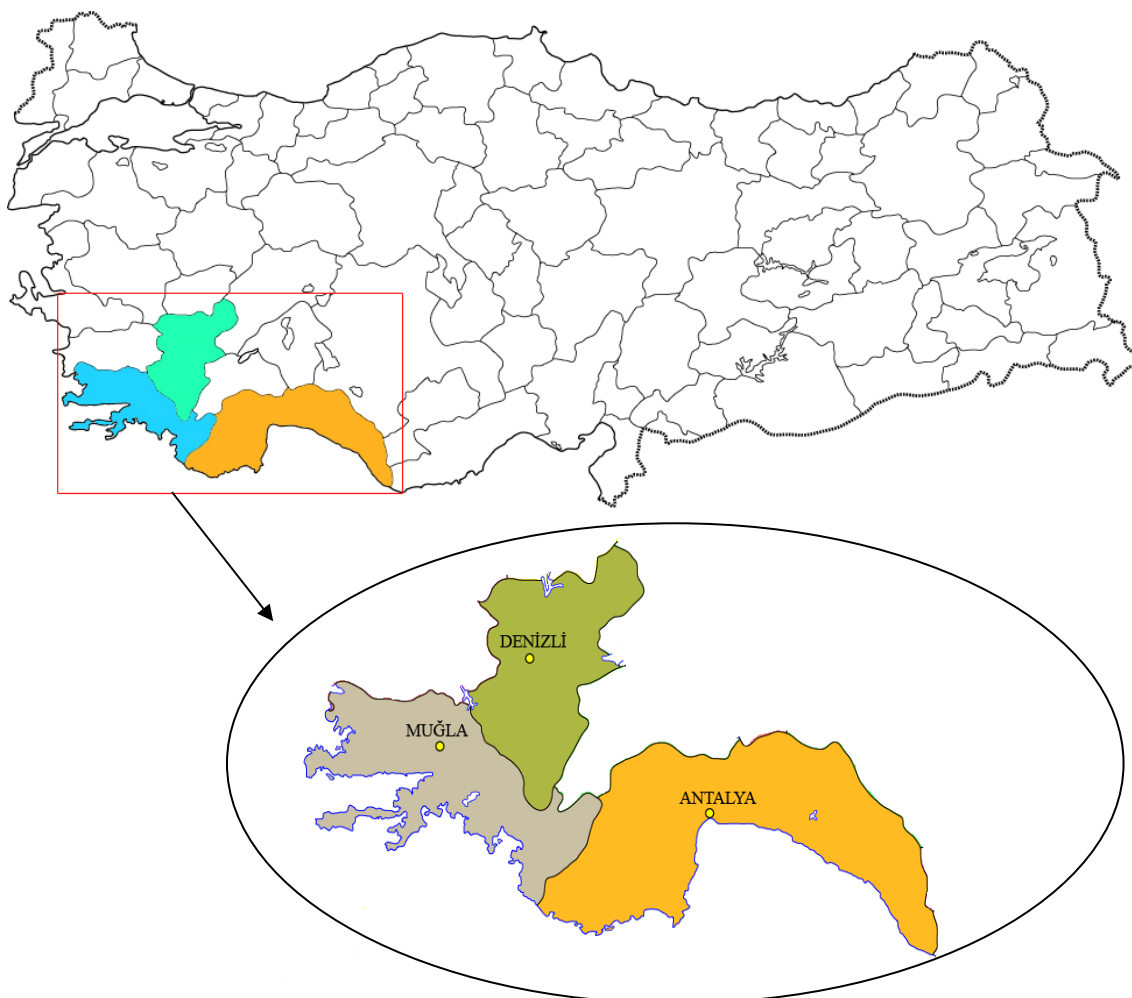
- **MAPs collectors:** To know exactly the norms of wild harvesting's activity.
- **Forest service:** To have "solicitation documents" for specific MAPs collected in large amounts, in order to know how the species should be harvested.
- **MAPs nurseries:** To have selected plant material (specific varieties), for the medicinal and perfumery sector.
- **MAPs farmers:** To have market information on MAPs' demand and prices and more information on the equipment for processing the dry herbs
- **Commercial sector:** To have regular provisioning of plants, with quality and documented traceability. Nowadays there is lack of organic MAPs and there is not enough offer in Catalonia (90% of the bulk product should be purchased abroad).

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3. Diagnosis of MAPs cluster in Denizli, Mugla and Antalya (Turkey)

Medicinal and aromatic plants in Turkey



**Denizli, Muğla provinces (Aegean region) and Antalya (Mediterranean region)
(46.382 km² – 5,9% of Turkey)**

The identification of native and naturalized plants of the Turkey, used as: food (including food and beverages); food additives (including processing agents and additive ingredients used in food preparations); animal food (including forage and fodder for vertebrates); bee plants (including pollen or nectar sources for honey production); invertebrate food (including plants eaten by invertebrates useful to humans e.g. silkworms); materials (including woods, fibers, tannins, latex, resins, essential oils, waxes, oils); social uses (including masticators, anti-smoking devices, hallucinogens, psychoactive drugs, contraceptives, and plants for ritual or religious purposes); vertebrate poisons (including poisonous plants for hunting and fishing); non-vertebrate poisons (including molluscicides, herbicides, insecticides, bactericides and fungicides); medicines (for human and veterinary uses); environmental uses (ornamental, hedges, windbreaks, soil improvement, erosion control, and indication of metals, pollution or underground water); and gene sources (including wild relatives of major crops).

Different MAPs species are known in Turkey:

- Foodstuffs: fresh (*Crocus*, *Rheum*, *Rumex*, etc) or cooked (*Malvae*, *Urtica*, *Gundelia*, *Apium* etc) herbs or flavouring properties (*Allium*, *Menthae*, *Thymus*, *Origanum*, etc.)
- Cosmetics: essential oil, perfumes and colognes, deodorants, hair products, beauty and skin treatment (*Rose*, *Lavandula*, *Aloe vera*, *Rosmarinus officinalis*, *Calendula officinalis*, *Urtica dioica*, etc.)
- Dyestuffs: Carpet and fabric dyeing (*Rubia* and *Gallae*)
- Drugs: Naturally growing or cultivated plants, usage of oils (*Ophiognomonina rosae*, *O. thymi*), aquas (*Aqua menthae*, *Aqua melissa*) and parts of the plants (*Semen pegani*, *Terebenthina*, *Radix liquiritae*, *Folia lauroceraci*, *Valonea*)

Many MAPs species are known by Turkish people, mainly from flora, but also other plants that have been introduced in the cultivation. Among these, we can outline the following:

Prunus amygdalus, *Capsicum frutescens*, *Colchicum speciosum*, *Mentha piperita*, *Salvia fruticosa*, *Crataegus monogyna*, *C. oxyacantha*, *Pimpinella anisum*, *Juniperus oxycedrus*, *Juniperus communis*, *Aesculus hippocastanum*, *Mentha spicata*, *Datura stramonium*, *D. Metel*, *Atropa belladonna*, *Rosmarinus officinalis*, *Rubus fruticosus*, *Triticum sativum*, *Pinus brutia*, *P. Sylvestris*, *Thea sinensis*, *Vaccinium myrtillus*, *Nigella sativa*, *Laurus nobilis*, *Malva sylvestris*, *Mentha pulegium*, *Papaver rhoeas*, *Rosa damascena*, *Papaver somniferum*, *Althaea officinalis*, *Ricinus communis*, *Tilia platyphyllos*, *T. rubra*, *T. argentea*, *Origanum vulgare* subsp. *hirtum*, *Plantago psyllium*, *Origanum onites*, *O. dubium*, *O. minutiflorum*, *O. syriacum* var. *bevanii*, *Capsicum annuum*, *Cuminum cyminum*, *Coriandrum sativum*, *Lavandula angustifolia* *latifolia*, *Lavandula angustifolia*, *Citrus* sp., *Glycyrrhiza glabra*, *Calendula officinalis*, *Melissa officinalis*, *Viscum album*, *Tussilago farfara*, *Helichrysum plicatum*, *Matricaria chamomilla*, *Taxus baccata*, *Citrus sinensis*, *Foeniculum vulgare*, *Allium sativum*, *Verbascum thapsiforme*, *Soja hispida*, *Calluna vulgaris*, *Humulus lupulus*, *Scolymus hispanicus*, *Spiraea ulmaria* (= *Filipendula ulmaria*), *Citrus aurantium*, *Nicotiana tabacum*, *Digitalis lanata*, *Olea europea*, *Orchis* sp., *Ophrys* sp., *Platanthera* sp., *Serapias* sp., *G. Arrostii*, *G. Bicolor*, *G. Graminifolia*, *Liquidambar orientalis*.

Cultivation; *Capparis ovata*, *Coriandrum sativum*, *Cuminum cyminum*, *Cynara scolymus*, *Echinacea* sp., *Foeniculum vulgare*, *Glycyrrhiza glabra*, *Hypericum perforatum*, *Lavandula angustifolia*, *Linum usitatissimum*, *Matricaria chamomilla*, *Melissa officinalis*, *Mentha piperita*, *Nigella sativa*, *Pimpinella anisum*, *Ricinus communis*, *Rosa damascena*, *Rosmarinus officinalis*, *Salvia officinalis*, *Sideritis* sp., *Silybum marianum*, *Origanum vulgare*, *Papaver somniferum*, *Ricinus communis*, *Trigonella foenum-graecum*, *Urtica dioica*.

Wild collection of MAPs in south-west Turkey

The main MAPs species collected from the wild are:

- Kekik (*Origanum* sp., *Thymus* sp., *Satureja* sp.).
- Dafne (*Laurus nobilis*).
- Sage (*Salvia fruticosa*, *Salvia tomentosa*, *Sideritis congesta*, *Sideritis stricta*, *Sideritis condensata*).
- Rosemary (*Rosmarinus officinalis*).
- Licorice root (*Glycyrrhiza glabra*).

- Linden (*Tilia argentea*, *T. platyphyllos*, *T. rubra*).

Usually, the harvesting begins before flowering for some species. On the other hand, harvesting is done after flowering to seed in some species. Therefore, the season continues until December June:

- Winter: *Rosmarinus officinalis*.
- Spring: *Hypericum perforatum*, *Rosmarinus officinalis*, *Plantago* sp., *Malva sylvestris*, *Origanum* sp., *Thymus* sp., *Satureja* sp., *Salvia fruticosa*, *Salvia tomentosa*, *Sideritis congesta*, *Sideritis stricta*, *Sideritis condensata*.
- Summer: *Origanum* sp., *Thymus* sp., *Satureja* sp., *Salvia fruticosa*, *Salvia tomentosa*, *Sideritis congesta*, *Sideritis stricta*, *Sideritis condensata*, *Lavandul* sp., *Tilia argentea*, *T. platyphyllos*, *T. rubra*., *Laurus nobilis*.
- Autumn: *Laurus nobilis*.

There are about 21.678 thousand ha (in 2015) used for collection in Turkey. Generally, they are public. No data is pointed in Denizli, Antalya and Muğla region.

Table 11. Natural areas in Turkey

Type	Total number	Total area (ha)
National parks	40	828,614
Nature parks	203	96,957
Nature preserve areas	31	48,657
Wildlife protection areas	81	1,192
Nature monuments	112	6,683
Grand total	299	1,033,646
Wetlands	135	1,919,893

Source: (<http://www.intechopen.com/books/advances-in-landscape-architecture/conservation-of-natural-plants-and-their-use-in-landscape-architecture>)

National parks in Turkey are one of the five protected areas in the country. Approximately, 1% of Turkey's total area consist of national parks.



Figure 5. Natural Parks in Denizli, Muğla, Antalya Region



Figure 6. Natural parks in Turkey

(Source:<http://www.intechopen.com/books/advances-in-landscape-architecture/conservation-of-natural-plants-and-their-use-in-landscape-architecture>)



Figure 7. Nature parks in Turkey

(Source:<http://www.intechopen.com/books/advances-in-landscape-architecture/conservation-of-natural-plants-and-their-use-in-landscape-architecture>)

Turkey has 41 National Parks and approximately 37 percent of their total area is forest ecosystems. Besides, Turkey has 41 Nature Parks and approximately 25 percent of them are forest ecosystems. Antalya homes to most number of national parks in Turkey.

Protection initiatives in Turkey are mostly in the form of in situ protection. There are various protected areas in Turkey which are under different institutions' authority and supervision and defined under certain laws. Turkey has signed many international conventions and protocols on Nature Protection.

These conventions are:

- Convention on Biodiversity Conservation (Rio Convention) (1997)
- Cartagena Protocol (2004)
- CITES (1996)
- Barcelona Convention (1988)
- Bucharest Convention (1994)
- Protection of Cultural and National Heritage (1983)
- Convention on Combating Erosion (1998)
- European Landscape Convention (2000)
- Bern Convention(1984)
- Ramsar Convention (1994)
- Kyoto Protocol (2009)

Following tables show the quantities of MAPs exported from Turkey

Table 12. Turkey's Export Quantity of Medicinal and Aromatic Plants (tons)

Plant name	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Kekik	10.42	12.202	11.213	9.683	11.475	12.957	13.159	13.964	14.813	15.491
Dafne	5.558	7.262	7.519	6.934	9.079	8.891	9.345	10.483	10.677	12.256
Cumin	7.202	4.900	4.209	2.367	5.822	7.695	7.316	3.732	7.942	6.011
Sage	1.689	1.710	1.530	373	1.545	1.643	1.771	1.490	1.416	1.693
Anise	2.259	2.593	2.003	2.658	2.053	924	982	1.838	1.944	3.809
Locust bean gum	4.102	2.705	3.623	518	3.130	2.136	2.198	1.363	2.472	2.242
Fennel	1.481	1.294	1.057	1.945	1.217	857	894	-	-	-
Sumac	990	976	965	1.175	1.245	1.177	1.213	1.206	1.292	1.539
Rosemary	505	576	432	573	620	685	641	664	758	849
Mint	49	45	153	125	309	572	327	166	190	205
Linden	253	177	80	27	179	117	86	64	68	77
Mahlep	113	104	109	102	159	53	799	144	102	71
Licorice Root	381	418	249	67	311	292	315	435	621	1.353
Çöven(<i>Gypsophila ssp</i>)	92	153	102	56	199	203	107	240	609	629
Spice mixtures	107	127	186	98	146	134	129	193	139	109
Other spices	126	168	137	139	102	120	136	164	187	287
1 Other MAPS	5.644	5.706	6.825	6.815	8.853	8.094	7.266	11.330	12.082	15.366
2	-	-	-	3	-	2	2	39	32,4	30,3
3	1.265	1.088	989	853	1.238	25	1.106	1.088	1.321	1.188
4	314	311	222	159	202	295	272	256	455	338
Total	42.55	42.515	41.603	34.670	47.884	46.872	48.064	48.859	57.120	63.543

Source: TurkStat, 2015.

Table 13. Turkey's Export Quantity of Essential Oils (1000 \$)

Essential oil	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Orange	3	-	11	30	10	34	-	5	489	256
Lemon	1	-	3	11	44	98	97	150	199	272
Other citrus	11	16	15	30	15	29	167	237	18	15
Mint	1	1	-	1	0	26	1	208	51	37
Kekik	1.104	1.132	1.271	1.584	1.369	1.233	1.050	1.294	2.561	3.129
Rose	7.174	7.594	9.383	11.210	8.492	9.157	10.301	12.613	10.748	13.961
Stearopten	3.118	2.905	1.987	3.737	1.033	359	1.100	896	1.420	3.815
1	1.608	1.843	1.309	2.959	4.836	140	159	228	285	316
2	964	638	714	339	479	832	457	134	249	138
3	346	183	379	285	57	28	59	56	48	55
Totally	14.330	14.312	15.072	20.186	16.335	11.936	13.391	15.821	16.068	21.994
Other Essential oil	3.456	3.188	6.546	8.019	10.142	4.370	7.060	6.336	6.912	7.781
Total	17.786	17.500	21.618	28.205	26.477	16.306	20.451	22.157	22.980	29.775

Source: TurkStat, 2015.

The type of harvesters, doing MAPs wild collection is:

- Farmers, especially women farmers.
- Farmer organizations.
- Industrialists.
- Traders who export or import MAPs products.

There are three cooperatives in the region:

- Sirtköy Agricultural Development Cooperative (SirtköyTarımsal Kalkınma Kooperatifi) (Manavgat/Antalya) .
- GözlerAgricultural Development Cooperative (GözlerTarımsa Kalkınma Kooperatifi) (Denizli).
- Gökbel Agricultural Development Cooperative Village Purpose (Gökbel Tarımsal Amaçlı Köy Kalkındırma Kooperatifi) (Ortaca/Muğla).

The wild MAPs are transformed with **drying and distillation**.

Some species are bulk traded. Some collectors and producers collect directly, and then do the drying, package and selling of herbal teas. And in some special cases, the harvester manufactures seasonings.

Cultivation of MAPs in south-west Turkey

Statistical data available are for all Turkey. There are not detailed database for the target region. Table 13 and 14 detail the main MAPs species produced in Turkey. Other species outside of these species on the list (Cumin, Anise, Hops, Red Pepper spice, Coriander, Lavender, Linseed) are grown in the target regions.

Table 14. Turkey's Growing Areas of Medicinal and Aromatic Plants (ha) (1ha=10da)

Plant name	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cumin	25.800	21.154	18.326	18.351	19.011	17.124	20.011	22.629	24.704	22.442
Anise	16.500	12.654	12.290	11.879	11.917	18.645	21.154	19.443	15.243	14.050
Kekik	4.700	5.885	6.075	8.413	8.495	8.535	7.770	9.428	8.913	9.295
Hops	0.253	0.267	0.283	0.284	0.326	0.355	0.357	0.344	0.354	0.353
Red Pepper (Spice)	7.800	6.696	7.128	7.774	9.137	10.404	9.175	11.267	11.273	10.850
Mint	0.871	0.989	0.936	0.975	1.114	1.173	1.104	1.046	1.064	1.065
Fennel	-	-	-	-	-	-	-	1.577	1.384	1.584
Coriander	-	-	-	-	-	-	-	1.100	1.100	1.100
Cumin	-	-	-	-	-	-	-	0.229	0.326	0.017
Sage	-	-	-	-	-	-	-	5.400	3.000	13.000
Rose	-	-	-	-	-	-	-	2.960	2.801	2.797
Nettle	-	-	-	-	-	-	-	0.300	0.300	0.300
Lavender	-	-	-	-	-	-	-	50.900	70.900	0.203
Lemon balm	-	-	-	-	-	-	-	45.000	50.500	50.500
Linseed	0.176	0.146	80.600	67.000	2.000	-	-	18.000	-	-
Total	56.100	47.792	45.122	47.745	50.003	56.237	59.573	69.048	66.191	62.880

Source: TurkStat, 2015

Table 15. Turkey's Production Amounts of Medicinal and Aromatic Plants (tons)

Plant name	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cumin	14.300	11.998	9.159	8.879	14.533	12.587	13.193	13.900	17.050	15.570
Anise	9.500	8.479	8.006	8.594	9.472	13.992	14.879	11.023	10.046	9.309
Kekik	6.400	7.979	5.350	10.082	12.329	11.190	10.953	11.598	13.658	11.752
Hops	1.280	1.384	1.423	1.555	1.650	1.842	1.759	1.752	1.852	1.832
Red Pepper (Spice)	45.000	45.861	67.213	60.000	196.900	186.272	162.125	165.527	198.636	186.291
Mint	7.750	9.591	9.376	9.824	10.998	11.772	12.160	12.598	14.143	14.700
Fennel	-	-	-	-	-	-	-	1.862	1.994	2.289
Coriander	-	-	-	-	-	-	-	1	1	1
Cumin	-	-	-	-	-	-	-	161	352	140
Sage	-	-	-	-	-	-	-	7	4	19
Rose	-	-	-	-	-	-	-	10.225	10.769	10.831
Nettle	-	-	-	-	-	-	-	0,42	0,42	0,42
Lavender	-	-	-	-	-	-	-	123	105	297
Lemonbalm	-	-	-	-	-	-	-	238	238	238
Linseed	86	84	48	40	1	-	-	13	-	-
Total	84.316	85.376	100.575	98.974	245.883	237.655	215.069	229.028	268.848	253.269

Source: TurkStat, 2015

Turkish statistics only gather information of few species: *Humulus lupulus*, *Cuminum cyminum*, *Foeniculum vulgare*, *Glycyrrhiza glabra*, *Hypericum perforatum*, *Lavandula angustifolia*, *Melissa officinalis*, *Mentha piperita*, *Nigella sativa*, *Pimpinella anisum*, *Rosa damascena*, *Rosmarinus officinalis*, *Salvia officinalis*, *Sideritis sp.*, *Origanum vulgare*, *Papaver somniferum*, *Urtica dioica*. and other industrial plants (eg. Mainly medicinal like as *Papaver somniferum*). But there are many other MAPs cultivated nowadays for small producers.

According to the National Statistics (2015), in 2014 were cultivated **62.880 ha** with MAPs in Turkey with a production of **253.269 t**, standing out Lemon balm (*Melissa officinalis*) 50.500 ha, Cumin (*Cuminum cyminum*) 22.442ha, Mint (*Mentha* spp.) 14.700 ha, Anise (*Pimpinella anisum*) 14.050 ha, Sage (*Salvia* spp.) 13.000 ha, Red Pepper for spice 10.850 ha.

Table 16. MAPs cultivation (drug yield and used part) in Turkey

Species	Used part	Drug yield (kg/ha)
<i>Capparis ovata</i>	Bud	25
<i>Coriandrum sativum</i>	Seed/Fruit	10
<i>Cuminum cyminum</i>	Seed/Fruit	7,5
<i>Cynara scolymus</i>	Leaf	120
<i>Echinacea</i> sp.	Root/Herb	90
<i>Foeniculum vulgare</i>	Seed/Fruit	10
<i>Glycyrrhiza glabra</i>	Root	60
<i>Hypericum perforatum</i>	Herb	65
<i>Lavandula angustifolia</i>	Flower	25
<i>Linum usitatissimum</i>	Seed	20
<i>Matricaria chamomilla</i>	Flower	12,5
<i>Melissa officinalis</i>	Herb	70
<i>Mentha piperita</i>	Herb	80
<i>Nigella sativa</i>	Seed	10
<i>Pimpinella anisum</i>	Seed/Fruit	7,5
<i>Ricinus communis</i>	Seed	50
<i>Rosa damascena</i>	Flower	80
<i>Rosmarinus officinalis</i>	Leaf	30
<i>Salvia officinalis</i>	Herb	50
<i>Sideritis</i> sp.	Herb	45
<i>Silybum marianum</i>	Seed	20
<i>Origanum vulgare</i>	Herb	75
<i>Papaver somniferum</i>	Capsule	5
<i>Ricinus communis</i>	Seed	50
<i>Trigonella foenum-graecum</i>	Seed	20
<i>Urtica dioica</i>	Herb	40

Source: <http://ztbb.org/festival/geleneksel-tip-festivali-2009/turkiyede-tibbi-aromatik-bitkilerin-kulturu>

Table 17. General Data of Organic Agricultural Production in Turkey (Including the Transition Period)

Years	Type of Products	Number of Farms	The Farming Area (ha)	Wild Collection Area (ha)	Total Production Area (ha)	Total Production (t)
1994	26	1. 705	-	-	5. 216	8. 843
2002	150	12. 428	57. 365	32. 462	89. 827	310. 125
2003	179	14. 798	73. 368	40. 253	113. 621	323. 981
2004	174	12. 806	108. 598	100. 975	209. 573	378. 803
2005	205	14. 401	93. 134	110. 677	203. 811	421. 934
2006	203	14. 256	100. 275	92. 514	192. 789	458. 095
2007	201	16. 276	124. 263	50. 020	174. 283	568. 128
2008	247	14. 926	109. 387	57. 496	166. 883	530. 225
2009	212	35. 565	325. 831	175. 810	501. 641	983. 715

Source: <http://www.tarim.gov.tr> (2011)

Even in the Organic production statistics (2011) show different numbers. In 2009, 501.641 ha were registered for organic cultivation in Turkey, being really productive 983.715 t.

The MAPs species produced in field conditions in South-West Turkey are:

Capparis ovata, *Coriandrum sativum*, *Cuminum cyminum*, *Cynara scolymus*, *Echinacea sp.*, *Foeniculum vulgare*, *Glycyrrhiza glabra*, *Hypericum perforatum*, *Lavandula angustifolia*, *Linum usitatissimum*, *Matricaria chamomilla*, *Melissa officinalis*, *Mentha piperita*, *Nigella sativa*, *Pimpinella anisum*, *Ricinus communis*, *Rosa damascena*, *Rosmarinus officinalis*, *Salvia officinalis*, *Sideritis sp.*, *Silybum marianum*, *Origanum vulgare*, *Papaver somniferum*, *Ricinus communis*, *Trigonella foenum-graecum*, *Urtica dioica*.

As it is shown in Table 12, the MAPs plantations have increased every year.

In Turkey last year, about 13.000 tons of oregano was produced in a total of 90.000 hectares; 11.000 tons came from Denizli.

Plantations characteristics

The MAPs plantations are established since 1995, and have an average surface of 1-10 ha. Only one company has got 300 ha of *Origanum vulgare* plantations in İzmir. But the majority of the plantations were established in the last 10 years.

The property of the plantations could be private or rented, belonging to a cooperative or sometimes being contracted farming. But the maintenance of the crops is usually a family business.

In own data have been identified 48 companies producing herbs in Denizli, Muğla and Antalya in different ways: 5 and 3 which are MAPs associations have field plantations (some have several activities). So, from 5 producers, **more than 98% of them have private property**.

The type of production used could be **both conventional and organic**, following good agricultural practices. According to our data in Turkey (2016), 5 producers provided information on the production system: 3 are using conventional techniques, 2 are using organic techniques.

There are several nurseries providing vegetal material (no exact data available). The promoted species are: Kekik (*Origanum sp.*, *Thymus sp.*), sage (*Salvia officinalis*, *Salvia fruticosa*, *Salvia tomentosa*), rosemary (*Rosmarinus officinalis*), and Lavender (*Lavandula x intermedia*, *Lavandula angustifolia*).

The main raw material obtained from the MAPs cultivation, is fresh and dry herb.

According to own data target region (2016) to 5 producers provided information on the type of farming machine used in the crops: all of them have tractor and motorized plough, 2 have planting machine and only 1 have harvester machine.

According to own data target region (2016) to 5 producers provided information on the type of transforming equipment used to process the raw material:

- All producers have **dryer equipment**, thus main obtained raw material is dry herb. The preferred type of dryer is using natural air, in a closed room with shelves.
- Only 2 producers have **steam distiller**.
- Only one producer has **processing machinery** for transforming the dry raw material.
- 2 producers have **packaging machinery**, like as range packaging of mixer-packager in bags, and only 1 producer have labeling machinery.
- Only one producer has other types of processing machinery (mainly for processing cosmetics).

Entrepreneurial model

The producers commercialise the MAPs raw material both in bulk and retail, also combining the production with the end products manufacturing: herbal medicinal aromatic oils, herbal drugs, cosmetics, perfumes, food (soups, creams, and health foods), food supplements, herbal teas and pesticides.

According to our data in Turkey (2016) to 48 companies provided information on the type of commercialization: 25 are wholesaler/distributor, 19 are retailer and 4 are raw material supplier.

48 producers provided information on the sector where the selling is addressed in relation to products:

- 32 to food sector.
- 3 to herbalist sector.
- 2 to cosmetic sector.
- 30 to medicinal sector.

According to 48 producers provided information on the sector to provided information on the product distribution:

- 19 are commercialising by a retailer.
- 25 are selling to a wholesaler/distributor.
- 4 are raw material supplier.
- 3 are distributing the product by a cooperative
- 1 is exporting.

From these 48 enterprises, 8 are considered Small and the other Micro in Turkey.

Prices

Fresh herb:

- Dafne (*Laurus nobilis*): 1.00 TL/kg

Essential oil retail:

- Sage (*Salvia* sp.): 20,00 TL/10 cc
- Dafne (*Laurus nobilis*): 20,00 TL/10 cc
- Kekik: 15.50 TL/10 cc
- Rosemary (*Rosmarinus officinalis*): 17,50 TL/10 cc

Dry herb:

- Sage (*Salvia* sp.): 6,00 TL/kg
- Dafne (*Laurus nobilis*): 5,00 TL/kg
- Kekik: 5.50 TL/kg
- Rosemary (*Rosmarinus officinalis*): 5.00 TL/kg

Guidance to producers

If requested by farmers, some institutions (acting as Agricultural/Forestry Extension Service) provide training and assessment on MAPs plantations establishment:

- Agricultural Research Institute (Information-training).
- Directorate of Provincial Food Agriculture and Livestock (Information-training-nurseries).
- General Directorate of Forestry (Information-training).

In addition, farmer training activities and demonstration activities are supported by some projects.

In relation to marketing, last year, some manufacture and producers have planned to produce MAPs including R&D and producing together. They want to launch from Turkey to world.

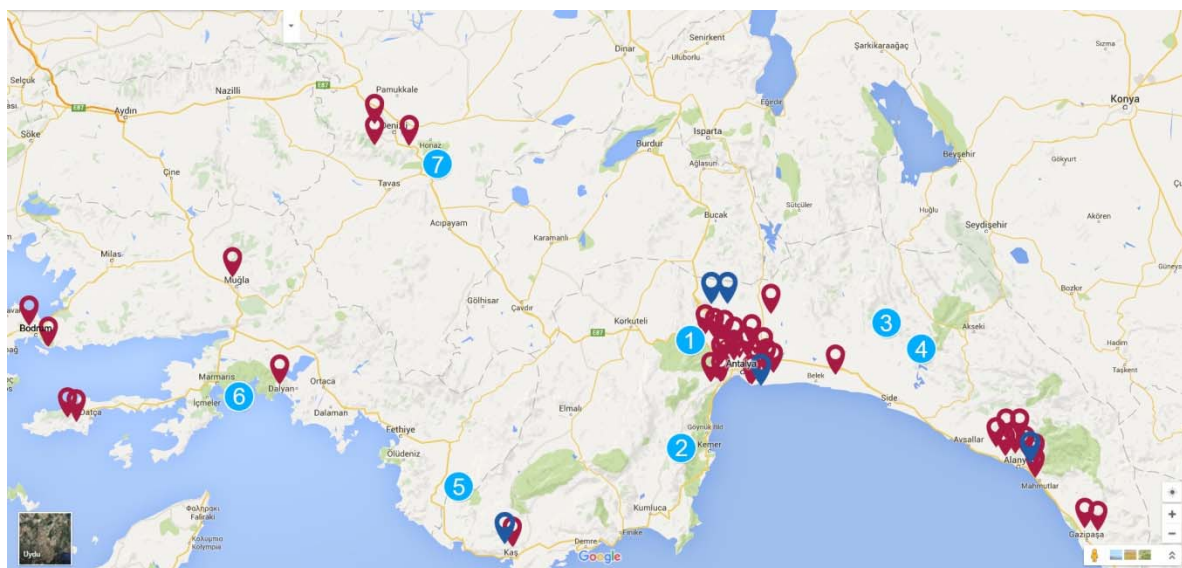
The technical information is disseminated to producers in different formats:

- Demonstration activities.
- Supported by projects (It be included training in project).
- Workshops.
- Brochures.
- Leaflets.
- Seminars.
- Field days.
- Flora trip.
- Books.
- Websites.

Furthermore, NGOs, Research institutions (Government+NGOs) and Universities are offering training, seminars and workshops.

Stakeholders in the MAPs value chain

MAPs producers



MAPs producers in Antalya, Denizli, Muğla (Turkey) in 2016



MAPs producers (cultivation) in Antalya, Denizli, Muğla (Turkey) in 2016

Figure 8. MAPs producers in Antalya, Denizli, Muğla (Turkey) (wild collection, cultivation, garden, nurseries)

Table 18. Existing cultivation MAPs producers in Antalya, Denizli, Muğla (Turkey) in 2016

MAPs producers	Location	Type of production	Raw material	Elaborating products	Services
Morlab Biotechnology	Antalya Technopolis Ar&Ge Building No 109	Conventional-wild harvesting	Fresh herb	Cosmetics	
	www.morlab.com.tr				
Evrenler İhr.İth.Tur. Tic. Ltd. Şti.	Çukurbağ Yarımadası Aydın Köker Sok. No : 7 Kaş	Organic, Wild harvesting	Dry herb	Bulk product, herbal teas, Seasonings	
	info@evrenlerherbs.com				
NU-KA İth. İhr. Paz.San. Tic. Ltd.Şti.	Hacet Mah. Canlı Sok. Mevlüt Kalay İşhanı No:12/D-E Alanya	Organic, Conventional	Dry herb, Essential oil	Bulk product, Cosmetics, Perfumes	
	http://www.nuka.com.tr				
İnan Tarım Ticaret - Ecodab Gıda Tar. Koz. Yağ. San. ve Tic. Ltd. Şti.	Güzelyurt Mah. 224 Sok. No:35/A	Conventional, Wild harvesting	Dry herb, Fresh herb, Essential oil	Bulk product, herbal teas, Seasonings	
	https://www.ecodab.com.tr				
WBT Tarım Ürünleri San.ve Tic. A.Ş.	Organize Sanayi Bölgesi 2. Cadde 07190 Kepez	Conventional, Wild harvesting	Dry herb	Bulk product, herbal teas, Seasonings	
	http://www.wbttarim.com/				

Source: own data (2016)

Table 19. Existing MAPs producers in Antalya , Denizli, Muğla (Turkey) in 2016

MAPs enterprises	Location	Producer	Client	Products	Other
Talya Bitkisel http://www.talyabitkisel.com/tr	Manavlar Mah. Armutlu Sok. No:108 Kızıllı - Kepez , Antalya	Harvester (wild collection)	Wholesaler /distributor	Cosmetics- Medicinal- Essences / perfumery	
MorlabBiotechnology www.morlab.com.tr	Antalya TechnopolisAr&G e 1 Building No :109 , Antalya	Farmer (cultivation), Harvester (wild collection))	Wholesaler /distributor	Cosmetics- Medicinal- Essences / perfumery	
WBT Tarım Ürünleri San.ve Tic. A.Ş. http://www.wbttarim.com/	Organize Sanayi Bölgesi 2. Cadde 07190 Kepez , Antalya	Farmer (cultivation), Harvester (wild collection)	Wholesaler /distributor	Food,Medicin al	
Mutlu Baharat San. Tic.A.Ş. www.mutlubaharat.com.tr	Çaybaşı Mah.1343 Sok.Aycan Apt. Antalya	Harvester (wild collection)	Retailer	Food,spices packaging	
Çalkaya Tarım 90 242 4681130	Güzelyurt Mah. Lara Cad. No: 219 Sok. No:13, Antalya	Harvester (wild collection)	Retailer	Food,spices packaging	
Antalya Konserve Pekmez Gıda Nak.Tar.Tur.San.Ltd.Şti. 90 242 3113424	Değirmenönü Cad. Zerdalilik Mah. Yeşim Apt. No:10 Muratpaşa , Antalya	Harvester (wild collection)	Retailer	Food	
Evrenler İhr.İth.Tur.Tic.Ltd.Şti. info@evrenlerherbs.com	Çukurbağ YarımadasıAydın Köker Sok. No: 7 Kaş , Antalya	Farmer (organic cultivation),H arvester (wild collection)	Wholesaler	Food,Medicin al	Export
Mehmet Armağan 90 242 243 44 20	Kanal Mah. 4762 Sok. No:19 , Antalya	Harvester (wild collection)	Retailer	Food	
Doğa Bitki Ürünleri Ltd.Şti. www.defnedoga.com.tr	Elmalı Mah. Subaşı Cad. Kasapoğluşhane No:28-17/4 , Antalya	Harvester (wild collection)	Retailer	Medicinal, Essences/ perfumery, Cosmetics	Spices
Öztaç Gıda Tarım Tur. Tic.Ltd. Şti. 90 242 3113424	Değirmenönü Cad. No: 10 , Antalya	Harvester (wild collection)	Retailer	Food	Spices
Princes Gıda San.Tic.Ltd. Şti. http://www.princessmarketing.com.tr/ www.citello.com	OoganizeSanayi Bölgesi1.Kısım 6.Cad.No:9 ,25/A Antalya	Harvester (wild collection)	Retailer	Food, Medicinal	Nut
MEZO Ek.Ür.Gıd.Tar.İth. İhr.San.Ltd.Şti. http:// www.mezo-organics.com	Org.San.Böl.WBT Tar.A.Ş.Binası 2 Cad.Yeniköy Antalya	Harvester (wild collection)	Wholesaler /distributor	Food,Medicin al	Export, Processing, Production, Marketing, Packaging

NU-KA İTH.İHR.PAZ.SAN.TİC.LTD.ŞTİ http://www.nuka.com.tr/	Hacet Mah. Canlı Sok.Mevlüt Kalay İşhanı No:12/D-E Alanya , Antalya	Farmer (cultivation), Harvester (wild collection)	Wholesaler /distributor	Medicinal,Essences / perfumery,Cosmetics,	Essential oil
Defne Şifalı Bitkiler Ltd. Şti. https://www.gmdü.net/corp-	Elmalı Mah. 13 Sok. Subaşı Cad.Antalya	Harvester (wild collection)	Wholesaler /distributor	Food,Medicinal	Essential oil
İnan Tarım Ticaret-Ecodab Gıda Tar. Koz. Yağ. San. ve Tic. Ltd. Şti. https://www.ecodab.com.tr	Güzelyurt Mah.224 Sok. No:35/A Antalya	Farmer (cultivation), Harvester (wild collection)	Wholesaler /distributor,Retailer	Food,Medicinal	Essential oil
Altes Alanya Tesisleri San. ve Tic.Ltd.Şti. https://www.altes-tr.com	Elmalı Mah.21 Sok. No:1 Şerbetçi Apt.Kat:3Antalya	Harvester (wild collection)	Wholesaler /distributor	Medicinal	Essential oil export
Akdeniz Doğal Tarım Gıda San.Tic.Ltd.Şti. 90 242 3221201	Cebesoy Cad. Sinan Mah. 1261 Sok. Nazlıhan Apt. 2-EAntalya	Harvester (wild collection)	Retailer	Food,Medicinal	Retailer
AlbaSuÜr. Gıdaİht. Mad. Ltd. Şti.	Sedir Mah.725 Sok. No: 4/4 Şencan Apt.Antalya				
NBT Eterik Yağ İmalatı Ticaret Ltd. Şti. nbt@nbt.t.com	Saray Mah. Kültür Cad. Şen Pasajı No:5/10Antalya	Harvester (wild collection)	Wholesaler /distributor	Medicinal	Essential oil export (Origanum majorana)
Antalya Yenigün Gıda Dış Tic. Ltd. Şti. http://www.yenigungida.com.tr	Altınova Mah. Honamlı Sok.No:4/2Antalya	Association	Wholesaler /distributor	Food	Jam and other products
Saimoğlu Ticaret 90 242 4248335	Odabaşı Köyü Yazla Mevkii No: 9Antalya	Harvester (wild collection)	Raw material supplier	Medicinal	
Şirinyalı Orman ve Tarım Ltd. Şti. 90 242 3169362	Kırcami Mah. Yalı Cad.No:3/AAntalya	Harvester (wild collection)	Wholesaler /distributor	Medicinal	Raw material supplier
Yalçın Ticaret 90 242 5722513	İstiklal Mah. Alanya , Antalya	Harvester (wild collection)	Wholesaler /distributor	Medicinal	Raw material supplier
İlçililer Tur. GıdaEterik Yağ. San. Tic. Ltd. Şti. 90 242 5119219	Ş.Hane Mah. Tevfikiye Cad. Bekiroğlu Apt. No:13 / 17 Alanya, Antalya	Harvester (wild collection)	Wholesaler /distributor	Medicinal	
Akasya İletişim Beton Ambalaj Orm. ve Tar. Ltd. Şti. 90 242 340 12 48	Menderes Mah. Güler Sok. No:22 Altınova , Antalya	Harvester (wild collection)	Wholesaler /distributor	Food	Raw material supplier

Harnup Gıda Tar. Tic. San. İhr. İth. Ltd. Şti. http://www.keciboyunuzcu.com	Sanayi Sitesi B Blok No:3 Gazipaşa, Antalya	Harvester (wild collection)	Retailer	Food, Medicinal	Retailer for medicinal and food
Arhan Medikal Özel Sağ. Tarım Ür. Ltd .Şti. http://www.arhanmed.com	Gençlik Mah. 1326 Sok. Metur Hotel No:59 K:6, Antalya	Harvester (wild collection)	Retailer	Food, Medicinal	
İpek Baharat 90 242 2487530	Tahıl pazarı Mah. İsmetpaşa Cad. 55/A, Antalya	Harvester (wild collection)	Retailer	Food	Spices
Oba Kuruyemiş Tic. ve San. A.Ş. http://www.sevilenkuruyemis.com http://www.obakuruyemis.com	Cikcilli Kasabası HacıbabaMez. Karşısı Alanya , Antalya	Association	Retailer	Food	
Alka Lazer Kutu Ambalaj Orman Tarım Ürünleri Gıda Sanayive Ticaret Ltd.Şti. 90 242 340 25 88	Cikcilli Kasabası HacıbabaMez. Karşısı Alanya , Antalya	Association	Retailer	Food	
İçs Bakliyat Gıda İnş. San. Tic. Ltd.Şti. http://www.caglarsoybakliyat.com	Yenimahalle 2452 Sok. Kepez , Antalya	Association	Retailer	Food	
Kamaş Kuruyemiş Gıdave Tem. Mad. Tar. Ürn. Tur. İnş. Teks. İml. İh. İt. San. Tic. Ltd.Şti. http://kamasbaharat.com/tr/	Cumalı Mah. Atatürk Sok. No:119 Serik , Antalya	Association	Retailer	Food	Spices
Evens Gıda ve İhtiyaç Maddeleri İnş.Tah. Tic. Ltd.Şti. 90 242 3250652	Özgürlük Mah. Mehmet Akif Ersoy Cad. Topçuoğlu Apt. No:76/B , Antalya	Harvester (wild collection)	Wholesaler /Distributor	Food	
Kalburoğulları Gıda Tar.Ür.Bah.K.Yemiş Taş.Eml.İnş.Tur.Oto.Or.Ür.İth.İhr. San. Tic.Ltd.Şti. http://www.kalburogullari.com	Kızılgüney Mah. Köprübaşı Sok. No: 24 Gazipaşa , Antalya	Association	Retailer	Food,Medicin al	Carop, dafne,oreg ano,almond
Botanika Tar. Ür. Koz. Gıda Yağ. San. Tic. Ltd. Şti.	Kocalar Köyü Dikmen Mah. No: 43 Alanya, Antalya	Association	Wholesaler /distributor	Medicinal	Essential oil export
Kimtar Tarım Gıda Turizm San. ve Tic.Ltd.Şti. http://www.keboy.com.tr	Altınova Orta Mah.Özen Sok.No:68 , Antalya	Association	Wholesaler /distributor	Food	Carop Powder- Molasses
Doğa BitkiÜrünleri Ltd. Şti. http://www.doga.com	Elmalı Mah.Subaşı Cad.No:23/17 Antalya	Association	Retailer	Food,Medicin al	Herbal Tea
Erüst TarımÜr.Paz. Ve Tic.Ltd.Şti http://www.erusttarim.com.tr	Tekke Köyü Zeybekler Mah. Aşağıoba Yolu No:22 07100 Gebiz Antalya	Association	Wholesaler /distributor	Food	

Dural Tarım Ürünleri ibrahimdural77@mynet.com	Hacı Memiş Ağa Sok. No:4 Tolga Apt. Dk:6 Şeyh Mah. Muğla	Association	Wholesaler /distributor	Food, Medicinal	
MMU-NAT Bitkisel İlaç ve Doğal Sağlık Ürünleri İmalat İthalat İhr. ve Tic. www.immunat.com.tr	Atatürk Cad. Merkez Mah. No:106 Yalıkavak – Bodrum , Muğla	Association	Retailer	Medicinal	
Datça Köy Ürünleri Turizm Ticaret ve Sanayi İth. İhr. Ltd. Şti. http://www.datcakoyurunleri.com.tr	Sındı köyü Datça Öğretmenlerevi dükkan No : 2 Datça , Muğla	Association	Retailer	Food, Medicinal	
Çalışkan Tarım Ürünleri http://herbsandspices.caliskantarim.com	Topraklık Mah. 630 Sok. No:9-B Denizli	Association	Wholesaler /distributor	Food, Medicinal	Herbs and spices, essential oil, mushrooms
Arsılanlar Toprak Mahsülleri San. Ve Tic. Ltd. Şti. http://www.arslanlarbaharat.com/	Bozburun Mah. 7026 Sok.No:13 Merkezefendi , Denizli	Association	Wholesaler /distributor	Food	Spices
Altıntaş Baharat http://www.altuntas.com.tr/tr/iletisim.html	Bozburun Mah. Bozburun Cad. No:9/A Merkezefendi , Denizli	Association	Wholesaler /distributor	Food, Medicinal	
Ören Tur Tic Mad İşl Ltd Şti http://www.trsektor.com/firma/oren-tur-tic-mad-isl	Reşadiye Mah. Datça	Association	Wholesaler /distributor	Food	Almond

Table 20. MAPs associations dealing in Antalya, Denizli, Muğla (Turkey) in 2016

MAPs associations	Location	Producers	Industry	Retailers	Others
S.S.Güzelbağ Tarımsal KalkınmaKoop.	Güzelbağ Kasabası Alanya	Cooperative	Food, Medicinal	Rawmaterial supplier	Dafne
S.S.Bayır Tarımsal KalkınmaKoop.	Güzelbağ Kasabası Bayır Köyü Alanya	Cooperative	Food, Medicinal	Rawmaterial supplier	Dafne
S.S. Ekincik Köyü Tarımsal KalkınmaKoop.	Ekincik Köyü Köyceğiz	Cooperative		Rawmaterial supplier	

Businesses surrounding the MAPs production

Contract farming

- AROMED TARIM VE GIDA ÜRÜNLERİ LTD.ŞTİ.Adana/Turkey
- Martin Bauer Isparta /Turkey

Wholesalers-Retailers

- Kılıç Baharat İstanbul/Turkey
- Karakaş Baharat İstanbul/Turkey
- Akan Baharat İstanbul/Turkey
- Topçu Baharat İstanbul/Turkey
- Zahter Lokman Bursa/Turkey
- Doğan Baharat İstanbul/Turkey

MAPs collectors- producers, Importation and exportation activities

- Kütaş Tarım Ürünleri Dış Ticaret ve San. A.Ş. , İzmir/Turkey
- WBT Tarım Ürünleri San. ve Tic. A.Ş. H.,Antalya/Turkey
- Talya Bitkisel Ürünler Tic. Ve San. Ltd. Şti.,Antalya/Turkey
- İnan Tarım Ekolojik Doğal Aromatik Bitkiler, Antalya/Turkey
- Manolya Doğal ve Aromatik Ürünler Gıda San. ve Tic. Ltd. Şti., Isparta/Turkey
- NBT Eterik Yağ İmalatı Tarım Gıda İthalat İhracat San. Tic Ltd. Şti., Antalya/Turkey
- BOTANİKA Tarım, Antalya/Turkey
- Nu-Ka Defne Esencia Nuri Kalay(Şirket Müdürü), Antalya-Isparta /Turkey
- Altes (Essential Oils Manufacture Trading) Alanya Tabii Esanslar Sanayi ve Ticaret Ltd. Şti, Antalya/Turkey
- Evçay, Anadolu Bitkileri Gıda San Tic. Ve Paz Ltd. Şti, İstanbul/Turkey
- Aksu Vitalİstanbul/Turkey
- Türer A.Ş., İzmir/Turkey
- Doğal Pazar Antalya/Turkey
- Defne Doğa Antalya/Turkey
- Robertet İtiryat San.ve Tic. Ltd. Şti Isparta/Turkey

Administration surrounding MAPs production

For the wild collection activity, there is a general Forestry legislation that regulates the collection of non-wood forests products including the MAPs, but giving general indications on the species and habitat preservation. For sustainable collection, international guidelines should be followed.

In Turkey,

- The Ministry of Forestry's Law prohibit benefiting from the non-wood forest products. However, it is possible to make use of these products after obtaining permission
- The Agriculture Ministry's plant collection regulations. After obtaining permission can be collected.

There is no legislation regulating the cultivation of MAPs in Turkey and producers should follow the recommendations of international guidelines. The cultivation of MAPs and the distillation is recorded as economic activity, and some species are considered for crop insurances like Spain.

Table 21. Existing legislation governing the collection, production and commercialization of MAPs in Turkey

Legislation / Norm	Regulation area	Type of products	Type of regulation
National (TURKEY)			
Orman Ürünleriinden Faydalanmak İsteyenlere Verilecek İziinlere Ait Tebliği Tebliğ No : 289 Tasnif NO : İv-1559	Forestry, Enviroment/Biodiversity	Food, Medicinal	Legislation (Statutory laws)
Description: The Regulation on Giving Permission of Getting Benefit from Forest Products -Benefit from basis of permissions to who want to export the forest productsand It regulates the procedures.	Species concerned (You can get detailed information on the website)	http://www.ogm.gov.tr/ekutuphane/Tebliğler/Orman%20Ürünlerinden%20Faydalanmak%20İsteyenlere%20Verilecek%20İzinlere%20Ait%20Tebliğ.pdf	
Odun dışı orman ürünlerinin envanter ve planlaması ile üretim ve satış esasları tebliği-tebliğ no:297	Trade,Forestry Manufacturing	Food, Medicinal,Cosmetics, Perfumes	Administrative proceeding
Description: The Regulation on Harvesting and Selling Principles of NWFP;-to within the planned utilization of non-wood forest ecosystem sustainability principles from the outside of the wood raw material to produce products and services; - non-wood forest products and ecosystem services;- to arrange non-wood forest products production and sales of inventory and planning principles	Species concerned (You can get detailed information on the website)	http://www.ogm.gov.tr/Lists/Duyurular/Attachments/90/297_SAYILI_TEBLİĞ.pdf	
Doğal Çiçek Soğanlarının Üretimi, Doğadan Toplanması Ve İhracatına İlişkin Yönetmelik	Environment / Biodiversity,Agriculture	Food,Medicinal,Cosmetics, Perfumes,soup, etc	Regulations
Gıda, Tarım ve Hayvancılık Bakanlığından:DOĞAL ÇİÇEK SOĞANLARININ 2016 YILI İHRACAT LİSTESİ HAKKINDA TEBLİĞ (TEBLİĞ NO: 2015/47)			
Description: Regulation of Collection, Production and Export of Natural Flower Bulbs ;;-to eliminate unsustainable collection of threatened wild flower bulbs;- to develop a long-term economic alternative for villagers formerly involved in collection, based on village-scale production; -to supply high quality flower bulbs to the international bulb market.	Species concerned (You can get detailed information on the website)	http://www.resmigazete.gov.tr/eskiler/2016/01/20160117-2.htm	
Evrensel Tüketici Hakları 2. Maddesi, Sağlık ve Güvenliğin Korunması Hakkı	Hygiene and Safety	Food, Medicinal,Cosmetics, Perfumes, etc.	Legislation (Statutory laws)
Description: Article 2 of the Universal Consumer Rights, Health and Safety Protection of Rights;- to protection of consumer health and safety;- to protection of economic interests of consumers;- to publicize consumer complaints or sound;- to representation of consumer - Consumer illumination, training and the right to be	Species concerned (You can get detailed information on the website)	http://www.tuketici.gov.tr/source.cms.docs/etuketici.gov.tr.ce/docs/yayinlar/BILINCLİ_TUKETİCİ.pdf	

Legislation / Norm	Regulation area	Type of products	Type of regulation
informed.			
Organik tarimin esasları ve uygulanması sayı : 27676	Manufacturing, Hygiene and Safety, Trade	Food, Medicinal, Cosmetics, Perfumes, etc.	Regulations
Description: PRINCIPLES AND IMPLEMENTATION OF ORGANIC FARMING-Protection of ecological balance, the implementation of organic agricultural activities, regulation of organic agricultural production and marketing, development, to determine the procedures and principles for dissemination.	Species concerned	http://www.resmigazete.gov.tr/eskiler/2010/08/20100818-4.htm	
Bitki genetik Kaynaklarının Toplanması Muhafazası ve Kullanılması Hakkında Yönetmelik Sayı:21316	Environment / Biodiversity, Agriculture	Food, Medicinal	Regulations
Description: Regulation on the Protection and Utilization of Plant Genetic Resources - to protect and improve the Turkey plant genetic resources, survey, collection, collected material storage, production, regeneration, characterization, evaluation, is designed to establish rules concerning the documentation and exchange.	Species concerned	http://www.tarim.gov.tr/TAGEM/Belgeler/yayin/Bitki.pdf	
Milli parklar kanunu Sayı: 2873	Forestry, Environment / Biodiversity	N/A	Legislation (Statutory laws)
Description: NATIONAL PARKS LAW-to perform the functions such as designation, organization, protection, development, management and advertisement of national parks, nature parks, nature monuments, nature conservation areas and wetlands.	Species concerned	http://www.milliparklar.gov.tr/korunanalanlar/belgeler/2873.pdf	
Biyogüvenlik Kanunu Kanun No. 5977	Agriculture, Environment / Biodiversity	Food, Medicinal	Legislation (Statutory laws)
Description: BIOSAFETY LAW-to establish and implement a biosafety system in order to prevent the potential risks of the genetically modified organisms and products thereof obtained through modern biotechnological means within the context of scientific and technological advancements;- to protect human, animal and plant health; safeguard and ensure the sustainable use of the environment and biological diversity and to determine the procedures and principles governing the control, regulation and monitoring of these activities.	Species concerned	http://www.resmigazete.gov.tr/eskiler/2010/03/20100326-7.htm	
Ulusal Biyolojik Çeşitlilik Stratejisi ve Eylem Planı 2007	Environment / Biodiversity	N/A	Regulations
Description: National Biodiversity Strategy and Action Plan; - to conserve and sustainably use biological diversity and share the benefits of genetic resources equitably.	Species concerned	http://www.nuhungemisi.gov.tr/DosyaRaporSunum/Belgeler/bb951776-e874-40ce-842b-d90ae82b6381.pdf	

Legislation / Norm	Regulation area	Type of products	Type of regulation
International			
CITES: Nesli Tehlike Altında Olan Yabani Hayvan ve Bitki Türlerinin Uluslararası Ticaretine İlişkin Sözleşmesi,1996	Environment / Biodiversity	N/A	Legislation (Statutory law)
Description: CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) - to ensure that international trade in specimens of wild animals and plants does not threaten their survival	Species concerned	http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.5427&MevzuatIliski=0&sourceXmlSearch=	
Rio Bildirgesi (Çevre ve Kalkınma Konusunda Rio Deklarasyonu)	Environment / Biodiversity	N/A	Legislation (Statutory laws)
Description: Rio Declaration on Environment and Development- The goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people.	Species concerned	https://www.tubitak.gov.tr/tubitak_content_files/vizyon2023/csk/EK-14.pdf	
Doğal ve Yabani Hayvan ve Bitki Koruma AB Konsey Yönergesi 92/43 EEC, 1992(Üye Devletler arasındaki ticareti düzenler)	Environment /Biodiversity	Five listed medicinal plants	Regulations
Description: The EU Council Directive 92/43 EEC, 1992, on the Conservation of Natural Habitats and Wild Fauna and Flora(regulates trade between Member States); to directive being to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements.	Species concerned	http://www.central2013.eu/fileadmin/user_upload/Downloads/Document_Centre/OP_Resources/HABITAT_DIRECTIVE_92-43-EEC.pdf	
Avrupa Yaban Hayati ve Yaşam Ortamlarının Korunması (Bern) Sözleşmesi	Environment / Biodiversity	N/A	Regulations
Description: The Bern Convention on the Conservation of European Wildlife and Natural Habitats; -to conserve wild flora and fauna and their natural habitats -to promote cooperation between states -to give particular attention to endangered and vulnerable species including endangered and vulnerable migratory species	Species concerned	http://jncc.defra.gov.uk/page1364 , http://did.ormansu.gov.tr/did/Files/Belgeler/AvrupaBirligi/AvrupaBirligiCevreMevzuati/DogaKoruma/BERNSozlesmesi.pdf	

Needs for the Turkish MAPs sector

The most important needs for the MAPs in Turkey are:

- Public awareness program for stakeholders and interest groups on the legislation related plant genetic resource conservation and utilization.
- To develop a sample natural resource cooperative management model.
- At every step, to have an efficient controlling mechanism and education of natural resource utilization.
- Development of natural resource utility model by consideration of common goal.
- Cultivation techniques and detailed definition of the MAPs.
- Preparation of management plans for in situ conservation endemic species of MAPs.
- Development of product standard and quality.
- Product promotion.
- Development of production and marketing model.
- Development of a model balancing the production and conservation.
- Alternative marketing research.

Futhermore, each MAPs production stakeholder has special needs:

MAPs collectors

- Sustainable wild harvesting methodology.
- Legislation and control.
- Knowledge of MAPs species.
- Standard raw material.
- Post-harvest processing.
- Final product.
- Commercialisation and business.
- Cooperative management approach.
- Acceptance of natural resource utility by consideration of common goal and equal opportunity concept.
- Development of utility areas and conservation policy.

Forest Service

- Lack of knowledge about MAPs .

MAPs nurseries:

- Standard varieties.
- Lack of technical information.
- The lack of information on sustainable production and cultivation techniques.
- The lack of information on product quality of species.
- Genetic structures.

MAPs farmers:

- Training.
- Learning the technology.
- Knowledge.
- Lack of bridge between stakeholders.
- The lack of information on sustainable production and cultivation techniques.
- The lack of information on product quality.
- Socioeconomic structures.

Commercial sector

- Standard raw material.
- Cultivation MAPs.
- Communication problems with the manufacturer.
- Legal problems.
- Collection and production related legal shortcomings.
- Problems of law application.

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4. Comparative analyses of the MAPs sector in two Mediterranean areas



	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Geographical aspects		
Area ¹	31.895 km ² – 6,3% of country	46.382 km ² – 5,9% of country
Population ¹	7.565.603	4.095.771
Climate ¹	Mediterranean, Continental, Mountain, Alpine	Mediterranean, Mountain
Average precipitation ¹	350-1200 mm	566-1.189 mm
Average temperature (low-high)	0 – 17 °C	10-24 °C

1.Source: <https://en.wikipedia.org>

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Known MAPs species		
Common	Aesculus hippocastanum, Allium sativum, Althaea officinalis, Atropa belladonna, Calendula officinalis, Calluna vulgaris, Capsicum annuum, C. frutescens, Citrus aurantium, C. sinensis., Coriandrum sativum, Crataegus monogyna, C. oxyacantha, Cuminum cyminum, Cynara scolymus, Datura stramonium, Digitalis lanata, Echinacea sp., Filipendula ulmaria, Foeniculum vulgare, Glycyrrhiza glabra, Hypericum perforatum, Humulus lupulus, Juniperus communis, Juniperus oxycedrus, Laurus nobilis, Lavandula angustifolia, L. x hybrida, Linum usitatissimum, Malva sylvestris, Matricaria chamomilla, Melissa officinalis, Mentha pulegium, Mentha spicata, Mentha x piperita, Nicotiana tabacum, Olea europaea, Papaver rhoeas, Pimpinella anisum, Pinus sylvestris, Prunus amygdalus, Rosa damascena, Papaver somniferum, Plantago psillium, Ricinus communis, Rosmarinus officinalis, Rubus fruticosus, Salvia officinalis, Scolymus hispanicus, Silybum marianum, Taxus baccata, Tilia platyphyllos, T. argentea, Trigonella foenum-graecum, Tussilago farfara, Urtica dioica, Vaccinium myrtillus, Viscum album	

Not common	Abies alba, Achillea millefolium, Allium schoenoprasum, Anemone hepatica, Anethum graveolens, Arctostaphylos uva-ursi, Arnica Montana, Artemisia absinthium, Artemisia dracunculus, Asperula cynanchica, Betula pendula, Celtis australis, Equisetum arvense, Fraxinus angustifolia subsp. oxycarpa, Fraxinus excelsior, Gentiana lutea, Hyssopus officinalis, Jasonia saxatilis, Juglans regia, Lavandula latifolia, Lavandula stoechas, Lippia citriodora, Mentha sativa, Ocimum basilicum, Origanum majorana, Origanum vulgare spp. vulgare, Petroselinum crispum, Plantago lanceolata, Prunus spinosa, Rosa canina, Ramonda myconi, Ruta graveolens, Salvia lavandulifolia, Sambucus nigra, Santolina chamaecyparissus, Satureja Montana, Satureja fruticosa, Silene saxifrage, Stevia rebaudiana, Tilia cordata, Thymus vulgaris, Valeriana officinalis	Capparis ovate, Colchicum speciosum, Salvia fruticosa, Datura metel, Gypsophyla arrostii, G. bicolor, G. graminifolia, Helichrysum plicatum, Liquidambar orientalis, Nigella sativa, Ophrys sp., Orchis sp., Origanum dubium, O. minutiflorum, O. onites, O. syriacum var. bevanii, O. vulgare subsp. hirtum, Pinus brutia, Platanthera sp., Tilia rubra, Serapias sp., Sideritis sp., Soja hispida, Verbascum thapsiforme
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	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Commercial species collected from the wild		
Common	Rosmarinus officinalis, Glycyrrhiza glabra, Tilia platyphyllos	
Not common	Gentiana lutea, Arctostaphylos uva-ursi, Fraxinus angustifolia, Juglans regia, Betula pendula, Arenaria rubra, Silene saxifrage, Sambucus nigra, Jasonia saxatilis, Equisetum arvense, Abies alba, Pinus sylvestris, Thymus vulgaris, Achillea millefolium, Asperula cynanchica, Papaver rhoeas, Plantago sp., Anemone hepatica, Artemisia absinthium, Crataegus monogyna, Matricaria chamomilla, Malva sylvestris, Satureja fruticosa, Fraxinus excelsior, Sanguisorba minor, Lavandula latifolia, Foeniculum vulgare, Prunus spinosa, Juglans regia	Origanum sp., Laurus nobilis, Salvia fruticosa, S. tomentosa, Sideritis congesta, S. stricta, S. condensata, Tilia argentea, T. rubra, Thymus sp., Satureja sp.,

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Wild collection season		
Winter	Rosmarinus officinalis, Plantago sp.	Rosmarinus officinalis
Spring	Anemone hepatica, Arctostaphylos uva-ursi, Artemisia absinthium, Crataegus monogyna, Hypericum perforatum, Malva sylvestris, Matricaria chamomilla, Juglans regia, Papaver rhoeas, Plantago sp., Pinus sylvestris, Ramonda myconi, Rosmarinus officinalis, Sambucus nigra, Satureja fruticosa, Thymus vulgaris	Hypericum perforatum, Malva sylvestris, Plantago sp., Rosmarinus officinalis, Thymus sp., Salvia fruticosa, S.tomentosa, Satureja sp., Sideritis congesta, S. stricta, S. condensata,
Summer	Abies alba, Achillea millefolium, Asperula cynanchica, Foeniculum vulgare, Jasonia saxatilis, Lavandula latifolia, Origanum vulgare, Satureja montana, Tilia sp.	Laurus nobilis, Lavandula sp., Origanum sp., Salvia fruticosa, S.tomentosa, Satureja sp., Sideritis congesta, S. stricta, S. condensata, Thymus sp., Tilia argentea, T. platyphyllos, T. rubra,
Autumn	Gentiana lutea, Prunus spinosa	Laurus nobilis

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Surface for wild collection		
Estimated area	3.949 ha (aromatic plants Spain) 38.184 ha (organic collection Spain)	21.678 thousand ha (Turkey)
Ownership of the harvested areas	Public and private	Public
Restricted areas		
National parks	1 (Catalonia: Lleida)	7 (4 Antalya, 2 Mugla, 1 Denizli)
Natural parks	19 (Catalonia)	203 (Turkey)
Nature preserve areas	144 (PEIN – Catalonia)	31 (Turkey)
Wildlife protection areas	Nature 2000 in Catalonia: 115 ZEC, 73 ZEPA.	81 (Turkey)

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Wild collection activity		
Type of harvesters	Self-employed (direct selling) Employed (commissioned by wholesalers)	Women farmers Farmer organizations Industrialist Import-export traders
Existing cooperatives	none	3
Raw material transformation	Drying	Drying and distillation
Commercialisation	Bulk selling (Gentiana lutea, Arctostaphylos uva-ursi) Retail selling (herbal teas, seasonings)	Bulk selling Retail selling (herbal teas, seasonings)

	SPAIN	TURKEY
Cultivated species		
Common	Capsicum sp., Coriandrum sativum, Cuminum cyminum, Cynara scolymus, Echinacea sp., Foeniculum vulgare, Glycyrrhiza glabra, Humulus lupulus, Hypericum perforatum, Lavandula angustifolia, Linum usitatissimum, Matricaria chamomilla, Melissa officinalis, Mentha x piperita, Papaver somniferum, Pimpinella anisum, Rosmarinus officinalis, Salvia officinalis,	
Not common	Artemisia dracunculus, Calendula officinalis, Capparis spinosa, Cichorium intybus, Crocus sativus, Hyssopus officinalis, Laurus nobilis, Lippia citriodora, Ocimum basilicum, Origanum majorana, Origanum vulgare subsp. vulgare, Origanum vulgare subsp. virens, Satureja montana, Stevia rebaudiana, Thymus vulgaris,	Capparis ovata, Nigella sativa, Origanum vulgare subsp. onites, Ricinus communis, Rosa damascena, Sideritis sp., Silybum marianum, Trigonella foenum-graecum, Urtica dioica.
Surface of cultivation of MAPs		
Area	21.829 ha (1.781 ha organic)	62.880 ha (501.641 ha organic)
Melissa officinalis	¿?	50.500 ha
Cuminum cyminum	825 ha	22.442 ha
Mentha sp.	15 ha	14.700 ha
Salvia sp.	¿?	13.000 ha
Pimpinella anisum	2.658 ha	14.050 ha
Red pepper for spice	1.553 ha	10.850 ha
Lavandula sp.	2.045 ha	
Humulus lupulus	539 ha	
Crocus sativum	166 ha	
Glycyrrhiza glabra	75 ha	
Other industrial crops	13.940 ha	

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Cultivation activity		
Common	Cynara scolymus, Echinacea sp., Foeniculum vulgare, Glycyrrhiza glabra, Hypericum perforatum, Lavandula angustifolia, Linum usitatissimum, Matricaria chamomilla, Melissa officinalis, Mentha x piperita, Rosmarinus officinalis, Salvia officinalis,	
Not common	Artemisia dracunculus, Calendula officinalis, Crocus sativus, Humulus lupulus, Hyssopus officinalis, Laurus nobilis, Lippia citriodora, Ocimum basilicum, Origanum majorana, Origanum vulgare subsp. Vulgare, Satureja montana, Stevia rebaudiana, Thymus vulgaris	Capparis ovata, Coriandrum sativum, Cuminum cyminum, Nigella sativa, Papaver somniferum, Origanum spp, Pimpinella anisum, Ricinus communis, Rosa damascena, Sideritis sp., Silybum marianum, Trigonella foenum-graecum, Urtica dioica.
Area	75 ha (26 ha organic) 5 ha of greenhouses	
Identified producers	89	48

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Identified producers	89	48
Plantations characteristics		
Land ownership	Among 63 companies: 58% private 60% family business	Among 5 companies: 98% private MAPs associations
Type of production	Among 83 companies: 73% organic cultivation 14% conventional cultivation 20% vegetal material suppliers 19% botanicals gardens	Among 5 companies 60% conventional cultivation 40% organic cultivation
Type of raw material obtained	Among 70 companies: 56% dry herb 40% alive plants	Fresh herb Dry herb
Type of farming machinery	Among 31 companies: 58% tractor 42% motorized plough 39% planting machine 29% harvester machine Other: brush cutter, fertilizer spreader, framing bicycle, cultivator, other tools. Nurseries: substrate mixer, seeder	Among 5 companies: All have tractor
Type of transforming equipment	Among 39 companies: 87% dryer 72% processing machinery (threshing, cutters, mills) 15% packaging machinery 10% steam distillation	Among 5 companies: 100% dryer 20% processing machinery 40% packaging machinery 40% steam distiller

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Identified producers	89	48
Entrepreneurial model		
Type of commercialisation	Among 59 companies: 13 bulk selling 48 retail selling (included raw material suppliers) 21 other services (tourism)	Among 48 companies: 25 bulk selling 19 retail selling (+4 raw material suppliers)
Type of manufactured products (retail selling)	Among 48 companies: 48% seasonings 44% herbal teas 29% cosmetics 19% perfumers and scented products 17% alive plants	
Sector addressed	Among 68 companies: 44% food sector 31% herbalist sector 23,5% cosmetic sector 4% pharmaceutical sector	Among 48 companies: 67% food sector 6% herbalist sector 4% cosmetic sector 62,5% pharmaceutical sector

Product distribution	Among 61 companies: 79% direct selling to the end-consumer 49% commercialising by a retailer 18% selling to a wholesaler 16% using distributor services 11,5% distributing by a cooperative Only 1 company exporting	Among 48 companies: 40% commercialising by a retailer 52% selling to a wholesaler/distributor 6% distributing by a cooperative Only 1 company exporting
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	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Prices (dry herb)		
<i>Salvia officinalis</i>	3-4 €/kg	6,00 TL/kg
<i>Rosmarinus officinalis</i>	1-2 €/kg	5,00 TL/kg

1 € = 3,34 TL

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Guidance to producers		
Institutional training and information	Agricultural general (research centers, VET centers, University, Department of agriculture) MAPs assessment (CTFC)	Agricultural Research Institute Directorate of Provincial Food Agriculture and Livestock General Directorate of Forestry
Other entities providing training	Producers associations	NGOs, Universities
Technical information available	Brochures, books, websites, technical seminars, field visits, flora trips,	Demonstration activities, workshops, brochures, leaflets, seminars, field visits, flora trips, books, websites

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Identified companies	99	48
Identified companies		
Producers (cultivation)	85	5
Producers (wild harvesting)	10	27
Producers (nursery)	8	1
Producers (botanical garden)	17	
Wholesalers	5	24
Herb conditioners / retailers	5	19
Associations	17	16
Cooperatives of producers	2	3

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
Identified legislation and norms related to MAPs		
Administrative proceedings	4	1
Legislation (Statutory laws) / Regulations	28	12
Standards (technical norms)	3	

Guidelines	5	
Regulation areas		
Forestry	11	3
Environment/biodiversity	7	10
Agriculture	11	3
Manufacturing	24	2
Hygiene and safety	7	2
Trade	11	1
Type of products regulated		
Food	25	7
Medicinal	12	7
Cosmetics	4	4
Perfumes	6	
Ornamental	2	

	SPAIN (Catalonia)	TURKEY (Antalya, Denizli, Mugla)
General		
Biodiversity		Public awareness on the legislation of plant genetic resource conservation Preparation of management plans for insitu conservation of endemic species of MAPs
Wild harvesting		Developing a sample natural resource cooperative management model Efficient controlling mechanism and education of natural resource utilization Developing a natural resource utility model by consideration a common goal
Cultivation		Cultivation techniques and detailed definition of MAPs
Commercialisation	Small producers needs to comply to quality industry requisites Producers are interested in supplying to the industry in bulk in fair prices Producers need to create cooperatives to offer a wide range of references to industries	Development of product standard and quality Product promotion Alternative marketing research
Business	Most producers are addressing their entrepreneurial model to the manufacturing and direct selling to the consumer	Development of production and marketing model Development of a model balancing the production and conservation
MAPs production stakeholders needs/problems		
MAPs collectors	To know exactly the norms and wild harvesting' activity	Sustainable wild harvesting methodology Legislation and control Knowledge of MAPs species

		Standard raw material Post-harvest processing Final product Commercialisation and business Cooperative management approach Acceptance of natural resource utility Development of utility areas and conservation policy
Forest service	To have “solicitation documents” for specific MAPs collected in large amounts, to know how the species should be collected	Lack of knowledge of MAPs
MAPs nurseries	To have selected plant material (specific varieties) for the medicinal and perfumery sector	Standard varieties Lack of technical information Lack of information on sustainable techniques Lack of information on product quality of species Genetics structures
MAPs farmers	To have market information on MAPs demand and prices More information on the equipment for processing the dry herbs	Lack of knowledge on technology (need of training) Lack of information on sustainable production and cultivation techniques Lack of information on product quality Lack of bridge between stakeholders Socioeconomic structures
Commercial sector	To have regular provisioning of plants, with quality and documented traceability Lack of organic MAPs Not enough MAPs raw material offer for industry (90% of bulk product should be purchased abroad)	Standard raw material More cultivated MAPs Communication problems with the manufacturer Legal problems Collection and production related legal shortcomings Problems of law application

5. Conclusions

Unless the Turkish studied area (Antalya, Denizli, Mugla) is located in Southern latitude, with higher temperature, it has higher annual precipitation than Catalonia region in Spain. Nevertheless, Catalonia has a more diverse climate that allows producing species more adapted to cold-temperate climate, while the Turkish area could produce other species less sensitive to the cold.

Both territories share similar species, both consumed and produced, unless they have specific species (eg. *Orchis* sp. in Turkey or *Jasania saxatilis* in Catalonia) or subspecies (eg. *Origanum vulgare* subsp. *onites* in Turkey and *Origanum vulgare* subsp. *vulgare* in Spain).

One special case is *Laurus nobilis*, it is very consumed in both countries, but it is wild collected in high amounts in Turkey, while in Spain is just cultivated (many houses have a bay laurel tree planted in the yard) because it is not found in the wild.

So, unless there are similar genera collected from the wild (eg. *Origanum*, *Thymus*, *Satureja*, *Salvia*), the species are different (eg. *Satureja thymbra* is Turkey and *Satureja montana* in Catalonia), and the only common species in both countries are: rosemary, linden and liquorice.

Even though, the wild collection activity in Catalonia region is very low compared to that implemented in these provinces in Turkey. In the middle of XXth century, wild collection was still important in Catalonia, mainly in the Pyrenean area for harvesting medicinal plants, but nowadays the only commercialized in big amounts species are *Gentiana lutea* and *Arctostaphylos uva-ursi*. Therefore, there is a high tradition of household collection and a very rich ethnobotanical knowledge, and many research and vulgarization groups are trying to recuperate as most part of people in Catalonia are living in urban areas and have lost their contact to nature.

Comparing the MAPs cultivation activity, species like as *Rosa damascena* or *Nigella sativa* are produced in Turkey which are not present in Spain, or *Crocus sativus*, *Lippia citriodora* or *Stevia rebaudiana* are widely cultivated in Spain, that are not mentioned in Turkey in the report. But most of them could be cultivated in both countries, and sometimes it depends on each market needs and opportunities.

The surface of MAPs cultivation is nearly 3 times in Turkey than in Spain, according to statistical data. Nevertheless, it appears to be more farmers in Catalonia than in the studied provinces in Turkey. But the average surface per farmer in Catalonia is less than 1 ha, while in Turkish area presumably should be higher.

The plantations characteristics in both countries seem to be quite similar, despite the fact of the existence of many botanical gardens associated with small cultivations in Catalonia.

In relation to the type of commercialization of the MAPs producers, while the Turkish producers are mainly doing bulk selling, the Catalan ones are mainly focused on retail selling, thus they also manufacture herbal products (seasonings, herbal teas, cosmetics) apart from cultivating, and also do direct selling, while Turkish producers mainly commercialise through a retailer or distributor.

In addition, existing legislation in Catalonia related to MAPs is more developed in the manufacturing issues, while in Turkey efforts are done in the environment/biodiversity frame (as the wild collection is important and there is a risk of overexploitation).

Hence, a consideration to be borne in mind is whereas the area of Catalonia is only about 14.500 km² less than the studied area in Turkey, Catalonia has nearly 3.470.000 more inhabitants, being an industrialized region. Antalya, Denizli and Mugla still depend on the primary sector.

Both areas could benefit from the tourism, as they have attractive seaside resorts and cultural interest. Referring to MAPs, Catalonia producers have addressed their commercial strategies

to that sector, combining their production with a touristic offer (mainly addressed to Catalan target): botanical gardens, practical workshops for elaborating products, field visits, etc. In the case of Turkish area, by now they are focusing to bulk selling to industry, but only few initiatives combine production with tourism.

So, while Catalanian MAPs production sector focus on small plantations that manufacture handicraft products to direct selling to consumer combining with touristic services, Turkish MAPs production is mainly focused on the wild harvesting to supply the distribution or industrial sector (food, cosmetics, perfumes).

The paradox is that in Catalonia there is a very important pole of MAPs consuming industries located in Barcelona surrounding (Pharmacy, Additives, Flavours, Cosmetics, Perfumes), but they are not providing the raw material from local producers, but from the wholesaler who is buying the 90% of botanicals abroad. The causes are diverse:

- the production costs (mainly labour cost) are higher than the other raw material coming from developing countries;
- the larger plantations are devoted to other cultivations (vineyard, olive, cereal, forage), and only the small and poor lands are allocated to MAPs cultivation;
- only few producers have enough investment capital to face the purchase of these infrastructures and equipments;
- interested producers are spread in the territory and it makes difficult to join efforts to create cooperatives/associations to share expenses for processing facilities.

So, Catalan producers could benefit from the organization in managing the wild harvesting and industry supplying in Turkey, while Turkish producers could learn about cultivation addressed to tourism model implemented in Catalonia.

Therefore, producers of both countries could be interesting in detailed training and/or information on:

- Standard norms for implementing sustainable wild collection (environmental friendly).
- Standard varieties of vegetal material in the nurseries.
- Sustainable cultivation techniques (organic).
- Database of raw material processing equipments.
- Standards of product quality.
- Market information.