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AGRICULTURE & INNOVATION



EIP-AGRI Focus Group

Plant-based medicinal and cosmetic products

MINI PAPER 1. Main actors, markets and collaboration of MAPs value chain

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1. MAPs value chain

A 'Value Chain' can be defined as a strategic partnership among inter-dependent businesses that collaborate to progressively create value for the final consumer resulting in a collective competitive advantage (Potter and Kramer 2011). An industry value-chain is a physical representation of the various processes involved in producing goods (and services), starting with raw materials and ending with the delivered product (also known as the supply chain). The value chain of medicinal and aromatic plants is constituted by several intermediaries and encompasses all processing steps to produce plant-based medicinal and cosmetic products. Additionally, many different industries are involved which accept primary and secondary processed products as well as final, more sophisticated and innovative products. In order to express the multi-stakeholders in the value chain, a non-linear approach is needed to include all processing steps to produce plant-based medicinal and cosmetic products. These steps include a) selection of plant raw materials, cultivation and/or wild-harvest; b) postharvest handling (drying and dry herb processing), distillation or extraction, purification/bio-refining (and/or isolation), product formulation and packaging. However, MAPs value chain links refer to different industries, producing different products considered as initial material for further processing (raw materials, natural ingredients, essential oils, etc.), secondary processed products (cosmetics, food and beverage, animal feed, medicines, agrochemicals and veterinary medicines etc.), trade patterns and services, all of which are connected in a complex and complementary way (Fig. 1).

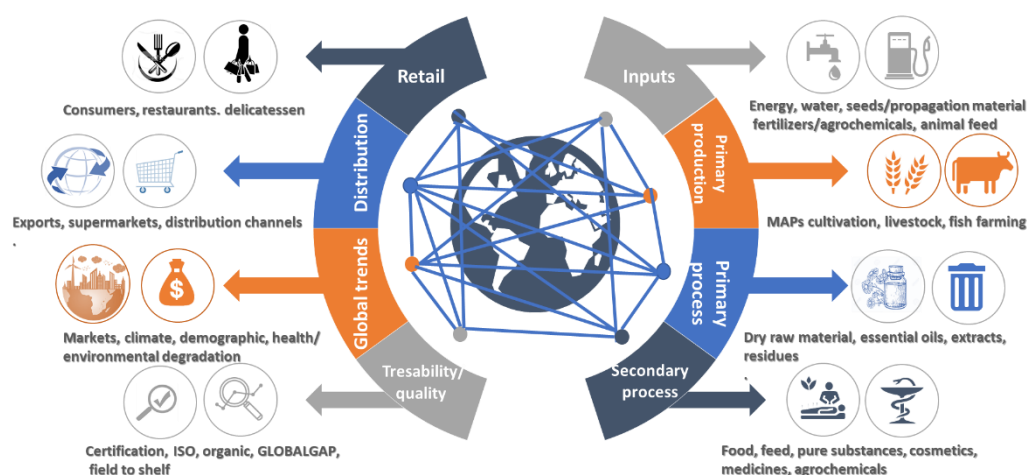


Figure 1: MAPs' value chain is presented in circular form. Inputs, primary and secondary production and process (raw materials, natural ingredients, essential oils, cosmetics, food and beverage, animal feed, medicines, agrochemicals, human and veterinary medicines etc.) are connected in a complex, complementary and global way with ethics, environmental issues, trade and services (Grigoriadou et al., 2019).

A link is an activity (or process) or a set of key activities. It may or may not be a substantial contributor to the value of the product. Several links can be integrated within the same company masking the construction of value. The vast majority of MAPs supply chains are supply chains for other sectors of high consumption products. However, there are important sectors where MAPs are marketed as they are (without real transformation) directly to consumers, like most aromatic herbs and plants for herbal medicines. The MAPs sectors are long agro-industrial sectors producing "Intermediate Products" and they consist of a set of interdependent enterprises with complementary activities production, processing and trading. They are at the origin of the valuation of species and / or varieties of plants to several other sectors / sectors of recovery: food, food supplements, pharmacy, cosmetic, functional perfumery and perfume fragrance.

"Plant-based medicinal and cosmetic product" can be defined as plant raw and semi-processed material (e.g. dried herb, essential oil, extract) that can be obtained by a MAP producer (i.e., grower or wild collector) and

used for manufacturing various plant-based products such as herbal medicines, cosmetics, supplements & functional food.

The levels of incorporation and use of the MAPs are very heterogeneous depending on the plant and the final product observed. According to FranceAgrimer (2012) two types of **activities** can be identified in MAPs value chain:

- **Basic operations in the value chain:** production, processing (drying, distillation, extraction, mixing-stabilization, packaging), research & development, manufacturing logistics (upstream logistics or collection / collection, storage, distribution logistics), marketing, distribution and marketing,
- **Support activities in the value chain:** business / process, brokerage, labelling, physicochemical analyses to characterize products or regulatory controls.

Subsequently, **two types of value chain** can be defined (FranceAgrimer, 2012):

1. **Sales of not transformed MAPs:** The value chain integrates the final product, which is, the one that is delivered in retail distribution channels. Two sectors are concerned:
 - Flavour sector
 - Herbal products sector

This value chain is characterised by the commercialization of "visible" MAPs products, having suffered very little transformation. An example of thyme is given in Fig. 2.

	<i>Eg. Bottle of thyme dried branch</i>	
4	Downstream recovery: flavours and herbal products sector, retail distribution, out-of-home catering, wholesalers	
▲	<i>Eg. Thymus branch - processed, mixed, stabilized and packaged at wholesale</i>	
3	Secondary transformation	
▲	<i>Eg. Thymus branch - calibrated</i>	
2	Industrial product marketing	Conditioning Trading, Brokerage
▲	<i>Eg. Thymus branch - dried</i>	
1	Production	Pre-processing and 1 st processing: distillation, cleaning, grinding, etc. Collection / Harvesting / Service delivery

Figure 2. Value chain of not transformed MAPs (FranceAgrimer 2012)

2. **Agro-industrial sectors manufacturing intermediate products:** The MAPs value chain does not integrate all links. Thus, the last links are an integral part of another chain of value (value chain of the cosmetic industry, industry of pharmaceuticals). The MAPs value chain ends with the commercialisation of products involved in the development of complex products. Therefore, they are considered as intermediate products: ingredient, component of the manufacture of a cosmetic and / or pharmaceutical product. If the MAPs component represents a value greater than 10% of the total cost of raw materials, it could be considered part of the MAPs value chain. In that case according to the market sector:
 - a. *Functional perfume and fragrance:* MAPs enter as 'Ingredient' in the development of perfuming bases. Steps suitable for the manufacture of fragrance or products using the functional perfumery are out of the field of MAPs value chain. They have their own value chain.
 - b. *Cosmetics and Pharmacy:* MAPs enter as 'ingredient' (and not as excipient) in the development of perfuming bases or aqueous / alcoholic bases of active ingredients from distillation or extraction. Post-production stages bases of active compounds or perfume bases

and specific to the manufacture of finished products of functional perfumery or fragrance are out of the value chain.

2. Markets and actors of MAPs value chain

2.1. Markets of MAPs

In a first approximation to the markets of the MAPs, two types of clearly differentiated products can be distinguished:

- the plant parts or parts thereof, whole or cut, fresh or dried
- the extracts, essential oils and oleoresins obtained as the first transformation of the plants.

Both groups of products constitute the raw materials of the perfumery, cosmetics, pharmaceutical, food and chemical industries. Medicinal and aromatic plants can be used in several markets, even the same species could go to different uses. The most common ones are (Moré and Tugrul 2017):

- **medicinal:** using plants with medicinal properties,
- **food:** using mainly aromatic plants for their flavours,
- **perfumery:** using aromatic plants for their fragrances.

Medicinal sector

In this sector, medicinal plants are used, both as botanical drug (dry raw material) or as primary processes products (extracts, essential oils, etc.). All the herbal medicinal products are subject to medicines legislation, according to the Committee on Herbal Medicinal Products (HMPC), which is the committee of the European Medicines Agency (EMA) (www.ema.europa.eu) responsible for compiling and assessing scientific data on herbal substances, preparations and combinations, such as herbal medicinal products (as well as their preparations). European Union (EU) herbal monographs (formerly known as Community herbal monographs) are species-specific or drug-specific, contain the HMPC's scientific opinion on safety and efficacy and critically deliver the available data about specific herbal substances and their preparations intended for medicinal use. Their processing and commercialisation are under strict rules.

There are different subsectors and materials involved with:

- pharmacy (isolated active ingredients),
- phytotherapy,
 - o herbal remedies (dry plant),
 - o phytomedicine (dry plant, extracts, essential oils),
 - o aromatherapy (essential oils),
 - o homeopathy (mother tinctures),
 - o bach flowers (floral elixirs),
- dermopharmacy or high cosmetic industry (extracts, essential oils, fat oils).

Food sector

In this sector, aromatic plants are used for flavouring, either directly in condiments for seasoning (fresh, frozen or dry) and in herbal teas within the food scope, or their derivatives in the industry for manufacturing food products (extracts, essential oils, oleoresins, etc.). All the products are regulated by the food legislation.

There are different subsectors and materials dealt with:

- products addressed to the end-consumer
 - o condiments/seasonings (dry plant),
 - o herbal teas (dry plant),
- products addressed to the industry
 - o food ingredients and additives (flavours, colours),
 - o functional food (dry plant, extracts),

- o food supplements (dry plant, extracts, essential oil). This is a special chain, which is between food and medicinal sector, being under specific regulation.

Perfumery sector

In this sector, extracts and essential oils are used to manufacture fragrant products but should be outlined that there is a huge competition of synthetic compounds.

There are different subsectors:

- perfumes (eau de cologne),
- toiletries or low cosmetic industry (soaps, moisturising creams, deodorants, insect repellent),
- drugstore (detergents and air fresheners),
- scented decoration. Both visual and fragrant aspects are features to be bear in mind to elaborate scented decoration products, using fresh or dry plants and essential oils or essences.

2.2. Main actors in MAPs value chain

In the area of MAPs’ production, four types of primary raw materials are found according to the degree of processing, preparation or transformation:

	<p>Fresh plant material. Fresh plant conveniently cleaned and selected to:</p>	<p>Obtaining essential oils and extracts. Direct sale as fresh seasoning herb (refrigeration and packaging process).</p>
	<p>Dried plant material. Plants or parts of them properly dried (process of drying, chopping, separation, cleaning, classification) to:</p>	<p>Obtaining extracts and essential oils. Packaging of herbal products and condiments. Preparation of phytomedicines. Ingredient in multiple industrial products (food industry, pharmaceutical and perfume-cosmetics).</p>
	<p>Essential oils. Products resulting from the distillation of aromatic plants destined to:</p>	<p>Production of cosmetics and natural perfumes. Preparation of phytomedicines. Obtaining flavours and fragrances, destined to the food, pharmaceutical and perfume-cosmetics industries.</p>
	<p>Extracts. Products resulting from the process of dissolution and extraction of the active principles of the plants, destined to:</p>	<p>Production of cosmetics and natural perfumes. Preparation of phytomedicines. Obtaining additives (preservatives, flavorings), destined to the food industry, pharmaceutical and perfumer-cosmetics.</p>

Many stakeholders are dealing with MAPs value chain for the production and processing of raw materials and final products.

Stakeholders	Activities
<p>Farmers and collectors</p>	<p>Raw material supplies come from cultivation and from the collection of wild plants. In many cases they are imported in countries where secondary process takes place and the importer is at the same time a distributor warehouse that connects with the industries and the laboratories. Small stakeholders perform elementary processes (drying, first classification and cleaning of the bulk) and then sell to larger distributors which are, occasionally, also exporters. Sometimes they are both suppliers of plant and essential oil, to the natural derivatives industry and to pharmaceutical and cosmetic laboratories as well as conditioners of herbal teas and spices.</p>
<p>Processors</p>	<p>Includes primary process of raw material (drying, chopping, sieving, cleaning,</p>

of dry herb material	classification, packing) and production of essential oil. Raw material is provided by farmers in bulk. Many companies in the sector are at the same time agricultural or wild collection collectors.
Secondary processors	involved in the production of extracts and medicinal and cosmetic products, food supplements, agrochemicals. Since extraction requires specialized chemical knowledge this type of process is not linked to primary production, but that it is located close to the secondary processing companies.
Providers of cultivation supplies	Includes production of MAPs plant propagation material (seeds, seedlings, cuttings), providers of farming inputs (agrochemicals, fertilizers, weed control), providers of special machinery for MAPs cultivation.
Providers of services	Certification (organic, sustainable collection, Global GAP, GMP, ISO 9001, ISO 22000, HACCP, ISO 14001 et), analytical laboratories for quality assessment, distribution (transport, logistics), marketing.
End-users	Apart from traditional herbalists and pharmacies, organic stores which can't sell phytomedicines but food supplements, combining with the sale of fresh and organic products.
Researchers	Necessary actors since most of the issues on natural products from cultivation to their action have not been explored yet.
Others	Public bodies, policy makers, NGOs et.

Best practices could be seen all over Europe.

Name	Activity
Aboca S.P.A.	An Italian company that implements a vertically production system of medicinal plants with respect of natural resources, the environment and biodiversity. Starting from the production of the seed to the final product of more than 80 species, it cultivates organically, each species in its special environment using renewable materials and renewable energy sources . https://www.aboca.com
Korres Natural Products Ltd	This Greek company uses sustainable the native plants of Mediterranean flora producing natural ingredients for cosmetics and food supplements. Each species is cultivated in the place where it grows native through special contracts with local farmers contributing thus to the principles of fair trade . . http://ir.korres.com/korres/app/en/article.ourphilosophy
Konopko Cooperative	The main goal of KonopKo cooperative is to link hemp growers and processors, innovators, researchers, entrepreneurs and other hemp interest groups in Slovenia and to ensure a sustainable and socially beneficial way of hemp growing and processing for supporting smaller and medium sized growers, connecting rural and urban areas whilst operating within the guidelines of Fair Trade and ecological (organic) growing. http://www.konopko.si
Apivita	This company makes contracts with local farmers for the production of raw material in a biological and biodynamic way, following the principles of Hippocratic medicine. It offers not only absorption of products but also special installation and equipment for primary processing in case they do not have. https://www.apivita.com
Hemp Cooperative of Ireland	The Hemp Cooperative of Ireland is a registered Cooperative with the aim of creating an infrastructure for farmers and local businesses to develop the hemp industry in Ireland. The Cooperative supports members by providing shared access to resources, equipment, and markets through a national body and local hubs. https://hempcooperativeireland.com/
Essenzialmenta	Cooperative specialized on cultivation and production of mint essential oil

	<p>in Pancalieri, Torino, Italy from 1865. The cooperative was created aiming to share the special machinery used for the cultivation and processing of mint. In this way small producers can use expensive equipment they could not buy on their own. http://www.essenzialmenta.it/</p>
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3. Research needs

A full value chain analysis looks at the political, social and environmental context the chain operates within; overall market trends for the sector or/and subsectors; the power relationships among the intermediaries and how they interact. It is important to know the needs and requirements of each actor in the different value chains, in order to improve products and services. In addition, to know which is the key actor in the supply chain (who determines the demand and prices).

Commonly, the value chain studies do not include auxiliary companies providing services. However, when focusing to producers, this is very important to consider if the production activity is viable. Thus, a critical point is where a value chain product starts and stops. There also other several aspects to consider when outlining a value chain:

- Species
- Addressed market
- Country of study

Market research should be conducted to identify the different MAPs value chains, and also considering aspects like the value and competitive creation factors. Also, market research on consumer demands in Europe and other continents will lead to the connection of the special production capacity of each region with modern consumer demands through high value added safe products.

The lack of official data on cultivation and production of MAPs and their products is common in all EU countries. The real data is based more on the experience of people involved in the field than on recordings. At research level there is a need for a detailed monitoring of areas and species grown and a correlation between climatic/soil conditions and yields. In this way it will be known where and how improvement is needed either by changing the cultivation techniques or by replacing the cultivated species.

4. Ideas for innovations

The creation of an economic observatory, including information on value chains of different countries and business directories will be very interesting. In that case, value chain description should be harmonized.

Other ideas could be:

- a. creation of local clusters/economical districts which will be based on an innovative thematic unit that makes them specialized and gives a comparative advantage over other groups (e.g. cultivation of a rare endemic medicinal plant),
- b. encouraging of small farmers to join in small unions (5-10), aiming to contract cultivation with processing companies for their specific requirements by the standards of sustainable management and fair trade
- c. creation of a European platform where producers of raw materials and industry of MAPs medicinal and cosmetic products could join, new trends will be presented and offer, and demand of raw materials will be shared.

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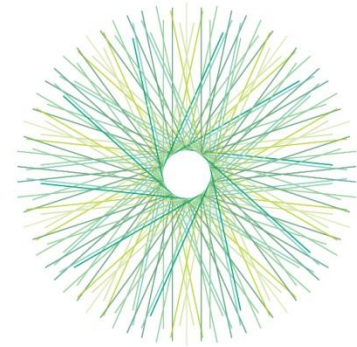
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The European Innovation Partnership 'Agricultural Productivity and Sustainability' (EIP-AGRI) is one of five EIPs launched by the European Commission in a bid to promote rapid modernisation by stepping up innovation efforts.

The **EIP-AGRI** aims to catalyse the innovation process in the **agricultural and forestry sectors** by bringing **research and practice closer together** – in research and innovation projects as well as *through* the EIP-AGRI network.

EIPs aim to streamline, simplify and better coordinate existing instruments and initiatives and complement them with actions where necessary. Two specific funding sources are particularly important for the EIP-AGRI:

- ✓ the EU Research and Innovation framework, Horizon 2020,
- ✓ the EU Rural Development Policy.

An EIP AGRI Focus Group* is one of several different building blocks of the EIP-AGRI network, which is funded under the EU Rural Development policy. Working on a narrowly defined issue, Focus Groups temporarily bring together around 20 experts (such as farmers, advisers, researchers, up- and downstream businesses and NGOs) to map and develop solutions within their field.

The concrete objectives of a Focus Group are:

- ✓ to take stock of the state of art of practice and research in its field, listing problems and opportunities;
- ✓ to identify needs from practice and propose directions for further research;
- ✓ to propose priorities for innovative actions by suggesting potential projects for Operational Groups working under Rural Development or other project formats to test solutions and opportunities, including ways to disseminate the practical knowledge gathered.

Results are normally published in a report within 12-18 months of the launch of a given Focus Group.

Experts are selected based on an open call for interest. Each expert is appointed based on his or her personal knowledge and experience in the particular field and therefore does not represent an organisation or a Member State.

*More details on EIP-AGRI Focus Group aims and process are given in its charter on:

http://ec.europa.eu/agriculture/eip/focus-groups/charter_en.pdf



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