

eip-agri  
AGRICULTURE & INNOVATION



# EIP-AGRI Focus Group

## Plant-based medicinal and cosmetic products

MINI PAPER 8. Knowledge exchange and training on Medicinal & Aromatic Plants

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# 1. Introduction

A “*plant-based medicinal and cosmetic product*” is a plant’s raw and semi-processed material (e.g. dried herb, essential oil, extract) that can be obtained from a Medicinal and Aromatic Plants (MAPs) producer (i.e. grower or wild collector) and used for manufacturing various plant-based products such as herbal medicines, cosmetics, supplements & functional foods. All the actors in this value chain need updated technical information, as well as information on markets and sector innovations. Proper tools and training methodologies need to be put in place to facilitate an effective transfer of knowledge.

It is important to know the knowledge needs of each actor dealing with these plants, the knowledge exchange and training systems that are currently used, and the ways in which new ideas could be implemented to facilitate the access and sharing of information.

# 2. Knowledge needs of the plant-based medicinal and cosmetic products sector



**Figure 1.** How doing training on wild collection of medicinal plants? GRUNDTVIG project PLANT WILD – Forest Plant Wild Harvesting Learning in Europe (<https://plantwild.wordpress.com>)

The stakeholders involved in the sector of plant-based medicinal and cosmetic products i.e. producers (wild collectors or growers), processors, providers, manufacturing users, end-users, researchers, public bodies and policy makers have different knowledge needs.

For **wild collectors**, it is important for everyone to be trained or at least informed<sup>1</sup>. Training should be focused mainly on sustainable wild collection techniques, good collecting practices (based mainly on Good Agricultural and Collection Practices - GACP) and postharvest handling (drying/distillation) and, in the second degree, on commercialisation and market aspects, implementation of standards and norms<sup>2</sup>. The knowledge needs for wild collectors are listed in table 1. However, the lack of available data on ecology, distribution and conservation status of the species might hamper the implementation of high technical training.

Table 1. Knowledge aspects for actors involved in MAP wild collection	
<i>Sustainable Wild Collection (SWC)</i>	
<b>Collectors</b>	<ul style="list-style-type: none"> <li>• SWC allows resources’ maintenance and long term profit, although collectors may not assume the proposed techniques in the short term, when used to do in their own traditional way.</li> <li>• Collectors certified organically need to be trained in SWC techniques as this capacity is not always provided by the certifying entities.</li> </ul>
<b>Forest owners</b>	<ul style="list-style-type: none"> <li>• Forest owners are potential collectors, and SWC could be a way to reduce costs associated to forest management and to avoid the potential negative impacts on private/public forest.</li> </ul>
<i>Business and Legal Aspects</i>	
<b>Collectors</b>	<ul style="list-style-type: none"> <li>• Current demand of unused resources of MAP species from the wild areas.</li> <li>• Botanical identification and habitats.</li> <li>• Active compounds’ richness of MAPs according to growing conditions (local chemotypes).</li> <li>• Good harvesting and processing practices, and the use of proper equipment.</li> </ul>

<sup>1</sup> Moré, E. *et al.* (2012). Sustainable wild harvesting – State of the art & needs on training. PLANT WILD GRUNDTVIG PROJECT. 3<sup>rd</sup> meeting report. Vilnius (Lithuania), 10-13<sup>th</sup> July 2012. <https://plantwild.files.wordpress.com/2013/04/3c2ba-report-conclusions-need-on-maps-swh-training-grundtvig-plant-wild.pdf>

<sup>2</sup> Moré, E. *et al.* (2013). Businesses of medicinal and aromatic plants’ wild harvesting. State of the art and needs on training. PLANT WILD GRUNDTVIG PROJECT. 4<sup>th</sup> meeting report. Kilis (Turkey), 9-10<sup>th</sup> May 2013. <https://plantwild.files.wordpress.com/2013/07/4th-report-on-businesses-of-medicinal-and-aromatic-plants-grundtvig-plant-wild.pdf>



**Table 1. Knowledge aspects for actors involved in MAP wild collection**

	<ul style="list-style-type: none"> <li>Standard raw material and end-product attributes according to their uses in the value chain.</li> <li>Trade, business and cooperative management approach.</li> <li>Legislation and control norms, both for accessing to the land (e.g. All Man's right in Nordic countries) and for wild collection activity.</li> </ul>
<b>Forest administration<sup>3</sup></b>	<ul style="list-style-type: none"> <li>Permitted harvesting techniques of most collected MAPs.</li> <li>Admission of natural resource utility considering a common goal and equal opportunity concept.</li> <li>Development of utility areas and on conservation policy.</li> </ul>
<i>Other aspects to consider</i>	
Other actors	<ul style="list-style-type: none"> <li>Ensure the transfer of traditional knowledge on wild collection to the younger generation, beginning with botanical and possibly therapeutical knowledge<sup>4</sup>.</li> <li>Wild collection of MAPs could contribute to the promotion of endogenous values of each territory, as the rural tourism linked to the ecological and gastronomic value<sup>2</sup>.</li> </ul>

**MAP growers** have similar knowledge needs as the wild collectors, while other actors of the production cluster have specific knowledge needs (listed in table 2), more linked to market requirements and technical innovations.

**Table 2. Knowledge aspects for actors involved in MAP cultivation**

<b>MAPs growers<sup>3</sup></b>	<ul style="list-style-type: none"> <li>Technology adoption and use, such as equipment for processing harvested herbs.</li> <li>Sustainable production and cultivation techniques and on product quality.</li> <li>Market information on MAPs demand, prices and socioeconomic structures.</li> <li>Use of active ingredients in cosmetics, medicine and nutrition, transformation and extraction techniques.</li> </ul>
<b>Providers of plant material</b> (i.e., seeds, seedlings) <sup>3</sup>	<ul style="list-style-type: none"> <li>More information about selected plant material (specific varieties) for the medicinal and perfumery sector, and standard varieties.</li> <li>Product quality of species.</li> <li>Genetic structures.</li> <li>Sustainable production and cultivation techniques.</li> </ul>
<b>Farming inputs suppliers</b> (i.e., plant protection, fertilisers, weed control products)	<ul style="list-style-type: none"> <li>Extend their knowledge about specific pests and diseases for MAPs.</li> <li>Nutrients needs in different soil and climate conditions.</li> <li>Auxiliary flora and fauna.</li> <li>Plant phenology characteristics.</li> </ul>
<b>Farm machinery companies</b>	<ul style="list-style-type: none"> <li>Information for each crop (i.e. planting systems adapted to different scales).</li> <li>The best weed control devices.</li> <li>Suitable harvesting methods for each desired botanical.</li> <li>Characteristics of each MAP are important when designing processing equipment (i.e., water content, sorption isotherm, drying curve, quality required).</li> </ul>
<b>Certification companies</b> (e.g. organic, Global GAP)	<ul style="list-style-type: none"> <li>General view of the overall production and processing of MAPs.</li> <li>Risks for contamination and environmental effects.</li> </ul>
<b>Quality assessment laboratories</b>	<ul style="list-style-type: none"> <li>Which compounds are most important for each species, in order to provide standard solutions for comparing and authorised methods for quality analyses.</li> <li>Quality needs of botanicals users and the number of producers and companies needing this service.</li> </ul>

**Plant traders and users** need different information depending on their own expertise and/or techniques used.

<sup>3</sup> Moré, E. and Tugrul Ay, S. (2016). 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. TRUMAP project. Networking and Dialogue on Black Truffles and Medicinal and Aromatic Plants in Turkey and Spain. [http://trumap.ctfc.cat/wp-content/uploads/2016/03/A1.-Diagnosis-of-MAPs-sector\\_TRUMAP-2.pdf](http://trumap.ctfc.cat/wp-content/uploads/2016/03/A1.-Diagnosis-of-MAPs-sector_TRUMAP-2.pdf)

<sup>4</sup> Asdal, A. et al. 2006. Spice and medicinal plants in the Nordic and Baltic countries. Strategies for conservation of genetic resources. SPIMED project. [https://www.nordgen.org/ngdoc/plants/publications/SPIMED\\_report\\_maj\\_2006.pdf](https://www.nordgen.org/ngdoc/plants/publications/SPIMED_report_maj_2006.pdf)

<b>Table 3. Knowledge aspects for actors involved in MAP use and trade</b>	
<b>botanicals wholesalers</b>	<ul style="list-style-type: none"> <li>In general, are not much interested in promoting sustainable wild collection<sup>1</sup>, but should be aware of good manufacturing practices, standards and procedures.</li> <li>They need crop's information of large scale producers (cooperatives) and species produced.</li> <li>How to deal with new contamination sources (e.g. pyrrolizidine alkaloids).</li> <li>New uses of manufacturing enterprises.</li> </ul>
<b>Primary transformation companies</b>	<ul style="list-style-type: none"> <li><i>Essential oils manufacturers</i> need to obtain information about distillation methodologies that are more efficient in the use of water and that can reduce the labour and the cost of distillation as well as systems to manage the contamination.</li> <li><i>Plant extracts' companies</i> need information about more efficient extraction methods, new sources of biocompounds and, where to find producers producing large amounts of plants.</li> </ul>
<b>Manufacturing users</b>	<ul style="list-style-type: none"> <li>Have an environmental concern linked to marketing strategies, but economic issues may be a disadvantage, as sustainable practices may lead to a higher cost only compensated by the creation of a quality certification or by increasing the added value of the final product<sup>1</sup>.</li> <li>Companies using high quality botanicals for medicinal products, chemotyped essential oils for aromatherapy, and fresh herb for obtaining extracts addressed to natural cosmetics, need to be trained on varieties and habitat identification, phenology of each species related to the major active compounds content, as well as in good practices and manufacturing techniques<sup>2</sup>.</li> <li>Manufacturers need access to a wide catalogue of processed plants with specific requirements, to a regular provisioning of plant raw material, with standard quality and documented traceability, and availability to organic MAPs<sup>3</sup>.</li> <li>Manufacturing companies dealing with medicinal products and food supplements need information on principle active substance composition of herbal material, and to be in direct contact with producers in order to control the quality of the plant's raw material.</li> <li>Natural cosmetics operators, need to know who is supplying organic cosmetic ingredients.</li> </ul>
<b>Packaging suppliers</b>	<ul style="list-style-type: none"> <li>Ecological materials that are effective and could be recycled.</li> <li>Conditions for preservation of herbal materials (fresh herb, dry herb, extracts, essential oils).</li> <li>Requirements for labelling (space needed, type of ink, etc.).</li> </ul>
<b>Storage providers</b>	<ul style="list-style-type: none"> <li>Possible contaminants (e.g. pests, cross contamination), to establish control methods.</li> <li>Type of materials of the floor and walls to ease the cleaning.</li> <li>How to manage herbal material, in order to design the space.</li> <li>Type of suitable containers to keep herbal material.</li> </ul>
<b>Distribution companies (logistics, etc.)</b>	<ul style="list-style-type: none"> <li>Type of suitable containers to avoid contamination.</li> <li>Conditions of temperature to avoid a decrease in the quality of the herbal material.</li> <li>How to implement batches control for traceability.</li> </ul>
<b>Marketing companies</b>	<ul style="list-style-type: none"> <li>Labelling requirements.</li> <li>Botany (to avoid mistakes in plant pictures).</li> <li>The production-manufacturing process.</li> <li>Studies on end-users preferences.</li> </ul>
<b>End-users</b>	<ul style="list-style-type: none"> <li>Better informed of the origin of the material (traceability) and the use of good practices, to raise awareness on wild collection in society, identifying it as a positive measure for improving the sustainable management of the environment and the resilience of rural economies<sup>1</sup>.</li> </ul>

Finally, the knowledge needs of actors involved in the management, control and/or elaboration of regulations are listed in table 4.

<b>Table 4. Knowledge aspects for actors involved in MAPs control and legislation</b>	
<b>Public bodies</b> granting permits and controlling the production	<ul style="list-style-type: none"> <li><i>Regarding wild collection:</i> list of commercially collected plants; list of endangered plants and conservation laws; species behaviour, in order to establish collecting practices specifications; and plant populations and their evolution, in order to allow or not the collection activity in certain areas.</li> <li><i>Regarding cultivation sector:</i> list of traded species and supply chains; number of crops surface and average yield obtained, in order to have real statistics; and cultivation practices implemented, in order to do environmental and traceability control.</li> </ul>
<b>Policy makers</b> and administration granting subsidies	<ul style="list-style-type: none"> <li>What type of business models are viable for MAP producers (considering that a small farm can be cost-effective when doing multifunctional activities, not only agriculture activity).</li> <li>Promote MAP sustainable wild collection, since, in the long term, these practices may improve public awareness on conservation issues and, thus, less investment in control</li> </ul>

**Table 4. Knowledge aspects for actors involved in MAPs control and legislation**  
measures and specific regulations may be needed<sup>1</sup>.

### 3. Tools and training methods currently used for knowledge transfer and exchange.

#### Transfer

Some important actors in knowledge transfer and advice are research centres and extension services:

- *Advisers:* advisory services to entrepreneurs comes from (a) research centres specialised in MAPs production or (b) private enterprises with experience in legal and technical aspects related to the manufacturing (e.g. in Catalonia, Spain: a\_ <http://apsb.ctfc.cat> and b\_ <https://www.fitomon.com/>).
- *Extension services:* Agricultural extension is the application of scientific research and new knowledge to agricultural practices through farmer education, encompassing a wider range of communication and learning activities (e.g. In Catalonia, Spain, the *Annual Plan of Technological Transfer* of the Ministry of Agriculture has promoted 55 MAPs training activities from 2014 to 2018).

Other important actors in the transfer of information are the end users and producers:

- *Working and dissemination groups:* people interested in MAPs, most of them volunteers, join together in associations to promote different aspects related to MAPs. For example: technical information (e.g. in France, Farmlab de la Bio is promoting autonomy of organic farmers on technics and mechanisation, with a community platform to exchange knowledge and experiences) or recovery of traditional uses (e.g. in Catalonia, Spain <https://eixarcolant.cat/> or <http://dolcarevolucio.cat>).

To facilitate the building and exchange of knowledge between these actors, different practices, methods and transfer tools are used. These are listed in table 5.

<b>Table 5. Transfer tools used to spread MAP knowledge</b>	
<i>Online platforms (Information and Communication Technologies _ICTs tools)</i>	<ul style="list-style-type: none"> <li>• <b>Websites:</b> are useful but the information flows just in one sense. For example, in Portugal, there are flora and vegetation databases (<a href="https://flora-on.pt/">https://flora-on.pt/</a> ) or platforms to provide information to producers (<a href="https://epam.pt/">https://epam.pt/</a>).</li> <li>• <b>Blog:</b> more dynamic with updated news, which can be linked to other ICTs tools (e.g. Information of MAPs in Catalonia, <a href="http://infopam.ctfc.cat">http://infopam.ctfc.cat</a>).</li> <li>• Many producers are using social media tools, as <b>Facebook, Instagram and twitter</b>; it seems to be the most adapted to reach consumers, and it allows interaction.</li> <li>• Professional experts are using <b>Linked-in</b>, while researchers use specific platforms as <b>Researchgate</b>, to show information and to connect to people with same interests.</li> <li>• <b>Whatsapp</b> groups could be a good tool for interacting, as it is easy to manage as most people have smartphone, although sometimes it tends to be used for leisure.</li> <li>• <b>Mobile applications (Apps)</b><sup>5</sup> are an interesting tool to be explored for MAPs sector (e.g. Pl@ntnet helps to identify plants).</li> <li>• <b>Video tutorials</b>, mainly uploaded in YouTube (short ones also in Instagram), are a very popular way to enlarge dissemination, but video design should be concise, attractive, not boring (e.g. "Swedish Beeproducts" video tutorials can be used even for illiterate farmers)<sup>6</sup>.</li> <li>• <b>Webinar</b>, or online streaming, is mainly used for doing online conferences, allowing the lecturer to interact with attending people. The most common problem is the internet</li> </ul>

<sup>5</sup> Drill, S.L. (2012). Mobile Applications for Extension. *Journal of Extension*, 50(5),. Retrieved June 5, 2019 from <https://www.learntechlib.org/p/157153/>.

<sup>6</sup> Sousa, F.; Nicolay, G. and Home, R. Information technologies as a tool for agricultural extension and farmer-to-farmer exchange: Mobile-phone video use in Mali and Burkina Faso. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 2016, Vol. 12, Issue 3, pp. 13-36. <http://orqprints.org/32666/1/sousa-et-al-216-IJEDICT-vol12-issue3-p19-36.pdf>

Table 5. Transfer tools used to spread MAP knowledge	
	connection for most of these tools, mainly in mountainous or isolated areas.
<i>Face-to-face activities</i>	<ul style="list-style-type: none"> <li>• <b>Seminars, symposia and conferences</b> are the most common way to disseminate information from research and experts (<i>e.g.</i> Bernburger Winterseminar für Arznei- und Gewürzpflanzen in Germany or Les Rendez-vous d'Herbalia in France). A successful methodology is to add discussion groups after the speeches, to promote interaction.</li> <li>• <b>Fairs or local exhibitions</b> devoted to MAPs are also a very common practice (<i>e.g.</i> Fira d'Herbes Remeieres de Vilanova de Sau , Spain; Fête des Plantes Médicinales in Abbaye de Bonnefont, France, etc.). These types of events mix workshops, exhibitions, trade, seminars, etc., and allow people and professionals to come together and exchange information.</li> <li>• <b>Farm open days or field trips</b> are transfer tools to let groups of people visit different businesses and exchange information with experienced farmers (Figure 2).</li> </ul>
<i>Media</i>	<ul style="list-style-type: none"> <li>• Access to national TV media is quite difficult, but they have specific programs related to rural life, natural products or ecological aspects where information of MAPs could be disseminated. Journalists decide if the topic is newsworthy. The risk is that they might change the angle of the information, adapting it to public expectations and this sometimes results in mistakes.</li> </ul>
<i>Publications</i>	<ul style="list-style-type: none"> <li>• There are professional publications that aim at informing both professionals and end-consumers about natural products, to show applications and sector news (<i>e.g.</i> <i>Mi Herbolario</i>, in Spain; <i>Erboristeria Domani</i>, in Italy) or technical information of botanicals production (<i>e.g.</i> <i>Zeitschrift für Arznei- &amp; Gewürzpflanzen - ZAG</i>, in Germany). This is a good way to find information about the companies in the market, but advertising is quite expensive.</li> </ul>

So, the widespread access to the **internet has led to the development of new forms of communication**. "Social media" tools (*e.g.* Blogging, Twitter, social networking, video sharing, photo sharing) have created vast opportunities for extension professionals in how they perform their work and how businesses interact with consumers. With the development of "apps," these tools have become popular for use on mobile networks, enabling communication almost anywhere<sup>7</sup>. Social media has provided growers, traditionally isolated, an opportunity to interact with the outside world without leaving the farm. Moreover, **social media support new approaches to learning that rely on voluntary, peer-to-peer communication**<sup>8</sup>.

## Training

Training on the production of MAPs faces several challenges. In most European countries, **academic training courses exist**, such as agronomy or herbal science, but they are not focussing specifically on MAPs. Most of the specialised training is offered through **non-formal courses**. So, it is due to foster a network of MAPs experts and trainers to develop high quality training systems to provide real capacity building to MAPs producers.

The different training methods, practices and/or tools are listed in table 6.

Table 6. Training tools used for MAP production	
<i>Academic training</i> <sup>9</sup>	<ul style="list-style-type: none"> <li>• <b>Agronomy</b> gives competences for all plant cultivation aspects of the more important crops and is the base for a professional approach. However, MAPs are usually not a subject of agro-food courses and organic production is still not consolidated in the academia scenario.</li> <li>• The courses in herbal science, within the general area of <b>Pharmacy</b>, propose a deeper knowledge in the specific field of medicinal plants considering also competences for the essential oils and the secondary metabolites production.</li> </ul>
<i>Non-formal courses</i> <sup>1,2</sup>	<ul style="list-style-type: none"> <li>• <b>Voluntary training</b> could be addressed mainly to the local population, collectors, small producers and forest owners.</li> </ul>

<sup>7</sup> Cornelisse, S., Hyde, J., Raines, C., Kelley, K., Ollendyke, D. & Remcheck, J. (2011). Entrepreneurial Extension Conducted via Social Media. *Journal of Extension*, 49(6). Retrieved June 5, 2019 from <https://www.learntechlib.org/p/110529/>.

<sup>8</sup> Mikum, S., Suksakulchai, S., Chaisanit, S. & Murphy, E. (2018). Students' Participation in Peer-to-Peer Communication Supported by Social Media. *Education and Information Technologies*, 23(2), 659-679. Retrieved June 5, 2019 from <https://www.learntechlib.org/p/191664/>.

<sup>9</sup> HERBARTIS (2017). Guidelines of training methodologies and policy recommendations for qualification recognition of herbal craft's production. ERASMUS+ program. [https://herbartis.files.wordpress.com/2015/12/herbartis-guide\\_en.pdf](https://herbartis.files.wordpress.com/2015/12/herbartis-guide_en.pdf)



**Table 6. Training tools used for MAP production**

	<ul style="list-style-type: none"> <li>• <b>Regular training</b> should be mandatory for groups of collectors and professional producers.</li> <li>• <b>On-line training</b> could be a good tool for forest owners and of medium interest for policy makers, manufacturing companies and end-users, but not for producers and wholesalers.</li> <li>• <b>Virtual training activities</b> would not always meet all the learner’s circumstances, but it is an economic tool. Nevertheless, it should be balanced with <b>face-to-face activities</b>.</li> </ul>
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Some studies<sup>10</sup> suggest that **e-learning resulted in better learning outcomes than face-to-face lecturing** and appropriately designed and applied could be valuable even in agricultural education, which stresses hands-on experience and lab activities. However, a study performed in West Macedonia region (Greece) to assess the potential of ICTs as agricultural extension tools, showed that **farmers desire on farm demonstrations and farmer involvement in applied research**. Results indicate that ICTs may supplement rather than replace traditional extension methods<sup>11</sup>.



**Figure 2.** Field trip during transnational mobility in Spain of the blended course on herbal craft’s production during ERASMUS+ HERBARTIS project (2015-2017) (<https://herbartis.wordpress.com/reports/compiling-of-learners-reports-of-study-visits/>)

In addition, it is easier to obtain the **certification** of a MAPs course related to food products than for those related to cosmetic and medicinal products, because the latter are a competence of laboratories and administration, who are reluctant to allow producers to manufacture these products<sup>9</sup>.

For the moment, aspects of MAPs related to the primary sector are addressed in two **academic curricula**: agriculture and food industries. However, training subjects should be more holistic: from production to end-products’ manufacturing and marketing (table 7). In the longer term, a new **Professional Profile** for “manufacturer of herbal food products” should be included in each National Qualifications Catalogue. This will be the starting point to reach also specific training on medicinal and cosmetic plants’ production. In addition, a common **qualification curriculum and certification criteria** would facilitate a wider recognition of the profession at transnational level<sup>9</sup>. Meanwhile, MAPs courses will be available as **continuous training** for existing or intended professionals in the sector.

**Table 7. Suggested subjects for training in MAP production**

<p><b>Wild collection</b><sup>12</sup> – PLANT WILD Grundtvig project (Lithuania, Portugal, Spain, Turkey)</p>	<ul style="list-style-type: none"> <li>• <i>Basic plant science with emphasis on MAPs</i> (ecology and habitats; phenology; bioactive compounds localisation and accumulation patterns; use in: pharmacy, cosmetology, culinary).</li> <li>• <i>Knowledge of MAPs species</i> (Botanical identification; highest demand for raw material; Endangered and protected species; special indications for use).</li> <li>• <i>Harvesting of raw materials and uses</i> (Harvesting calendar; good harvesting practices).</li> <li>• <i>Sustainable wild collection of MAPs</i> (methodology, legislation and control).</li> <li>• <i>Post-harvest processing of MAPs</i> (technologies; quality and good practices).</li> </ul>
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<sup>10</sup> Park, S.Y., Kim, S.W., Cha, S.B. & Nam, M.W. (2014). Comparing Learning Outcomes of Video-Based E-Learning with Face-to-Face Lectures of Agricultural Engineering Courses in Korean Agricultural High Schools. *Interactive Learning Environments*, 22(4), 418-428. Retrieved June 5, 2019 from <https://www.learnlib.org/p/152847/>.

<sup>11</sup> Anastasios, M., Koutsouris, A. & Konstadinos, M. (2010). Information and Communication Technologies as Agricultural Extension Tools: A Survey among Farmers in West Macedonia, Greece. *Journal of Agricultural Education and Extension*, 16(3), 249-263. Retrieved June 5, 2019 from <https://www.learnlib.org/p/108880/>.

<sup>12</sup> Radusiene, J. et al (2013). Good practices for training of medicinal and aromatic plants wild harvesting. 5<sup>th</sup> meeting report. Solsona (Spain), 11-14<sup>th</sup> June 2013. <https://plantwild.files.wordpress.com/2013/07/report-on-good-practices-for-training-map-wild-harvesting.pdf>



Table 7. Suggested subjects for training in MAP production	
<b>Cultivation and elaboration of plant-based products<sup>9</sup></b> – ERASMUS + project (France, Italy, Portugal, Spain)	<ul style="list-style-type: none"> <li>• <i>Marketing and business</i> (Market demand; distribution; good manufacturing practices _GMP_)</li> <li>• <i>Production</i> (quality of botanicals; types of production; certification; harvest and post-harvest; machinery; good agricultural and collection practices _GACP_; production organisation.</li> <li>• <i>Transformation of the raw materials</i> (cooling and freezing; drying and processing; extraction and concentration techniques; stocking and treatments for conservation; good management and environment protection; raw material transformation organisation.</li> <li>• <i>Herbal elaboration techniques</i> (raw materials and auxiliary ingredients; working rooms and equipment for processing and packing; quality and safety management; environment protection; types of herbal products; planning and cost control.</li> <li>• <i>Marketing business and sale</i> (value chain; global market; cooperation, concept stores; labels; marketing; herbal products; botanicals and phytochemicals; online business strategies).</li> </ul>

## 4. Recommendations for research and practice

### Proposals for research from practice

Researchers need information on the most demanded plants and their uses, in order to focus research on these plants, and to analyse the problems and gaps in the herbal material whole supply chain (from production to distribution), to find practical solutions and implement technology transfer adapted to MAPs producers. So it is very important **to be in touch with forest and agriculture trainers in order to facilitate the knowledge flow from research to practice**. In the other sense, surveys should be addressed to producers in order to gather information on the needs for innovation.

In addition, technical experts and researcher should **rely on educational experts to deliver suitable training materials using adapted pedagogical methods**. This will ensure a better quality of knowledge transfer for the actors dealing with plant-based medicinal and cosmetic products.

### Proposals to facilitate the flow of knowledge

Ideas for knowledge transfer on MAP production for medicinal and cosmetic products:

- Development of tools that can reach producers with different educational backgrounds in European rural areas:
  - A series of video tutorials with a European GACP (Good Agricultural and Collection Practices) and GMP (Good Manufacturing Practices) about MAPs.
  - Development of mobile phones APPs to allow farmers' learning and interacting.
- Design of a common European curriculum for vocational education training integrating production, processing and elaboration of plant based medicinal and cosmetic products, and fostering the recognition of the professional profile.
- Using EPAM platform (<https://epam.pt/>) as a model platform in more countries and connect them all in a European network.

Potential EIP operational groups would be:

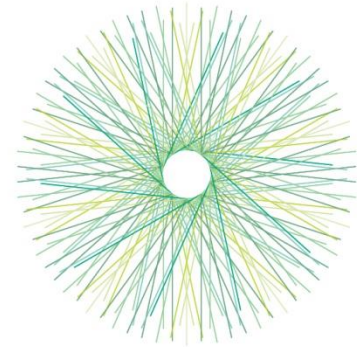
- Use of new ICT tools to facilitate knowledge transfer and training of farmers on MAPs
- Development of a European professional profile of "producer and manufacturer of herbal products".
- Networking platforms for sharing information to MAPs producers.

## 5. Conclusions

The different stakeholders involved in the sector of plant-based medicinal and cosmetics products have different knowledge and information needs. Training and knowledge exchange should be provided to all actors

in the value chain as well as policy makers and involved public bodies. It should be presented at multiple platforms and be designed to fit the different levels of professionalism amongst the recipients (ranging from private family collectors to large companies and organisations). It should be accessible to all users and customised to various age groups and levels of education.

There are different transfer tools that can be useful for spreading knowledge. Training should be based on a common qualification curriculum and on certification criteria at a European level, in order to homogenise the training contents and to facilitate a wider recognition of the profession and related products. Information on each step of the professional production, from plant identification to post-harvesting processing, has an impact on the quality of the final product. Moreover, herbal elaboration techniques, marketing, business and legal aspects are very important for those producers and entrepreneurs aiming at having a viable economic activity.



eip-agri  
AGRICULTURE & INNOVATION

**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](http://ec.europa.eu/agriculture/eip/focus-groups/charter_en.pdf)



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