Interreg
Alpine Space

Alp Bio Eco

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Market potential analysis for regional products in the Alpine Space

AlpBioEco WP T1: Value chain analysis

– Walnuts and herbs –

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Content

1) Introduction: project background and objective

This report summarises the results from the value chain analyses on walnuts and herbs that were conducted in the framework of work package 1 of the AlpBioEco project (Interreg Alpine Space programme). This study was issued by the Kompetenzzentrum für Ernährung (KErn, Kulmbach/Germany) and a parallel study was issued by the EURAC in Bolzano on the value chain of apples. Referring to the Alpine Space programme[1], the objective of this study is to identify market potentials in (the relevant parts of) Austria, Italy, Germany, France, Switzerland and Slovenia[2]. Moreover, bio-economic potentials are regarded as a potentially promising strand of innovation opportunities.

The focus of this study comprises all stages of the value chain, namely cultivation / primary production, processing / refinement, marketing / sales and consumption as well as the value-added activities on the different value creation stages (see Figure 1). In this context, networks of economic activities rather than linear value chains are in consideration (e.g. HOFFMANN 2009; DAHMEN et al. 2019).

However, general challenges in value creation related market studies were indicated. For example, the data availability across borders, on fine spatial scales or in small market niches is limited. This is also the case for the examined products walnuts and herbs. Furthermore, there exist rather grey literature (e.g. GUBLER 2013; STUKER 2017) or (scientific) publications on walnuts and herbs for regional or even local topics (e.g. HUG et al. 2010; WALSER et al. 2017).

[1] See https://www.alpine-space.eu/about/the-programme/what-is-the-alpine-space-programme-

[2] In detail: Austria (whole country), France (Région Auvergne-Rhône-Alpes, Région Bourgogne-Franche-Comté, Région Grand Est, Région Provence-Alpes-Côte d'Azur) Germany (Freiburg, Tübingen, Schwaben, Oberbayern), Italy (Friuli Venezia Giulia, Liguria, Lombardia, Piemonte, Provincia Autonoma di Bolzano, Provincia Autonoma di Trento, Valle d'Aosta, Veneto), Slovenia (whole country) and Switzerland (whole country).

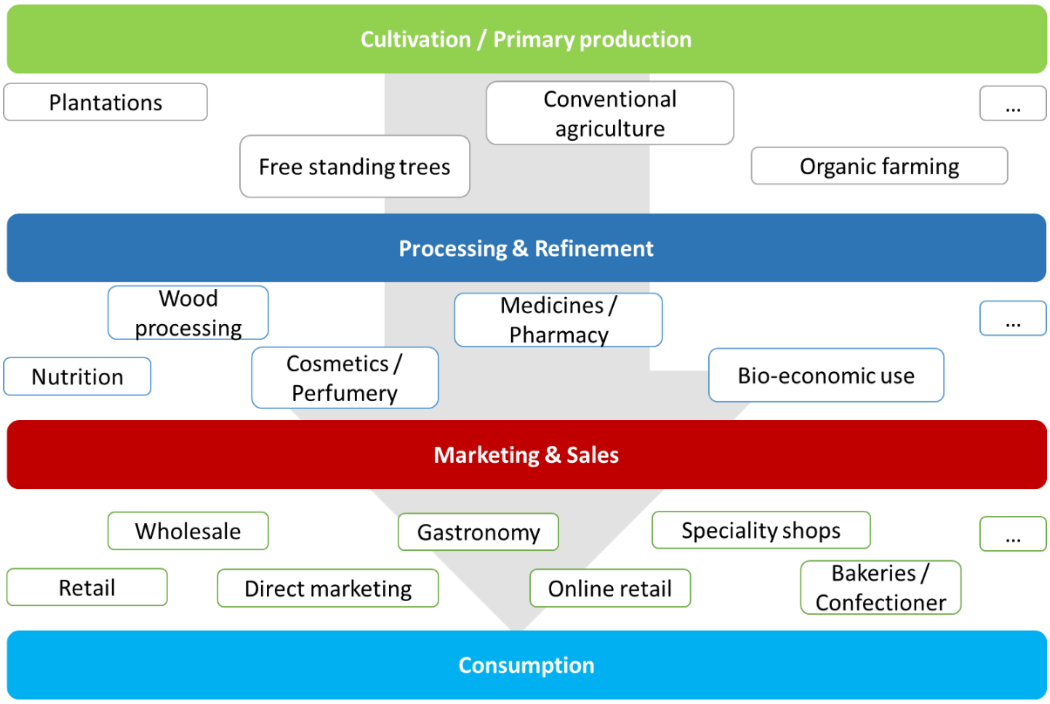


Figure 1: Different stages of value creation for walnuts (own illustration)

2) Methodology

a) Desktop research

The operationalisation of the study is organised in three working steps that comprise each two tasks as illustrated in Figure 2.

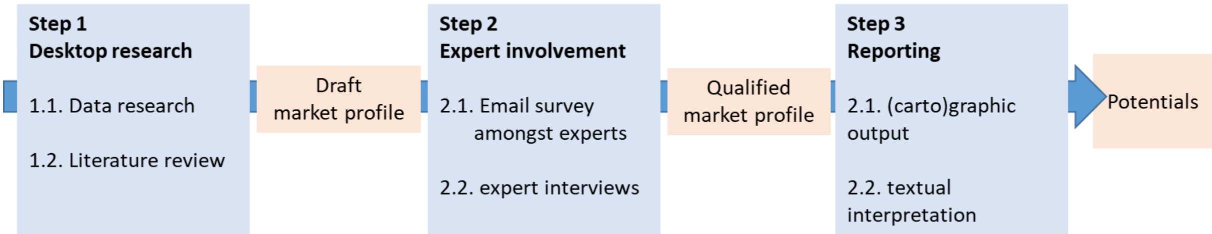


Figure 2: Study design - Own illustration

In order to allow for a draft market profile, the desktop research made use of the available knowledge from data bases and from publications. The data base screening refers to all available sources, including international sources like FAOstat or Eurostat, regional and national statistical offices as well as sectoral institutions (like e.g. Bayerische Landesanstalt für Weinbau und Gartenbau LWG).

The literature review comprises scientific journals, grey literature and reports as well as web information from associations etc. The conducted data / literature search for this study was made in four languages - German, French, Italian and Slovenian - to get a comprehensive, country-specific in-formation base. These information were put together in form of a draft market profile for each surveyed country that give a first overview on the cultivation areas, market situation, product variety and on the relevance of bio-economic activities.

b) Expert involvement

The draft market profile from the first working step is the basis for the experts' involvement. The objective was to qualify the draft market profile and receive additional information or hints for semi- and non-public data and reports.

Firstly, the relevant information was edited for an email survey with regard to sub-regional specificities within the Alpine Space. These tailor-made survey forms were submitted to those experts that were identified in close cooperation with the project consortium. The expert list included experts from all involved countries and relevant regions.

Despite several reminder mailings, the response rate was rather modest (in numbers: 27 of 119 answered, with ten answers for walnuts and 17 answers for herbs. Examples for the questionnaires can be found in the annex (see page 86)). This is why the second step, the expert interviews via telephone are of high complementary relevance. However, the contacted experts' willingness for interviews was just as low here. Overall, three experts were interviewed for the topics of the walnuts and three experts for the herbs. The conducted expert interviews took between fifteen and 35 minutes, depending on the experts' expertise.

The quantity of the expert involvement was lower than expected, due to regional market differences and due to varying support by the project stakeholders. However, the quality of the experts' knowledge and the intensity of the exchange ensures a solid information base that led to a qualified market profile as output of this work step.

c) Reporting and synthesis

In a third step, all information were combined in a (carto-)graphic and textual manner. Given the exploratory character of this study, very different levels and qualities of information had to be combined in this step. Benchmarking, approximation and triangulation are important elements of this step. Even if some spatial detailing and more in depth knowledge might be desirable, the results at hand are solid. For both kinds of products – walnuts and herbs of Alpine origin –

certain potentials can be described. It will be the task of the following work steps of the AlpBioEco project to further detail and develop them.

d) Assessment of data availability, data quality and the experts' involvement

Given the limited scope of this study (a subcontract of roughly 60 working days), the character of the study is a market screening that concentrates on key insights. The underlying approach allows to give relevant answers to a broad range of analytical questions in a thematic of limited data availability and quality.

Secondary statistical data on walnuts or herbs are only partially and primarily available for whole countries (e.g. harvesting and production volumes, producer / selling prices, import and export volumes). For example, due to the small harvesting volumes of walnuts and herbs in Germany, data for these products are not recorded or shown separately as own category by the statistical offices. As already mentioned at the beginning, region- or Alpine-specific data on these topics can only be extracted from grey literature or project reports.

Furthermore, according to the surveyed experts' feedback, valid quantitative assessments on topics like the percentage share of cultivation forms, the percentage market shares of specific products and market prices are only conditionally possible. In addition, according to the experts, statements for small-scale cultivation areas or regions with predominantly small, non-commercial producers could not be made. Therefore, some experts refused to provide information in the online survey on these topics. Moreover, very few experts provided comprehensive information on the bio-economic potentials of walnuts and herbs. As a result, a detailed survey in form of expert interviews on this topic based on the identified experts by the project partners was only possible to limited extent.

As mentioned above, the expert involvement was rather modest despite repeated, partly personal reminder (E-mail reminder, calls and reminder via project partners). Beside the aforementioned difficulties to provide detailed information about specific market characteristics, the low number of responses in the case of walnuts may be due to the project time-related conduct of the online survey during the harvest and processing season.

Necessarily a trade-off between maximum depth of information and a maximum with of experts involved had to be made. For a few selected areas, the knowledge of the involved experts was near to comprehensive, whilst in other areas the experts were hesitating to share their impressions or they were simply not able to respond to the questions in particular in quantitative forms.

3) Market analysis for walnuts

This chapter focuses on the cultivation, processing, refining and marketing of walnuts and their by-products in the Alpine Space. Due to the low feedback on specific topics in the online survey and expert interviews, information from the literature search were added. Detailed information from the online survey and interviews for each investigated country can be found in the annex (see page 44).

a) Cultivation areas

Based on the localised experts' assessments and supplemented by literature research, several cultivation areas of walnuts can be identified within the Alpine Space (see Figure 3; NB: the size of the bubbles is not proportional to the size of the cultivation areas, and the spatial perimeters are meant as approximate indication of the areas and not as exact cultivation areas). The peculiarity in the alps is that walnut trees grow at heights up to 1.200 metres above sea-level, even if they rarely grow at altitudes above 800 metres beyond the Alpine Space. The walnut tree is very sensitive to winter cold or late frosts and grows especially in winter-mild regions with low precipitation (KALLER 2018: 3). The identified cultivation areas are mainly small-scaled cultivations areas in which free-standing trees are farmed, whereas just a few large orchard areas exist (e.g. Kaiserstuhl in Germany). In the cultivation areas, several walnut species are cultivated (e.g. Mars, Lara, Mosel walnut or Fernor) (GUBLER 2013: 3; LFL 2018; Mondagri COOP 2015: 3). Depending on their sort characteristics (e.g. size, flavour), they are suitable for various processing possibilities (e.g. oil, fresh consumption) (Mondagri COOP 2015: 3). With regard to their production quantity, important cultivating countries of walnuts in Europe are France and Italy (INC 2018: 5). However, official data on small-scale harvesting volumes of walnuts are only available for specific countries (see Table 1). In addition, Table 1 gives an overview of how limited the data availability on walnuts is.

Table 1: Country-specific information about acreage, harvesting volumes and yield per acreage of walnuts

Country	Region / Statistical unit	Small-scale cultivation area	Acreage in hectare	Harvesting volumes in tons	Yield per acreage in tons	Time reference	Data source
Austria	Burgenland		27	109	4	2018	Statistik Austria (2018)
	Carinthia		1	1	1,5		
	Lower Austria		30	120	4		
	Upper Austria		20	243	12		
	Salzburg		-	-	-		
	Styria		90	225	2,5		
	Tyrol		0	1	10		
	Vorarlberg		0	1	10		
	Vienna		0	0	4		
France			20.340	39.410*	1,9	2016	FAOStat (2018)
				35.000		2018	INC (2018)
	Rhone-Alpes		9.862			2010	Gubler (2013)
Germany			5.549	18.203*	3,3	2016	FAOStat (2018)
	Tübingen	Bodensee-Oberschwaben		8	0,03	2016	Walser et al. (2017)
Italy			4.005	12.368*	3,1	2016	FAOStat (2018)
Slovenia			273	5.570*	1	2016	FAOStat (2018)
					1	2017	Plešivčnik (2018)
Switzerland			1.714	2.507*	1,5	2016	FAOStat (2018)

* Values in statistics specified as production

The location of these cultivation areas is especially determined by the climatic conditions, the existing infrastructure for the cultivation and processing of walnuts (e.g. walnut tree nurseries, oil mills or walnuts processors and marketers), the know-how of the regional producers and processors and the traditional connection with viticulture (e.g. Kaiserstuhl in Germany (expert statement), Mittelburgenland in Austria (TRENKER et al. 2017a), Wagram in Austria (TRENKER et al. 2017b)).

There are some general potentials for the cultivation of walnuts in the Alpine regions. The favourable arguments can be summarised in three points: First, the resistance of summer drought and minor sensitivity to frost of the walnut trees facilitate their cultivation under the given climatic conditions (experts' assessments, KALLER 2018: 3). Second, the cultivation of walnuts can be used as a substitute for arable crops, marginal acreage and sites at risk of erosion (for example, residual areas with unfavourable shape, steep surfaces; experts' assessments, STREBL n.d.: 4). Third, the local know-how supports the further expansion of walnut cultivation in the already existing cultivation areas in the Alpine space.

Figure 3: Cultivation areas of walnuts - localised experts' assessments

By contrast, there are some impeding arguments: Firstly, the Alpine space is traditionally characterised by small-scaled cultivation areas and the establishment of larger cultivation areas cannot be easily realised (e.g. the average size is at three trees per farmer in the region of Bodensee-Oberschwaben / Germany). Secondly, the processing capacities (e.g. cracking machines, oil mills) are limited or in remote distance. The processing of the harvested nuts is complicated or only possible at considerable expense for the producers. For example, in order to support the walnut producers, in the region Bodensee-Oberschwaben the BUND Ravensburg-Weingarten collects the nuts of the producers and organises joint trips to processing services. Thirdly, a heavy rainfall in some growing areas (in particular the mountainous regions) triggers the occurrence of fungal infestation, small flies and bacteria that harm the trees and affect the harvest.

b) Current market situation

i) General trends and overview

Since 2011, the global walnut consumption has increased by approx. 28% (INC 2018: 36), whereby the increasing demand is mainly covered by the harvest from growing plantations in China, USA, Turkey or Iran (AAS 2008: 8). Figure 4 shows important production countries of walnuts regarding the production quantities of walnuts (with shell) in tons in a worldwide comparison. In 2016 within Europe, Turkey (195.000 tons), Ukraine (107.990 tons), the Republic of Moldova (13.825 tons), France (39.410 tons) and Romania (34.095 tons) were the countries with the highest production quantities of walnuts (FAOstat 2018a).

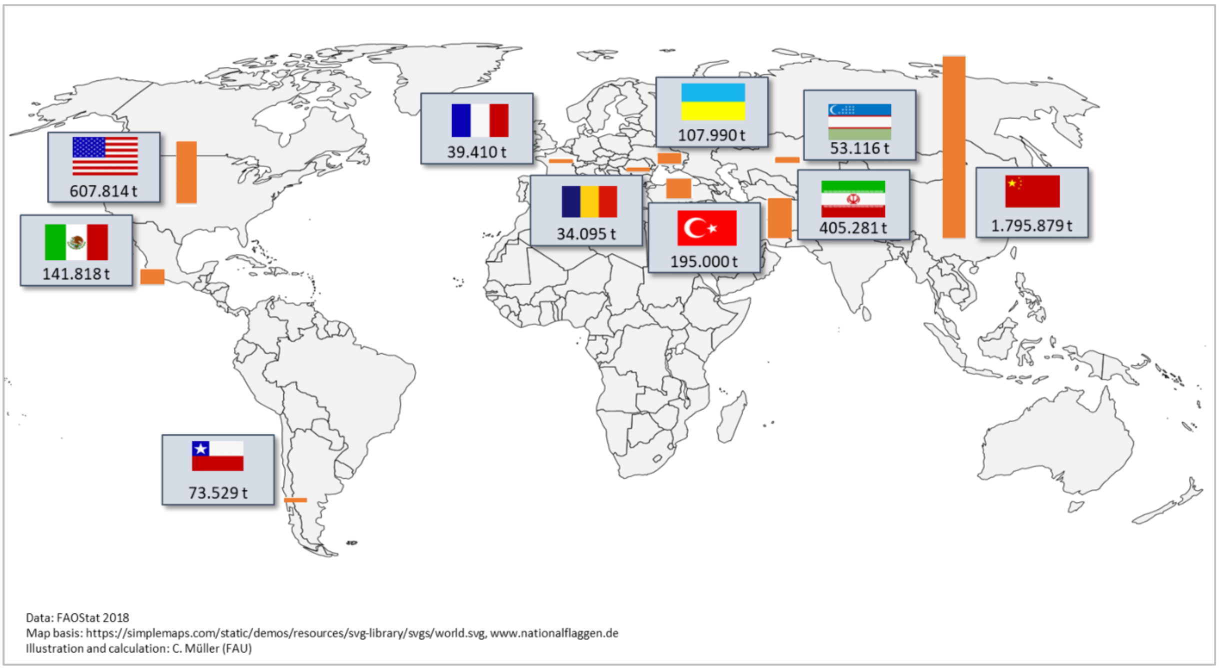


Figure 4: Important production countries of walnuts with production quantities of walnuts (own illustration)

Generally speaking, the cultivation and processing of walnuts has to be seen as an opportunity also for regional producers and processor of walnut products on the European market (STREBL n.d.: 4). This is supported by global food trends and changing consumer behaviours like the growing health awareness, the growing quality orientation, the lower consumption of meat and the associated growing demand for vegetable substitutes for animal products (e.g. walnut milk) that support a middle and long-term growing of the market (CBI 2017a: 6, 12).

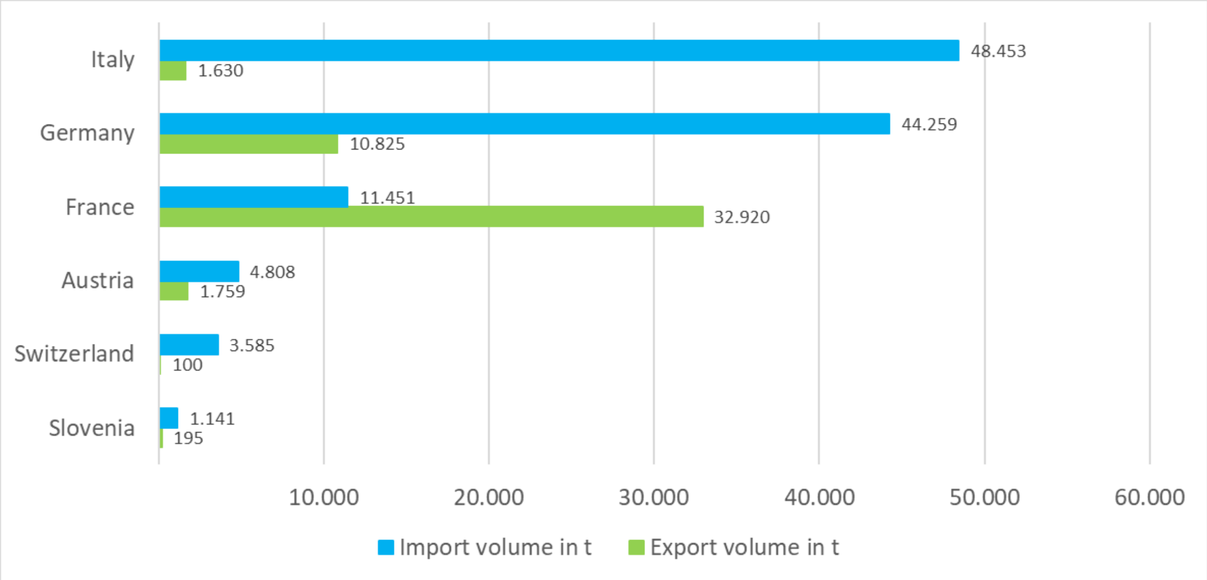


Figure 2: Trade balance of walnuts for selected European countries (shelled and with shell) 2016 (FAOstat 2018b, own illustration)

Taking the trade balance of walnuts in 2016 into account (see Figure 5), especially Italy and Germany have a high import volume with more than 40.000 tons per anno. At the same time, France's role as an important walnut exporter is obvious (NB: these data refer to the entire countries and not to the regions of the Alpine Space and can only give an impression of the export and import situation in the selected countries).

Figure 6 shows the producer prices for one ton of walnuts in Euros for the surveyed countries. Please note, these data refer to the entire countries and not to the regions of the Alpine Space and should only alternatively indicate the price development on the national level. As in Figure 6 shown, in each country different producer prices for a ton of walnuts can be received.

By means of the online survey, producer and selling prices were specified for the German and Italian parts of the Alpine space. The German and Italian experts reported on producer prices for one ton of walnuts between 1.500 and 7.000€, depending on the regional cultivation areas.

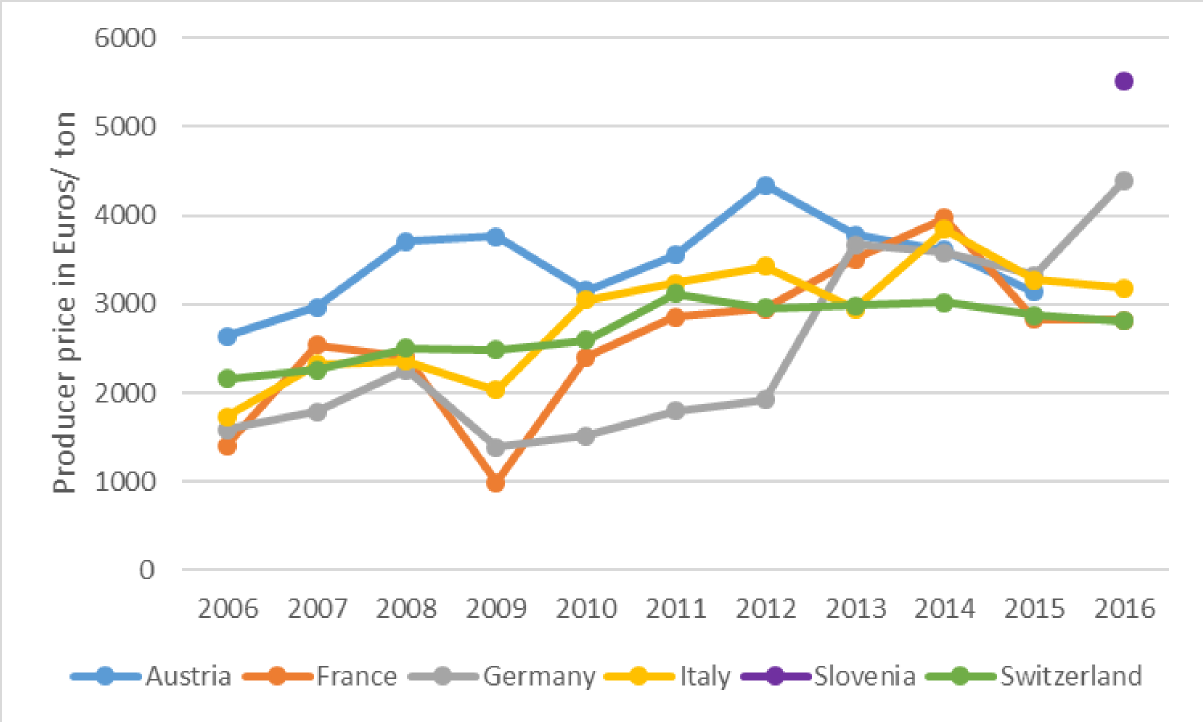


Figure 3: Producer prices (Euros/ ton) - Annual for walnuts, in shell for selected European countries (FAOstat 2018c, own illustrations and calculation with the exchange rate 1 USD = 0.88€, state: 06.02.2019). NB: Data for Slovenia only available for 2016.

Furthermore, selling prices for one kilogram in direct marketing between 5€ and 13€ can be achieved in Italy and Germany, whereby a positive development of 5 - 10 % for the past five years was estimated by the experts. Moreover, some publications report high price increases in recent years with regards to refined high quality walnut products (e.g. 70€/l for walnut oil, WALSER et al. 2017: 4). Unfortunately, valid information on the market share of conventional and organic cultivation, the agricultural purchase form, the company size and legal form could not be retrieved by the online survey. It can be assumed that, as it is typical for small businesses with focus on local markets, a relevant share of the production volumes is supposed to be operated via "grey markets" or direct marketing. However, quantitative values for the sales figures cannot be specified.

ii) Product-specific information

The market segments nutrition, wood processing, cosmetics, medicines and also other usages of walnuts and their by-products (e.g. tree leafs, green peel, walnut shell) present the processing possibilities for walnuts. Table 2 gives an overview of the most important walnut products produced in the Alpine Space.

Table 2: Walnut products produced in the Alpine Space (AlpBioEco online survey 2019, Milind & Deepa 2011: 11-15)

Product category	Products
Nutrition	- Fresh consumption - Dry fruit / snack (e.g. nut mixes) - Refined walnut products (e.g. walnut liqueur, oil, honey, milk, cheese, yogurt, baking and cooking ingredients, black nuts, ice cream) - Several regional specialities (e.g. Grison's cake, Bavarian fruit bread, Pesto di noci)
Wood processing	- Furniture - Decoration - Traditional craftsmanship
Cosmetics	- Skin care products (e.g. soap, walnut oil cream) - Hair dye (use of green peel)
Medicines	- Component of medicines and remedies (use of walnut oil, kernels, walnut tree leafs, walnut seeds, etc.)
Other usage	- Walnut flour (= grated walnut shell) as a cleaning and polishing agent (e.g. for metals, fiberglass) - Walnut granulate for cleaning intake systems in diesel engines - Textile dyes (use of the green peel) - Animal feed - Briquettes / lighters - Insulating material - Organic pesticide (use of walnut tree leafs)

Unfortunately, the experts' feedback does not allow generalised statements about the market potentials of each product category and the regional anchoring of walnut products. Reasons for this can be found in the very different experts' assessments of the market potentials as well as missing information on the regional anchoring of walnut products. The individual assessments can be found in the appendix (see page 44). However, taking the general market trends into account (see page 12), some market potentials and limits for the market segment nutrition can be derived.

Nutrition:

- Potentials
    - Higher demand for fresh and refined walnut products than supply (Experts' assessments)
    - Concentration on the producing and processing of high quality walnuts or (refined) walnut products (e.g. walnut oil, walnut liqueur) (CBI 2017: 12)
    - Intensified use of regional cultivated walnuts for regional products (e.g. Grison's cake, regional-specific walnut oil) (WEIDMANN 2013: 3)
    - Partially good chances for direct marketing on local markets (e.g. in Switzerland) (GUBLER 2016: 28)
    - Marketing of regional walnuts using charge models to create agricultural and ecological added value for the walnut farmers and regions (see project "*Walnussanbau in Oberschwaben*", WALSER et al. 2017: 5)
- Limits
    - Competition from cheaper export goods, inter alia from China, USA and Iran (STEFANI & GIOVANARDI 2014: 6, FAU assessment)
    - Presence of local customers (FAU assessment)
    - Cost orientation of broad consumer groups (FAU assessment)
    - Too low harvesting volumes in the small-scale cultivation areas to serve the demand on a supra-regional market (Experts' assessments)
    - Species problem (e.g. nut size, kernels grown with the shell), whereby some walnut species cannot be processed (Experts' assessments)
    - Limited processing capacities and structures (strictly speaking drying, washing, cracking, sorting and packaging; Experts' assessments)
    - Difficulty in gaining access to service providers by walnut growers because of the wide distribution of the walnut growers and the long distances to the next service providers (Experts' assessments)

c) Bio-economic potentials and other innovations

i) Bio-economic potentials

Amongst others, bio-economy aims at replacing fossil resources by various renewable raw materials, such as the replacement of oil by vegetable raw materials in the production of plastics (BMBF 2018: 1-3). Table 3 shows bio-economic exploitation opportunities of the various components of the walnut (inter alia leafs, green shell, hard shell) and the limits of the bio-economic exploitation.

Table 3: Bio-economic exploitation opportunities of walnuts and their waste residues and their limits (experts' assessments, MILIND & DEEPA 2011: 10-15)

Bio-economic exploitation opportunities	Limits
- Organic pesticides of leafs (Experts' assessments) - Processing the shell to produce biofuel, briquettes, lighters, animal feed or insulating material (Experts' assessments) - Use of the hull for textile (MILIND & DEEPA 2011: 14) - Grated walnut shell, named walnut flour, as a cleaning and polishing agent (MILIND & DEEPA 2011: 13)	- Missing know-how and knowledge (Experts' assessments) - Missing marketing strategies to support the sale of bio-economic products (Experts' assessments) - No complete exploitation of the nuts and their by-products by the producers (Experts' assessments) - No interest of producers and processors because of economically inefficiency (e.g. costs for machines; experts' assessments) - No information by the growers of walnuts about the quantities of by-products possible for processing companies (Experts' assessments)

In particular, the complete utilisation of the walnut components has bio-economic potential for producing briquettes/ lighters, animal feed, insulating material or walnut flour from the shell, organic pesticide from the leafs or textile dyes by the use of the green peel. These bio-economic products have to be seen as potentials for the future, as the walnut producers and processors hardly use these bio-economic utilization options at the moment. According to the experts, the missing knowledge and know-how of bio-economic exploitation opportunities amongst the walnut producers and processors are the main reason for the scarce bio-economic recovery. In addition, only limited information is available on the actual quantity of by-products in the respective regions. However, the regional production volumes of by-products would be of interest to the processors in terms of processing possibilities.

ii) Process and product innovations

Based on the experts' assessments, the following innovation potentials and obstacles can be identified along the value chain of walnuts in the Alpine Space (see Table 4).

Table 4: Innovation potentials and obstacles for walnuts (experts' assessments)

Innovation potentials	Obstacles to innovation
- Process innovation: Expansion of regional processing capacities and service offers for walnut producers (e.g. cracking machines, oil mills) - Innovation / regionalisation in value chain: Sale of walnut kernels to regional customers (e.g. health food shops, processors of refined walnut products) - Product innovation: Bio-economic exploitation/ complete processing of all walnut components (kernel, membrane, shells, etc.)	- Limited processing capacities (e.g. cracking machines, harvesters) and structures (e.g. great distance to the nearest processing service) - Partially insufficient quality of the walnuts (too small and moist walnuts) - Small harvests due to small-scale cultivation to meet the demand for raw materials (e.g. for large cosmetic or food producers) - Decentralised cultivation structures limit the processing quantities of the walnut (100% processing is currently unrealistic) - High competition with cheap imports

The experts emphasized that in particular the limited local processing capacities (e.g. cracking machines, oil mills) are affecting the walnut production and processing in the identified cultivation areas. For example, parts of the local walnut harvest cannot be sold via direct marketing on local markets. Therefore, the local walnuts remain unprocessed or unused. This is accompanied by the fact that the regionally harvested walnuts often miss certain quality and quantity criteria (e.g. nut size, harvesting volume, nut kernels grown with the shell) for an appropriate processing and refining, especially for the food and cosmetic sector.

Innovation gaps along the value chain of walnuts can be identified at the interface of the value creation stages cultivation / primary production and processing / refinement. Therefore, the experts gave the following recommendations for action:

- Provision of (cooperatively organised) service offers and processing infrastructure (e.g. deploying of cracking machines, oil mills, disposal machines) for walnut producers to increase regionally available processing capacities and the bio-economic exploitation of waste residues

- Merger of small companies to a large service provider to pursue an assembly line-like cracking machine
- Introducing quality assurance guidelines (for example, see quality and processing information of MANUFAKTUR GELBE BÜRG EG 2018)
- Increase in value through the cultivation of the most suitable walnut species for the region-al produced walnut products
- Assistance in the harvest by social enterprises

d) Interim conclusion for walnuts

To sum up, the market of walnuts in the Alpine Space can be described as a small-scale market with mainly small producers and a few major processing companies. In addition, the Alpine market for walnuts is characterized by an investment backlog, especially with regard to investments in processing infrastructure. Nevertheless, a positive market development can be recognized (e.g. rising sales prices, supportive consumer trends, regionalisation in the value chain). However, these positive market developments have not yet fully reached the local Alpine level. Moreover, regional walnut farmers within the Alpine Space are in fierce competition with cheaper and quantitatively more in size imports of international walnut producers (e.g. from China, USA, Iran, etc.) and can secure their competitive position in particular through quality assurance.

Amongst the multiple experts' proposals many ideas and recommendations for actions seem generally promising. Positioning them on a more general level, the following four types of activities can be regarded as potentially efficient:

- Establishment of joint quality assurance guidelines by producers and processors
- Supported knowledge exchange between producers and processors (e.g. quantities, processing possibilities of certain species, bio-economic potentials)
- Exploring alternative processing possibilities (e.g. bio-economic products)
- No one-size-fits-all solution, but activities should be developed in respect to the local cultivation and processing situation (e.g. establishment of cooperatives, funding of regional mills, cracking machines, etc.)

e) Synthesis for the Alpine Space

Table 5: Alpine potentials and challenges along the value chain of walnuts – synthesis

Walnuts	Cultivation / Primary production	Processing / Refinement	Marketing / Sales	Consumption
General market conditions	- Agricultural niche production - Important European cultivation areas in France and Italy - Increasing producer prices	- Increasing popularity of alternative walnut products	- High import requirement - Medium and long-term market growth	- Increasing consumption and demand - Growing health awareness - Higher willingness to pay for quality products
Alpine potentials	- Mostly suitable climatic conditions - Cultivation as a sideline business or on marginal acreages - Bio-economic usage - Support through the extension of existing processing structures (e.g. cooperative organisation) - Focus on special walnut species and high quality walnuts - Local know-how of cultivation	- Quality orientation - Bio-economic usage - Extension of existing processing structures (e.g. cooperative organisation) - Use of regional cultivated areas for regional products - Cooperation of small companies	- Marketing as quality products - High demand of nutritional walnut products - Direct marketing on local markets	- Demand for high quality products
Challenges	- Diseases of the trees due to climatic conditions - Competition by globally active nut producers - Too low harvesting to serve the demand on a supra-regional market - Quality assurance for cultivated walnuts - Currently limited processing capacities - Decentralised cultivation limits bio-economic exploitation	- Rare presence of a regional commercial buyers / traders - Currently limited processing capacities and structures - Decentralised cultivation limits bio-economic exploitation	- Competition through import ware (i.e. from China, Iran and USA)	- Cost orientation of broad consumer groups

	- Presence of a regional customer			

4) Market analysis for herbs

This chapter focuses on the cultivation, processing, refining and marketing of herbs and herbal products in the Alpine regions. The following explanations were mainly based on the results of the online survey and expert interviews. Supplementary information could only be integrated selective due to the limited availability of relevant literature on the topic of herbs. Detailed information on this topic for each investigated country form the online survey and interviews can be found in the annex (see page 44).

a) Cultivation areas

The cultivation of herbs - regardless of the form of cultivation - is a niche for specialists as herbs require good soil and climatic conditions. For example, herbs need mainly weed-free areas, because of the weak driving force of the seed or the slow development of the young plant shoots as well as an adequate irrigation (e.g. artificial irrigation, sufficient precipitation; DORSCH 2011: 70-72). Across the Alpine Space several small-scaled cultivation areas can be located. Figure 7 indicates the locations of these cultivation areas of herbs mentioned by the respondents of the AlpBioEco online survey and is supplemented by literature research (NB: the size of the bubbles is not proportional to the size of the cultivation areas, and the spatial perimeters are meant as approximate indication of the areas and not as exact cultivation areas).

According to the experts' assessments, the existence of the cultivation areas of herbs is largely based on the Alpine climatic conditions, the long-standing tradition and the associated know how of herb cultivation. Another reasons for the existence of the illustrated locations can be found in the (historical) presence of species (for example poppy, caraway, edelweiss) or in the existing infra-structure and the good marketing and sales opportunities (e.g. gastronomy, processing firms). There are also synergies between with touristic offers that support the cultivation of herbs.

Figure 7: Cultivation areas of herbs - localised experts' assessments

It shows that there are several cultivation areas of herbs across the alpine countries, in particular in the mountain areas of Austria, France, Italy and Switzerland. The Alpine wide cultivation areas suggest an important relevance of the production of herbs in the Alpine space. Table 7 gives an over-view of the percentage share of the forms of cultivation and of the several species of herbs cultivated in the Alpine Space mentioned by the surveyed experts. Official data on herbs or specific herb species like harvesting volumes, acreage, etc. are only for Austria available (see page 80).

Table 6: Percentage share of the form of cultivation and species of herbs cultivated in the Alpine Space per country (Experts' statements, LES AROMATES DE PROVENCE 2019, SIGNES D'IDENTIFICATION DE LA QUALITÉ ET DE L'ORIGINE EN PROVENCE-ALPES-CÔTE D'AZUR 2019)

Country	**Region**	**Small-scale region / cultivation area**	**Form of cultivation**	**Cultivated species**
Austria	Upper Austria	Mühlviertel	-	• Chive • Parsley • Basil • Rosemary • Thyme • Oregano • Mint • Melissa • Dill • Poppy seed • Kummel
	Lower Austria	Waldviertel	-	
	Lower Austria	Marchfeld	-	
	Styria	Graz	97% greenhouse cultivation 1% cultivation under cloth	
	Vorarlberg	Great Walser Valley, Arlberg	-	
	Salzburg	-	-	
	Tyrol	Kufstein, Thaur	25% greenhouse cultivation	
	Vienna	-	5% greenhouse cultivation 95% cultivation under cloth	
France*	-	-	-	• Rosemary • Savory • Oregano • Thyme
Germany	Oberbayern	Donaumoos (Neuburg-Schrobenhausen)	• 100% outdoor cultivation	• Parsley • Dill • Chervil • Lovage • Thyme • Hyssop • Majoram • Coriander
	Oberbayern	Freising	• 100% outdoor cultivation	
	Schwaben	Donauwörth	• 100% outdoor cultivation	

				• Fennel • Kummel
Italy	Valle d'Aosta	-	-	• Peppermint • Lavender • Chamomile • Melissa • Coriander • Tarragon • St. John's wort • Hyssop • Mallow • Rosemary • Salvia • Thyme • Dandelion • Savory • Calendula • Yarrow • Arnica • Gentian • Edelweiss • Garden cornflower • Mullein • Lemon balm • Bee balm • Oregano
	Piemonte	-	85% outdoor cultivation	
	South Tyrol	-	14% cultivation of wild herbs 80-90% outdoor cultivation 1-5% greenhouse cultivation 2-5% cultivation under cloth	
	Lombardia	-	-	
	Trentino	-	20% cultivation of wild herbs 75-90% outdoor cultivation 1-5% greenhouse cultivation 2-5% cultivation under cloth	
	Veneto	-	85-100% greenhouse cultivation	
	Liguria	-	50% cultivation under cloth	

<table>
<tr><td></td><td></td><td></td><td></td><td>Majoram
Nettle</td></tr>
<tr><td rowspan="7">Slovenia</td><td>Coastal Karst</td><td>-</td><td>-</td><td rowspan="7">Buckwheat
Echinacea
Rosemary
Artichoke
Valerian
Blessed Thistle
Sambucus
Lemon verbena
Small-flowered willowherb
Hyssop
Fennel
Nettle
Lime tree
Thyme
Lemon balm
Marigold
Oats
Horsetail
Melissa
St. John`s Wort
Lavender
Peppermint</td></tr>
<tr><td>Pomursko</td><td>-</td><td>-</td></tr>
<tr><td>Mura</td><td>-</td><td>-</td></tr>
<tr><td>Central Slovenia</td><td>-</td><td>-</td></tr>
<tr><td>Southeast Slovenia</td><td>White Carniola</td><td>-</td></tr>
<tr><td>Drava</td><td>-</td><td>-</td></tr>
<tr><td>Savinja</td><td>-</td><td>-</td></tr>
</table>

				• Mullein • Milk thistle • Ladies mantle • Centaury • Mallow • Mother's wort
Switzerland	Grisons	Val Poschiavo	1% cultivation of wild herbs 50% outdoor cultivation 48% cultivation under cloth Greenhouse cultivation is only operated by individual larger producers	• Mint • Thyme • Sage/ salvia • Lemon balm • Oregano • Basil • Mallow • Coriander • Balm • Echinacea • St. John's wort • Pimpinella • Ribwort
	Bern	Pre-Alpine mountain areas Jura Emmental	Up to 30% cultivation of wild herbs 60% outdoor cultivation 5% cultivation under cloth 5% Greenhouse cultivation (operated only by individual larger producers)	
	Valais	-	Up to 30% cultivation of wild herbs 50% outdoor cultivation 4-10% cultivation under cloth Up to 10% Greenhouse cultivation (operated only by individual larger producers)	

	Lucerne	Entlebuch, Lucerne	1% cultivation of wild herbs 90% outdoor cultivation 9% cultivation under cloth Greenhouse cultivation is only operated by individual larger producers	
	Thurgau	-	-	
	Schaffhausen	-	-	
	St. Gallen	-	-	

The investigated Alpine countries differ with regard to the form of herb cultivation. While herb cultivation areas in Germany, Italy or Switzerland are dominated by outdoor cultivation, greenhouse cultivation. Cultivation under cloth is the predominant cultivation form in Austria. Greenhouse cultivation is mostly operated by larger producers. Furthermore, the collection of wild herbs is currently practiced in Italy (South Tyrol), Switzerland and in particular mountain areas of Austria.

In line with the experts' assessments, the growing of wild herbs has untapped cultivation potentials, especially in dry and mountain areas. Also the cultivation of "regional herbs" (e.g. gentian, edelweiss) must be seen as unexploited potentials of the cultivation of herbs as the substitution of imported herbs or the expansion of biological cultivation is a realistic option. However, the use of certain Alpine herb species is critical. For example, the Alpine edelweiss is under strict nature conservation in Austria or Germany (TIEFENBACH & LARNDORFER 1998: 19; SCHAUER 2014: 194). But in Switzerland a hybrid form (sort Helvetia) of the wild form of edelweiss is cultivated for the market for the use in cosmetics and medicines due to its healing and cosmetic active ingredients (CARRON 2010; SWI SWISSINFO.CH 2005). An important edelweiss producer is Valplantes, an association of farmers in the Swiss canton of Valais (SWI SWISSINFO.CH 2005).

The expansion of the cultivation in the Alpine Space is currently limited due to several reasons, including increasing production costs (especially in the case of biological cultivation), the poor organisation of trade structures, as well as insufficient logistic infrastructures (especially in Veneto/Italy and Slovenia).

b) Current market situation

i) General trends and overview

The corporate structure of the investigated herb market is very diverse, as both micro as well as small and medium-sized companies are active. The companies mainly have legal forms like private companies, corporations or cooperatives and are often run by family businesses. For example, in Italy or Slovenia part-time work is the predominating base for cultivation, processing and finishing and mixed operations, while in Austria, Germany and Switzerland businesses are mainly run in full-time mode.

Moreover, common trends like the growing health awareness or quality orientation of consumers are influencing the market for herbs and herbal products (CBI 2010: 11). This results in the growing demand for quality goods with traceability, fresh or organic herbs (DORSCH 2011: 74, CBI 2017: 2). In addition to this, the surveyed experts estimated that the organic cultivation has a market share of approx. 60 percent in contrast to the conventional cultivation with approx. 40 percent. Currently, there is a high demand of cosmetic firms that are interested in medicinal plants respectively mountain herbs (KELLER 2014: 26).

Despite these supporting trends, herb producers and processors have to cope with a strong competitive pressure in the market for spice and medicinal plants (e.g. low producer prices, competition for dried herbs by imported goods from Asia) and a high price pressure due to the strength of buyers (DORSCH 2011: 74). Since the herb cultivation and processing is very cost- and labour-intensive (especially the organic cultivation), small producers and processors have to charge higher prices to cover their expenses. Furthermore, according to some experts some German companies recently gave up their activities in cultivation of herbs and processing in the dried herbs sector. Against this background there are limited opportunities for small producers and processors to compete on the international or global market for herbs. Market potentials rather arise at the local or regional level for them and they have to be linked with increased added value (quality orientation, product innovation).

Based on the results of the online survey, very different producer and selling prices for herbs and herbal products in the Alpine countries can be indicated. For example, in Italy producer prices for dried herb leafs were named up to 60€/kg, in contrast to countries such as Slovenia or Switzerland where lower producer prices between 2€/kg - 13€/kg are reported. The same can be said for the selling prices, while in Italy selling prices for dried herbs for 90€/kg are said to be achieved, in Slovenia the kilogram price for dried herbs is estimated at 5-8€. Over the past five years, in all investigated countries the producer and selling prices increased, e.g. for dried herbs a producer price in-creases of 1-10 % and a selling price increase of 5-10% was reported by the experts.

ii) Product-specific information

In general, the food sector is the most important market segment for the sale of aromatic herbs and herbal products (CBI 2010: 2). Additional relevant market segments of the non-food sector are cosmetics and perfumery or pharmacy and medicine for the sale of medicinal herbs (CBI 2010: 2, MANNS 2011: 19). Table 7 gives an overview of herbal products produced in the Alpine Space classified by product categories.

Table 7: Herbal products produced in the Alpine Space (AlpBioEco online survey 2019, Bundeszentrum für Ernährung 2018)

Product category	Products
Nutrition	- Fresh herbs (cut and pot herbs) - Dried herbs - Teas and spices - Vinegar - Oil - Dairy products with herbs (such as herbs quark, cheese) - Sweets (for example herbal sweets) - Spirits (for example herbal liquor / liqueur) - Food supplements - Aromatics and hydrolates - Deep frozen herbs - Herbal salt mixture - Baked goods - Several regional specialities (e.g. alpine herbs, pesto alla genovese, „Chrütersalz”)
Cosmetics / perfumery	- Essential oil - Bath additives (use of fragrances and essential oils) - Skin care (e.g. creams) - Soaps - Sun protection - Mouth spray
Pharmacy / Medicine	- Component of medicines and remedies (e.g. use of essential oils, bitter substances, resins, etc. in ointments and tinctures) - Medicinal teas - Homeopathic preparations
Other usage	- Infusions - Herbal / fragrance pillows - Natural colorant (e.g. vegetable dyed wool) - Phytomedicinal usage - Detergents - Textiles

According to the estimation of the surveyed experts, the country-specific import share of raw materials or primary products for the above mentioned product categories is currently approx. 60-100 percent. In the special case of the pharmacy and medicine segment some experts noted that pharmaceutical companies are forced to import raw materials for the production of remedies and medicines because the local harvesting volumes of herbs cannot cover their need. Moreover, small-scaled herb cultivation – like it is the case in most of the alpine cultivation areas – that cannot guarantee sufficiently standardised raw materials.

For the export share, however, very different assessments were given. The export share ranges according to the surveyed experts between approx. 5-80 percent, whereby manufactured nutritional, cosmetic and pharmaceutical products are mainly distributed (in particular from Italy or Switzerland) on the European Market and to a lower extent on the Asian, Arabic or American Market. The main sales markets, especially for nutritional products, are local and regional and only partially national. Direct marketing takes place primarily at the local level (e.g. weekly markets). The different export values suggest that the individual countries are at different stages of development in the cultivation and trade of herbs and herbal products. For example, while Italian herbal products are distributed on international markets, the cultivation of herbs and their supra-regional marketing, e.g. in Slovenia, is still at the beginning.

The results of the online survey show that products with a regional anchoring (i.e. showing a clear linkage between herbal products and their region of origin) are especially produced and sold in the regions of Italy or Switzerland, e.g. spirits (liqueur, gin, absinthe), skin care or teas. The regional anchoring of these products refers mainly to the regional cultivation and processing of regional typical, alpine herb species and the marketing as a regional product. According to the expert assessment, regional products are usually sold locally and regionally and only in exceptional cases Europe-wide (e.g. Braulio liqueur). Nevertheless, the survey experts estimate the market potential of regional products to be low to medium.

According to the experts, market potentials for the Alpine Space can be activated in the sectors of nutrition (e.g. quality herbal products), cosmetics and perfumery (e.g. alternative and traditional treatments) and also in pharmacy and medicine (e.g. homeopathic remedies). **Market potentials and limits** identified by the surveyed regional experts for the above mentioned product categories can be summarized as follows:

Nutrition: high potential (in Austria, Slovenia), medium potential (in Germany, Italy)

- Potentials

  - Concentration on high quality and niche products in combination with alpine herbs
  - Production and sale of fresh herbs
  - New product or speciality creations (e.g. for cheese, oil, vinegar, sweets)
  - Market potential can be increased by good marketing or collaboration of producing companies
- Limits
  - Saturation of local markets (e.g. for teas and spices in Italy)
  - Presence of a local customer for fresh herbs
  - Logistic requirements
  - Convenience habits of potential consumers
  - Decreasing spirit sales
  - Difficult marketing opportunities of new products for small companies because of the existent dominance of market leading companies

Cosmetics/ perfumery: medium potential (in Switzerland), medium / high potential (in Italy), high potential (in Slovenia)

- Potentials
  - Strong expansion because of the growing demand for alternative and traditional treatments (e.g. natural skin care)
  - Processing of Alpine herbs (e.g. edelweiss)
- Limits
  - Only small amounts of raw materials are needed for the processing of cosmetics

Pharmacy/ Medicine: medium potential (in Austria, Germany, Switzerland), medium / high potential (in Italy), high potential (in Slovenia)

- Potentials

    - Collaborations with pharmacies, for example cultivation contracts and purchase agreements between producers of herbs and pharmacy companies, to support the regional herb cultivation
    - Processing of homeopathic remedies based on vegetable matter due to the de-mand for alternative medicine
- Limits
    - Only herbs with certified quality can be used for the production of pharmacies and medicines
    - Standardized materials and big crops are necessary, but this cannot be realised by small-scale herb cultivation and production like in the most of the alpine regions
    - Competitive pressure through imported, standardized raw materials

c) Bio-economic potentials and other innovations

i) Bio-economic potentials

According to the survey experts, bio-economic exploitation opportunities of herbs and their waste residues are in particular the utilization of plant parts for biogas plants, the production of paper or textile material from plant fibres (see Table 8). Another bio-economic exploitation potential is the composting of the raw materials and their reusing as land fertilizer. Despite these bio-economic exploitation opportunities, the interviewees gave feedback that they are not highly activated by producers or processors. Only the option to utilise raw materials for biogas plants is more commonly used. But because of the small amounts of the utilised raw materials for biogas production, this is just a small contribution for replacing fossil energy with renewable raw materials.

Moreover, the experts estimate that the producers and processers have no interest in the exploitation of waste residues because it is not economically efficient for them (due to transportation costs, personnel costs). Currently, there are no public support structures for the purchase of waste residues from producers and processors. Another point is that the producers and processers often reuse the small amounts of waste residues on their own farms (e.g. for composting), thus waste residues are not available on the market. The results of the expert interviews also suggest that producers of herbs have little knowledge of the possibilities of bio-economic recovery.

Table 8: Bio-economic exploitation opportunities of herbs and their waste residues (experts' assessments)

(Used) Bio-economic potentials	Limits
- Used potentials: utilisation of plant parts for biogas plants (NB: very small amounts of raw material available) - Used potentials: composting and reusing as fertilizer - Unused potentials: production of paper - Unused potentials: production of textile material from plant fibres	- Too small amounts of raw materials for sufficient biogas production - Little knowledge about bio-economic exploitation opportunities by producers - No interest of producers and processors because of economically inefficiency - No public tenders for organised buy-off the waste residues - Personal utilisation of the waste residues by farmers

ii) Process and product innovations

Based on the online survey, various potentials and obstacles for process and product innovations along the value chain of herbs can be identified (see Table 9).

First, potentials for product innovations can primarily be realised by an improvement of the product quality or by product diversification. In line with the experts, the regional producers and processors of herbs and herbal products are cultivating the same species and are producing similar products (e.g. certain types of tea or spirits). Potentials for product innovations are given by the producing of Alpine herbs with high quality features or the development of nutritional products with unique flavours or compositions (e.g. teas). In order to achieve these higher product quality standards, stricter quality regulations by the producers are needed.

Table 9: Innovation potentials and obstacles for herbs (experts' assessments)

Innovation potentials	Obstacles to innovation
- Improvement of product quality - Product diversification (special varieties and mixtures, e.g. Alpine mix) - Mechanical improvement and automation of cultivation and processing - Development of new methods for the extraction process of essential oil - Creating synergies with tourism (e.g. hiking tours)	- Limited regional processing capacities (e.g. in destemming the leafs) - Inadequate organizational structures for joint regional marketing, product development, etc. - High competition between producers and processors limits willingness to cooperate - Cost-intensive production and processing technology

Second, potentials for process innovations are seen in the mechanical improvement and automation of cultivation in order to reduce the need of hand pickers. Producers of herbs require special machines for sewing, mowing and harvesting which are suitable for the fine herb seeds and leafs (DORSCH 2011: 72). This is why herb producer in the study regions adapt ordinary seeders or harvesters to make them suitable for their small-scale cultivation areas. Here, an establishment of ma-chine communities could help to distribute the high investment costs for these special technologies among the herb producers (DORSCH 2011: 72). Moreover, innovation potentials in processing can be seen in the development of new methods for the extraction of essential oils (e.g. ultrasound, liquid extraction, sub- and supercritical fluid extraction).

Third, synergies with tourism can be activated in order to support the regional cultivation of herbs by providing various tourist offers in the context of the regional cultivation of herbs. For example, one can mention so called “herb paths” or hiking tours that allow to learn more about regional species and their cultivation in the Alpine regions.

On the other side, regional producers of herbs have currently to cope with limited regional pro-cessing capacities, especially for the destemming of the leafs.

According to the experts, the organisational structures for supporting joint regional marketing and product development are rather insufficient. In addition, there is a strong competition between producers or processors of herbal products that limits cooperation because each market actor wants to secure his own competitive advantages.

In order to exploit the potentials or to avoid the obstacles, the experts propose the following recommendations for actions:

- Cooperation of producers and processors of herbal products with regional organisations or umbrella brands (e.g. “Qualität Südtirol”) to support the marketing and sale of regional produced herbal products
- Provision of collaboratively financed processing machines for producers of herbs
- Stricter quality regulations for producers to ensure a high quality of the Alpine herbs, to generate competitive advantages on the European Market for herbal products

d) Interim conclusion for herbs

In summary, the market for herbs and herbal products in the Alpine Space is a niche market with mainly small-scale cultivation areas and small producers with their own equipment. Furthermore, the market for aromatical and medicinal herbs (especially for dried herbs) is characterised by a strong competitive pressure and a high price pressure because of the buyers’ power. In addition, the cultivation of herbs is very cost-intensive for the producers due to the use of special technology. Despite these difficult market conditions, some potentials along the value chain can be identified and are already exploited differently within the different growing regions (e.g. quality orientation, product diversification, colleting of wild herbs, cultivation of Alpine-specific herbs). The different exploitation of the added value potentials can be attributed to the fact that the cultivation and processing of herbs is at different stages of development in the countries of the Alpine Space (e.g. South Tyrol vs. Slovenia).

The surveyed experts mentioned various (innovation) approaches that could be used to activate unused value creation potentials. Taken the whole Alpine Space into account, the following four types of activities can be seen as particularly supportive:

- Establishment of joint quality guidelines by producers and processors that ensure a high-quality-standard of Alpine herbs
- Supporting cooperation with regional organisations, umbrella brands and other relevant market players to improve a supra-regional marketing

- Supporting communication between the market players to identify region-specific innovation potentials and possibilities for their joint implementation
- Involvement of machine manufacturers (e.g. harvesters, seeders, processing machines) to get information about new technological standards and their implementation possibilities

e) Synthesis for the Alpine Space

Table 10: Alpine potentials and challenges along the value chain of herbs - synthesis

Herbs	Cultivation / Primary production	Processing / Refinement	Marketing / Sales	Consumption
General market conditions	- Cultivation of herbs as a niche production - Mainly small companies with own equipment for drying, cleaning, etc.	- Market potential in the product categories nutrition, cosmetics and pharmacy - Growing demand for hemp products	- high import requirement (esp. for dried herbs)	- Growing quality orientation of consumers and health awareness - Higher willingness to pay for quality products
Alpine potentials	- Producing of high quality and/ or fresh herbs - Cooperation with umbrella brands - Linking with tourism offers (e.g. “herb paths”, hiking tours to explore herbs) - Mechanical improvement/ automation of herb cultivation - Cultivation of wild herbs - Cultivation of hemp and cannabidiols	- Producing of high quality herbal products - Product diversification (e.g. different sorts of teas) - Cooperation with umbrella brands - Mechanical improvement/ automation of the processing - new methods for the extraction process of essential oil (e.g. ultrasound)	- Marketing of high-quality or local products (e.g. Alpine herbs) - Implementation of a cooperative trade mark - Direct marketing - Selling of fresh herbs	- Demand for quality products - Growing demand for alternative and traditional treatments (e.g. natural skin care)
Challenges	- High investment costs for special technology (e.g. for drying, cleaning or harvesting machines) - Competition between regional producers limits cooperation	- High investment costs for special/ new technology - Presence of a regional customer - Strict regulations for pharmaceutical/ medicinal usage	- Strong global completion in the market and few regional sales opportunities (esp. for dried and medicinal herbs)	- Cost orientation of broad consumer groups - Convenience habits

	- Collection and destemming of herbs is mainly hand work and consequently cost intensive - High price pressure due to buyers' focus - Strong fluctuations in yields due to weather conditions - Too small cultivation areas and yield to satisfy the demand		- Market saturation for local products	

5) Conclusion

Finally, the results of the market screening of walnuts and herbs in the Alpine Space show that there are several potentials but also obstacles to support the cultivation, processing and marketing of both products and their by-products. Due to the predominantly small-scale cultivation areas and low crop yields, walnuts and herbs in the Alpine Space can only be established as quality niche products. A conscious focus on quality in production and processing as well as marketing as high-quality products with a clear connection to origin offers high development potential and is in line with current market trends and consumer behaviour.

For both products currently main bottlenecks are given by limited processing capacities. Primarily it is necessary to develop and implement supporting measures for already existing processing and marketing structures to create the basis for further innovation opportunities. As a result, unused production volumes can be processed and the workload for the regional producers of walnuts and herbs can be significantly reduced. Then in a second step, inactivated potentials, like the further exploitation possibilities with bio-economic potential and also their practical, logistical implementation should be taken into account.

6) Literature

AAS, G. (2008): Die Walnuss: Systematik, Verbreitung und Morphologie. In: LWF Wissen 60, pp. 5-10.

AGRICORTI S.S. (2019): Agricorti, a heritage enclosed in the shell of walnut. Online available at https://www.agricorti.it/en/, checked on 21.02.2019.

BUNDESZENTRUM FÜR ERNÄHRUNG (BfZE) (2018): Kräuter: Verarbeitung. Produkte mit frischen Kräutern. Available online at https://www.bzfe.de/inhalt/kraeuter-verarbeitung-440.html, checked on 10.10.2018.

CARONE, S. L.-M. (2018): PSR 2014-2020: Metodologia per l'individuazione delle unità di costo standard (UCS) per i nuovi impianti arborei, per la Misura 4 dei PSR. Documento realizzato nell'ambito del

Programma Rete Rurale Nazionale Piano biennale 2017/18 Scheda Progetto ISMEA 7.1, Ministe-ro delle politiche agricole alimentari e forestali Ufficio DISR2.

CARRON, C.-A. (2010): Anbau von Edelweiss, Sorte Helvetia. Online available at https://www.bioaktuell.ch/pflanzenbau/kraeuteranbau/anbautechnik-kraeuter/edelweiss-helvetiad.html, checked on 21.02.2019.

CBI MINISTRY OF FOREIGN AFFAIRS (2017a): Exporting walnuts to Europe. Available online at https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/walnuts, checked on 07.02.2019.

CBI MINISTRY OF FOREIGN AFFAIRS (2017b): Exporting fresh herbs to Europe. Available online at https://www.cbi.eu/market-information/fresh-fruit-vegetables/fresh-herbs/europe/, checked on 10.10.2018.

CBI MINISTRY OF FOREIGN AFFAIRS (2018): Which trends offer opportunities on the European spices and herbs market? Available online at https://www.cbi.eu/market-information/spices-herbs/trends/, checked on 10.10.2018.

DAHMEN, N., LEWANDOWSKI, I., ZIBEK, S. & WEIDTMANN, A. (2019): Integrated lignocellulosic value chains in a growing bioeconomy. Status quo and perspectives. In: GCB Bioenergy 11 (1), pp. 107-117.

DORSCH, K. (2011): Kräuteranbau - Nische für Spezialisten. In: top agrar (12), S. 70–75.

FAOStat (2018a): Area harvested in hectare, production in tons and yield in hectogram per hectare for walnuts with shell. Available online at http://www.fao.org/faostat/en/#data/QC, checked on 20.02.2019.

FAOSTAT (2018b): Crops and livestock products. Available online at http://www.fao.org/faostat/en/#data/TP, checked on 07.02.2019.

FAOSTAT (2018c): Producer prices - annual for walnuts in shell. Available online at http://www.fao.org/faostat/en/#data/PP, checked on 07.02.2019.

GITE LA SOURCE (2018): La noix de Grenoble. Available online at http://gite-la-source.com/gite-activ-noixgrenoble01-impr.htm. Checked on 22.10.2018.

GUBLER, C. (2013): Potential des Anbaus und Absatzmöglichkeiten der Walnuss in der Schweiz (Bachelor thesis).

GUBLER, H. (2016): Nussanbau. Ein interessanter zukünftiger (Bio)-Betriebszweig?

HOFFMANN, D. (2009): Creation of regional added value by regional bioenergy resources. In: Renewable and Sustainable Engergy Reviews 13 (9), pp. 2419-2429).

HUG, R., HEINRICH, J., BUCHER, S. & NICCA, C. (2010): Machbarkeitsstudie. Ist ein rentabler Walnussanbau in Graubünden mit Verarbeitungszentrum möglich? In Zusammenarbeit mit LBBZ Plantahof, regioViamala, alpinavera.

INC (International Nuts and Dried Fruit Congress, 2018): Walnut round table. May 21-23, 2018, Spain.

KALLER, U. (2018): Baum des Jahres 2008. Available online at http://www.baumdoctor.com/baum-des-jahres-2008.html, checked on 01.10.2018.

KELLER, U.O. (2014): Der Kräuteranbau war die Chance. In: die grüne (14), pp. 24–26.

LES AROMATES DE PROVENCE (Union de producteurs, 2019): Une historie de plantes aromatiques typiquement issues du terroir Provençal et des producteurs Passionné. Available online at https://www.lesaromatesdeprovence.fr/producteurs-plantes-aromatiques-provence, checked on 07.02.2019.

LFL (Bayerische Landesanstalt für Landwirtschaft, 2018): Vorkommende Streuobstsorten in den Landkreisen.

MALAVASI, G. (2017): Il boom delle noci: vivai sguarniti di piante e, nel Veneziano, la prima azienda italiana per produzione del frutto. Available online at https://www.genteveneta.it/gvfocus/boom-delle-noci-vivai-sguarniti-piante-nel-veneziano-la-azienda-italiana-produzione/, checked on 07.02.2019.

MANNS, C. (2011): Untersuchung der Eignung von Kräutern zur Sodenproduktion. Forschungsbericht Agrartechnik des Fachausschusses Forschung und Lehre der Max-Eyth-Gesellschaft Agrartechnik im VDI (503).

MANUFAKTUR GELBE BÜRG EG (2018): Qualitäts- und Verarbeitungsinformation zur Walnussveredelung für Nusslieferanten. Available online at https://docplayer.org/71693221-Qualitaets-und-verarbeitungsinformation-zur-walnussveredelung-fuer-nusslieferanten.html, checked on 07.02.2019.

MERLE & RICHAUD (1994): e séchoir à noix du Bas-Dauphiné. In: Le Monde alpin et rhodanien. Revue régionale d'ethnologie, n°4/1994. pp. 25-42.

MILIND, P. & DEEPA, K. (2011): Walnut: Not a hard nut to crack. In: International Research Journal Of Pharmacy 2 (5), pp. 8-17.

Mondagri Coop (2015): La coltivazione del noce e del nocciolo. Nueve opportunità per il Pie-monte. Available online at http://www.oataitalia.it/la-coltivazione-del-noce-e-del-nocciolo-nuove-opportunita-per-il-piemonte/, checked on 22.10.2018.

PLEŠIVČNIK, S. (2018): Pridelki kmetijskih rastlin v 2017 zaradi vremenskih razmer znatno manjši kot v 2016. Available online at https://www.stat.si/StatWeb/News/Index/7210, checked on 29.01.2019.

SCHAUER, T. (2014): Das neue Plakat "Geschützte Alpenpflanzen" und frühere Plakate mit Unterstützung des Vereins zum Schutz der Bergwelt. In: Jahrbuch des Vereins zum Schutz der Bergwelt (79), pp. 191-216.

SIGNES D'IDENTIFICATION DE LA QUALITE ET DE L'ORIGINE EN PROVENCE-ALPES-COTE D'AZUR (2019): Les saveurs uniques de la region. Provence-Alpes- Côte d'Azur. Available online at: http://www.signes-qualite-paca.com/?action=index&controller=index&idc=2, checked on 07.02.2019.

SLOW FOOD (Slow Food Foundation for Biodiversity, 2018): Walnut Oil. Available online at https://www.fondazioneslowfood.com/en/slow-food-presidia/walnut-oil/, checked on 14.01.2019.

SOLAR, A. (1990): Phenological and pomological characteristics of walnut cultivars in North-eastern Slovenia. In: Acta Hortic (284), pp. 167-174.

STATISTIK AUSTRIA (2018): Ernteerhebung. Obstproduktion aus Erwerbsanlagen, endgültiges Ergebnis 2018.

STEFANI, E. & GIOVANARDI, D. (2014): Bacterial blight of walnut: a severely re-emerging disease.

STREBL, H. (n.d.): Aronia und Walnuss - Alternativen zum Ackerbau?

SWI SWISSINFO.CH (2005): Das Geschäft mit dem gezähmten Edelweiss. Online available at https://www.swissinfo.ch/ger/das-geschaeft-mit-dem-gezaehmten-edelweiss/4613296, checked on 20.02.2019.

TIEFENBACH, M. & LARNDORFER, G. (1998): Naturschutz in Österreich. Monographien / Umweltbundesamt, Bundesministerium für Umwelt, Jugend und Familie (Bd. 91).

STUKER, U. (2017): Kräuteranbau im Appenzellerland. Spleen oder Chance. Kurzreferat vom 25.04.2017. Kompetenznetzwerk Ernährungswirtschaft.

TRENKER, D., SOMMER, E. & HÖBAUS, E. (2017a): Mittelburgenländische Kaesten und Nuss. Available online at https://www.bmnt.gv.at/land/lebensmittel/trad-lebensmittel/spezialkulturen/mbgld_kaesten_nuss.html, checked on 07.02.2019.

TRENKER, D., SOMMER, E. & HÖBAUS, E. (2017b): Wagramer Nuss. Traditioneller Anbau von Walnüssen (Juglans regia) in Gärten der Region Wagram, Niederösterreich. Available online at https://www.bmnt.gv.at/land/lebensmittel/trad-lebensmittel/spezialkulturen/wagramer_nuss.html, checked on 16.10.2018.

WALSER, M., MILLER, U. & MUNOZ, M. (2017): Walnussvermarktung in der LEADER Region Mittleres Oberschwaben. Abschlussbericht.

WEIDMANN (2013): Bündner Walnüsse für Bündner Nusstorten. In: LID Mediendienst, Nr. 3147, pp. 3-4.

7) Annex

a) Number of surveyed experts per country

Country	Online survey				Expert interviews			
	Walnuts		Herbs		Walnuts		Herbs	
	Requested	Feedback	Requested	Feedback	Requested*	Conducted	Requested*	Conducted
Germany	11	4	13	3	2	1	1	-
France	8	-	9	-	-	-	-	-
Italy	7	2	2	6	1	1	1	1
Austria	14	3	14	3	-	-	-	-
Switzerland	11	-	9	3	-	-	-	-
Slovenia	8	1	13	2	1	1	2	2
Total	59	10	60	17	4	3	4	3

* Experts for in-depth interviews were selected based on their detailed statements in the online survey on the topics of innovation, market and bio-economic potentials

State of 11.02.2019

b) Results of the online survey – Walnut

i) Cultivation

Country	Region	Small-scale region/ cultivation area	Cultivation form	Relevance	Potentials
Austria	Upper Austria	Linz, Wels, Eferding, Perg	-	-	-
Austria	Vorarlberg	-	100% free standing trees	-	-
France	-	-	-	-	-
Germany	Freiburg	Kaiserstuhl	-	• Large tree population • Existing walnut tree nursery and oil mills • Traditional connection with viticulture	• Good potential because of existing infrastructure for walnut cultivation • Experience and know-how in cultivation • Climatic conditions
Germany	Tübingen	Swabian Alb (in particular Reutlingen, Esslingen)	-	• Biggest orchard area in Baden-Württemberg • Many walnut trees in Reutlingen and Esslingen • Many walnut processors and marketers	

Germany	Tübingen	Bodensee-Oberschwaben (in particular Districts of Bodenseekreis, Ravensburg and Sigmaringen)	5% Plantation 95% free standing trees	• Several new oil mills (e.g. in Waldburg, Ravensburg, Bad Wurzach, Owingen)	• Good potential for walnut cultivation because of resistance to summer drought • Service offer by innovative farmers
Italy	Valle d'Aosta	-	10% Plantation 90% free standing trees	-	• Use of marginal acreage • Wood finishing in carpentries • High demand for fresh and • Currently higher demand than supply (fresh and refined walnut products)
Italy	Piemonte	-	-	-	-
Italy	Trentino	-	-	-	-
Italy	Veneto	-	-	-	-
Slovenia	Southeast Solvenia	White Carniola	-	• Walnut is a traditional tree (represented in all regions, but today the largest plantations of grafted walnuts are in White Carniola, Savinja and Prekmurje)	-
Slovenia	Savinja	-	-	• Walnut is a traditional tree (represented in all regions, but	-

				today the largest plantations of grafted walnuts are in White Carniola, Savinja and Prekmurje)	
Slovenia	Prekmurje	-	-	• Walnut is a traditional tree (represented in all regions, but today the largest plantations of grafted walnuts are in White Carniola, Savinja and Prekmurje)	-
Slovenia	Slovene Littoral	-	-	-	-
Switzerland	-	-	-	-	-

ii) Market

Country	**Producer/selling price**				**Market share of conventional and organic cultivation in %**		**Agricultural purchase form**			**Company size**	**Legal form**
	Producer price for one ton of walnuts 2018	Development over the past 5 years	Selling price for a kg of Walnuts 2018	Development over the past 5 years	Conventional cultivation	Organic cultivation	Cultivation	Processing and finishing	Mixed operation		
Austria	-	-	-	-	-	-	-	-	-	-	-
France	-	-	-	-	-	-	-	-	-	-	-
Germany	4500€/t 1500€/t 3000-5000€/t -	+7% - - -	7,50€ 6,00€/kg 5-13€/kg 7,95€/kg	+10% - - +10%	80% - 90-95% -	20% - 5-10% 80%	Part-time	Part-time	Part-time	Micro, small and medium-sized enterprises	Private companies
Italy	7000€/t	0%	7,5€/kg	+5%	-	-	-	-	-	-	-
Slovenia	-	-	7-14€/kg	-	-	5-8%	Part-time	Part-time	Part-time	Micro enterprises	Private companies

Switzerland	-	-	-	-	-	-	-	-	-	-	-

iii) Products

Country	Product	Market share	Market potential	Comment on market potential	Import share	Export share	Sales areas/ target markets
Austria	-	-	-	-	-	-	-
France	-	-	-	-	-	-	-
Germany	Nutrition	-	Medium	-	80-90%	0%	-
	Fresh consumption	-	Medium high	-	-	-	-
	Dried fruits/ snack	-	High 2x Medium low	-	-	-	-
	Baking and cooking ingredient	-	High 2x Medium low	-	-	-	-
	Walnut cheese	-	Low	-	-	-	-
	Walnut liquer	-	High Medium 2x Low	-	-	-	-
	Walnut milk	-	Low	-	-	-	-
	Regional products…	-	Low Medium	-	-	-	-
	pesto	-	Medium	-	-	-	-
	liqueur	-	-	-	-	-	-
	Kletzenbrot/ bavarian Fruit bread	-	Low Medium	-	-	-	-

	Walnut honey	-	-	-	-	-	-
	Walnut yogurt	-	-	-	-	-	-
	Wood processing	-	Low Medium	-	20% 50%	0%	-
	Furniture	-	Low Medium	-	-	-	-
	Decoration	-	Low	-	-	-	-
	Cosmetics	-	Low Medium	-	-	-	-
	Skin care	-	Low Medium	-	-	-	-
	Hair dye	-	Low Medium	-	-	-	-
	Medical usage	-	Low Medium	-	90%	0%	-
	Medicines and remedies	-	Low	-	-	-	-
	Other usage	-	Low	-	80%	0%	-
	Cleaning and polishing agent	-	Low	-	-	-	-
	Textiles dyes	-	Low	-	-	-	-
	Animal feed	-	-	-	-	-	-
	Sandblasting with walnut shells	-	-	-	-	-	-
Italy	Nutrition	-	-	-	-	-	-
	Fresh consumption	-	High	-	-	-	-

	Dried fruits/ snack	-	High	-	-	-	-
	Baking and cooking ingredient	-	-	-	-	-	-
	Walnut cheese	-	-	-	-	-	-
	Walnut liquer	-	-	-	-	-	-
	Walnut milk	-	-	-	-	-	-
	Regional products…	-	-	-	-	-	-
	Oil	-	-	-	-	-	-
	Wood processing	-	-	-	-	-	-
	Medical usage	-	-	-	-	-	-
	Other usage	-	-	-	-	-	-
Slovenia	Nutrition	-	Medium	-	90%	-	-
	Fresh consumption	-	High	-	-	-	-
	Dried fruits/ snack	-	High	-	-	-	-
	Baking and cooking ingredient	-	Medium	-	-	-	-
	Walnut cheese	-	Low	-	-	-	-
	Walnut liqueur	-	Medium	-	-	-	-
	Walnut milk	-	Low	-	-	-	-

	Slovenske potice	-	Medium	-	-	-	-
	Prekmurska gibanca	-	Medium	-	-	-	-
	Walnut oil	-	-	-	-	-	-
	Wood processing	-	Medium	-			-
	Furniture	-	Medium	-	-	-	-
	Decoration	-	Medium	-	-	-	-
	Cosmetics	-	Medium	-	-	-	-
	Skin care	-	Medium	-	-	-	-
	Hair dye	-	Medium	-	-	-	-
	Walnut massage oil	-	-	-	-	-	-
	Medical usage	-	Medium	-			-
	Medicines and remedies	-	Medium	-	-	-	-
	Other usage	-	Medium	-			-
	Cleaning and polishing agent	-	Low	-	-	-	-
	Textiles dyes	-	Low	-	-	-	-
Switzerland	-	-	-	-	-	-	-

iv) Regional anchoring of walnut products

Country	Region	Walnut product	Regional Anchoring
Austria	-	Bündner Nusstorte	Traditional cake
France	-	-	-
Germany	-	-	-

Italy	Valle d'Aosta	• Dinus Donavit (Oil) • Nocino (liqueuer)	• Cold-pressed nut oil • Produced by family-run businesses in the region
Slovenia	-	-	• As the production of walnuts is so small, it is pointless to label origin of walnuts in relation to Slovenian regions. It is more important to label it "produced in Slovenia"
Switzerland	-	-	-

v) Innovations

Country	Process and product innovations	Bio-economic potential
Austria	• There is a lack of infrastructure (cracking machines…)	
France		
Germany	• Processing as an offered service • Complete processing of all components	• Using the shell to make briquettes or insulating material • Making organic pesticide out of the leaves
Italy	• Improving the value by using the most suitable walnut species	• Processing the shell to produce a biofuel
Slovenia		
Switzerland		

vi)Regional projects and initiatives

Country	Projects and initiatives
Austria	-
France	-

Germany	www.gelbe-buerg.de
Italy	IAR project (evaluation of different cultivars' adaptability)
Slovenia	-
Switzerland	-

vii) Further information

Country	Information
Austria	• Ten years ago, the last walnut plantation in Vorarlberg with around 70 trees was cleared • Due to high rainfall, there is a big problem with fungal infestation (Marssonia), bacteria (Xanthomonas) and small flies (Rhagoletis complete) that harm the trees • The trees tend to sprout earlier every year which resulted in damages due to late frost
Italy	• The walnut is a promising crop that requires little input • The demand for walnuts in the Aosta valley cannot be supplied, so a cultivation area's expansion seems conceivable
Slovenia	• It is hard to give an exact calculation on prices, but the price of the crop of 2018 fell by approx. 30%, which is due to abundant harvests. The year 2017 was very affordable for those who did not record frost

c) Results of the expert interviews – Walnuts

i) Innovations

Country	Region	Obstacles to innovation	(Implemented) Solutions	Innovative regions/ companies
Germany	Tübingen	• Not enough cracking machines available • Large distance to the next cracking service providers	• Promotion of founding new service providers or cooperatives (to share machines and equipment) • Cooperation with social institutions (e.g. sheltered workshops) to get help with picking up and drying the walnuts	-
Italy	Aosta valley	-	-	-
Slovenia	-	• Difficult cracking and drying processes • Need of know-how and skills	• Careful handling/ processing • High quality drying machines	-

ii) Bio-economic potential

Country	Region	Use of bio-economic exploitation opportunities	Produced bio-economic products	Limits for bio-economic exploitation	Solutions for promoting bio-economic potentials/ exploitation	Further bio-economic exploitation opportunities
Germany	Tübingen	• No full use of all compounds	• Liqueur and distillate out of green walnuts (as they can't be cracked and used for common products) • Black walnuts (pickled in water together with their shells)	• Missing know-how (e.g. dual use of croplands, separation of different components, potential bio-economic opportunities) • Decentralised walnut cultivation (around 3 trees per farmer – limited quantities) • Problems in infrastructure (e.g. not enough cracking machines available, large distance to the	• Promotion of founding new service providers (development of strategies to use bio-economic potentials) • Merger of several small farmers and businesses to create one big service provider with an assembly- line like cracking machine	• Using the inner partition membrane for cosmetics • Birdseed or packaging material from the shells • Production of timber • Walnut flour from press cake (a by-product of the oil pressing process)

				next cracking service provider) • Problems in quality (stringent guidelines for quality assurance) • Limited marketing strategies • Costs (e.g. for new machines)		
Italy	Aosta valley	• There is hardly any use of bio-economic potentials	• Biofuels for biomass plants	• Limited quantities	-	-
Slovenia	-	• Bio-economic exploitation opportunities are used	• Products from shells and leafs	• No knowledge about bio-economic exploitation potential • No regional customers	• There are practically no opportunities	• Using the shells as bio pots

iii) Market

Country	Region	Solutions to meet market challenges
Germany	Tübingen	• Implementing an “Upper Swabian walnut oil” as a regional product from Swabian walnuts • Market penetration – selling regional walnuts in (organic) supermarkets (they are currently selling Chilean walnuts) • Implementing organic certification
Italy	Aosta valley	• Sensitivity towards regional products (the two products do not compete directly) – regional products are labelled • Customers are willing to pay higher prices for regional walnut products
Slovenia	-	• Improvement in quality and coming up with innovative ideas for new products to succeed in competition

iv) Further information

Country	Region	Information
Germany	Tübingen	• New guidelines for quality assurance were implemented
Italy	Aosta valley	• Mainly companies that cultivate walnuts for fresh consumption or the production of walnut oil • New lateral fructification varieties for an easier implementation of mechanized processes • New cold-pressing techniques are being developed to maintain the oil’s properties • There is another regional product called “Troillet”, but it is not marketed commercially yet
Slovenia	-	-

d) Results of the online survey – Herbs

i) Cultivation

<table>
<tr><th>Country</th><th>Region</th><th>Small-scale region/ cultivation area</th><th>Cultivation form</th><th>Species</th><th>Relevance</th><th>Potentials</th></tr>
<tr><td>Austria</td><td>Upper Austria</td><td>Mühlviertel</td><td>-</td><td rowspan="5">Chive
Parsley
Basil
Rosemary
Thyme
Oregano
Mint
Melissa
Dill
Poppy seed
Kummel</td><td>-</td><td>-</td></tr>
<tr><td>Austria</td><td>Lower Austria</td><td>Waldviertel</td><td>-</td><td>Tradition (poppy, caraway seeds)
Existing local companies</td><td>-</td></tr>
<tr><td>Austria</td><td>Lower Austria</td><td>Marchfeld</td><td>-</td><td>High growth
Focus on frozen food</td><td>-</td></tr>
<tr><td>Austria</td><td>Styria</td><td>Graz</td><td>97% greenhouse cultivation
1% cultivation under cloth</td><td>Good infrastructure
Existing areas for cultivation
History of herb cultivation
Focus on herbs in pots</td><td>-</td></tr>
<tr><td>Austria</td><td>Vorarlberg</td><td>Great Walser Valley, Arlberg</td><td>-</td><td>Collection of wild herbs in particular in mountain areas</td><td>Biological cultivation, but high risk for producers; alternative option: abandonment of pesticides</td></tr>
</table>

						• Cultivation of herbs in accordance with the preservation of nature in mountain areas
Austria	Salzburg	-	-		• Good marketing opportunities (e.g. gastronomy, processing firms…)	-
Austria	Tyrol	Kufstein, Thaur	25% greenhouse cultivation		• Proximity to food retailer • Focus on fresh herbs • gastronomy	-
Austria	Vienna	-	5% greenhouse cultivation 95% cultivation under cloth		• Good marketing opportunities (e.g. gastronomy, processing firms…) • Focus on fresh herbs and herbs in pots	-
France	-	-	-	-	-	-
Germany	Oberbayern	Donaumoos (Neuburg-Schrobenhausen)	100% outdoor cultivation	• Parsley • Dill • Chervil • Lovage	• Existing herb dehydration/drying firm	-
Germany	Oberbayern	Freising	100% outdoor cultivation		-	-
Germany	Schwaben	Donauwörth	100% outdoor cultivation		• Biggest cultivation area in Bavaria	-

<table>
<tr><td></td><td></td><td></td><td></td><td>Thyme
Hyssop
Majoram
Coriander
Fennel
Kummel</td><td>Existing herb dehydration/drying firm</td><td></td></tr>
<tr><td>Italy</td><td>Valle d’Aosta</td><td>-</td><td>-</td><td rowspan="3">Peppermint
Lavender
Chamomile
Melissa
Coriander
Tarragon
St. John’s wort
Hyssop
Mallow
Rosemary</td><td>Traditional herb cultivation and know-how
Existing local companies
Good climatic and soil conditions</td><td>-</td></tr>
<tr><td>Italy</td><td>Piemonte</td><td>-</td><td>85% outdoor cultivation</td><td>Existing local companies
Existing cultivation area
Well organized processing industry that produces cosmetics, tinctures and medical products out of herbs</td><td>High demand for herbs
Cultivation and sale of regional herbs to substitute imported herbal products</td></tr>
<tr><td>Italy</td><td>South Tyrol</td><td>-</td><td>14% cultivation of wild herbs</td><td>Traditional herb cultivation/ use of herbs and know-how</td><td>Cultivation of special cultures (e.g. gentian, edelweiss, artemesia)</td></tr>
</table>

			80-90% outdoor cultivation 1-5% greenhouse cultivation 2-5% cultivation under cloth	• Salvia • Thyme • Dandelion • Savory • Calendula • Yarrow • Arnica • Gentian • Edelweiss • Garden cornflower • Mullein • Lemon balm • Bee balm • Oregano • Majoram • Nettle	• Collection of wild herbs in the mountain area • Good market conditions for (small) direct processors and businesses due to the tradition and tourism potential of herb cultivation • Potential for the cultivation of different kinds of Mediterranean and Alpine medicinal herbs due to different altitudes and rock formations • Synergies between agriculture and tourism	• (Local) market saturation (in particular for direct marketing) • High productions costs restrict extensive production • Little potential for the extension of the cultivation of herbs, but remaining potential for herb cultivation in dry and mountain areas (e.g. Vinschgau) • Expansion of the cultivation of wild herbs • Cultivation of herbs as additional income opportunity for farmers considering falling milk and wood prices • Cultivation of herbs as alternative mounting option contributes to the

						exploitation of mountain areas and limits the migration of young people • High added value of nutritious, high quality herbs
Italy	Lombardia	-	-		-	-
Italy	Trentino	-	20% cultivation of wild herbs 75-90% outdoor cultivation 1-5% greenhouse cultivation 2-5% cultivation under cloth		• Traditional use of herbs • Traditional know-how in herb cultivation • Collection of wild herbs in the mountain area • Good market conditions for (small) direct processors and businesses due to the tradition and tourism potential of herb cultivation • Potential for the cultivation of different kinds of Mediterranean and Alpine medicinal herbs due to different altitudes and rock formations • Synergies between agriculture and tourism	• High potential for herb cultivation in dry and mountain areas • Expansion of the cultivation of wild herbs • Cultivation of herbs as additional income opportunity for farmers considering falling milk and wood prices • Cultivation of herbs as alternative mounting option contributes to the exploitation of mountain areas and limits the migration of young people

						• High added value of nutritious, high quality herbs
Italy	Veneto	-	85-100% greenhouse cultivation		• Economically and logistically active region • Production • Well organized processing industry that produces cosmetics, tinctures and medical products out of herbs	• Logistics
Italy	Liguria	-	50% cultivation under cloth		• Climatic conditions • Historical, traditional herb cultivation	-
Slovenia	Coastal Karst	-	-	• Buckwheat • Echinacea • Rosemary • Artichoke • Valerian • Blessed Thistle	• Few small cultivation areas • Processing of herbs in local processing companies	• Many areas with high potential for herb cultivation • Poor organization of the buy-in limits the developing and expanding of herb cultivation
Slovenia	Pomursko	-	-		• Most important cultivation area of Slovenia	• Good environmental conditions

				• Sambucus • Lemon verbena • Small-flowered willowherb • Hyssop • Fennel • Nettle • Lime tree • Thyme • Lemon balm • Marigold • Oats • Horsetail • Melissa • St. John`s Wort • Lavender	• Biggest area for herb cultivation	• Unpolluted environment • Small cultivation areas
Slovenia	Mura	-	-		• few small cultivation areas • Processing of herbs in local processing companies	• Many areas with high potential for herb cultivation • Poor organization of the buy-in limits the developing and expanding of herb cultivation
Slovenia	Central Slovenia	-	-		• Few small cultivation areas • Processing of herbs in local processing companies	• Many areas with high potential for herb cultivation • Poor organization of the buy-in limits the developing and expanding of herb cultivation
Slovenia	Southeast Slovenia	White Carniola	-		• Few small cultivation areas • Processing of herbs in local processing companies	• Many areas with high potential for herb cultivation • Poor organization of the buy-in limits the developing and

<table>
<tr><td></td><td></td><td></td><td></td><td rowspan="3">• Peppermint
• Mullein
• Milk thistle
• Ladies mantle
• Centaury
• Mallow
• Mother’s wort</td><td></td><td>expanding of herb cultivation</td></tr>
<tr><td>Slovenia</td><td>Drava</td><td>-</td><td>-</td><td>-</td><td>• Good environmental conditions
• Unpolluted environment
• Small cultivation areas</td></tr>
<tr><td>Slovenia</td><td>Savinja</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Switzer-land</td><td>Grisons</td><td>Val Poschiavo</td><td>1% cultivation of wild herbs
50% outdoor cultivation
48% cultivation under cloth
Greenhouse cultivation operated only by individual larger producers</td><td rowspan="2">• Mint
• Thyme
• Sage/ salvia
• Lemon balm
• Oregano
• Basil
• Mallow
• Coriander
• Balm
• Echinacea</td><td>• Focus on dried herbs
• Historical aspects
• Swiss pioneers in herb cultivation
• Climatic conditions (warm)
• Light soils</td><td>• Creating functional structures for herb cultivation and drying</td></tr>
<tr><td>Switzer-land</td><td>Bern</td><td>Pre-Alpine mountain areas
Jura
Emmental</td><td>Up to 30% cultivation of wild herbs
60% outdoor cultivation
5% cultivation under cloth</td><td>• Focus on dried herbs
• Climatic conditions
• Quantity of harvested herbs
• Old tradition</td><td>• Creating functional structures for herb cultivation and drying</td></tr>
</table>

			5% Greenhouse cultivation (operated only by individual larger producers)	• St. John's wort • Pimpinella • Ribwort		
Switzer-land	Valais	-	Up to 30% cultivation of wild herbs 50%+ outdoor cultivation 4-10% cultivation under cloth Up to 10% Greenhouse cultivation (operated only by individual larger producers)		• Focus on dried herbs • Climatic conditions • Quantity of harvested herbs • Old tradition	• Creating functional structures for herb cultivation and drying
Switzer-land	Lucerne	Entlebuch, Lucerne	1% cultivation of wild herbs 90% outdoor cultivation 9% cultivation under cloth Greenhouse cultivation operated only by individual		• Focus on dried herbs	• Creating functional structures for herb cultivation and drying

			larger producers			
Switzer-land	Thurgau	-	-	-	-	-
Switzer-land	Schaffhausen	-	-	-	-	-
Switzer-land	St. Gallen	-	-	-	-	-

ii) Market

Country	**Producer/selling price**					**Market share of conventional and organic cultivation in %**		**Agricultural purchase form**			**Company size**	**Legal form**
	Product category	Producer price 2018	Development over the past 5 years	Selling price 2018	Development over the past 5 years	Conventional cultivation	Organic cultivation	Cultivation	Processing and finishing	Mixed operation		
Austria	Herbs in pots (from 12 cm)	-	-	3,11/piece	+11%	20-25%	75-80%	Full-time/ Part-time	Full-time	Full-time	Micro, Small and medium sized enterprises	Private companies, Corporations, Cooperatives
France	-	-	-	-	-	-	-	-	-	-	-	-
Germany	Herb leafs		+5%		+5%	95%	5%	Full-time	Full-time		Micro, Small and medium sized enterprises	Corporations, private companies
Italy	Dried white genepí	- -	- -	90€/kg -	+5% -	- 80% 30% 20%	- 20% 70% 80%	Part-time	Part-time	Part-time	Micro, Small and medium sized enterprises	Private companies, Cooperatives, (family businesses)
	Herbs for tea	- 25€/kg	+20% -	- 60€/kg	+40% +10%							
	Dryed herb leafs	60€/kg	+10%	90€/kg	+10%	1%	99%	Part-time	Part-time	Part-time	Micro enterprises	Private companies
Slovenia	-	-	-	-	-	20%	80%	Part-time	Part-time	Part-time		

	Sales of dryed herbs	1,8-6€/kg	-	5,5-8,35€/kg	-	45%	55%				Micro, Small and medium sized enterprises, others (All)	Private companies, small businessmen, personal supplementary work (All)
Switzerland	-	-	-	-	-	50%	50%	-	-	-	Micro, Small and medium sized enterprises	Private companies, Corporations, Cooperatives
	Dryed herbs	13€/kg	+1%	-	--		100%	Full-time	Full-time	Full-time	All	all

iii) Products

Country	Product	Market share	Market potential	Comment on market potential	Import share	Export share	Sales areas/ target markets
Austria	Nutrition	-	High		80%	-	-
	Fresh herbs	-	High Low	Logistic requirements, convenience habits	-	-	-
	Teas and spices	-	Medium	Simple and unproblematic	-	-	-
	Vinegar	-	-	-	-	-	-
	Oil	-	-	-	-	-	-
	Dairy products	-	-	-	-	-	-
	Sweets	-	-	-	-	-	-
	Spirits	-	-	-	-	-	-
	Food supplements/ Aromatics	-	-	-	-	-	-

	Regional products	-	Medium	There are some potential regions (Biosphärenpark großes Walsertal)	-	-	-
	Deep frozen herbs	-	-	-	-	-	-
	Cosmetics/ perfumery	-	-	-	90%	-	-
	Mouth spray	-	-	-	-	-	-
	Pharmacy/ medicine	-	-	-	95%	-	-
	Medicines and remedies	-	Medium	Current critical debate about homeopathy	-	-	-
	Other usage	-	-	-	60%	-	-
	Infusions	-	-	-	-	-	-
	Herbal/ fragrance pillows	-	-	-	-	-	-
	Natural colorant	-	-	-	-	-	-
France	-	-	-	-	-	-	-
Germany	Nutrition	-	Medium	-	60%	5-20%	-
	Fresh herbs	-	Medium	-	-	-	-
	Teas and spices	-	Medium	-	-	5-20%	-
	Vinegar	-	Medium	-	-	-	-
	Oil	-	Medium	-	-	-	-
	Dairy products	-	Medium	-	-	-	-
	Sweets	-	Medium	-	-	-	-
	Spirits	-	Medium	-	-	-	-
	Food supplements	-	Medium	-	-	-	-

	Regional products	-	Medium	-	-	-	-
	Cosmetics/ perfumery	-	-	-	-	-	-
	Pharmacy/ medicine	-	Medium	-	-	-	-
	Medicines and remedies	-	Medium	-	-	-	-
	Medicinal tea	-	-	-	-	-	-
	Other usage	-	-	-	-	-	-
	Infusions	-	-	-	-	-	-
	Herbal/ fragrance pillows	-	-	-	-	-	-
	Natural colorant	-	-	-	-	-	-
Italy	Nutrition	- 40% 70% - -	Medium Medium Medium - High	Possible extension of product capacity through concentration on high quality and niche products in combination with Alpine herbs. Market potential can be increased by good marketing and because of growing health awareness.	- 60% 90% 30,5% 99%	- - 50% 15,6% -	Distribution as a nutritional product primarily takes place on a regional and secondarily on a national level International sales for herbs as a nutritional product constitute just a small fraction. To France, Spain, Ireland, Germany and Turkey,
	Fresh herbs	-	- Medium Low	Extension is possible but requires a good communication between the	-	-	Supermarkets, regional farmers markets

			- High	producing companies. Sale is not so easy. Lot of unused potential.			
	Teas and spices	-	- High Medium - Medium	Market potential can be increased by good marketing and because of growing health awareness. Local market is saturated.	-	- - - - 5%	Direct marketing only on a regional level. Besides that there is some trading on a national level and to Germany, Austria and sometimes Arabic or Asian Countries.
	Vinegar	-	- Medium Medium - Low	Market potential can be increased by new and creative variations. Unused potential could be used.	-	-	Direct marketing only on a regional level. Besides that there is some trading on a national level, to Germany and Austria
	Oil	-	- Medium Medium - Low	Market potential can be increased by new and creative variations. Unused potential could be used.	-	-	Direct marketing only on a regional level. Besides that there is some trading on a national level, to Germany and Austria
	Dairy products	-	- Medium Medium - Medium	More variation in cheese could be interesting and potentially successful. Production companies have to pay fair prices.	-	-	National level, neighboring provinces
	Sweets	-	- Low Medium -	Maybe some specialties, but Ricola is already market-leading. Unused potential could be used.	-	-	EU

			Low				
	Spirits	-	- Low Medium - Medium	There are already products (Braulio, Schwedenbitter…) on the market. Unused potential could be used, but liquor sales are decreasing.	-	-	EU, worldwide
	Food supplements	-	- High Low - Medium	Market potential for products developed and tested by doctors. Unused potential could be used.	-	-	EU
	Regional products: Pesto alla Genovese	-	- Low Low - Low	Pesto does already exist and there are some market-leading companies. Unused potential could be used.	-	-	EU, worldwide
	Sausages and meat products	-	-	-	-	-	-
	Sauces and preserves	-	-	-	-	-	-
	Baked goods	-	-	-	-	-	-
	Herbal salt mixture	-	-	-	-	-	-
	Cosmetics/ perfumery	- 20% 20% - -	High High Medium - Medium	Sector`s heavy expansion because of growing demand for alternative/ traditional products and treatments. High potential. Unused potential could be used.	- 80 95% 27,6% 99%	- - 5% - -	Distribution of those cosmetics only takes place on a regional level.
	Bath additives	-	- Medium Medium	Can be potentially successful, but cosmetic products don't	-	-	EU, worldwide

			- Low	have a high demand for raw herbs.			
	Skin care	-	- High High - Medium	Alternative and natural skin care is getting more and more important	-	-	EU, worldwide
	Soaps	-	- Medium Medium - Medium	Can be potentially successful	-	-	EU, worldwide
	Sun protection	-	- Medium Medium Medium	There is potential and also some research results (edelweiss)	-	-	EU, worldwide
	Bath additives and flavoured bath salts	-	-	-	-	-	-
	Essential oils	-	-	-	-	-	-
	Pharmacy/ medicine	- 25% 5% - -	Medium High Medium - High	Most of the pharmaceutical companies obtain their supply from national and foreign companies who ensure consistent supply and certified quality. Limited opportunities for growth of organic cultivation. Unused potential could be used.	- 80% 99% 99%	- - - -	No pharmaceutical companies in Valle d'Aosta but sale of national and international products
	Medicines and remedies	-	- High Medium	Collaboration with pharmacies should be aimed.	-	-	EU, worldwide

			- High				
	Homeopathic preparations	-	-	-	-	-	-
	Extracts, tinctures, herbal *Mazerat (extract?)*	-	-	-	-	-	-
	Phytomedicine	-	- High - - -	Both sides have to be secured by cultivation contracts and purchase agreements	-	-	-
	Supplements	-	-	-	-	-	-
	Other usage	- 10% 5% - -	High Low - - -	Health/ well-being sector is expanding simultaneously with a growing demand for natural, healthy, local and traditional products and treatments.	- - - - -	- - 5% 8,7% -	Customer groups who are looking for high quality, health and local products
	Infusions	-	- Medium Medium - Medium	Does already exist. Would have more potential if registered in Rome and sold with therapeutic indication or sold by bigger tea companies as Alpine herbs.	-	-	EU, worldwide
	Herbal/ fragrance pillows	-	- Low Medium - Low	-	-	-	Hotels, lodging, national level, Germany, Austria

	Natural colorant	-	- Low Medium - Medium	Unused potential could be used.	-	-	Spain, USA; Brasil (Aosta) Direct marketing only on a regional level and some trading on a national level, to Germany and Austria.
	detergents	-	-	-	-	-	
	Natural paper production	-	-	-	-	-	-
	Cloth	-	-	-	-	-	-
Slovenia	Nutrition	-	High	-	100%	-	No data available. If there is any export, it is very small.
	Fresh herbs	-	High	-	-	-	-
	Teas and spices	-	High	-	-	-	-
	Vinegar	-	Medium	-	-	-	-
	Oil	-	High	-	-	-	-
	Dairy products	-	High	-	-	-	-
	Sweets	-	Medium	-	-	-	-
	Spirits	-	High	-	-	-	-
	Food supplements	-	Medium	-	-	-	-
	Regional products	-	High	-	-	-	-
	Cosmetics/ perfumery	-	High	-	100%	-	-
	Bath additives	-	High	-	-	-	-
	Skin care	-	High	-	-	-	-
	Soaps	-	High	-	-	-	-
	Sun protection	-	High	-	-	-	-

	Hydrolate	-	-	-	-	-	-
	Essential oils	-	-	-	-	-	-
	Pharmacy/ medicine	-	-	-	100%	-	-
	Medicines and remedies	-	High	-	-	-	-
	Other usage	-	-	-	100%	-	-
	Infusions	-	High	-	-	-	-
	Herbal/ fragrance pillows	-	High	-	-	-	-
	Natural colorant	-	High	-	-	-	-
Switzerland	Nutrition	60%	Medium High	-	80% 50%	80%	-
	Fresh herbs	-	Medium	-	-	-	-
	Teas and spices	-	Medium High	-	-	-	-
	Vinegar	-	Low	-	-	-	-
	Oil	-	Low	-	-	-	-
	Dairy products	-	Low	-	-	-	-
	Sweets	-	Medium Low	-	-	-	-
	Spirits	-	Low Medium	-	-	-	-
	Food supplements	-	Low	-	-	-	-
	Regional product Chrütersalz	-	Low	-	-	-	-
	Chrüterschnaps	-	Low	-	-	-	-

	Cosmetics/ perfumery	5%	Low Medium	-	99% 80%	-	-
	Bath additives	-	Low	-	-	-	-
	Skin care	-	Low Medium	-	-	-	-
	Soaps	-	Low Medium	-	-	-	-
	Sun protection	-	Low	-	-	--	-
	Pharmacy/ medicine	30%	Low High	-	99% 80%	20%	Increasing trend Europe, Asia, South America
	Medicines and remedies	-	Low	-	-	-	-
	Other usage	5%	Low	-	99%	-	-
	Infusions	-	Low	-	-	-	-
	Herbal/ fragrance pillows	-	Low	-	-	-	-
	Natural colorant	-	Low	-	-	-	-

iv) Regional anchoring of walnut products

Country	Region	Herbal product	Regional Anchoring
Austria	Alpine region	Gentian liquor	Gentian's existence in that area
France	-	-	-
Germany	-	-	-
Italy	Valle d'Aosta	White Genepì, Imperatoria, Arnica	• Genepì: used for the production of a traditional liqueur and "Aspirin for climbers"; antiseptic, balsamic and expectorant effect. Imperatoria: treatments for respiratory and bowel

			diseases and as “antichimotic” treatment or for disinfection. It has an anti-inflammatory effect. • Arnica: treatments of bruises, hematoma, arthrosis, rheumatism and other painful areas. Dried leafs were used as tobacco or as treatment against cough and bronchitis.
	Piemont	• Alpine herbs liqueur from the Cesana mountain range • Elisir d’erbe Barathier (Alpin herbs liqueur) • Alpin herbs liqueur P.A.T	• Herbs from the area around Cesana • Herbs from the Germanasca valley and surrounding areas • Herbs from the Piemont mountains
	South Tyrol	Alpine herbs tea	Bagged by Viropa and Pompadour for the South Tyrol region
	Vinschgau	• Plima • Fasui edelweiss cream	• Product line by Reinhold Messner • From local edelweiss cultivation
	Bormio	Braulio	Herb bitter, sold in the EU
Slovenia	-	-	Regional anchoring is not present in Slovenia, except some local specialties which are taken from history by individuals. They prepare a product (specialty) from old recipes which is only locally known and usually doesn`t expand further.
	Primorska (coastal region)	Brinjevec (strong alcoholic drink from Juniper, similar to Gin)	Protected drink with geographical origin (Karst Gin)
Switzerland	Alpine region	Tea	Pro montagna Coop
	Entlebuch	Tea	Echte Entlebuch
	Val de Travers	Absinthe	Cradle of absinthe

	Appenzell	Herbal bringe (e.g. for cheese) Appenzeller Alpenbitters	Appenzell cheese
	Grosser St. Bernhard VS	Tea, spices	-
	Puschlav	Raselli tea	-

v) Innovations

Country	Process and product innovations	Bio-economic potential
Austria	• Innovations by Sonnentor	• Low potential because of small amounts
France	-	-
Germany	• Agrimed Hessen: A producer cooperation by 40 farmers, sharing equipment, knowledge and capacity • Support of processing methods like cleaning, cutting, sieving or pulverization (because currently there is an undersized capacity)	• Useless by-products can be utilized in biogas plants (but very small amounts)
Italy	• Improvement of cultivation, marketing (Alpine products), product development and new products • Cultivation of wild herbs • Development of new methods for the extraction process of essential oils (ultrasound, liquid extraction, sub- and supercritical fluid extraction)	• Stems could be used for distillation, too • Useless by-products can be utilized in biogas plants
Slovenia	• Many opportunities in production and marketing, because most of the cultivation is currently carried out by farmers on small cultivation areas • Demand for organized purchase, production and processing and for cultivation improvement (more Automation, less manual work)	• Useless by-products could be used the same way by-products from other cultivations can be used

	• Development of secondary activities and incomes for the farmers (tourism, sells of processed products) • Implementation of a trademark coordinated by a "herbal cooperative" is a possible option	
Switzerland	• Cultivation in Switzerland is rather expensive and not competitive to other countries • Some areas are supported by companies like Ricola and Rausch for marketing purposes • Pioneer in medicines' production out of herbs is Zeller • Innovations by companies giving a commitment to their Swiss origin (high-price segment)	• Small amounts → unprofitably • There are researches on using the dandelion's cell sap as a replacement for rubber in tires • Plant extracts as an organic pesticide

vi) Regional projects and initiatives

Country	Projects and initiatives
Austria	• Alchemilla
France	-
Germany	• TAGWERK Verein and Ökomodellregion Isental (potential funding for herb cultivation) • elder growers (together with Naturland Bauern AG) are looking for possibilities to sell dried elderflowers
Italy	• Assoerbe (association of producers, farmers, collectors, exporters, importer, wholesalers and more) • Training programs and courses to become a herb farmer, herb pedagogue or collector (FS Laimburg, VZ Laimburg and Gutsverwaltung Landesdomäne)

	• Publishing of an instruction for herb cultivation in South Tyrol (Heinrich Abraham and DI Ute Schwarz) • Different courses about sensing and product creation; further training options for female farmers • Improvement of those offered training programs and courses (professional qualification, certification, recognition of the profession) • “Verein Südtiroler Kräuteranbauer” (association) • “Südtiroler Qualitätszeichen” • “Trentinerbe” • Research projects on herbs
Slovenia	-
Switzerland	• Initiation of a „Phyto Valley“ in Thurgau and adjacent cantons by a cooperation of several companies (Zeller, Hänseler, Bioforce, Herbamed and others)

vii) Further information

Country	Information
Austria	• Organic cultivation is risky • Growing market for hemp, hemp products and cannabidiols (newcomers)
	• Austrian production of herbs in pots: 5,25 Mio. pieces per year in approx. 350 companies • Important cultivation areas: Styria around Graz (1,7 Mio pieces), Kufstein in Tyrol (1,0 Mio pieces), Wallern in Burgenland (0,4 Mio pieces), Wals Siezenheim in Salzburg (0,4 Mio. pieces) and Vienna (0,4 Mio pieces)

	• Distinction according to cultivation area: in Vienna 34,74 hectare chives, 23 hectare parsley und 16 hectare other herbs; in Lower Austria 75 hectare chives (5 cuts), 10 hectare parsley, 41 hectare other herbs; in Tyrol 24 hectare chives, 7 hectare parsley
Germany	• Germany's market for medical plants and herbs is not profitable (several farmers gave up the cultivation of herbs), production costs are higher than producer prices
Slovenia	• Most companies import herbs for their products (there are no cultivations to cover the full range of demand by the companies) •
Switzerland	• Zeller Vitaplant are primarily cultivating medical plants and herbs for medicines. The majority of cultivation areas is located abroad due to climatic and economic conditions.

e) Results of the expert interviews – Herbs

i) Innovations

Country	Region	Obstacles to innovation	(Implemented) Solutions	Innovative regions/ companies
Italy	South Tyrol	• High costs • Fragmented organization • Stubbornness and competition between the individual smaller farmers/ producers (don't want to cooperate, invest high sums in machines instead of sharing them with others)	• Useful and innovative ideas • Improvement of technology and quality • Higher controls ("Qualitätsmarke Südtirol")	• Umbrella brand "Qualitätsmarke Südtirol" • IDM (organization)

Slovenia	-	• Non-competitiveness of home cultivation in contrast to cheap import of herbs • Far lower prices of imported herbs	• Connecting the producers with offered cooperatives to maximise the producers' effectiveness • Processing of herbs to various herbal products within complementary activities on farms • Including the growers into region`s touristic offer	• There are smaller growers who market the processed herbs under the farm`s complementary activities or s.p. (self-employed individual)
	-	• Insufficient organization for joint regional marketing • The costs of herbs' production in Slovenia are higher than in other parts of Europe • Manual labour	• Mechanical cultivation/ processing (development of special machines for herbs' cultivation) • Establishing machinery groups/ Cooperatives • Adaptations to make existing machines suitable for small-scale cultivation (around 1 hectare; most viable for the cultivation/ processing of Lavender) • Finding a high-end niche (e.g. marketing of premium products with higher prices) • Local products and biodynamic cultivation	• "Renčelj (Sivka s krasa)" and "Vila Lavanda Lokavec" • Those two companies offer high-end products. Maybe they have implemented a mechanical process for Lavender cultivation/processing • They cover the whole value chain - from cultivation to processing to marketing of their own products • They have their own brand (trademark)

ii) Bio-economic potential

Country	Region	Use of bio-economic exploitation opportunities	Produced bio-economic products	Limits for bio-economic exploitation	Solutions for promoting bio-economic potentials/ exploitation	Further bio-economic exploitation opportunities
Italy	South Tyrol	• Rare use of bio-economic exploitation opportunities • Farmers/ producers are not interested	• Paper • Fabric	• Farmers are not interested (don't want to share their by-products/ residues)	-	-
Slovenia	-	• There are some biogas plants in Pomurje region that use plants for the production of biogas, but there are not enough herbs (residues) for biogas production	-	• Herb cultivation just takes place on a small scale in Slovenia • Minimal quantity (insufficient for biogas plants)	• Exploitation of knowledge for the development of new green products with higher added value (in competitive branches that use local herbs, e.g. pharmaceutical products)	• Paper • Textiles • Food products • Medicine • Biogas
	-	• No overview	• Fertilizer (from composted hops)	• No financial assets • No public tenders • Problems with biogas plants (e.g.	• Building smaller biogas plants that don`t produce that much smell and pollution in combination with	• Using hops/ hops residues for biogas plants

			• clothing and footwear from hemp	pollution and smell)	direct benefits for local people (gas or money) • Less IRS - tax issues • Simplification of legislation • More (European) tenders (simpler and more user-friendly) as financial support for farmers	• Synergies with tourism

iii) Market

Country	Region	Solutions to meet market challenges
Italy	South Tyrol	• Online marketing and sale • IDM as key-player (financial support) • Direct marketing (on small and medium sized scales) • Direct contact with pharmacies (extensive expansion, standardized products) • “Qualitätsmarke Südtirol” as a brand
Slovenia	-	• Cultivation of high-quality herbs under the guidelines of good farming and gathering practices of medicinal plants

		• Ecologic/ organic products from herbs • Integration of herbalists into local tourism
	-	• Marketing in the form of tourist products, spa tourism (balneology), gift boutique (holiday presents) and giveaways • Simplifying legislation and finances

iv) Further information

Country	Region	Information
Italy	South Tyrol	
Slovenia	-	• Lately, the farmers in Pomurje region grow more and more hemp, and less and less flax. Mostly they grow the seeds for processing into oil • Herb`s cultivation in Slovenia is small scale (the herbs are mostly dried and sold on farms in form of teas, nutritional supplements, tinctures, essential oils and cosmetic products)
	-	• The biggest acreage is in Prekmurje so it is most worthwhile to start the mechanical cultivation there • SUNNA (Patricija Šenekar) = https://hiskazelisc.com/sunna-trgovina/. High-end skin culture, problem of recognisability • Lots of data on the plant Echinacea available (prices of production, technical sheet…)

f) Regional market profile - example of a questionnaire for walnuts

Regional market profile Slovenia – Walnut

Thank you for taking part in this survey. Your expertise helps us to get comprehensive insights into the value chain of walnuts in the Alpine region.

1 Cultivation

1.1 Regional cultivation areas

Map: Alpine Space Programme
Data: Solar 2012

The map indicates the Slovenian walnut areas in the regions Štajerska, Dolenjska, Celje, Prekmurje, Ljubljanska kotlina, Primorska, Gorenjska and Goriška.

Please name **other important walnut cultivation areas** in Slovenia, if you know them.

1.2 Forms of cultivation

Please estimate for the above-mentioned Slovenian cultivation areas the share in percent of the respective **forms of cultivation**.

Cultivation area	Form of cultivation	Share in %
	Plantation	
	Free-standing trees	
	Plantation	
	Free-standing trees	
	Plantation	
	Free-standing trees	
	Plantation	
	Free-standing trees	
	Plantation	
	Free-standing trees	

1.3 Relevance of the cultivation areas

Which of the above-mentioned **cultivation areas** of walnuts are the **most important ones**? Please give comment on your assessment.

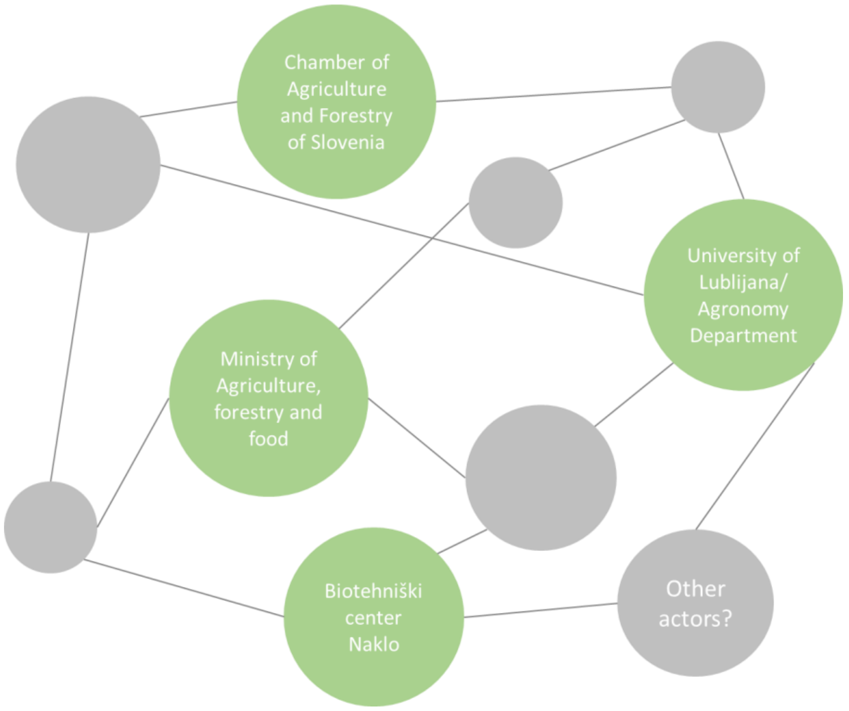
Cultivation area	Comment on relevance

1.4 Potentials of the cultivation areas

Which existing or further areas offer **potentials for walnut cultivation** (regarding area capacities, climatic conditions, etc.). Please comment your assessment.

(Cultivation-)Area	Comment on potential

2 Network



The illustrated network exemplifies the actors identified by us in Slovenia (including producers, associations, regional authorities for agriculture, retailers, etc.) involved in the production, processing, refining or marketing and distribution of walnuts.

Please name **other relevant stakeholders**, if you them. (Note: the data will only be published in anonymous form)

Function	Actors
Production/ cultivation	
Manufacturing companies	
Wholesale	
Retail trade	
Logistics & storage	
Advisory institutions (including offices and research institutions)	
Further functions	

3 Market

3.1 Producer price

Please give your assessment of the **development of the producer price of walnuts** in Slovenia:

The producer price for a ton of walnuts is currently about _____________ €. Over the last five years, this price has changed by ______________% (please use + or - to indicate the trend).

3.2 Selling price

Please give your assessment of the development of walnut sales prices in Slovenia:

The selling price for a kg of walnuts in direct marketing is currently about _____________ €. Over the last five years, this price has changed by ______________% (please use + or - to indicate the trend).

3.3 Market share of conventional and organic cultivation

Please give your assessment of the **market share in percent** of conventional and organic cultivation.

Form of agriculture	Marketshare in %
Conventional cultivation	
Organic cultivation	

3.4 Agricultural purchase form

Is the cultivation and processing of walnuts in Slovenia mainly runned in **full- or part time**? Please check the appropriate box.

Company	Full-time	Part-time
Cultivation	☐	☐
Processing and finishing	☐	☐
Mixed operation	☐	☐

3.5 Company size and legal form

Which **company size and legal form** do the companies in the Slovenian walnut market mainly have? Please check the appropriate box.

Company size	☐ Large enterprises
	☐ Small and medium sized enterprises
	☐ Micro enterprises
	☐ Others
Legal form	☐Private companies (limited partnership, general partnership, etc.)
	☐Corporation (stock company, Ltd., etc.)
	☐Cooperatives
	☐Others

4 Products

4.1 Product selection

Our research has shown that walnuts, i.e. the kernel, the hard and green shell, are used to produce the following products.

Please name **further products of walnuts** made in Slovenia, if you know them.

Product category	Products
Nutrition	• Fresh consumption • Dry fruit/snack (e.g. nut mixes) • Refined walnut products (e.g. walnut liqueur, milk, cheese, baking and cooking ingredients, black nuts) • Regional specialities (e.g. Slovenian walnut pie, walnut cake) •
Wood processing	• Furniture • Decoration •
Cosmetics	• Skin care products (e.g. soap, walnut oil cream) • Hair dye (use of green peel) •
Medicines	• Component of medicines and remedies (use of walnut oil, cores, walnut tree leaves, walnut seeds, etc.)

	•
Other usage	• Walnut flour (= grated walnut shell) as a cleaning and polishing agent (eg for metals, fiberglass) • Textile dyes (use of the green peel) •

4.2 Market shares and potentials

Please estimate the **market share in percent** and the **market potential** for the following herbal products based on the categorization high - medium - low.

Please comment your assessment.

Product	Market share in % (share of products sales)	Market potential	Comment on market potential
Ernährung		☐ high ☐ medium ☐ low	
Fresh consumption		☐ high ☐ medium ☐ low	
Dried fruit / snack		☐ high ☐ medium ☐ low	
Baking and cooking ingredient		☐ high ☐ medium ☐ low	
Walnut cheese		☐ high ☐ medium ☐ low	
Walnut liqueur		☐ high ☐ medium ☐ low	
Walnut milk		☐ high ☐ medium ☐ low	

Regional products:		☐ high ☐ medium ☐ low	
Regional products:		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	
Wood processing		☐ high ☐ medium ☐ low	
Furniture		☐ high ☐ medium ☐ low	
Decoration		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	
Cosmetics		☐ high ☐ medium ☐ low	
Skin care		☐ high ☐ medium ☐ low	
Hair dye		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	
Medical use		☐ high ☐ medium ☐ low	

Medicines and remedies		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	
Other usage		☐ high ☐ medium ☐ low	
Cleaning and polishing agent		☐ high ☐ medium ☐ low	
Textiles dyes		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	

4.3 Import share

Please estimate the **import share in percent** of raw materials or primary products in the following product categories.

Product category	Import share in %
Nutrition	
Wood processing	
Cosmetics	
Medical use	
Other usage	

4.4 Export share

Please estimate the **export share in percent** of walnut products produced in Slovenia for the following product categories and, if necessary, please name **important sales areas or target markets** (e.g. regions, countries, consumer groups).

Product	Export share in %	Sales areas/ target markets
Nutrition		
Fresh consumption		
Dried fruit / snack		
Baking and cooking ingredient		
Walnut cheese		
Walnut liqueur		
Walnut milk		
Slovenske potice		
Prekmurska gibanica		
Wood processing		
Furniture		
Decoration		
Cosmetics		
Skin care		
Hair dye		
Medical use		
Medicines and remedies		
Other usage		
Cleaning and polishing agent		
Textiles dyes		

5 Regional anchoring of walnut products

The regional anchoring describes the linkage between walnuts or walnut products and their region of origin. For example the historical anchoring of the cultivation, the processing of regional herbs, the marketing as a regional product (for example Alpine herbs), the contribution to the landscape care or the symbiosis associated with cultivation between plants and animals and other crops (e.g. wine).

Please name, if available, the regional anchoring for the following herbal products. A well-known example is the Grisons nut cake from Grisons, for whose production regional walnuts are used.

Region	Walnut product	Regional anchoring

6 Innovations

6.1 Product- and process innovation

In your estimation, what are the **potentials for product and process innovations** (e.g. cultivation methods, processing methods, logistics, marketing, new products) in Slovenian walnut production and processing? Who might take on a pioneering role?

6.2 Bio-economic potential

In bioeconomy, fossil resources are replaced by various renewable raw materials, such as the replacement of oil with vegetable raw materials in the production of plastics.

What **bio-economic potential** do you see in herbs and their waste and residues?

Which products from fossil raw materials can be replaced by herbs and their waste and residues?

7 Regional projects and initiatives

In Slovenia, we identified Slovensko strokovno društvo lupinarjev (SSDL) regional project "Slovenski oreh" to promote walnut production and marketing of regional walnut products.

Please name **regional funding programs, projects or initiatives** to promote herb cultivation and marketing of regional herbal products in Slovenia, if you know them.

8 Regional studies and information

For the preparation of this regional market profile, we used the following article.

- Solar, A. (2012): Pridelava Lupinastega sadja v Sloveiji: Stanje in perspektive. In: Zbornik referatov 3. slovenskega sadjarskega kongresa z mednarodno udeležbo, Krško, 21. - 23. november 2012, S. 379-390.

If necessary, please name **further relevant studies or articles** on the subject of walnuts.

9 Further comments

g) Regional market profile - example of a questionnaire for herbs

Regional market profile – herbs

Thank you for participating in this survey. Your expertise helps us to get comprehensive insights into the value chain of herbs in the Alpine region.

1 Cultivation

1.1 Regional cultivation areas

Please name **important cultivation areas** for herbs in Slovenia, if you know them.

1.2 Relevance of the cultivation areas

Which of the above-mentioned **cultivation areas** of herbs are the **most important ones**? Please give comment on your assessment.

Cultivation area	Comment on relevance

1.3 Forms of cultivation

Please estimate for the above-mentioned Slovenian growing areas the share in percent of the respective **forms of cultivation**.

Cultivation area	Form of cultivation	Share in % (assessment)
	Cultivation of wild herbs	
	Outdoor cultivation	
	Greenhouse cultivation	
	Cultivation under cloth	
	Cultivation of wild herbs	
	Outdoor cultivation	
	Greenhouse cultivation	
	Cultivation under cloth	
	Cultivation of wild herbs	
	Outdoor cultivation	
	Greenhouse cultivation	
	Cultivation under cloth	
	Cultivation of wild herbs	
	Outdoor cultivation	
	Greenhouse cultivation	
	Cultivation under cloth	
	Cultivation of wild herbs	
	Outdoor cultivation	
	Greenhouse cultivation	
	Cultivation under cloth	

1.4 Species

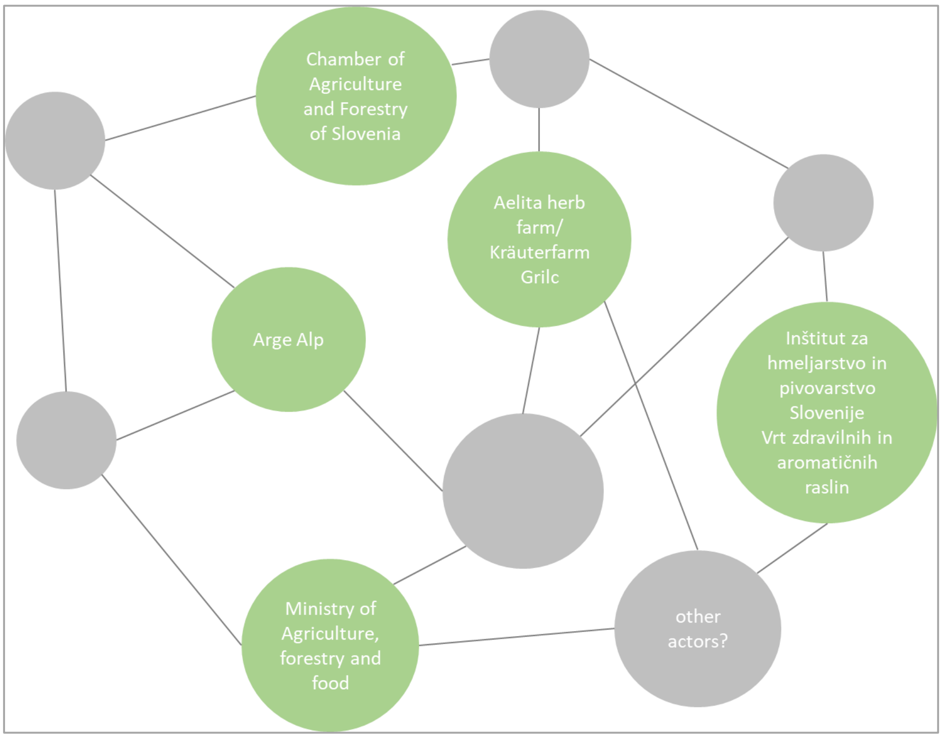
Which **types of herbs** are (mainly) cultivated in the mentioned Slovenian cultivation areas?

Potentials of the cultivation areas

Which existing or further areas offer **potentials for herb cultivation** (regarding area capacities, climatic conditions, etc.). Please comment your assessment.

(Cultivation) Area	Comment on potential

2 Network



The illustrated network exemplifies the actors identified by us in Slovenia (including producers, associations, regional authorities for agriculture, retailers, etc.) involved in the production, processing, refining or marketing and distribution of herbs.

Please name **other relevant stakeholders**, if you them. (Note: the data will only be published in anonymous form)

Function	Actors
Production/ cultivation	
Manufacturing companies	
Wholesale	
Retail trade	
Logistics & storage	
Advisory institutions (including offices and research institutions)	
Further functions	

3 Market

3.1 Producer price/ selling price

Please give your assessment of the **development of the producer and selling prices** of herbs in Slovenia:

	currently (in €/kg)	Development over the past 5 years (in +/- %)
Producer price		
Selling price		

This assessment refers to product category: ______________________.

3.2 Market share of conventional and organic cultivation

Please give your assessment of the **market share in percent** of conventional and organic cultivation.

Form of agriculture	Marketshare in %
Conventional cultivation	
Organic cultivation	

3.3 Agricultural purchase form

Is the cultivation and processing of herbs in Slovenia mainly runned in **full- or part time**? Please check the appropriate box.

Company	Full-time	Part-time
Cultivation	☐	☐
Processing and finishing	☐	☐
Mixed operation	☐	☐

3.4 Company size and legal form

Which **company size and legal form** do the companies in the Slovenian herb market mainly have? Please check the appropriate box.

Company size	☐ Large enterprises
	☐ Small and medium sized enterprises
	☐ Micro enterprises
	☐ Others
Legal form	☐Private companies (limited partnership, general partnership, etc.)
	☐Corporation (stock company, Ltd., etc.)
	☐Cooperatives
	☐Others

4 Products

4.1 Product selection

Our research has shown that herbs are used to produce the following products.

Please name **further herbal products** made in Slovenia, if you know them.

Product category	Products
Nutrition	• fresh herbs (cut and pot herbs) • dried herbs • tea and spices • vinegar • dairy products with herbs (such as herbs quark, cheese) • sweets (for example herbal sweets) • spirits (for example herbal liquor / liqueur) • food supplements • regional products (e.g. Alpine herbs) •
Cosmetics / perfumery	• bath additives (use of fragrances and essential oils) • skin care (e.g. creams) • soaps • Sun protection •
Pharmacy / medicine	• component of medicines and remedies (e.g. use of essential oils, bitter substances, resins, etc. in ointments and tinctures) •
Other usage	• infusions • herbal / fragrance pillows • natural colorant (e.g. vegetable dyed wool) •

4.2 Market shares and potentials

Please estimate the **market share in percent** and the **market potential** for the following herbal products based on the categorization high - medium - low.

Please comment your assessment.

Product	Market share in % (share of products sales)	Market potential	Comment on market potential
Nutrition		☐ high ☐ medium ☐ low	
Fresh herbs		☐ high ☐ medium ☐ low	
Teas and spices		☐ high ☐ medium ☐ low	
Vingear		☐ high ☐ medium ☐ low	
Oil		☐ high ☐ medium ☐ low	
Dairy products		☐ high ☐ medium ☐ low	
Sweets		☐ high ☐ medium ☐ low	
Spirits		☐ high ☐ medium ☐ low	
Food supplements		☐ high ☐ medium ☐ low	

Regional products: Alpine herbs		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	
Cosmetics / perfumery		☐ high ☐ medium ☐ low	
Bath additives		☐ high ☐ medium ☐ low	
Skin care		☐ high ☐ medium ☐ low	
Soaps		☐ high ☐ medium ☐ low	
Sun protection		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	
Pharmacy/ medicine		☐ high ☐ medium ☐ low	
Medicines and remedies		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	
Other usage		☐ high ☐ medium ☐ low	
Infusions		☐ high	

		☐ medium ☐ low	
Herbal/ fragrance pillows		☐ high ☐ medium ☐ low	
Natural colorant		☐ high ☐ medium ☐ low	
		☐ high ☐ medium ☐ low	

4.3 Import share

Please estimate the **import share in percent** of raw materials or primary products in the following product categories.

Product category	Import share in %
Nutrition	
Cosmetics / perfumery	
Pharmacy / Medicine	
Other usage	

4.4 Export share

Please estimate the **export share in percent** of herbal products produced in Slovenia for the following product categories and, if necessary, please name **important sales areas or target markets** (e.g. regions, countries, consumer groups).

Product	Export share in %	Sales areas/ target markets
Nutrition		
Fresh herbs		
Teas and spices		
Vingear		
Oil		

Dairy products		
Sweets		
Spirits		
Food supplements		
Regional products: Alpine herbs		
Cosmetics / perfumery		
Bath additives		
Skin care		
Soaps		
Sun protection		
Pharmacy/ medicine		
Medicines and remedies		
Other usage		
Infusions		
Herbal/ fragrance pillows		
Natural colorant		

5 Regional anchoring of herbal products

The regional anchoring describes the linkage between herbs or herbal products and their region of origin. For example the historical anchoring of the cultivation, the processing of regional herbs, the marketing as a regional product (for example Alpine herbs), the contribution to the landscape care or the symbiosis between plants and animals connected with the cultivation.

Please name, if available, the regional anchoring for the following herbal products. A well-known example is the "Albsinth®" (Hahn's distillate manufactory) from the Swabian Alb, where regional herbs are used to make an absinthe.

Region	Herbal product	Regional anchoring

6 Innovations

6.1 Product- and process innovation

In your estimation, what are the **potentials for product and process innovations** (e.g. cultivation methods, processing methods, logistics, marketing, new products) in Slovenian herbal production and processing? Who might take on a pioneering role?

6.2 Bio-economic potential

In bioeconomy, fossil resources are replaced by various renewable raw materials, such as the replacement of oil with vegetable raw materials in the production of plastics.

What **bio-economic potential** do you see in herbs and their waste and residues?

Which products from fossil raw materials can be replaced by herbs and their waste and residues?

7 Regional projects and initiatives

Please name **regional funding programs, projects or initiatives** to promote herb cultivation and marketing of regional herbal products in Slovenia, if you know them.

8 Regional studies and information

For the preparation of this regional market profile, we used the following studies and articles.

- DORSCH, K. (2011): Kräuteranbau - Nische für Spezialisten. In: *top agrar* (12), S. 70–75.
- KELLER, U.O. (2014): Der Kräuteranbau war die Chance. In: *die grüne* (14), S. 24–26.

If necessary, please name **further relevant studies or articles** on the subject of herbs.

9 Further comments

h) Interview guide for product category walnuts

Country:	
Name:	
Company/ institution:	
Function:	
Contact:	
Date:	
Duration of the interview:	
Interviewer:	

**** Comments for interviewers in italics****

I Innovations

1. Our online survey showed that **(innovation) barriers** along the value chain of walnuts are mainly due to limited regional processing capacities (*e.g. cracking machines*).

a, Do you think that there are **further (innovation) barriers**?

b, What opportunities are there for overcoming these (innovation) barriers in your region/ country?

(e.g. processing as a service for tree owners, cooperative organized cracking machines)

2. Where and **by whom** (*e.g. producer organizations, large companies*) are the **solutions** mentioned under question 1 **already implemented**?

II Bio-economic potential

1. Our online survey showed that, in particular, the complete utilization of the walnut components (*walnut leaves, core, hard and green peel*) has bio-economic potential for producing briquettes/ lighters or insulating material from the shell, organic pesticide from the leaves or walnut flour.

a, Are these bio-economic exploitation opportunities used by producers or processors in your region/ country?

b, (*If there is no utilization of bio-economic opportunities*): Why are regional producers and processors **not exploiting the bio-economic exploitation opportunities** of walnut components?

(e.g. no knowledge about bio-economic exploitation potential, no regional customers)
c, Which bio-economic products are produced in your region / your country by the utilization of the plant parts?

2. What opportunities are there for promoting the use of bio-economic exploitation opportunities in your region / country?

3. Do you have **further ideas for bio-economic exploitation opportunities** that can be used or implemented in your region / country?

III Market

Our research showed that there is strong competition for regional walnut producers / processors by globally operating nut producers and imported goods, especially from Iran, China and the US.

What do you see as **potential for the regional producers / processors** in your region / country to meet the current challenges in the European market for walnuts?

(e.g. marketing as (regional) quality products or specialties)

IV Further comments

i) Interview guide for product category herbs

Country:	
Name:	
Company/ institution:	
Function:	
Contact:	
Date:	
Duration of the interview:	
Interviewer:	

**** Comments for interviewers in italics****

I Innovations

1. Our online survey showed that **(innovation) barriers** along the herbal value chain are in particular due to limited regional processing capacities in cleaning, drying, etc. or due to inadequate organizational structures for joint regional marketing, product development, etc.

a, Do you think that there are **further (innovation)barriers**?

b, What opportunities are there for overcoming these (innovation)barriers in your region/ country?

2. Where and by whom (e.g. producer organizations, large companies) are the solutions mentioned under question 1 already implemented?

II Bio-economic potential

1. Our online survey showed that in particular the utilization of plant parts for biogas plants, the production of paper or textile material from plant fibres have bio-economic potential.

a, Are these bio-economic exploitation opportunities used by producers or processors in your region/ country?

b, (*If there is no utilization of bio-economic opportunities*): Why are regional producers and processors **not exploiting the bio-economic exploitation opportunities** of plant parts?
(e.g. no knowledge about bio-economic exploitation potential, inadequate infrastructure, small quantities of plant parts)

c, Which **bio-economic products** are produced in your region / your country by the utilization of the plant parts?

2. Our online survey showed that various factors (e.g. no biogas plant nearby, high transport costs, small residual amounts) inhibit the bio-economic utilization of plant parts.

3. What opportunities are there for promoting the use of bio-economic exploitation opportunities in your region / country?

4. Do you have **further ideas for bio-economic exploitation opportunities** that can be used or implemented in your region / country?

III Market

Our research and online survey showed that there is currently **strong competitive pressure in the market for medicinal and spice plants** (*e.g. low producer prices, competition for dried herbs by imported goods from Asia*).

What do you see as **potential for the regional producers / processors** in your region / country to meet the current challenges in the European market for medicinal and aromatic herbs?

(e.g. production of fresh herbs / wild herbs, organic quality, marketing as Alpine herbs, tourist marketing)

IV Further comments

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