



BTC TRADE FOR DEVELOPMENT



***WILD-COLLECTED BOTANICALS
AND THE EU MARKET***



Author: ProFound – Advisers In Development
<http://www.ThisIsProFound.com>

Managing editor: Carl Michiels, BTC, 147 rue Haute, 1000 Brussels

Cover: Compiled by ProFound

© BTC, Belgian Development Agency, 2014. All rights reserved.

The content of this publication may be reproduced after permission has been obtained from BTC and provided that the source is acknowledged.

This publication of the Trade for Development Centre does not necessarily represent the views of BTC.

Table of contents

1.	INTRODUCTION	4
1.1	<i>Market channels.....</i>	4
1.2	<i>Raw materials vs. processed materials</i>	6
1.3	<i>Segmentation</i>	6
2.	COUNTRY BACKGROUNDS	8
2.1	<i>Bolivia.....</i>	8
2.2	<i>Peru.....</i>	9
2.3	<i>Ecuador.....</i>	11
2.4	<i>United Republic of Tanzania.....</i>	12
2.5	<i>Mozambique.....</i>	14
2.6	<i>Vietnam.....</i>	15
3.	POTENTIAL MARKET SEGMENTS.....	18
3.1	<i>High potential cross- and sub-segments</i>	19
4.	MARKET ACCESS REQUIREMENTS	21
4.1	<i>Legislative requirements</i>	21
4.2	<i>Non-legislative requirements</i>	21
5.	TRENDS AND DEVELOPMENTS FOR DIFFERENT SEGMENTS.....	24
6.	POTENTIAL EUROPEAN MARKETS	27
6.1	<i>European imports.....</i>	27
6.2	<i>European exports.....</i>	31
6.3	<i>Promising EU export markets</i>	34
6.4	<i>European buyer perspective</i>	35
7.	OPPORTUNITIES AND THREATS	36
8.	PRIORITY LIST.....	38
9.	CONCLUSIONS	85
	LITERATURE SOURCES	89
	ANNEX I	96
	ANNEX II	100
	ANNEX III	109
	ANNEX IV.....	112

1. Introduction

The Trade for Development Centre (TDC – www.befair.be) of the Belgian Development Agency (BTC) aims at economic and social empowerment of small producer organisations, by both enhancing business knowledge and improving their access to markets.

TDC implements a Producer Support Programme through which financial and technical assistance is provided to producer organisations. Within the framework of this programme, TDC has decided to carry out a market study on wild-sourced botanicals and the EU market, thus anticipating the growing opportunities for these products in the food, cosmetics and pharmaceutical industries. The results of this study will be provided, among others, to ethical actors.

In this context, the study focuses on wild-collected MAPs which have a potential for livelihoods enhancement and conservation action. Moreover, these species are assessed in terms of sustainable trade. The countries covered in this study are Bolivia, Peru, Ecuador, Tanzania, Mozambique and Vietnam.

Methodology

The list of 20 botanicals investigated in this study is derived from a long list of prioritised species according to biodiversity and trade programmes in the 6 target countries. The narrowing down of these species, in consultation with local and European experts & organisations, was based on the following criteria:

- Marketing criteria: scale of production, market readiness, competition, product standards and certification potential.
- Ecological criteria: availability, sustainability of supply, resource management, certification (potential).
- Socio-economic criteria: local benefits, value addition potential, fair labour conditions.
- Technological criteria: (adherence to) processing and quality requirements, traceability and availability of human resources/access to technology.

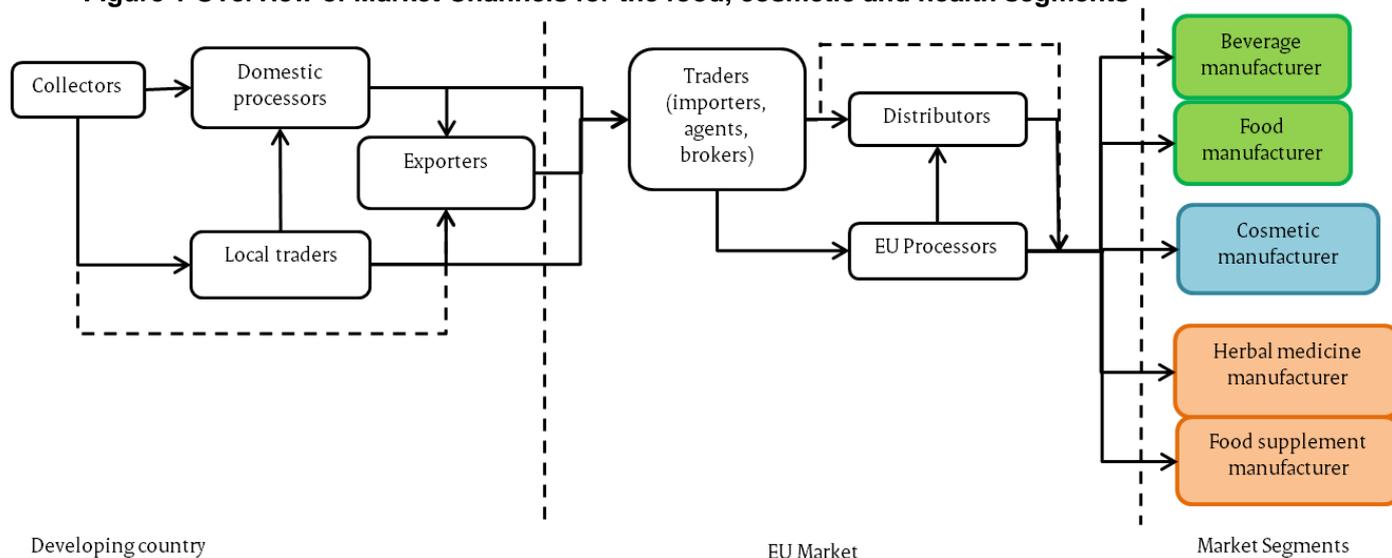
Product definition

In order to obtain a broad overview of trade and potential of wild-collected species, natural gums and resins and plant derived materials (herbal extracts, essential and vegetable oils) are included together with medicinal and aromatic plants (MAPs). In this study, these species and their derivatives are referred to as MAPs.

The potential of these species is based on their uses in food, cosmetic and health industries. For an overview of these segments, please refer to section 1.3 on segmentation. These industries remain dependent on wild-collected materials for various species, as a result of the high cost or difficulty of cultivation if a limited quantity is needed.

1.1 Market channels

Regardless of the final segment in which they are used, wild-collected MAPs have a similar value chain (Figure 1). In the country of origin, the MAPs are collected, after which they can be processed locally and traded to the EU. The products can be exported both as raw materials and as processed products, such as extracts or essential oils (see section 1.2). Traditionally, most extraction has taken place in Europe. More recently, for certain MAPs, this is shifting towards the countries of origin, which offers good value addition opportunities for exporters in the region. Whether or not MAPs are processed at origin depends on various factors. Ingredients with most potential for at origin extraction are perishable botanicals with low technological barriers to enter the market and for which producers can ensure traceability and a consistent quality and quantity at a commercially attractive price.

Figure 1 Overview of Market Channels for the food, cosmetic and health segments

As can be seen in chapter 5, industry consolidation, which occurs for food, cosmetics and health segments, is changing the landscape for natural ingredients. This has an influence on the relevant market channels for these ingredients as well. Larger players have more market power, but smaller processors remain active as well. Therefore, it is important for small or community exporters from DCs to target the right partner in Europe. For specialised/premium or certified ingredients that are available in small volumes, specialised traders are most relevant. For these ingredients, value chains tend to be much shorter as importers generally source directly from the country of origin.

Most commonly, ingredients are exported through exporters or processors. As European companies are shortening their value chains, roles of local/community traders are becoming more limited. Depending on various factors, extraction at origin or in Europe is more prevalent. These factors include the complexity of the extract, associated risks, the specific (sub-) segment the extract is used in and feasibility of extraction in Europe. For certain raw materials, for example açai fruits, extraction in Europe is not an option as the product deteriorates too quickly. The fruits need to be processed within 24 hours. For all segments, an increased consumer interest in the story of ingredients offer opportunities for increased processing at origin. European companies increasingly use marketing stories to differentiate themselves from their competitors.

Food industry

In the food industry, especially in mature markets, manufacturers need more complex flavourings to differentiate from competitors. As they increasingly rely on European processors to develop new products, the role of these processors is becoming stronger. For botanical ingredients especially, such as MAPs, traders and processors in Western Europe, in particular Germany and France, continue to play a main role. In order to match the demand of these processors, improvements in the value chains of DCs can be made, which consist of quality standardisation and a certain level of value addition (e.g. distillation).

Cosmetic manufacturers

For cosmetic ingredients, there is a divergence of processing locations. Basic cosmetic ingredients, which require simple process (e.g. cold pressing or essential oil production), are increasingly produced at origin. Moreover, for some raw materials it is too expensive to transport the raw material to Europe for extraction. Examples include moringa seeds for seed oil production or rosewood; transporting the essential oils of these products is more economical than the raw materials.

Similar to health ingredients, there is an increased concern over safety for these ingredients, which favours extraction in Europe. These concerns affect all actors throughout the chain, including producers, industries and consumers and can be split into technical/chemical safety and ethical safety. In addition, increasingly difficult technologies and processes are used in producing cosmetics, as consumers search for functionality in their products. Often, after first processing steps in DCs, these materials are further

processed in Europe to obtain functional or active ingredients. These processes are often outside the scope of small producers in developing countries (DCs).

Health industry: herbal medicine and food supplement manufacturers

For health ingredients, extraction in Europe is still most common. As a result of concerns with safety of these ingredients and the resulting strict EU legislations, some companies still prefer to import raw materials instead of herbal extracts. Additionally, certain complicated processes are beyond the scope of small DC producers. At origin production of essential oils offers better value addition possibilities. However, it is key for exporters to comply with necessary, well-established certification standards. Small community producers should determine whether such lengthy and costly certification schemes are worthwhile.

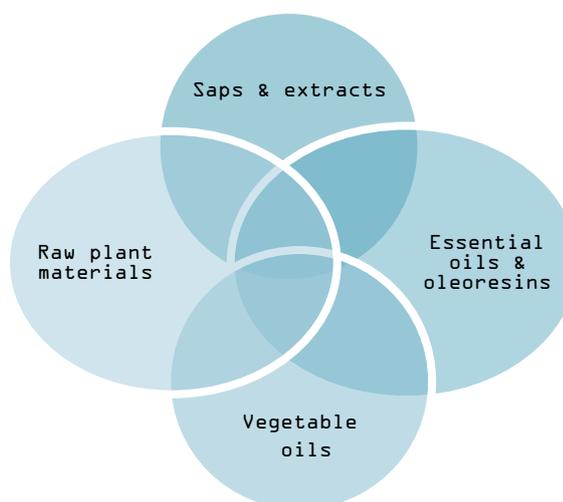
For health products, even after first processing at origin, further processing in Europe are important as well. Activities undertaken in Europe include purifying of the extracts, improving quality or extracting active ingredients.

1.2 Raw materials vs. processed materials

For this study, both raw materials and derived products are of importance (see Figure 2). As was demonstrated in section 1.1 on market channels, for certain products and segments there are opportunities for value addition in the country of origin. If and where value addition is feasible in the form of extracts, essential or vegetable oils, these species have an increased commercial potential for small producers in the target countries.

Raw plant materials include MAPs, natural gums and resins and oil seeds and nuts. These can be processed in various derivatives. Extraction of MAPs commonly results in herbal extracts: essential oils, oleoresins and saps. Natural gums and resins can also be processed into essential oils, while oil seeds and nuts can be processed into vegetable oils. International trade in raw materials and derivatives is recorded separately.

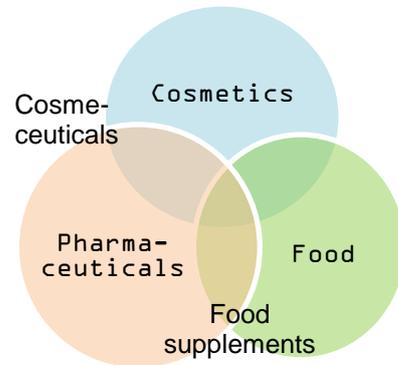
Figure 2 Overview of raw materials and derivatives



1.3 Segmentation

As mentioned above, the different segments included in this study are food, cosmetics and health (see chapter 3 for more information). Within these segments, various cross-segments exist. The most interesting ones for trade in wild-collected MAPs are cosmeceuticals (combination of cosmetics and pharmaceuticals) and food supplements (combination of food and pharmaceuticals) as can be seen in Figure 3. These cross-segments are increasing in popularity as they combine the functionality of pharmaceutical ingredients with lower required legislations of food and cosmetic industries. As such, they offer an added benefit, without having to comply with stringent pharmaceutical legislative requirements.

The food segment can be further divided into food and beverage manufacturers. Within the cosmetics industries, sub-segments are skin care, hair care, decorative, fragrances and toiletries. The health segment consists of both herbal medicine and the cross-segment food supplements.

Figure 3 Overview of relevant segments and cross-segments

Differences exist between these segments in whether wild-collected or cultivated species are used more extensively. In general, cosmetics and food industries rely more on cultivation than herbal medicine. Variations in type of buyer influence the use of wild-collected or cultivated species as well. For example, conventional cosmetics are more prone to using synthetic ingredients and rely on cultivation if large quantities are needed. In fragrance industries, several wild MAPS are used, which can amount to significant quantities. As such, especially as CITES (see chapter 4) applies to several of these species, sustainable trade becomes essential to safeguard future availability of these species.

2. Country backgrounds

This section gives an overview of the wild botanical sector of the six countries in this study. For several of the focus countries, most notably Vietnam and those in Latin America, a broad range of information is available. These countries have been the focus of many studies and (research) projects focused on wild collection and biodiversity. Information availability for Mozambique and Tanzania is much more limited. Their wild botanicals sector is less commercially oriented and their governments pay less attention to its potential. Moreover, these countries have benefitted from fewer studies and projects on biodiversity and available flora.

This section discusses the countries' biodiversity, traditional use of MAPs and its translation into commercial use and current and potential exports based on wild collection. Furthermore, these country backgrounds consider issues around access and sustainable use of wild resources, looking at legislation relevant to wild-collection and an overview of sustainability issues in the country.

Due to data availability the content of these country backgrounds is neither exhaustive nor conclusive, nor does it replace need to further investigation and stakeholder consultation if activities in the wild botanicals sector are considered.

2.1 Bolivia

Topography, climate and biodiversity

Bolivia has a wide variety of microclimates and ecosystems, resulting from a diverse topography which ranges from 3,000+m (up to 6,000 m - Andean region), 2,500 m (Sub-Andean region) and lowlands. Natural forests cover around 50% of Bolivia's surface, of which 80% are concentrated in its lowlands. Bolivia has a rich biodiversity. 35% to 45% of the world's species are represented in its territory, including nearly 20,000 plant species.

Most of Bolivia's medicinal plants are distributed in the Amazon region, Interandean valleys, Yungas region, High plateau and Gran Chaco region. The great majority of these plants is sourced from wild collection, but exact figures are not available ([UNIDO, 2006](#)).

Traditional use of MAPs

Knowledge on medicinal plants in Bolivia is based on traditional practice of ancient Andean and Amazon cultures, which still influence its population nowadays. Traditional medicine has a strong preference in Bolivia, especially in the northern provinces of Potosí department (Charcas, Ibañez and Chayanta) and southern Cochabamba department (Bolívar and Arque). Around 3,000 medicinal plants are used locally ([UNIDO, 2006](#)). Bolivia also has a national association which promotes and defends the interests of the traditional medicine sector: the [Sociedad Boliviana de Medicina Tradicional \(SOBOMETRA\)](#) ([Herbario Nacional de Bolivia, 2006](#)).

Industrial scale/potential

The Bolivian processing industry counts two main nutraceutical companies which offer biodiversity products: [Hahnemann](#) and [Alcos](#); six other high technology companies in the country have the necessary capacity to offer such products, but are currently not focused on biodiversity products. At least ten other medium-sized companies in Bolivia, mainly specialised in the processing of food ingredients (e.g. oil extraction, drying) could have a potential to engage with the biotrade (biodiversity trade) sector when linked to producer (communities) ([Diagnóstico de Ingredientes Naturales – PFNM](#)).

A few biodiversity products have reached industrial scale in Bolivia, among which: brazil nut oil (*Bertholletia excelsa*), wild cocoa butter and powder (*Theobroma cacao*), cupulate and copoazu butter (*Theobroma grandiflorum*), urucú extract (*Bixa Orellana*), cusi oil (*Orbignya phalerata*), copaibo oil (*Copaifera raticulata*), cat's claw (*Uncaria tomentosa*) and sangre de drago extract (*Croton lechleri*). The latter two are investigated more in-depth in Chapter 8 ([Diagnóstico de Ingredientes Naturales – PFNM](#)).

In terms of scale of commercialisation, quinoa is the dominant biodiversity product. However, this is a cultivated species.

Export potential/trade

According to the *Instituto Boliviano de Comercio Exterior* ([IBCE](#)), Bolivian exports of biotrade products (cultivated and wild-collected) amounted to US\$ 250 million in 2012, among which brazil nut (*Bertholletia excelsa*), quinoa (*Cinchona officinalis*) and wild cocoa (*Theobroma cacao*) represented the largest share. Bolivia's main export markets for biotrade products are the USA, the UK, the Netherlands, France and Germany.

IBCE also reports that the country's northern Amazon, Chiquitania and Plateau (*Altiplano*) regions are the ones with most potential for biotrade products; most of the currently traded products come from these zones ([El Día, 2013](#)).

Institutional framework

Bolivia ratified the Convention on Biological Diversity (CBD) in 1994, through *Ley N° 1580*. The *Programa Nacional de Biocomercio Sostenible (PNBS)* is an initiative of the Bolivian government in the framework of the CBD. The initiative was established in 2003, following a joint commitment from the *Viceministerio de Recursos Naturales y Medio Ambiente (VRNMA)*, the *Ministerio de Desarrollo Económico*, UNCTAD's BioTrade Initiative and the Dutch and Swiss governments. The executing body is the *Fundación Amigos de la Naturaleza (FAN)* ([Corporación Andina de Fomento CAF, 2011](#)).

According to the Bolivian Constitution, all natural forests in the country belong to the State, including those on private land. Under *Artículo 29* of *Ley Forestal 1700* it is established that the *Autoridad de Fiscalización y Control Social de Bosques y Tierra (ABT)* can issue concessions to individuals or groups for exclusive exploitation in a delimited forest area. The application of a Sustainable Management Plan by such individuals or groups is mandatory under the concession contract ([Unidad de Análisis de Políticas Sociales y Económicas, 2009](#) and [Gobierno Autónomo Departamental de Santa Cruz](#)). In 2013, Bolivia introduced the *Ley Integral de Bosques*, but it is not yet clear whether this law will have any influence in the country's forest concession model.

Sustainability issues:

There are over 40 protected areas in existence in Bolivia, legally created but with no proper management. These correspond to about 16% of the total national territory ([Convention on Biological Diversity](#)).

The regions where wild-availability is under most threat are the deserts and steppes, highland tundra's, the inter-Andean valleys and the Chaco due mainly to overgrazing, inadequate agricultural practices, tree felling and burning of forests. Other ecosystems are threatened by: demographic pressures, loss of forest cover, inappropriate use of technology, and overharvesting. Almost 2% of Bolivian flora is considered threatened ([Convention on Biological Diversity](#)).

2.2 Peru

Topography, climate and biodiversity

Peru is divided into three contrasting topographical regions: the coast (costa), the highlands (sierra), and the eastern rain forests (selva). The country is home to 84 of the 104 climate zones of the world and is among the most bio-diverse countries in Latin America. Peru accounts for around 10% of the world's flora (25,000 plant species), of which 30% are endemic ([UNDP in Diario 16, 2011](#)).

Peru ranks second in Latin America, and fourth in the world, in terms of forest coverage. Around 13% of the Amazon rainforest is in Peru, with almost 72 million hectares (ha) and great potential for non-timber products, such as nuts, fruits, fungi and medicinal herbs. Around 80% of Peru's medicinal plants come from the Amazon region ([UNEP, 2012](#)).

Traditional use of MAPs

Peru has one of the world's highest number of plant species used as medicine (4,400 species) and food (787 species) by the local population. Many of these are wild-collected. It is estimated that 80% of the Peruvian population makes use of medicinal plants, especially popular in Northern Peru. Many of the species reported from Northern Peru are widely known by *curanderos* and herb vendors as well as the general population of the region and are used for a large number of medical conditions ([Busmann, 2013](#)).

Industrial scale/potential

According to the Ministry of Environment (MINAM), biodiversity represents 22% of the Peru's GDP and 24% of its total exports ([UNDP in Diario 16, 2011](#)). Biodiversity-based businesses in Peru are concentrated in the Andes and the Amazon - two areas with high poverty rates. In the province of Madre de Dios, for instance, almost 30% of all the families work directly or indirectly in the production, processing or commercialization of products and services related to biodiversity. A high proportion of these activities are based on wild collection, although some of the more established species (e.g. sacha inchi) have been domesticated and are now largely cultivated ([PROMPEX](#)).

Export potential/trade

Almost 95% of all Peruvian biotrade production is exported, with a substantial growth of 20% per year. The major export destinations are the United States, the European Union and Japan ([UNEP and UNCTAD, 2011](#)).

According to Peru's BioTrade Promotion Programme, Peruvian exports of biotrade products (cultivated and wild collected) were expected to reach US\$ 351 million by the end of 2012, with a large share of colorants, Andean grains (quinoa *Cinchona officinalis* - and kiwicha - *Amaranthus caudatus*), Brazil nuts (*Bertholletia excelsa*) and physalis (*Physalis peruviana*) ([FAO, 2012](#)).

Peru is also an important producer of organic (wild) cocoa and one of the largest producers of nutraceuticals and functional foods such as maca (*Lepidium meyenii*), yacon (*Smallanthus sonchifolius*), sacha inchi (*Plukenetia volubilis*) and camu-camu (*Myrciaria dubia*) which are increasingly well-known in export markets such as the US and Western Europe. As such, Peru is increasingly considered as prime origin country for biodiversity-related products ([UNEP and UNCTAD, 2011](#)).

Institutional framework

Peru is a signatory to the Convention on Biological Diversity (1992). The *Consejo Nacional del Ambiente* (CONAM) is responsible for the elaboration of the *Estrategia Nacional de Biodiversidad*. This is a management tool establishing (economic, legal, political, technical) policies, procedures and actions for the conservation and sustainable use of Peru's biological diversity, and the *Comisión Nacional de Diversidad Biológica*. This commission has initiated a participatory process involving various stakeholders and institutions who make use of the country's biological diversity.

The role of regulating BioTrade in Peru falls under the Ministry of Environment, the Ministry of Agriculture, the Ministry of Production, the Ministry of Health and the Ministry for Foreign Trade and Tourism. In 2003, these government bodies combined their efforts in Peru's National BioTrade Promotion Program (PNBP), in close consultation and cooperation with international cooperation partners such as GIZ and the State Secretariat for Economic Affairs of Switzerland (SECO). The PNBP is implemented through the National BioTrade Strategy (NBS) ([UNEP and UNCTAD, 2011](#)).

The Peruvian government allocation of concessions for sustainable forest management under Forestry Law 27308 of 2002. This legislation was drawn up in consultation with local and national stakeholders, foreign trading partners and international NGOs and defines conservation land, community land, and forest concessions. It is designed to regulate extraction volumes to ensure the integrity and sustainability of the forest ([UNEP, 2012](#)).

There are different types of *Títulos Habilitantes* for the sustainable exploitation and conservation of forest resources in Peru: concession contracts, permits and authorisations. There are also special forest concessions to exploit non-timber forest products. The concessions and other *Títulos Habilitantes* are issued by the *Instituto Nacional de Recursos Naturales* (INRENA) to individuals or groups, and supervised by the *Organismo Supervisor de Concesiones Maderables* (OSINFOR). Holders of *Títulos Habilitantes* must implement a Forest Management Plan ([CONAP](#), [SPDA, 2010](#) and [OSINFOR](#)).

Sustainability issues:

Peru has established a Regulatory Framework (2005) implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and formally identified 11 threatened species of flora.

Peru currently has 72 protected natural areas, covering 14% of the country's territory. Nevertheless, deforestation remains an alarming challenge. According to the Ministry for the Environment (MINAM), 7 million hectares have been deforested. Illegal mining operations and logging in the rainforest are considered to be the main causes of deforestation. Large portions of the Amazon rainforest's gold deposits are being exploited by illegal businesses that use toxic metals during the extraction process, leading to serious harm to the environment. The number of unofficial mines has also increased as gold prices continued to rise in recent years ([UNEP, 2012](#)).

2.3 Ecuador

Topography, climate and biodiversity

Ecuador is divided into 4 natural geographical zones: coast, mountain range, the Amazon and the Galapagos Islands. The country is recognized globally for its vast richness in flora; it is estimated that the country has more plant species per unit area than any other country in South America ([Convention on Biological Diversity](#)).

Ecuador's total forest cover represents about 42% of the national surface area. The country is home to 10% of the world's plant species, the majority of which grow in the Amazon. The country's climatic diversity has given rise to more than 25,000 species of trees. Moreover, the Andes is home to an estimated 8,200 plant and vegetable species ([Biocomercio Andino](#)).

Traditional use of MAPs

In Ecuador, over 900 different plants are used for medicinal purposes ([The Globalist, 2009](#)). Most are collected from the wild. Around 80% of Ecuadorians depend (partly) on traditional medicine. Knowledge of traditional herbal medicine of Ecuador's indigenous populations has been transferred down from one generation to the next by the *shamans*, traditional healers, or *curanderos*. Nowadays, thanks to a new legal system (2008 Constitution) which recognizes the validity and importance of ancestral treatments for indigenous communities, this is a growing market ([Today in Ecuador, 2013](#)).

Industrial scale/potential

Most of the communities producing and/or collecting and marketing medicinal plants in Ecuador are located in the Amazon and Andes regions ([La Hora Nacional, 2013](#)). A few examples of well-structure cooperatives in Ecuador are [Jambi Kiwa](#), [CEDEIN](#) and UNORCACH ([Agro Ecuador](#)).

Several companies in Ecuador have also reached industrial scale for medicinal and aromatic plants, for example [RENESA](#), [Agrotrading](#) and [Aromas del Tungurahua](#).

Export potential/trade

Some of the most popular and commercially successful medicinal plants (mostly processed into essential oils and extracts) from Ecuador on the international market are: cat's claw (*Uncaria tomentosa*), zaragotana (*Plantago psylliuml*), dragon's blood (*Croton lechleri*), Sacha inchi (*Plukenetia volubilis* L.) and cascarilla (*Croton Eleuteria*) ([Ecuador.com](#)).

Institutional framework

Ecuador ratified the CBD in 1993. The management of environmental issues is the responsibility of the Ministry of Environment (MAE) and the National Environmental Authority ([Conservation International, 2013](#)). In 2001, the MAE established the *Programa Nacional Biocomercio Sostenible (PNBSE)* in Ecuador, in the framework of UNCTAD's BioTrade Initiative. The *Corporación de Promoción de Exportaciones e Inversiones (CORPEI)* is the PNBSE's executive and technical body ([Biocomercio Andino](#)).

More recently, in 2011, the GEF-CAF Biocomercio project was initiated in Ecuador and two other countries: Peru and Colombia. This project is implemented by the United Nations Environment Programme (UNEP), and executed regionally by the *Banco de Desarrollo de América Latina (CAF)*. At the country level, the executive unit is CORPEI, in close cooperation with MAE ([Biocomercio Andino](#)).

Biodiversity has been integrated in the following sectors: agriculture, education, health, fisheries, water resources, mining and petroleum, tourism and commerce/industry. The 2008 Constitution contains various items related to the conservation of biodiversity, the rights of nature, the formation of a national system of protected areas, and, most significantly, the national environmental objectives outlined in the National Plan for Good Living and the definition of National Environmental Policy (PAN). However, a proposal for biodiversity legislation has not yet been approved. The Forestry Law has not yet been revised, although Ecuador does possess a Law on Forestry and Conservation of Natural Areas and Wildlife. As such access for sustainable use of biodiversity resources is not entirely clear at the time of writing.

Continental Ecuador does not possess any plans or legislation on land use. This is in stark contrast to strong land use plans in the Galapagos Islands ([Convention on Biological Diversity](#) and [Ministerio del Ambiente, 2010](#)).

Sustainability issues

The main threat to biodiversity conservation in Ecuador is deforestation, with Ecuador ranked second among Latin American countries in terms of highest levels of deforestation. Firewood collection, urban expansion, petroleum exploration and exploitation, agriculture, mining, fishing, overexploitation of natural resources, poverty, human migrations, tourism development, and introduced species are other important aspects contributing to the deterioration of the country's biological richness in both continental and island areas ([Convention on Biological Diversity](#)).

One of the best known medicinal herbs in the world, *Cinchona pubescens* - the original source of the anti-malarial drug quinine - may be threatened as a result of over-exploitation in Ecuador, according to WWF. Today the herb is used to treat a variety of ailments, from upset stomach to immune system problems ([Environmental News Service, 2007](#)).

2.4 United Republic of Tanzania***Topography, climate and biodiversity***

Measured in terms of ecosystem types, species richness and endemism, Tanzania is categorised as a biodiversity hotspot (National Report on Implementation of CBD, 2009). Regions especially rich in biodiversity are the Eastern Arc, Mountain Forests, Coastal forests, the Great Lakes area (Victoria, Tanganyika and Nyasa), marine coral reef ecosystems, alkaline ecosystems in the Rift-valley and grassland savannahs. Of these, the Eastern Arc forests, particularly the Uluguru mountain forest, although only covering 0.2% of the total land surface, contain around 18% of all plant species. Tanzania has more than 10,000 plant species, of which 1,100 are endemic to the country ([EarthTrends, 2003](#)).

Tanzania has both natural and plantation forests, the natural forests consist of miombo woodlands, montane forests and mangroves. Miombo woodlands predominate with *Acacia* and *Commiphora* species and grasslands. In the coastal regions, lowland forests, mangroves, wetlands and floodplains are present.

Traditional and industrial use of MAPs

An estimated 2,500 plant species found in Tanzania are categorised as wild medicinal plants (Nahashon, 2013). Traditional medicine plays an essential role in Tanzania; over 60% of the population depends on medicinal plants as a primary health care. This popularity is supported by the high costs of Western medicine, and the low availability of Western medicine practitioners compared to traditional healers. The latter group often collects medicinal plants themselves. Traditional herbal medicinal products are sold as mixtures of various species in dried and powdered or shredded forms.

Industrial scale/potential

Most industrial activity is concentrated in Dar es Salaam, followed by Arusha. The rest of manufacturing companies are located among Mwanza, Singida, Tanga, Kagera and Kilimanjaro. Regarding pharmaceutical industries, quality of medicines manufactured in Tanzania is often inadequate, as the country's General Manufacturing Practices (GMP) do not meet international standards. In 1997, the government of Tanzania privatised its two pharmaceutical industries; TPI and Keko Pharmaceutical Industries. Six other local private pharmaceutical companies exist in the country. Information on production of traditional medicine or natural ingredients is not available.

Export potential/trade

Some reporting of exports of medicinal plants from Tanzania exist, although it is difficult to estimate quantities of exports (Nahashon, 2013). Species traded internationally include *Aloe* extracts, *Osyris* spp., *Steganotaenia araliacea*, *Wedelia mossambicensis*, *Acalypha fruticosa*, *Harrisonia abyssinica* and *Prunus africana*. Heavily exploited species include *Acacia mellifera*, *Cadaba farinose*, *Dioscorea dumetorum*, *Ehretia amoena* and *Milicia excels*.

Institutional framework

There is a need for a policy and legislation framework in Tanzania as there is no written legislation related to exports of medicinal plants from this country ([Giliba, 2010](#) and Nahashon, 2013). However, there is a responsible institution for the international trade in medicinal plants; the [Tanzanian Food and Drugs Authority](#). Tanzania has made significant steps in protecting the biodiversity of some of the country's main sources for MAPs, its forests.

Tanzania has a high rate of deforestation at 1.2% annually, while this rate is probably close to 5% in its high-biodiversity coastal forests ([Rights and Resources, 2010](#)). To reduce deforestation and forest degradation, the country has put in place systems of participatory forest management (PFM). This framework is regarded as one of the most advanced and progressive legal frameworks for participatory forestry in Africa. To that end, the Forest Act of 2002 provides a legal basis for communities, groups and individuals across the country's mainland to own, manage or co-manage forests. In addition, the Land and Village Land Acts of 1999 and the Local Government Act provide a legal basis for villages to identify, declare and manage forest resources on village land, in such a way that these are sustainable and profitable. This essentially establishes [Community based Forest Management](#) (CBFM), which applies to both reserved and unreserved forests. Communities become actors and responsible to make decisions on how to use the forests.

Although communities face significant costs at managing forests, it has also produced benefits in terms of income from sale of forest products, sustainable supplies of household products, conservation and maintenance of water sources and additional benefits from ecotourism. One of the objectives of PFM is to improve livelihoods and wellbeing of rural communities. The community is assisted to make a Forest Management Plan with legal backing, a Joint Management Agreement, if the forest is part of a government forest reserve and to register a village or group forest reserves at the District Register of Forests ([CBFM in Tanzania, 1999](#)).

Sustainability:

The government of Tanzania has declared several areas for biodiversity conservation and has taken further initiatives to protect endemic and threatened biodiversity. For example, some tree species such as

Mangroves, *Milicia excelsa*, *Pterocarpus angolensis*, *Allanblackia stulmanii*, *Cephalosphaera usambarensis*, and *Dalbergia melanoxylon* are protected by law. Collection is not allowed unless collectors receive special permission from the relevant authorities.

Wild-harvested medicinal plant species in the Uluguru Mountains are estimated to have the highest depletion rate in the country (Wildlife Conservation Society of Tanzania, 2009). A large urban and international demand for medicinal plant species is a major threat for species such as *Cassia abbreviata*, *Zanthoxylum usambarense*, *Zanthoxylum chalybeum*, *Myrsine africana*, *Milicia excelsa* and *Prunus africana*. The latter is discussed in Chapter 10.

A consequence of their popularity is that plants are harvested unsustainably; for example by harvesting roots completely or de-barking the trunk of the tree entirely. Another species from the Kilimanjaro region that is used mostly in the cosmetic industry, *Osyris* spp., has been over-exploited as well. Other species that are under reported conservation concern are: *Acacia mellifera*, *Acalypha fruticosa*, *Cadaba farinosa*, *Dioscorea dumetorum*, *Ehretia amoena*, *Harrisonia abyssinica*, *Steganothena araliacea* and *Wedelia mossambicensis*.

2.5 Mozambique

Topography, climate and biodiversity

Mozambique has a coastline of over 2,500 km and in general has a low altitude, with 13% of the land being more than 1,000 m above sea level ([USAID Mozambique Biodiversity and Tropical Forests, 2008](#)). From the coast land inwards, the country has coastal lowlands up to a small area of mountains on the western border. The [FAO](#) states that forest cover in Mozambique is estimated at 40 million hectares. In the south, the country has a subtropical climate with a tropical climate in central and northern Mozambique.

The country has 14 ecological zones and has designated 15% of its natural territory as protected areas ([CBD Country profile](#)). Several sites of high importance for biodiversity include the Gorongosa Mountains, the Great Inselberg Archipelago of Quirimbas in north Mozambique and the Chimanimani Massif. The country has about 5,500 plant species, of which 177 are endemic.

Traditional use of MAPs

According to an estimation of UNIDO, 80% of the population in Mozambique uses traditional medicine for their health-care needs. This is the result of insufficient health care facilities, and a strong belief of traditional medicine. UNIDO (2004) estimates that 10% of plant species are used in traditional medicine. Plant material that is traded in the capital of Mozambique, Maputo, originates mostly from the Maputo, Gaza and Inhambane provinces. Traders in the capital serve local and, to a lesser extent, regional markets, such as South Africa and Swaziland.

Industrial scale/potential

In Mozambique, the largest industries are food, beverages and tobacco (62%); and extraction of mineral resources. Industrial capacity is largely limited to the country's larger cities; Maputo, Matola, Beira and Nampula. According to industry sources, there is a lack of commercialisation in the country in terms of MAPs collection and trade. In addition, production of extracts and essential oils still needs to be developed.

Before 1998, state-owned Medimoc was the only importer and distributor of medicines. After liberalisation of the country it remains one of the largest companies in the sector.

Export potential/trade

Since 1985, only three species of MAPs are exported internationally; *Jateorhiza palmata*, *Terminalia sericea*, and *Asparaus* sp. Exports of these plants are primarily destined for Germany, France and Belgium. Other wild-collected MAPs that have been exported in the past include *Tabernaemontana elegans*, *Gloriosa superba*, *Harpagophytum procumbens*, *H. zeyheri* and *Brackenridgea zanguebarica* (National Report on Implementation of the CBD, 2009).

Institutional framework

On paper, Mozambique has a land governance system protecting community-based land rights. However, the implementation of this legislation has been slow. In addition, there is weak capacity among state actors. A tension exists between promoting foreign investment and agro-industry on the one hand and a rural population which is insufficiently aware and able to exercise their legal rights ([LandGovernance, 2012](#)). The state owns all the land in Mozambique, however, communities, women and smallholder farmers are allowed to use the land according to the Land Law of 1997. Community land use rights are legally equivalent to the rights granted to individuals and entities.

Communities are free to use and benefit from forest resources for subsistence use. If they want to use resources commercially, they need to acquire a license in accordance with the Forestry and Wildlife Act of 1999, articles 9 and 34 ([Rights and Resources, 2012](#)). The procedures to obtain these licenses are difficult and need to be based on an approved Management Plan. Such plans provide individuals, corporations and local communities with 50-year forest concessions, giving them the exclusive right to exploit, research and analyse the forest resources stipulated in the contract. Local communities are allowed to apply for these contracts, but the requirements are usually beyond their financial and technical capacities.

Sustainability issues:

Threats to plant diversity are often related to increasing human settlements and unsustainable use. Specific threats include deforestation for fuel wood, agriculture, uncontrolled fires and selective species utilisation resulting in over-exploitation. In addition, especially among traders, limited knowledge exists on the state of wild populations in Mozambique, as well as the impact that harvesting has on priority species. Field research on plants has been impeded by civil strife.

Of all flora found in Mozambique, 300 species are in the red list, of which 122 are threatened. UNIDO (2004) has identified the following species as being the most threatened in Mozambique: *Aloe* spp., *Ansellia gigantean*, *Ceropegia ampliata*, *Diospyros mespiliformis*, *Dalbergia melanoxyllum* and *Spirostachys africanus*. Other species of conservation concern are *Warburgia salutaris*, *Brackenridgea zanguebarica* and *Harpagophytum procumbens*. The latter only has a limited distribution in Mozambique.

2.6 Vietnam**Topography, climate and biodiversity**

As a result of its geographic location, complex geology and strong variations in climate, Vietnam has a wealth of biological diversity. Worldwide, it ranks 16th in terms of species richness. Almost 40% of the country's total land area, mostly in mountainous and remote areas, is covered by forests, which support high levels of biodiversity. Additionally, Vietnam has a dense network of rivers and delta environments, a long tropical coastline, over 3,000 islands and spans a sub-tropical to tropical transitional zone. The lowlands in Vietnam are used for intensive agriculture. Agricultural land has increased considerably in the last 20 years, and is driven by the global demand for crops such as sugar, tea, coffee and cashew nuts. Shifting lands to agriculture has led to losses in forest ecosystems in northern Vietnam, as well as expansion of cash crops in south eastern agro-ecological zones and the Central Highlands. In addition, many freshwater wetlands have been converted to rice agriculture.

To conserve landscapes, species and ecological processes, Vietnam has defined several conservation corridors. In addition, key biodiversity areas have been identified and linked with these conservation corridors. The country can be classified into 10 terrestrial biodiversity regions (forest and agricultural plantations, primary and poor quality secondary forests) and 9 coastal and marine biodiversity regions (including mangroves, brackish lagoons, coral reefs and swamps) each with specific range of species (Vietnam Environment Monitor, 2005)

Traditional and industrial use of MAPs

Different studies have reported medicinal uses of up to 3,926 plant species in Vietnam. The National Institute of Materia Medica in Vietnam developed a list of 1,863 plants of known safety and efficacy in treating common medical conditions. According to the institute, around 200 plant species are commonly used for traditional medicine in Vietnam, both cultivated and wild-collected. Additionally, 20 wild-collected

species are exploited in large quantities, at 50 tonnes per year or more (TRAFFIC, 2008). Another six species are cultivated in quantities exceeding 50 tonnes annually.

Annually, Vietnam uses around 50,000 tonnes of raw materials in medicinal products, both wild-collected and cultivated. Of this, around 30,000 tonnes are harvested in Vietnam, with the remaining 20,000 tonnes imported from China. Of the total raw materials used in Vietnam, an estimated 60% is used for traditional medicine and 20% used as raw material for manufactured drugs. The remaining 20% is exported abroad. For domestic markets, around 1,500 types of traditional medicines were licensed by the Ministry of Health in 2003, while unlicensed medicines are used to a large extent as well (TRAFFIC, 2008).

In Vietnam, around 75% of the population uses traditional medicine systems as a primary source of treatment for common health problems. Over 95% of traditional medicines used in Vietnam are plant-based (TRAFFIC 2008). Both Traditional Vietnamese Medicine (TVM) and Traditional Chinese Medicine (TCM) are used. TVM is more common for curing ailments and diseases whereas TCM is primarily used to enhance or support overall health. Each system has drawn from each other and many of the plants used in TCM are currently cultivated in Vietnam.

Industrial scale/potential

The pharmaceutical market in Vietnam, the main user of MAPs, is one of the fastest growing in Asia, worth almost US\$ 3 million in 2012. The market is expected to grow by 18-20% in the coming years. In 2012, around half the medicinal products consumed in Vietnam were produced locally. This is to a considerable extent accounted for by several large domestic producers focussing on the production of (low-cost) generic medicine. More sophisticated synthetic drugs are being imported. However, the country also has many (generally smaller) producers focussing on traditional herbal medicines; some of these focus on the trade in both raw materials and finished products.

Around 170 pharmaceutical companies were present in Vietnam in 2012, 10% of which were owned by foreign investors. Even though the situation has changed significantly, most national companies are still state-owned. Vietnam has encouraged local manufacturers to obtain GMP (Good Manufacturing Practice, chapter 3) certification to comply with WHO standards. Also in 2012, one third of Vietnamese pharmaceutical companies have this certification in place ([Italian Trade Agency, 2013](#)).

Industry sources indicated that Vietnam has specialised in several oils, although these do not have large markets. This signifies that the technology to produce essential oils is present in the country, which offers opportunities for value addition of wild-collected MAPs by extracting essential oils.

Export potential/trade

Around 20% (5-10 thousand tonnes) of medicinal plant material harvested in Vietnam is exported abroad. A report from TRAFFIC, “*An overview of the use of plants and animals in traditional medicine systems in Vietnam*”, published in 2008, indicates that there is an increased national and international trade in traditional medicinal materials. The largest export destination is China, which is in turn also an important supplier of MAPs to Vietnam. Other traditional export markets include countries in Asia (e.g. Taiwan, Japan, Singapore and Korea), the USA and European countries (Germany, the Netherlands, Bulgaria, Hungary, Poland and the UK).

Vietnam exports raw and (partly) processed materials for use in traditional and western medicine, food and cosmetic industries. MAPs that are commonly exported include *Cinnamomum cassia*, *Illicium* spp., *Amomum aromaticum* and other *Amomum* species, *Morinda officinalis*, *Sophora japonica*, *Homalomena* spp., *Kaempferia galangal*, *Chrysanthemum indicum*, *Cibotium barometz* (listed in CITES Appendix II), *Cyperus stoloniferus*, *Coix lachrymal-jobi* and *Melaleuca cajuputi*.

Institutional framework

In Vietnam, traditional medicine and medicinal plants are governed by two specific ministries (TRAFFIC, 2008). These are the Ministry of Health (for traditional medicines) and the Ministry of Agriculture and Rural Development, with its Department of Forestry (for medicinal wildlife). These institutions are in charge of developing and implementing guidelines for the exploitation, market development and conservation of medicinal flora and fauna, as outlined in Prime Ministerial Directive 210-TTg (1966). Moreover, the Ministry of Health is responsible for compiling inventories of plant species used in traditional medicine and the Department of Forestry for managing the exploitation and protection of medicinal wildlife in protected forests.

In Decision 108/2002/QD-TTg, the government of Vietnam launched a strategy to encourage the use of both traditional and western medicines in Vietnam. This included the development of national quality standards by the Ministry of Health, for 186 medicinal plants and 88 derivatives from plants and animals. In addition, the National Academy of Traditional Medicine was created, responsible for undertaking research on traditional medicines, as well as setting standards for their quality, ensuring sustainable use of natural resources and improving the cultivation and production of medicines from plants and animals.

More specifically, collectors and traditional medicine producers using wild-collected MAPs need to comply with environmental protection laws in Vietnam. For terrestrial wild-collected species, these laws are implemented by the Ministry of Agriculture and Rural Development. In addition, in the Bac Kan province, collectors need to request a license before collecting MAPs.

Sustainability

In Vietnam, unsustainable use of natural resources combined with uncontrolled harvest and poor management of trade in MAPs has contributed to a significant reduction in available supply of various important plant species. The TRAFFIC Southeast Asia report (2008) indicates that, together with habitat loss and degradation, this caused the decline of 136 MAP species.

Complimentary to the IUCN Red List of Threatened Species, Vietnam has established a Red Data Book and a list of species in Decree 32/3006/ND-CP, with threatened and endangered species. This legislation concerns both plant species (category A) and animal species (category B). In addition, it classifies species into two groups; those for which trade and commercial exploitation are forbidden (I) and those? restricted, which require ministerial approval for trade and exploitation (II). Examples of species that are in short supply, some of which as a direct result of overharvesting, are *Anoechtochilus setaceus*, *Nervilia fordii*, *Panax bipinnatifidus*, *P. stipuleanatus*, *P. vietnamensis*, *Coptis chinensis*, *C. quinquesecta*, *Lysimachia congestiflora* and *Paris polyphylla*.

Additionally, as a signatory party to CITES, Vietnam developed Decree 11/2002/ND-CP as a legal framework for the management of importing and exporting wild species and to control the illegal trade in endangered species. The National Institute for Materia Medica has also compiled inventories of medicinal plants for protected areas in Vietnam, as was decided by Decision 250/BYT-QD of 1997.

3. Potential market segments

Wild collected MAPs from the six countries covered in this study are most often used in cosmetics and health segments, while some are also used in food products.

Food industry

Food ingredients are sold to the processing industry as ingredients, being in manufacturing different food products. MAPs are used for various functions: as flavouring (e.g. essential oils), thickeners (e.g. natural gums) or colouring (e.g. extracts).

Ingredients for food can be further segmented into specialty ingredients and commodity ingredients. Specialty products can be of premium quality, certified, or exotic and (relatively) new to the market. Commodity products are of a standard quality, traded in large quantities (some even through futures markets).

Wild-collected MAPs have most potential in the specialty food segment, as it commands lower quantities and higher prices than the commodity segment. In the food segment there is an increasing demand for natural health and lifestyle options. Introducing new species for the food segment can result in legislative hurdles, for example the Novel Food Regulation (see chapter 4).

Cosmetic industry

Developing countries supply many different natural ingredients to cosmetic producers in the EU, often through intermediaries (traders, brokers, processors). The cosmetic industry is divided into five segments: skin care, hair care, decorative cosmetics, fragrances and toiletries. Of these, toiletries, skin and hair care represent the largest segments (around 25% each), followed by fragrances and decorative cosmetics (around 15% and 10%, respectively).

Figure 5 Segmentation EU market for cosmetic products

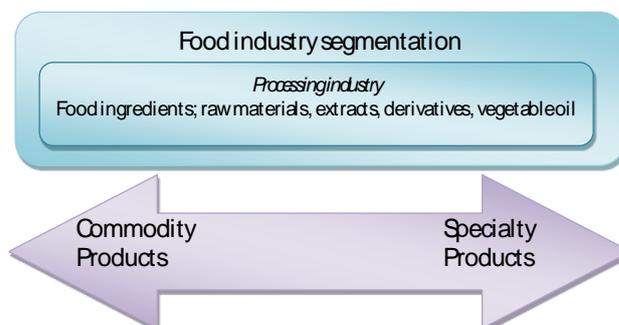


MAPs and their derivatives are often used as active (e.g. anti-aging) or functional ingredients (e.g. preservative or fragrance). The cosmetics segment has a strong drive for innovation and is a more flexible industry than the pharmaceutical and food industries, as legislation is less stringent.

Demand can be divided between conventional (commodity) and specialty ingredients. Cosmetics ingredients have most potential as specialty ingredients. More specifically, if they are: natural; induce a feeling of exotic, luxury or health; have active properties and have been produced in an environmentally and socially sustainable manner. These aspects are often used for marketing stories. As such, wild-collected MAPs which encompass these aspects have strong potential in this sector. When these ingredients offer additional marketing or storytelling opportunities, such as exclusivity, certifications, demonstrating benefits for local communities in the country of origin, the ingredient can be used as specialty ingredient and has a stronger competitive edge.

However, some words of caution need to be given on the use of these ingredients in cosmetics. New, less established ingredients depend on trends in product introductions, which can change quickly. Sustainable wild-collection is of extra importance in this respect, to ensure future supplies of attractive ingredients. Not all markets are equally receptive to MAPs, especially if these are new. In Europe, countries like France, the UK and Germany offer most potential for these ingredients. In order to develop markets for sustainably produced MAPs, these need to be available to cosmetic producers in high volumes and in a wide range of ingredients. Finally, for producers of certified natural cosmetics, which

Figure 4 Segmentation EU market for food products



require a certain threshold of natural content, cheaper vegetable oils can be of more interest than expensive MAPs or extracts.

Health industry

The most relevant segments within health industries are herbal medicine and dietary industries (e.g. food supplements). Innovation is most feasible and welcomed by companies in the dietary industry. This market segment offers most opportunities for exporters of wild-collected MAPs or extracts.

Due to very high research and market authorisation costs to establish new ingredients for herbal medicine (efficacy, safety), herbal medicine products focus on ingredients that have community monographs with either documented well-established or traditional use. Most ingredients have established markets as they have been used for a long time. In addition, these markets focus on quantity and competitive prices and companies do not easily switch suppliers.

For less established wild-collected species, like many species covered in this study legislative requirements will pose a challenge. The adoption of the Traditional Herbal Medicine Product Directive (THMPD) in Europe, which provides a simplified regulatory approval process for traditional herbal medicines, could negatively affect the demand for these less established species. Most importantly, in registering traditional herbal medicine products, the directive requires an evidence of safe use of 30 years, of which 15 years in the EU. In addition, if the market per product is too small, a marketing authorisation may not be worthwhile. Finally, for products containing multiple herbs or non-herbal ingredients registration is difficult, as all ingredients need to be authorised jointly.

Dietary industries offer more opportunities for innovation and/or market entry. Regulatory hurdles are lower, as these products are regulated as food and not as pharmaceuticals. Companies in these industries are looking for new ingredients to diversify and distinguish themselves on the market. However, legislative requirements for food products can still be a significant bottleneck for producers of new ingredients. As food supplements are covered in legislation for food, Novel Food Regulation applies for these products as well (see chapter 4). Additionally, these markets are rather competitive and price-sensitive. New ingredients compete with established herbal medicine ingredients as these are used in food supplements as well. In general, product standards are lower than in herbal medicine products, consequently, prices tend to be lower as well.

3.1 High potential cross- and sub-segments

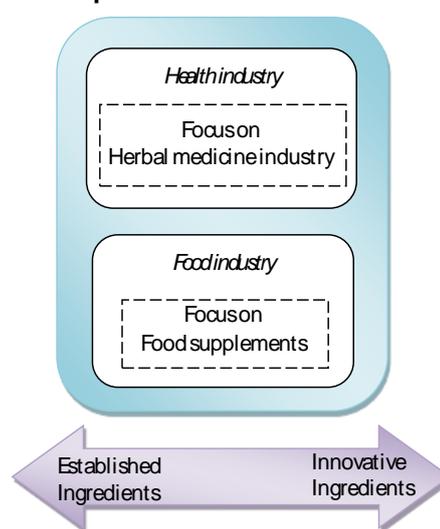
Within these segments, four high-potential sub-segments are identified. An overview of these is added below.

Food supplements (health): in the health segment, food supplements offer most opportunities for innovations. Since these products are regulated as 'food', regulatory hurdles are much lower than for herbal medicine, while the European market is considerably larger than for medical nutrition. In Europe, this market is growing at 3% annually and is expected to reach US\$ 16.6 billion in 2015. Manufacturers are interested in product development to set them apart on the market and increase their profit margins.

Cosmeceuticals (cosmetics): in this segment between cosmetics and pharmaceuticals, cosmetic producers can offer products that enhance health and beauty, without making medicinal claims. These products contain at least one bioactive ingredient, and botanical ingredients can be an interesting proposition for manufacturers, as these combine functionality with 'naturalness'. Market growth is the result of the introduction of new ingredients and changing consumer demand.

Natural and organic cosmetics: natural, and in particular organic cosmetics are expected to grow in the coming years, until 2018 by almost 10% annually in the global market. European natural cosmetics companies are active outside the continent, adding to their demand for natural ingredients. Globally,

Figure 6 Segmentation EU market for health products



Germany represents the third largest market for organic personal care products, behind the U.S. and Japan. In 2011, skin care products represented the largest segment of global organic personal care products market, followed by hair care and decorative cosmetics.

Organic/fair trade food ingredients (food and cosmetics): overall, organic and fair trade markets are most developed in Western Europe, but some East-European countries show strong growth. The European market for organic products in 2011 was € 21.5 billion, an increase of 9% compared to 2010 (€ 19.7 billion), in terms of retail sales. Interest in organic products is stimulated by consumers' concern about the environment, health and nutrition, and food safety.

4. Market access requirements

For an overview of the relevant market access requirements for the food, cosmetics and health segments, please refer to Annex I of this report. Additionally, as this study specifically covers wild-collected botanicals, certain (non-) legislative requirements are relevant for all segments. Be aware that requirements for medical products are the most stringent, followed by food products/ingredients and cosmetics.

4.1 Legislative requirements

Legislative requirements are the minimum requirements, which must be met by exporters of food, cosmetic, or health products marketed in the EU and EFTA countries. Products that fail to meet these requirements are denied market access. The EFTA States, with the exception of Switzerland, take part in the European Economic Area (EEA). This means that Liechtenstein, Norway and Iceland follow EU legislation in general. In Switzerland, the legislation deviates slightly, but it is increasingly becoming harmonised to EEA provisions. In this section, an overview of most important legislation for wild-collected botanicals, as well as a comparison is given on the legislation for the different segments.

Wild-collected botanicals and derivatives

For wild-collected botanicals, the most important legislative requirements are CITES and GACP (Good Agriculture and Collection Practices). If these botanicals are further processed into essential oils or extracts the EU legislation on extraction solvents and REACH become important as well. In addition, the EU has laid down legislation on packaging, labelling, classification, as well as specific legislation for the segments covered in this study; food, cosmetics and health products.

Food

Food products and ingredients are covered by an extensive body of legislation. The most important aspects deal with food safety, which includes hygiene, pesticide residues, contaminants, microbiological criteria, permitted additives, and processes and systems to control these requirements. In addition, buyers can demand food safety, traceability and sustainability standards beyond legislative requirements (see section 3.2). However, the need for this depends on the wishes of the buyer. Organic certification is available for wild-collected MAPs as well. Legally, this regulation only applies for food products, non-legislative organic certification in the other segments is based on this legislation.

Cosmetics

For cosmetic products, legislative requirements are less stringent than for the other segments in this study. However, non-legislative requirements, which are discussed in section 4.2, are of key importance.

Health

Regulations for the health industry are the most difficult to comply with, compared to the other two segments. The requirements that are relevant in this segment focus on herbal medicine products and food supplements. For natural ingredients aimed at the herbal medicine segment, producers need to comply with specific legislation from the start of the value chain. For herbal medicine, these include the legislative requirements on Good Agriculture and Collection Practices (GACP) for raw materials, and GMP for further processed ingredients.

Although food supplements fall under the same regulation as food products, in marketing terms they are more aligned to the health sector. The main legislative difference compared to other food products can be found in specific labelling and composition requirements.

4.2 Non-legislative requirements

Non-legislative requirements can include a variety of certifications (e.g. organic), standards and/or CSR requirements, but also include issues such as having the right documentation and promotional materials to entice specific buyers. These requirements often go beyond legislation, as buyers can have stricter

requirements. Certifications or standards can be difficult or time-consuming to comply with; therefore, it is important for small DC producers to determine whether specific schemes are relevant for specific segments/buyers. In general, these requirements are more relevant for food and cosmetics segments, as well as food supplements. Legislative requirements for herbal medicine products are already more specific and definite in terms of standards, documentation and certifications.

Certification schemes oriented at wild-collection focus on the supply and/or market side. From a supply side perspective, certifications aim at changing / improving operations of small producer organisations. From the market side perspective, certifications can be used to distinguish the botanicals or extracts sold from similar non-certified products. Standards specifically aimed at wild-collected MAPs include [FairWild](#) standards, [FairForLife](#), and [Ethical BioTrade](#). [Rainforest Alliance](#) and [Utz](#) certifications do not apply to wild-collected MAPs and are not included in the analysis below.

Moreover, for all segments, but in particular for cosmetics and food supplements, non-legislative requirements are very relevant, as these segments strongly revolve around the story of products. Additional certifications, marketing materials (such as those promoting the origin or benefits to local communities) etc. can be used to differentiate products from those of competitors, but can also be demanded by buyers. Please refer to chapter on segmentation (chapter 3) for more information on the marketing potential of ingredients in these segments.

Certifications and programmes

Certification standards available for wild-collected MAPs include FairWild, Fair for Life, the Union of Ethical BioTrade, organic and Fairtrade. First, an overview is given on the aim and underlying principles of the certifications or programmes. After that, these certifications are analysed in terms of opportunities for collectors and small producer organisations.

The **FairWild Standard** has been developed to promote sustainable management and supply chain development specifically for wild-collected natural ingredients and products. The [core requirements](#) of the standard include management planning, sustainable collecting practices, cost calculation along the supply chain, traceability and fair trading practices. The standard is based on best practice harvesting and trading of wild-collected plants and resources. Additionally, a distinction is made based on low, medium or high risk of unsustainable wild-collection, with the latter resulting in more rigorous requirements for management and monitoring of collection. In terms of income towards the collectors, the FairWild standard accounts for a FairWild Premium paid to the collectors, with the FairWild price for buyers being usually above market prices for non-certified wild-collected. European companies wishing to certify ingredients with the FairWild standard are required to pay a license fee.

The **Union for Ethical BioTrade (UEBT)** promotes the “Sourcing with Respect” principle for natural ingredients. This principle is not based on a certification programme, but rather addresses companies, NGOs, community producers or collectors, which can become trading or affiliated members. [Membership of UEBT](#) is based on a verification system. Members commit to the following principles and criteria of UEBT: conservation and sustainable use of biodiversity, fair and equitable sharing of benefits, socio-economic criteria, compliance with national and international regulations, respect for the rights of actors involved in BioTrade activities and clarity about land tenure, use and access to natural resources and knowledge. Trading members need to meet minimum requirements, pay an annual membership fee based on turnover and commit to the verification system, which includes third party verification, developing and implementing a work plan and commit to continuous improvement after compliance.

Organic certification is covered by specific EU legislation for food products. This [regulation](#) covers imports from third countries, as well as standards for organic production and labelling. Organic legislation prohibits the use of genetically-modified organisms and restricts the use of chemical synthetic pesticides, synthetic fertilisers and antibiotics. Compliance with this legislation is required for all products that carry the EU organic logo. Additionally, labels of organic products need to include the name or code number of the certification body to allow for traceability. Auditees undergo a conversion period of two to three years in order to label their product as organic. Independent third party certification is used for the implementation of the regulation in member states. The legislation specifies that wild-collection of plants can be considered as organic production. To qualify as such, the collection area cannot have been treated with products not allowed for organic production for at least 3 years. Additionally, collection cannot affect the natural habitat or the maintenance of species in the collection area.

Fairtrade International promotes sustainable development and poverty alleviation, by developing [Fairtrade standards](#) for compliance by producers. Fairtrade certification is most relevant for food products and ingredients. Standards include a Fairtrade Premium (additional funds above selling price) and a Fairtrade Minimum Price (minimum price available for producers to cover average costs of sustainable production). These levels are set at country, regional or global levels. Before producer organisations can apply for Fairtrade certification, they need to adhere to core requirements which reflect Fairtrade principles.

Fair for Life is a certification programme which covers the chains of custody from production to final brand holder, requiring fair working conditions at all stages. Although the certification focuses on social accountability and fair trade in agricultural, manufacturing and trading operations, the programme includes a separate [module on wild-collected products](#). This module includes criteria for working and labour conditions, social and environmental responsibility, together with Fair for Life FairTrade criteria. In order to obtain certification, operators must fulfil certain core criteria; 90% needs to be reached in the first year, 95% in the second and 100% in the third year. A FairTrade sales price above market prices ensures that collectors receive sufficient income. Additionally, buyers pay a FairTrade Development Premium on top of the sales price to allow for social and other development in the producer operation's community.

Comparison of certifications and programmes

These certifications and programmes are analysed regarding their possibilities on the sustainable supply and ecological aspects, as well as income improvement of wild-collected MAPs (Table 1). A distinction can be made between certifications or programmes which focus on sustainable supply and ecological aspects of wild-collected products (UEBT and organic) and those that focus on the working conditions and income improvement of collectors and producers (Fairtrade and Fair for Life). FairWild, however, combines these aspects; although compliance requires a substantial investment at first, it provides producers with benefits in terms of available future supplies, a price premium and market access.

UEBT and organic certification offer benefits in terms of sustainable management of resources, even though these programmes do not offer a guaranteed premium to collectors. Their benefits are in terms of guaranteeing future supply of wild-collected MAPs. Membership of UEBT and organic certification requires an investment, although organic certification may be less difficult to obtain. Wild-collected MAPs are often organic by default, as such, certification becomes a matter of proving this with audits.

Of the remaining certifications, Fairtrade certification is the least relevant to collectors. With some exceptions (e.g. baobab and marula), Fairtrade standards do not exist for wild-collected MAPs as these focus on producers / producer cooperatives instead of collectors of natural ingredients. As such, it is often impossible to obtain Fairtrade certification. Fair for Life certification has more potential, but has limited use in terms of sustainable management of natural resources.

Table 1 Certification standards and programmes and applicability for wild

Certification / programme	Sustainable supply and other ecological components	Income improvement
<i>FairWild</i>	Sustainable management and collection	FairWild Premium
<i>Union of Ethical BioTrade</i>	Conservation and sustainable use of biodiversity	Not specified but focus is on fair and equitable sharing of benefits
<i>Organic</i>	Minimising environmental impact of inputs	Usually involves a premium
<i>Fairtrade</i>	No specific focus, unless combined with other certifications	Fair Trade Premium / Price (standard)
<i>Fair for Life</i>	Monitoring of environmental aspects of collection	FairTrade sales price and development premium

Alternatively, collectors of wild MAPs can demonstrate that they apply sustainable collection practices without specific certifications, for example in documentation (e.g. well-documented best practices, standard operating procedures, evidence of sustainable resource management). As will be discussed in chapter 6, European buyers do not necessarily require certifications to consider sustainably wild-collected MAPs according to their sourcing policy.

5. Trends and developments for different segments

Sustainable wild-collection and ethical sourcing

The importance of sustainable sourcing in wild-collection is growing as a result of legal (Convention on Biodiversity), CSR and economic perspectives. Sustainability can be beneficial to companies in terms of supply (ensuring future availability) and marketing (premium, market access) and can be ensured with certification standards.

Sustainability of supply, in terms of quantity and quality (e.g. consistency in active content) is increasingly relevant to EU buyers of ingredients, especially when they need to make large investments in product development and documentation. Subsequently, European buyers are becoming more involved in the sustainable management of natural resources to secure supplies. This requires exporters to make their supply chains more transparent and take more responsibility to ensure sustainability of raw material production. These measures are especially relevant for wild-collected MAPs. Reduced availability of wild-collected materials is caused by encroaching cities and agricultural zones, less interest of young rural populations in collecting, retiring collectors, low prices and overharvesting.

In addition, there is increasing consumer awareness of the effects that purchasing behaviour has on social conditions in production countries and an increasing interest in the source of ingredients, resulting in an increased demand for ethically produced products. However, consumers do not always require certification of these products; e.g. cosmetic products with interesting stories on ethical sourcing that go beyond certifications are also popular.

Healthy and natural

Consumer demand for natural and healthy products is increasing. Often, natural products (including food ingredients) are seen as healthier alternatives to synthetic products, a view which companies increasingly exploit in marketing strategies. To respond to this trend, producers move away from chemical to natural ingredients. Companies across all segments are highlighting their use of natural ingredients, which can include certifications to formalise this 'naturalness'. This is of particular importance in cosmetics, food products and food supplements.

This trend is relevant for a range of "functionalities" required by industries; e.g. improving taste and smell (offering opportunities for MAPs or extracts to replace flavour additives and salt), safety and shelf-time (preservatives) and efficacy (active properties such as antioxidant, anti-ageing, medicinal properties etc.). It also relates to adequate preservation of taste, nutrients and vitamins in processed products.

Organic

Helped by an increase in demand for natural products and ingredients, the market for organic products is increasing as well. This trend is most relevant for food and cosmetics, but is also present in food supplements.

Moreover, some European herbal medicine companies (only) use organic ingredients to adhere to their company philosophy. Often organic products represent a small part of the overall market; however, this depends on the specific product. The most mature markets in the EU are Northwest European countries, such as Germany, the UK and the Nordic countries. The highest growth is observed in East European countries. For small producers of wild-collected MAPs, organic certification may be more difficult, depending on the origin of the ingredient. For example, if ingredients are collected from a wide geographical area or from tropical forests that are difficult to reach.

Safety

Safety of ingredients in these segments has always been important, but through various legislative and buyer requirements, safety has increasingly been placed at the forefront in these segments. In pharmaceutical legislation, efficacy and safety substantiation have been fully established. In the other segments, safety concerns of consumers and legislators are increasing.

Substantiation of claims

Product claims towards consumers are under increased scrutiny. For food, the EU harmonised the use of nutrition and health claims across the EU, which has led to many claims being rejected, negatively affecting the markets for these products. In terms of health products, efficacy and safety substantiation is fully established in pharmaceutical legislation, while for food supplements, claims for botanical ingredients have not yet been harmonised. Cosmetics legislation is also narrowing down on product claims. On the one hand, this offers opportunities to make use of such grey areas, while on the other hand it causes uncertainty to buyers and producers, negatively affecting innovation.

Vertical integration of supply chains - Responsibility for quality enforced along the chain

Decreasing margins in competitive markets, combined with increasing demands on safety and quality have prompted various European manufacturers to integrate their supply chain management in their processing operations and rationalise their value chains. This results in:

‘Middlemen’ (local traders, brokers/agents), with a limited value addition function are cut out of value chains as capacities in countries of origin increase

Manufacturers and retailers are generally shortening their chains and work with fewer preferred suppliers (importers and producers) in whose hands they place the responsibility for product quality.

A tighter control over the chain allows them to improve traceability, monitor product safety and quality and achieve process improvements. This also leads to the increasing adoption of quality management systems, which are discussed below.

Quality management – traceability

As a result of legislative and buyer requirements (e.g. certification schemes), quality management within value chains has become increasingly important to producers. Significant aspects needed for quality management are traceability and transparency. Following guidelines on harvesting and processing are of growing importance to access the European market. Suppliers who are able to offer full traceability to their buyers are at a competitive advantage. In this context, the adoption of verifiable/documented quality management systems become increasingly important for suppliers. Examples are the [British Retail Consortium \(BRC\)](#) for processing plants, the [International Food Standard \(IFS\)](#) and [ISO 22000](#). Be aware that especially for small DC exporters complying with these certifications is a costly process.

Shift in processing at origin

A shift in processing towards origin countries is observed, as producers in these countries are increasingly able to comply with strict requirements in the EU. At first, this trend was apparent for lower-value extracts and products, but recently further processed extracts are included as well. The European market is increasingly receptive to them and offers great opportunities for exporters from DCs.

Producers’ potential to process botanicals into extracts themselves depends on their ability to comply with EU requirements, as well as the complexity of the extraction process (see chapter 3). Some examples for the food industry are extracts used as food additives, such as essential oils as flavourings.

Companies look for differentiation

In mature EU markets, companies are increasingly trying to differentiate themselves from their competitors. This can be done in various ways. Relevant to ingredients, approaches are certification, including more specialty ingredients in products, adding functionalities to products or building the product's story. For example, cosmetic producers are increasingly including exotic antioxidant ingredients as consumer awareness of functional properties grows.

Overlap between product groups: Intermediate industry categories, such as food supplements and Cosmeceuticals are growing strongly. These products are marketed as “health products”, without having to deal with regulatory hurdles for pharmaceutical products. They contain active ingredients, but cannot make medicinal claims.

Technology (innovation/processing): To respond to global competition and signs of saturation, companies make use of innovations in technology. These innovations are aimed at improving performance, increasing efficiency, enhancing sustainability/yields of processing and to launch new and innovative products. In European countries, these technologies are continuously updated.

Marketing stories: Companies are exploiting marketing stories to differentiate themselves on the market as well. These can cover specific certification standards, functionality of the product but also the origin of the ingredient and benefits to local communities.

Supply constraints

For certain MAPs supply constraints exist in the European market. This can be the result of either increased global demand from other regions or decreased supply because of over exploitation in certain areas. An example for this is rosewood oil. The source of this essential oil, the rosewood tree, has been overexploited in Brazil, the main producing country. As a result, the oil is listed on CITES and the Brazilian government has banned exports of the product due to the deforestation of the trees. According to industry sources, only 10% of what was previously available is exported now. This opens up opportunities for sustainably harvested rosewood oil from other regions, such as Bolivia.

Industry consolidation and horizontal integration

EU retail and manufacturing sectors are consolidating, which in turn leads to consolidation at the processing and trade level, both between and within segments. While some processors now supply conventional and organic product lines to food, cosmetic and health product producers, others still only offer ingredients to a specific segment. This makes the landscape less clear and more difficult to find truly specialised companies. However, such diversified companies can also offer good market entry opportunities.

Larger players have more market power, enabling them to demand more services and lower prices from their suppliers, which smaller suppliers will have difficulty meeting. Larger players also strive to limit their suppliers to those that offer reliable (large) quantities and qualities. In contrast, many smaller processors remain and quantities in demand for many specific natural ingredients, as is the case for certain MAPs, are limited. Sourcing through smaller, specialised importers therefore remains vital to EU industries.

6. Potential European markets

As can be seen in section 1.2 and Figure 7, species covered in this study can be exported as raw material or as derivatives. The raw materials include MAPs, natural gums and resins, and oil seeds. These can be processed into (herbal) extracts, including saps, essential oils, oleoresins and vegetable oils. For a more complete overview of trade in these species, both raw materials and derivatives are included in this analysis.

Data on trade for these species consist of both wild-collected and cultivated products, as a distinction between the two is not made in international trade statistics. In addition, as species covered in this study often do not have a separate product group, traders have some 'room' in determining the classification of these species. Consequently, trade statistics on MAPs only include species that traders classified as MAPs. An analysis of trade in MAPs alone would therefore be too restrictive.

Thyme (*Thymus* spp.), for example, can be defined as an aromatic plant, but also as a spice (when dried).

Figure 7 Overview of raw materials and derivatives

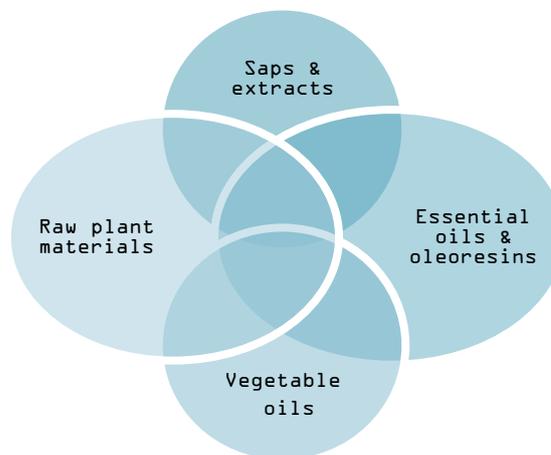


Table 2 Overview HS codes and Group Description

HS code (Harmonised System)	Commodity Group Description
1211	Plants and parts of plants, of a kind used primarily in pharmacy or perfumery, or for insecticidal, fungicidal or similar purposes, fresh or dried
1301.20	Gum Arabic
1301.90	Natural gums (excl. gum Arabic), resins, gum-resins & oleoresins
1302	Herbal extracts and vegetable saps; pectic substances, pectinates and pectates; agar-agar, carrageenan and other mucilages and thickeners, whether or not modified, derived from vegetable products
1515.90	Fixed vegetable fats & oils & their fractions, whether or not refined but not chemically modified
3201	Tanning extracts of vegetable origin (e.g. myrobalan extract, quebracho bark extract)
3301	Essential oils (terpeneless or not), including concretes and absolutes; resinoids; extracted oleoresins; concentrates of essential oils in fats, in fixed oils, in waxes or the like, obtained by enfleurage or maceration

6.1 European imports

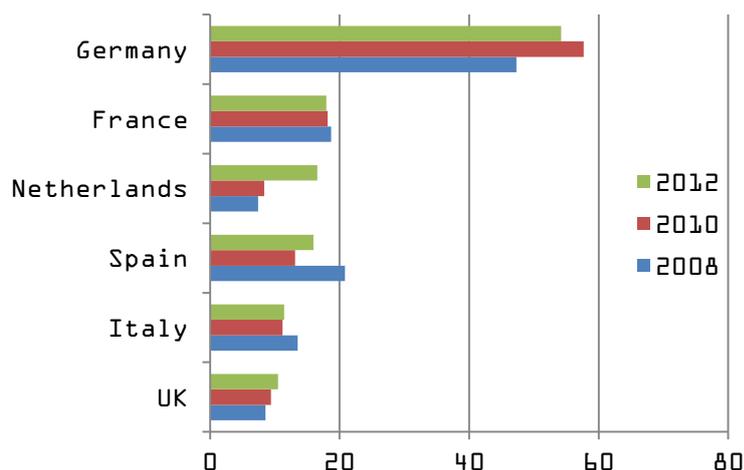
MAPs and extracts

As trade in MAPs and extracts is not further specified into particular species or whether the sources are cultivated or wild-collected, these trade flows provide the only indication of trade in these products. However, studies have shown that over 70% of trade volume in MAPs is sourced from wild collection. However, it is important to take into account that a substantial proportion of herbal medicine and plant processing companies have their own cultivation in hand, either locally or internationally. Furthermore, it

is estimated that most species traded internationally, between 80 and 90%, are obtained through wild-collection. Under 1,000 medicinal plant species are cultivated, with fewer than 400 on a commercial scale.

In 2012, total European imports of **MAPs** (raw materials) amounted to 175 thousand tonnes, representing a value of € 614 million. After a significant decrease in imports from 2008-2010 (6%), import levels recovered in 2012, to an overall decrease of less than 1%. In terms of value, on the other hand, imports showed a continuous and strong increase (5% per annum).

Figure 8 Leading European importers of MAPs, 2008-2012, in 1,000 tonnes



Source: Eurostat, 2013

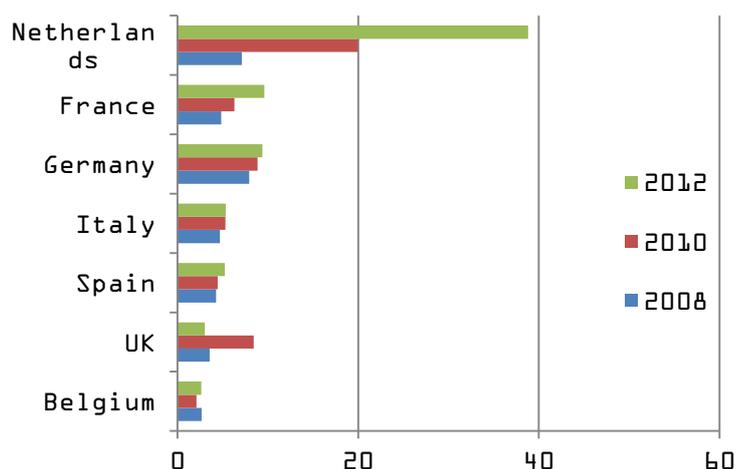
The largest European importers of MAPs are traders in Western Europe, such as the Netherlands, Germany and France (Figure 8). In addition, from 2008 to 2012, several Eastern European countries steeply increased imports of MAPs. However, as these markets represent a small share of the total European market, total imports are still much smaller when compared to other countries. Examples of these fast-growing importers are the Czech Republic and Hungary.

Imports of **extracts and saps** amounted to 84 thousand tonnes in 2012, representing a value of € 550 million, growing annually by over 16% from 2008-2012. This indicates a trend towards increasingly importing extracts instead of raw materials, which slightly decreased in the same period.

Value of total imports (5% annually) increased at a slower pace than in terms of volume (16% annually). This can be explained by increased competition and lowering prices of some cultivated extracts.

As can be seen in Figure 9, in 2012 leading European importers of saps and extract were again the largest traders (the Netherlands, Germany, France and the UK). Further examination of these data indicates that around 80% of these imports in 2012 consisted of liquorice extract, which is not exported by the countries covered in this study. Excluding this product and other large products¹ which are not relevant for these countries, results in data on unspecified vegetable saps and extracts, totalling 41,000 tonnes in 2012. Other main importers were Italy, Germany, Spain and the UK. Interesting cases are Denmark and the UK, which both increased imports substantially from 2008-2010 (930% and 160%, respectively), while from 2010-2012 imports decreased to a level lower than in 2008.

Figure 9 Leading European importers of saps and extracts, 2008-2012, in 1,000 tonnes



Source: Eurostat, 2013

¹ Saps and extracts of liquorice, opium and hops and vanilla oleoresin

Tanning extracts

Although European (EU+EFTA) imports of tanning extracts (volume) increased by 16% from 2008 to 2010, volume of imports from the entire review period decreased annually by 3%, to 42,000 tonnes worth € 78 million in 2012. Value of imports in the same period increased by 4%, indicating that import price increased.

Of the leading EU importer (Figure 10), only France and Spain increased imports in volume from 2008 to 2012 (+4% and +10%, respectively). Interestingly, Spain's imports in volume increased more than in value (+3%) indicating a lowering of import prices. The country's significantly increased imports in 2010 were the main cause of the increase in total EU imports of tanning extracts.

Essential oils

The EU and EFTA imported 84 thousand tonnes of essential oils in 2012, at € 1.2 billion. Imports in volume were stable from 2008-2012, but imports in value increased by 6% annually.

Most of leading importers of essential oils (Figure 11) decreased imports from 2010 to 2012, with the exception of Germany and Ireland.

The largest non-European suppliers in 2012, in terms of volume, were Brazil (24%), the USA (9%), China (8%) and India (5%). Intra-European trade in 2012 accounted for 42% of all imports, with the Netherlands, Germany, France and the UK as main European suppliers.

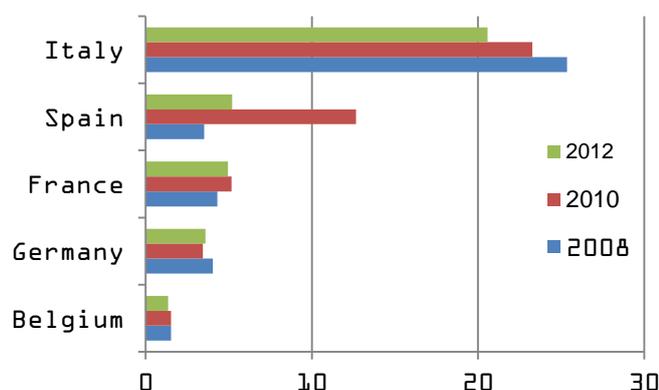
Natural gums and resins

European imports of natural gums and resins are divided into gum Arabic, one of the main products in the product group, and other natural gums and resins. In this section, this division has been included to demonstrate the trade in these two groups. The figures below (Figures 12 and 13) represent an overview of leading European importers of the products.

Total European imports (EU + EFTA) of natural gums, excluding gum Arabic, amounted to 52,700 tonnes in 2012, representing a value of € 118 million. Compared to 2008, this was an annual increase of over 3% in volume but over 13 % in value, indicating an increase in import price. This increased demand was higher than for gum Arabic, which grew by 1% annually (volume) to 69,000 tonnes worth € 128 million.

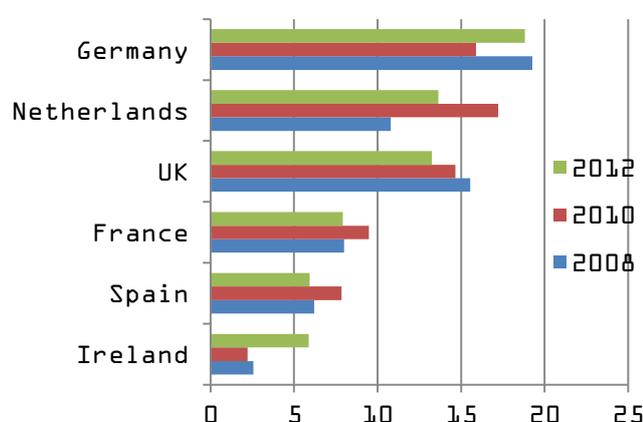
Gum Arabic cannot be produced in Europe, whereas the group of other natural gums and resins contains products that can be sourced from within Europe.

Figure 10 Leading European importers of tanning extracts, 2008-2012, in 1,000 tonnes

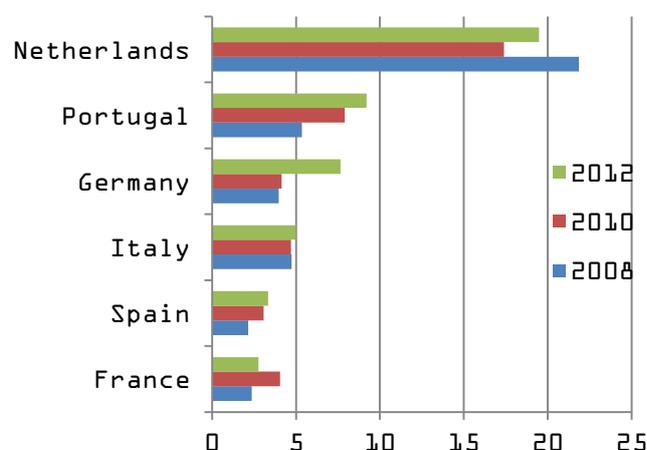


Source: Eurostat, 2013

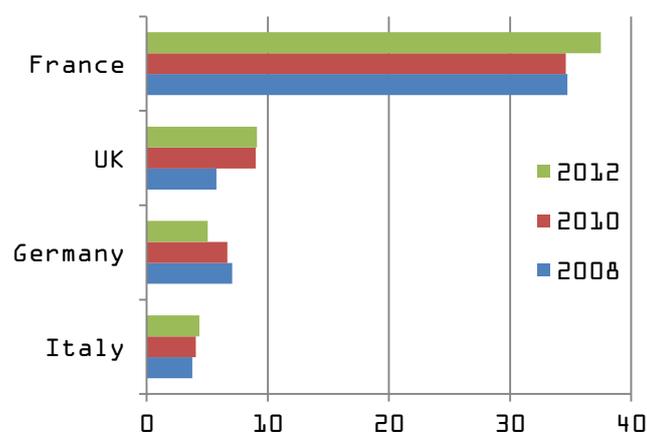
Figure 11 Leading European importers of essential oils, 2008-2012, in 1,000 tonnes



Source: Eurostat, 2013

Figure 12 Leading European importers of natural gums and resins, 2008-2012, in 1,000 tonnes

Source: Eurostat, 2013

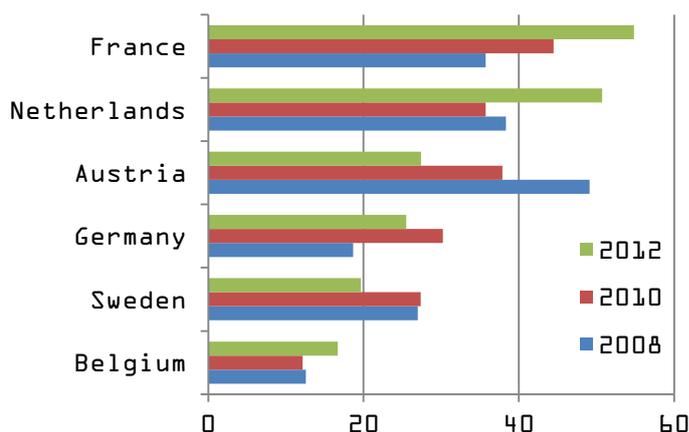
Figure 13 Leading European importers of gum Arabic, 2008-2012, in 1,000 tonnes

Source: Eurostat, 2013

Fixed vegetable fats

Fixed vegetable fats, 'not elsewhere specified', increased by almost 2% in volume and 5% in value between 2008 and 2012, amounting to 256,000 tonnes / € 488 million in 2012. It is important to note that European exporters play a major role in trade in this product group.

Of the main importers (Figure 14), highest increases in imports from 2008-2012 came from France (+11%), Germany (+8%) and the Netherlands (+7%). On the other hand, both Austria and Italy significantly decreased imports in volume by -14% each. Main non-European suppliers were Ghana, India and China.

Figure 14 Leading European importers of fixed vegetable fats, 2008-2012, in 1,000 tonnes

Source: Eurostat, 2013

Trading partners of target countries

In the following table (Table 3), an overview is presented of total exports of the six countries covered in this study. Additionally, major trading partners have been identified, in terms of share of total exports. This is divided into European and other trading partners, to indicate the countries' prevalence of trading with European countries. As can be expected, most trade occurs with regional partners. It can be seen that Bolivia, Ecuador and Vietnam trade to a larger extent with countries outside of Europe. Trading partners of Peru, Tanzania and Mozambique are more evenly spread among regional and European partners. Switzerland, the Netherlands and Germany are common trade partners for the countries in this study.

Table 3 Main current trading partners of target countries

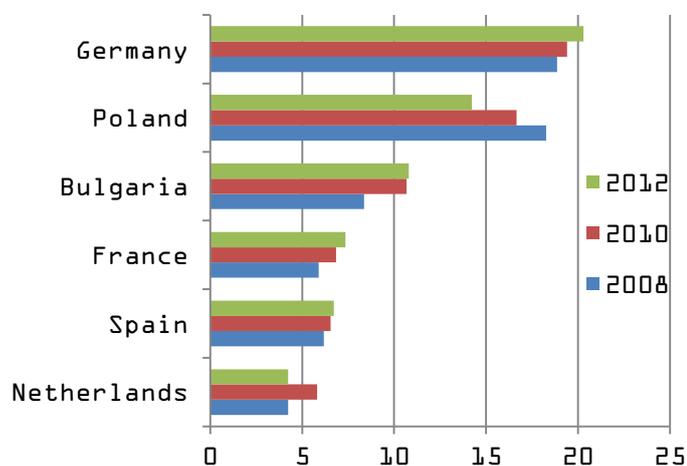
Countries in study	Total exports; value (2012)	Major European trading partners (% of total exports 2012)	Other major trading partners (% of total exports 2012)
Bolivia	€ 9.2 million	Belgium (3%) Switzerland (2%) UK (1%) Spain (1%)	Brazil (31%) Argentina (18%) USA (15%) Peru (5%)
Peru	€ 35.7 million	Switzerland (11%) Germany (4%) Spain (4%) Italy (2%)	China (17%) USA (14%) Canada (7%) Japan (6%)
Ecuador	€ 18.5 million	Italy (2%) Spain (2%) Germany (2%) The Netherlands (1%)	USA (45%) Chile (8%) Peru (8%) Colombia (4%)
United Republic of Tanzania	€ 4.3 million	Switzerland (14%) Germany (5%) Belgium (3%) The Netherlands (2%)	South Africa (18%) China (9%) India (9%) Kenya (6%)
Mozambique	€ 2.7 million	The Netherlands (27%) UK (5%) Italy (3%) Switzerland (3%)	South Africa (19%) China (18%) India (4%) Zimbabwe (2%)
Vietnam	€ 69.6 million	Germany (3%) UK (2%) The Netherlands (2%) France (2%)	USA (18%) China (12%) Japan (11%) Republic of Korea (5%)

Source: ITC, 2013

6.2 European exports

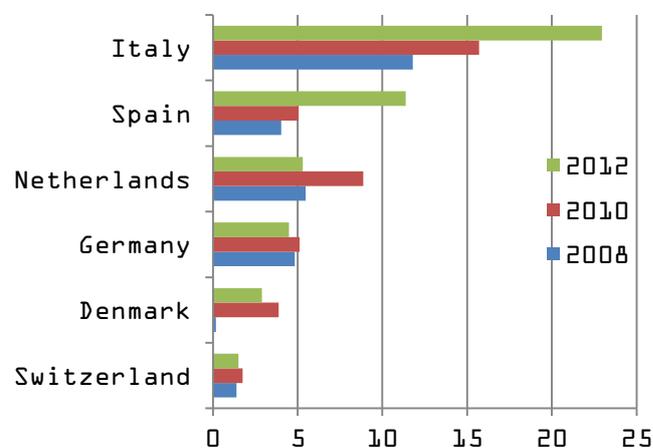
MAPs and extracts

Figure 15 Leading European exporters of raw material, 2008-2012, in 1,000 tonnes



Source: Eurostat, 2013

Figure 16 Leading European exporters of extracts, 2008-2012, in 1,000 tonnes



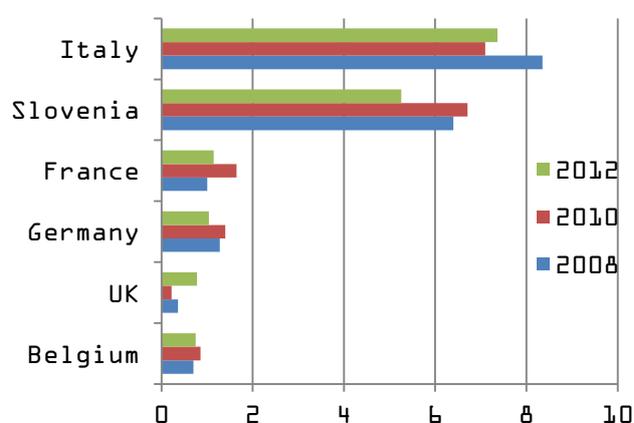
Source: Eurostat, 2013

Exports of **MAPs** (raw material) amounted to 80,000 tonnes and € 372 million in 2012. Compared to 2008, this was a minor increase in volume and a 3% increase in value. With the exception of Poland and the Netherlands, exports from the leading exporters (Figure 15), increased (in volume terms) from 2008 to 2012.

Similar to developments in imports, exports of **extracts** increased at a much higher extent than raw materials, by 11% in volume and 8% in value, amounting to 60,000 tonnes and € 521 million in 2012. Increased exports are mainly attributed to extracts not elsewhere specified. Main destinations of European exports in 2012 were France, Iran, Germany and Spain.

Tanning extracts

Figure 17 Leading European exporters of tanning extracts, 2008-2012, in 1,000 tonnes



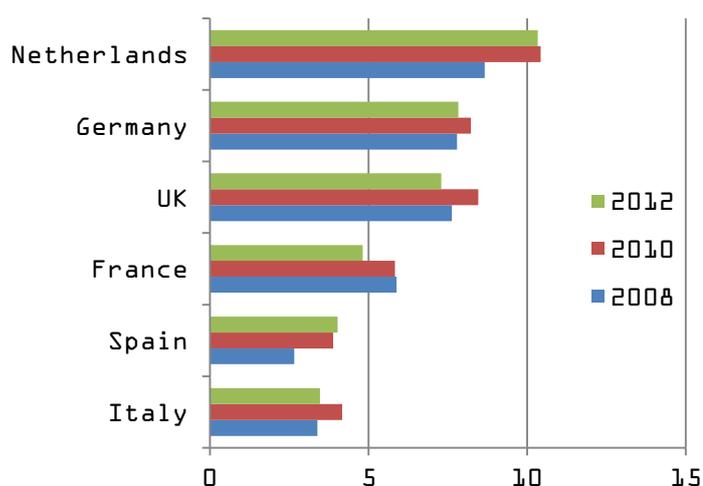
Source: Eurostat, 2013

European exports of tanning extracts decreased in volume (-2%) and increased in value (+3%) from 2008 to 2012, amounting to 17,000 tonnes and € 59 million in 2012. Leading exporters, accounting for 72% of total exporters, were Italy and Slovenia (Figure 17). In addition, these countries export lower-value extracts, while Belgium and France export high-value extracts. Large annual increases of export volume originate in the UK (+21%) and Spain (+33%), with exports growing much stronger than the EU and EFTA average. Destinations of European tanning extracts in 2012 were Italy, France, Germany and the US.

Essential oils

During 2008-2012, European exports grew by 1.3% in terms of volume and 5.9% in terms of value, reaching 47,000 tonnes worth € 840 million in 2012. Leading exporters (Figure 18) are both producers and re-exporters of essential oils. These countries accounted for 80% of exports in volume. Their exports were relatively stable from 2008 to 2012, with most growth coming from the Netherlands, Spain, Belgium, Bulgaria and Ireland. Major decreases in export volume were from France and Switzerland. Most essential oil exports are destined to other European countries and the USA. Emerging destinations include Japan, China, Singapore and Turkey, with growing manufacturing industries.

Figure 18 Leading European exporters of essential oils, 2008-2012, in 1,000 tonnes



Source: Eurostat, 2013

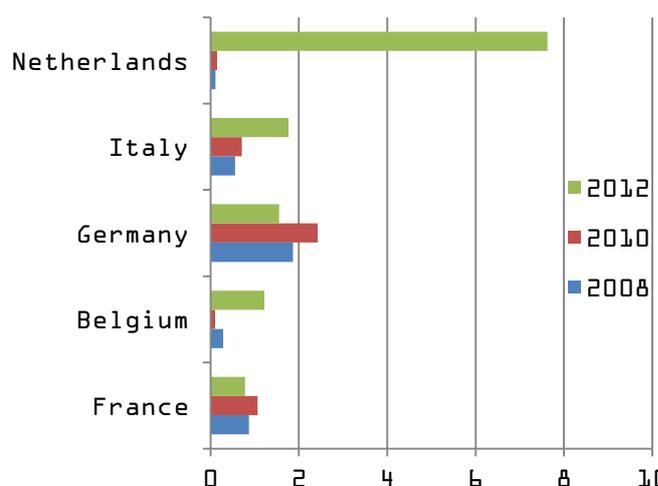
Natural gums and resins

Exports of **natural gums and resins** increased by 33% in volume and 16% in value from 2008 to 2012, resulting in 14,000 tonnes and € 54 million in 2012. Compared to total imports, around 26% are re-exports. Interestingly, volume of exports by the Netherlands increased by 187% in this time frame,

making the country the largest exporter in 2012. Other leading exporters in 2012 were Germany, France, Belgium and Italy (Figure 19). The main destination in 2012 was Portugal, to which exports increased by 320% (volume) from 2010 to 2012. Fast-growing export destinations were the United Arab Emirates, Ireland, Egypt and Turkey.

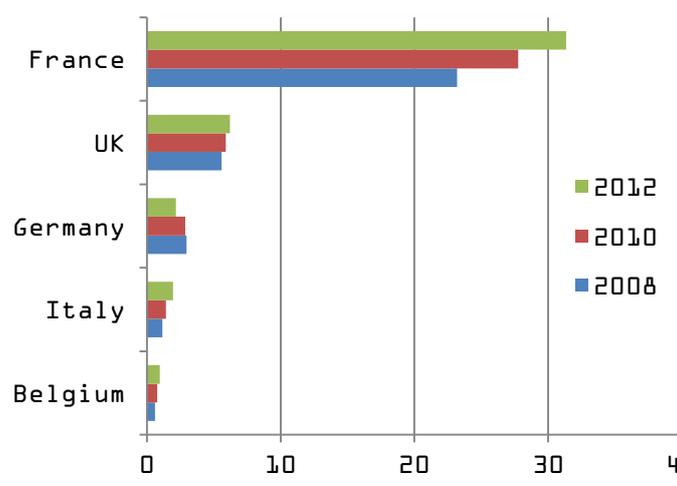
Exports of **gum Arabic** increased by 6% in volume and 9 % in value, to 43,000 tonnes and € 132 million in 2012. As the largest importer of gum Arabic, it is not unexpected that France is also the main exporter of gum Arabic, accounting for 72% of total volume of exports. Main destinations in 2012 were the US and China, as well as several European countries.

Figure 19 Leading European exporters of natural gums and resins, 2008-2012, in 1,000 tonnes



Source: Eurostat, 2013

Figure 20 Leading European exporters of gum Arabic, 2008-2012, in 1,000 tonnes

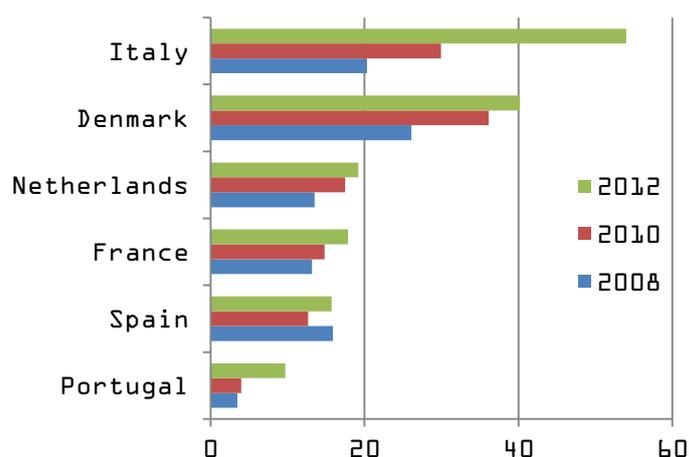


Source: Eurostat, 2013

Fixed vegetable fats

European exports of fixed vegetable fats saw significant growth from 2008 to 2012, of 11% in volume and 12% in value. In total, exports amounted to 181,000 tonnes and € 431 million in 2012, with Italy and Denmark as the largest exporters. Main export destinations in 2012 were European countries (Germany, France, Poland and Spain), the US and Korea.

Figure 21 Leading European exporters of fixed vegetable fats, 2008-2012, in 1,000 tonnes



Source: Eurostat, 2013

6.3 Promising EU export markets

Based on the analyses in sections 6.1 and 6.2, an overview of most promising European export markets is given below. Moreover, these markets are described regarding imports, production and exports of MAPs and the segments they are used in.

Germany:

Germany is the largest European importer of MAPs and extracts, with a large extraction and trading sector. Moreover, it is a leading market, producer and exporter of essential oils. In general, German buyers have strict specification requirements and value sustainability and organic certification in MAPs. Demand for herbal medicine is strong. It is the second largest EU producer of cosmetics products and the country is known as being the most advanced EU market for natural cosmetics. Germany is also the largest vegetable oil consumer.

France:

France is the EU's largest pharmaceutical and cosmetic producer, as well as being important in the global flavour industry. As a result, it is the second largest EU importer of MAPs and a main importer of extracts and essential oils (largest in terms of value). In addition, France is the market entry point for most gum Arabic in Europe. Even though the country has a large processing industry and is the largest European producer of essential oils, it is increasingly importing saps and extracts instead of raw materials. Moreover, regarding essential oils, France is one of the leading EU countries importing from DCs.

UK:

Both the natural cosmetics market and industry in the UK are expanding quickly. It is one of the largest European pharmaceutical markets and has a strong herbal medicine sector. Combined with its extraction industry, make the country an important MAP buyer. Compared to other countries, the UK has a relatively stronger focus on tropical MAPs outside of traditional Western medicine. In addition to being a main producer and exporter of essential oils, the country is the EU's third largest importer of essential oils, and the second largest importer of essential oils from DCs. Finally, the UK represents a major market for thickeners.

The Netherlands:

The Netherlands is a major European re-exporter of MAPs, mainly vegetable oils, extracts and essential oils. As such, it is a viable option to export these product groups to the Netherlands. The country is the second largest EU importer of essential oils and oleoresins, with a large part sourced from DCs. It has an important role in trade in the largest vegetable oils, for which it functions as a trade and refining hub. For smaller vegetable oils, other countries such as Italy, France, the UK and Belgium have a larger role.

The Netherlands has a limited and mature cosmetics market, as well as a decreasing cosmetics industry. At the same time, herbal remedies are becoming increasingly popular, with a focus on traditional western herbal medicine and homeopathy. On this market, domestic producers have a strong position, with larger businesses being mostly foreign owned.

Italy:

Italy is a leading market for MAPs, but mainly for MAPs that are traditionally available in Italy. It has a large extraction and trading industry for MAPs, but is increasingly importing saps and extracts instead of raw materials. Compared to other Western European countries, it is a smaller importer of essential oils, with a small but growing share from DCs. The country is the fourth major producer and exporter of essential oils in the EU.

In terms of markets, Italy is an important pharmaceutical market with international players and a sizeable processing industry for natural ingredients for pharmaceuticals. Moreover, its cosmetics market is the third biggest in Europe and consists almost exclusively of SME companies, resulting in a very fragmented industry.

Spain:

Spain is a producer of several MAPs, a major exporter of saps and extracts and an important producer of essential oils. Most import potential for MAPs and essential oils stems from tropical species that are not available in Spain and Europe. Imports of essential oils from DCs make up more than half of total essential oils imports. Essential oils produced in Spain consist mainly of citrus varieties. The country has a large pharmaceutical and cosmetics industry, although smaller than France, Germany, Italy and the UK, with a good international reputation for cosmetics.

Belgium:

Belgium is a leading EU distributor in the global pharmaceutical industry and MAPs. Compared to other, larger, West European countries, it is a modest importer and exporter of essential oils, with low local production. In imports of essential oils, DCs play a smaller role than in imports of other countries. Production of cosmetics is limited in Belgium.

Poland:

As an important MAPs producer and the largest market for MAPs in Central and Eastern Europe, most opportunities in Poland exist for tropical species or supplies outside of the Polish growing season. It has the largest pharmaceutical market in Central and Eastern Europe and plays an important role in production and trade of natural ingredients and final products. The country is a traditional market for herbal medicines and a large share of its pharmaceutical market consists of self-medication products.

6.4 European buyer perspective

European buyers indicated several points of interest regarding wild-collected MAPs. Aspects such as sustainability, supply availability, price, certifications and marketing stories are very different compared to cultivated raw materials.

- European buyers indicated a great interest in **sourcing wild-collected MAPs**. Their quality was seen as higher than their cultivated counterparts. Also, they indicated the marketing potential of wild-collected MAPs. However, buyers also mentioned that there was a limited range of wild-collected MAPs which are available at sufficient volumes on the market.
- **Sustainability** also plays a role in cultivated MAPs, with a focus on soil quality (which influences raw material quality). In wild-collected varieties, sustainability is important to ensure future supply security of specific MAPs. European buyers value sustainability in wild-collected MAPs and have included it in their sourcing policies. As buyers do not always have the resources to check sustainable collection of MAPs, they often rely on instruments such as third party certification, sending questionnaires to collectors or working with local control bodies. Problems in ensuring sustainable supplies stem from cultural differences between European buyer and collectors, as well as a lack of understanding of what sustainable collection entails due to insufficient research.
- Not all **standards and certifications** which are used for cultivated species are available for wild-collected varieties as well. For wild-collected MAPs, certifications that focus on sustainable collection are most important, according to European buyers. Of these, particularly FairWild is of increasing interest among European buyers and their customers. Additionally, organic certification is used for various species. Fairtrade certification is more difficult, as standards do not focus specifically on collectors and very few standards exist for wild-collected MAPs (e.g. baobab and marula).
- Especially for cosmetic manufacturers, the **marketing story** of wild-collected ingredients is important. These marketing stories revolve around the benefits to the local collectors community, available pictures to visualise the story and information on the value chain. For example, if, aside from collection of natural ingredients, further processing steps (e.g. processing raw materials into essential oils or extracts) also take place in the country of origin, this can add to the story. Certifications can provide strong backing for such marketing stories. The marketing story is most important to demonstrate to end consumers that companies are achieving a positive impact. This can increase consumers' willingness to pay for sustainably collected wild-collected MAPs, which is often higher priced than cultivated species.

7. Opportunities and Threats

Based on the information provided in the previous chapters, various opportunities and threats have been identified for small producer organisations. These general opportunities and threats are listed in the table below. They range from market components, such as changing trends and requirements in the European market, to issues related to the supply, such as availability, sustainable collection and value addition. For the priority species (chapter 8), more specific opportunities and threats are provided.

Table 4 Opportunities and threats for small producer organisations

Opportunities	Threats
Growing markets: increased demand for wild-collected ingredients especially for cosmetics and health segments.	Short-lived trends: especially in cosmetic products, demand for specific MAPs can change substantially as a result of changes in trends.
Sustainability: for wild-collection especially, sustainability is a major issue and opportunity to add value to products or facilitate market access.	Unreliable supply: limitations in supply quantity can be the result of unsustainable collection and fewer collectors as younger generations have a limited interest in wild collection. Wild-collected species can also differ in quality, whereas industry buyers need a constant quality and quantity.
Value addition at origin: there are increasing opportunities for value-added products, in terms of processing botanicals into essential oils or extracts, for developing countries (section 1.2 and 1.4). Value addition is of particular interest for simple extracts (e.g. essential oils) with low safety risks, and those which need to be processed close to harvesting.	Technological improvements: Technological improvements to increase or improve processing at origin might be out of reach for small producer organisations, in terms of capital and skilled labour. This can become a significant disadvantage compared to European or other competitors, who have made these improvements.
Certifications: specific certifications exist for wild-collected botanicals (chapter 4). Examples are FairWild and Fair for Life, which has a module for wild collection operations. These certifications can improve transparency in the value chain.	Complying with strict (non-)legislative requirements: both legislation and increasingly strict buyer requirements are a main threat for collectors and small producers (chapter 4). These include EU legislation, compliance with certifications from internationally recognised sources to improve traceability in the value chain, as well as requirements for development of innovative natural ingredients for the various sectors.
Marketing stories: interesting marketing stories on the collection of botanicals and community involvement are of particular importance for specialty products and ingredients in food and cosmetic segments.	Limited awareness of new origins: among importers there is a limited awareness of new origins and less established wild-collected MAPs.
Specialty segments: specialty segments (quality, innovation, certified) offer market opportunities for small exporters of wild-collected MAPs. The markets for these products outperform general markets, products often carry a premium and they are traded in lower volumes.	Vertical & horizontal integration: Manufacturers and retailers are generally working with a more limited number of preferred suppliers. Additionally, industry consolidation leads to increasingly large companies, with higher volume requirements, often higher and company specific requirements as well as more limited knowledge of products and processes. As such, it is difficult for small producer organisations to enter these markets.
Healthy and natural: make use of the increasing consumer trend towards healthy and natural ingredients for food, cosmetics and health.	Competitors: Other countries or regions can offer the same MAPs or extracts, compare for example Bolivia, Ecuador and Peru in this study. Depending on the origin, these countries might

	offer a competitive advantage over the countries covered in this analysis. Moreover, the increasing demand for wild-collected ingredients can raise competitiveness and prices.
<p>New market segments/product groups: Marketing ingredients towards new product groups such as industry crossovers and new markets for MAPs and extracts offer opportunities for small producer organisations. These segments can be more open to less established ingredients (see chapter 3).</p>	<p>Cultivation: cultivation of species can pose a threat to wild-collected MAPs, as producers of cultivated species can more easily control quantity of supplies and often offer species at a lower price. However, not all species are suitable for cultivation. For example, industry sources indicated that cultivated açai fruits have a lower quality than wild-collected fruits.</p>
<p>Supply restrictions: for certain species, such as rosewood oil, there are restrictions in global supply as they have been overexploited in certain regions. If these species are collected sustainably from other countries, these offer a good opportunity to offer them on the European market.</p>	

8. Priority list

To create a priority list with wild-collected MAPs from the six countries in this study, lists of available species were collected per country/region. A compilation of these lists can be found in Annex II. From this list, a pre-selection was made based on the potential of livelihood enhancement and economic potential, as judged by industry experts. The following criteria were used to determine the social, environmental and economic feasibility of interventions for specific wild-collected MAPs and origin countries:

Marketing criteria: e.g. scale of production, market readiness, competition, product standards, and certification potential.

Ecological criteria: e.g. availability, sustainability of supply, resource management, certification (potential).

Socio-economic criteria: e.g. local benefits, value addition potential, fair labour conditions.

Technological criteria: e.g. (adherence to) processing and quality requirements, traceability and availability of human resources/access to technology.

Certain pre-selected species were eventually not selected for the final priority list as further research showed they had too limited economic potential in the European market, which was the case for *Ampelopsis cantoniensis* and *Cinnamomum loureirii* (Cassia bark) from Vietnam. In the case of *Opuntia ficus-indica* (prickly pear cactus) from Bolivia, this species is cultivated to such an extent that wild-collected sources would be unable to compete in price and quantity. *Quillaja saponaria* was excluded as there was limited supply available from the South American countries covered in this report; highest availability is present in Chile.

The resulting list of priority species is provided in Table 5. The priority list was further researched for their potential in cosmetics, health and food segments, for which several databases were consulted. As such, some of the selected priority species are quite established in the European market across different segments, while others have a more narrow market use, and others are currently not (or even hardly) used, but have a good potential in the market.

[Cosing](#) is the European Commission database with information on cosmetic substances and ingredients, lists under their INCI names. This database was used to determine whether MAPs could be used in cosmetic products in the EU.

For use in medicinal products in the EU, ingredients need to be registered in the [European Pharmacopoeia](#). Additionally, a search was done in [Herbmed](#), a database by the American Botanical Council specifically for herbal medicine. This database provides information on traditional use, clinical trials and filed patents for specific species. Traditional use is based on specific historical or cultural practices, including organised systems such as Traditional Chinese Medicine practice. Clinical trials offer an evaluation of the safety and effectiveness of herbal formulations by monitoring their effects on large groups of people. This information should be used as an indication only, as it is not updated frequently. European countries also provide lists on which ingredients are allowed in food supplements. These lists were used to determine the potential for wild-collected MAPs in food supplements.

Finally, [Novel Food Regulation](#) is an indication as to whether species are allowed for food use (chapter 4). Food ingredients that have not been used in the EU before 15 May 1997 are considered novel foods and novel food ingredients. As such, these foods or ingredients need authorisation by the EU Commission for which scientific information and safety assessment reports need to be presented. MAPs that do not have authorisation for use on the EU market have limited potential in the food segment, as Novel Food application is deemed beyond the scope of SME producers. If species have been used before 15 May 1997, such as the soap bark tree on the priority list, they do not require authorisation as they are not novel foods.

Please note that Table 5 included below provides a preliminary selection of priority sources are listed according to their potential in cosmetic, health and food segments.

Table 5 Priority list of wild-collected MAPs

Region/ Country	Botanical name	Common name	Cosing	European Pharma- copoeia	Herbmed ²	Food supplement	Novel Food
Latin America: Bolivia (BOL), Ecuador (ECU) and Peru (PER)							
BOL, PER	<i>Myroxylon balsamum</i>	Bálsamo de Tolú	Yes	Yes	Not listed	Yes	No
BOL, PER	<i>Uncaria tomentosa</i>	Cat's Claw	Yes	Yes ³	3 Traditional Use 5 clinical trials 4 patents	Yes	Food suppl.
BOL, ECU, PER	<i>Genipa americana</i>	Jagua	Yes	No	Not listed	No	No
BOL, ECU, PER	<i>Croton lechleri</i>	Dragon's blood	Yes	No	Not listed	No	No
BOL, ECU, PER	<i>Oenocarpus bataua</i>	Bataua	Yes	No	Not listed	No	No
BOL, PER	<i>Bertholletia excelsa</i>	Brazil nut	Yes	No	Not listed	No	Allowed
BOL, PER	<i>Aniba rosaeodora</i>	Rosewood	Yes	No	Not listed	No	No
ECU	<i>Euterpe oleracea</i>	Açaí	Yes	No	To be added	Yes	Allowed
PER, BO	<i>Tabebuia serratifolia</i>	Yellow Lapacho	Yes	No	Not listed	No	No
PER	<i>Krameria lappacea</i>	Peruvian Rhatany	Yes	No	Not listed	Yes	No
East Africa: Mozambique (MOZ) and Tanzania (TAN)							
MOZ, TAN	<i>Prunus africana</i>	Red Stinkwood	Yes	Yes ²	Not listed	Yes	No
MOZ, TAN	<i>Adansonia digitata</i>	Baobab	Yes	No	Not listed	Yes	Allowed
MOZ, TAN	<i>Kigelia africana</i>	Sausage tree	Yes	No	Not listed	No	No
MOZ, TAN	<i>Ximenia americana</i>	Ximenia	Yes	No	Not listed	No	No
MOZ, TAN	<i>Sclerocarya birrea</i>	Marula	Yes	No	Not listed	No	Allowed
MOZ	<i>Balanites aegyptiaca</i>	Desert date tree	Yes	No	Not listed	No	No
TAN	<i>Moringa oleifera</i>	Moringa	Yes	No	Not listed	No	Only leaves
Asia							
Vietnam	<i>Litsea cubeba</i>	May Chang	Yes	No	Not listed	No	No
	<i>Illicium verum</i>	Star anise	Yes	Yes	To be added	Yes	Not novel
	<i>Melaleuca leucadendra</i>	Cajeput tree	Yes	No	Not listed	Yes	No

The rest of this chapter discusses the priority species in depth. It is divided into the product definition, potential market segments (cosmetics, food and health), relevant trends, EU demand for the species, a price indication or development where available, opportunities and threats for SME producers of the species, focusing on sustainability, closing of with several recommendations for SME producers.

² Data from Herbmed is added where publically available. Listings on the remaining species will be added in the second version.

³ For this species, the [European Medicine Agency](#) has assigned a rapporteur to develop a Community herbal monograph.

MYROXYLON BALSAMUM

Product definition

Myroxylon is a genus of Central American and South American trees. The tree is well known in the western world as the source for Peru balsam and Tolu balsam.

**Myroxylon
balsamum tree**



Tolu balsam is obtained from the trunk of *Myroxylon balsamum* var. *balsamum*. The tree is found in northern South America, predominately in Colombia, Peru and Venezuela and in certain areas of Argentina, Paraguay and Bolivia. Main production of balsam occurs in Colombia, predominately from wild-collection. Wild-availability is very limited, also as a result of the low yield per tree of 3kg per year. Cultivation processes are available, though they are hardly taking place. In addition, the level of standardization is very limited, due to the different ecosystems in which the tree thrives.

Tolu balsam is closely related, but not similar to Peru balsam, which is obtained from the trunk of *Myroxylon balsamum* var. *pereirae*. Tolu balsam differs in its odour profile, being considered less sweet and fresher than Balsam of Peru.

Tolu balsam is tapped through incisions made in the trunk of the tree. It is a yellow to brown gum, semi fluid to solid, which exudates from the tree. After the balsam is dried, it becomes hard and brittle. It is soluble in solvents, such as alcohol, sodium hydroxide solution and chloroform. It consists of resin (up to 80%) and has an aromatic vanilla-like taste and odour. The balsam contains free cinnamic (15%) and benzoic acid (40%). The balsam contains an essential oil (1.5-7%) and a small amount of vanillin (0.05%). The essential oil is extracted by using steam or direct distillation. Tolu absolute and resinoids are obtained with solvent extraction. Raw materials available in Europe are currently not traceable to the origin, and it is often not clear whether synthetic or nature-identical balsams are used.

Tolu balsam



Segments

The main use for Tolu balsam in Europe is in cosmetics, particularly in perfumery, where it is used as a vehicle for other fragrance compounds, and as traditional fragrance material with cinnamon and vanilla notes. As the balsam has allergic properties, the European Commission has set a maximum concentration of Tolu balsam extracts and distillates as a fragrance in cosmetic products of 1.5%. More information can be obtained at [IFRA](http://www.ifra.org), the International Fragrance Association.

Tolu balsam also has a long traditional use in human and veterinary medicine and is included in the European Pharmacopoeia for use in pharmaceuticals. For pharmaceutical use, producers need to comply with quality requirements for pharmaceuticals, e.g. Good Agricultural and Collection Practices (GACP), and Good Manufacturing Practices for processed pharmaceutical ingredients (GMP). In pharmaceuticals, it is used most commonly for cough syrups, but it also has use in fighting infections (parasitic, bacterial, and fungal) and to treat certain skin afflictions. Lastly, Tolu balsam can be used in food supplements (amongst others in Belgium, France and Italy).

To supply these segments, and especially the pharmaceutical sector, a steady, sustainable supply of quality raw material is crucial.

Trends

- Raw materials are increasingly processed into extracts or oils in the country of origin.
- There is an increasing consumer demand for natural and ethically sourced cosmetics and supplements, which could strengthen the use of natural ingredients compared to synthetic alternatives.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories.
- Although product registration and authorisation processes make pharmaceutical manufacturers less respondent to consumer trends, European manufacturers are interested in using less common ingredients which are permitted on the market, such as Tolu Balsam.

EU demand

According to industry sources, Tolu balsam is a traditional, well-established product on the European market. The product is predominately imported as raw materials, which is then processed into different extracts in Europe, mostly in Germany. Other major buyers are France and Italy. From the perspective of final users, it is interesting to look at [fragrances using Tolu balsam](#).

There are very few processors currently working with natural balsam. The majority of Tolu balsam on the market is synthesised by European companies, most notably in Germany. Examples include [Oskar Tropitsch](#), which, next to synthetics, also offers natural balsams and [Sigma-Aldrich](#) in the United States. Still, industry sources expressed an interest in natural varieties of the balsam to be used in (certified) natural products.

Price and price developments

Producers can add value to the product by processing Tolu balsam to oils or extracts. However, even as a raw material the balsam is still a highly priced product.

Tolu balsam is priced lower than Peru balsam. In 2008 it was priced at € 13,480 per tonne (€ 13.48 per kg).

Prices for ingredients such as Tolu balsam fluctuate widely, and prices are rarely stable. The main influences as such are based on a number of factors including:

- Quality – crop concentration, active ingredients, standardization
- Economic – current supply and demand
- Certification – organic, FairWild, etc
- Point in the supply chain – different prices and margins apply throughout the various trade channels.

Price structures and developments cannot be transparent without traceability in place.

Opportunities and threats

Opportunities;

- There is demand for natural Tolu balsam as an alternative to the synthetic balsams (if sustainable supply can be demonstrated).
- To add value, Tolu balsam can be processed into derivatives.
- Another value addition option is through certification. As a wild product, FairTrade certification is not available, but FairWild and organic certification do offer opportunities. This certification can also facilitate market access to producers by showing sustainable collection practices to potential buyers. This will show buyers that future availability is better secured.
- Tolu balsam's long history of use, its exotic origin and potential benefits to local livelihoods, can contribute to a marketing story by producers. This is especially relevant for the cosmetics sector.

Threats:

- Most of the balsam used in Europe is Peru balsam, with El Salvador as the main exporter.
- Natural Tolu balsam competes with synthetic substitutes. In some applications, such as in cosmetics, it can be replaced with cheaper natural alternatives such as essential oils of vanilla or cinnamon.
- Wild availability of Tolu balsam is limited. With a small supply base, many companies opt for synthetic alternatives to ensure availability of raw materials..

Recommendations when supporting the Tolu Balsam chain

Support needs of producers:

As the product already has a position on the market, the recommendations for Tolu balsam focus mostly on the production side:

- Producers need to identify the exact species and its relation to European standards (e.g. compared to Pharmacopeia etc.) through herbarium vouchers confirmed by competent authorities.
- A feasibility based on SME/community capacities is needed to shed light into where producers can compete (cosmetics, pharmaceuticals) and whether they could export themselves or should be linked to exporters. As requirements on product quality standards are lower for cosmetic ingredients, it might be more feasible to target initially cosmetic ingredient buyers.

- Further processing, especially according to GMP standards, will probably be outside of the scope of SMEs and collector's communities. Building such capacities at a sustainable scale might not be feasible considering limited raw material availability. Partnerships with exporters and processors in the region could be an option.

Support needs to ensure sustainability:

- Ensuring sustainable supplies is vital to compete with Peru balsam and synthetic alternatives. Resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers.
- Certification of sustainability practices through FairWild can help to support the credibility of sustainability schemes to buyers and can add to the marketing story when targeting the cosmetics sector.
- Domestication of the species is a strategy which can increase the supply of raw material, but only if a feasibility research shows expected market potential merits the high costs of this process.

GENIPA AMERICANA

Product definition

Jagua (*Genipa americana*) is a plant which grows in tropical rainforests in Latin America, from Mexico to Argentina, including Bolivia, Peru and Ecuador. In the Amazon, the trees flower from May to September and give fruits from September to April. Parts of the tree are useful for colorants, syrups, pharmaceuticals and tanning extracts, among others.

The tree produces large green fruits, which are covered with a thick pericarp. They contain around 300 seeds surrounded in pulp. Trees of 15-20 years old yield 400-600 fruits per harvest, they can be harvested several times per year. Wild availability of the tree is good, but damage to trees during harvest can be an issue.

The fruit of the tree is used to produce a natural colorant (blue and black), which is extracted from the fruit pulp, using a mixture of water and ethanol. Indigenous people in Latin America use the colorant for skin decoration and as an insect repellent.

Most research focuses on the use of Jagua as a colouring material. Research into [other applications](#) of the species remains limited, but shows that its main compound genipin has properties which could be of use for medicinal products (insulin stimulant, anti-angionic) and in cosmetics (anti-inflammatory, anti-bacterial).

Segments

The colouring extract leaves a blue stain which remains for approximately 10-15 days before fading and/or washing off. At the same time, natural colouring materials have the tendency to be photosensitive. To make it desirable for use in cosmetics, processing is needed to improve this. Currently, Jagua extracts are registered for use in cosmetics as extracts with additional colouring properties, not as a colorant. To be used as a colorant in cosmetics, the ingredient needs to be listed (Annex IV of the Cosmetics Directive). To be listed, further safety evaluation is required by the Scientific Committee on Consumer Products. In addition, as chemical compounds, they would fall under REACH. Both processes require extremely detailed technical dossiers, which are beyond the scope of SMEs.

When registered, the colorant can be used in cosmetic products including shampoos, soaps, make-up, mascara, perfumes, toothpaste, mouth wash, cleansers etc. Though it could potentially also be used by the food industry, the process for approval is complicated in Europe, and product requirements are different.

As Jagua is not listed in the European Pharmacopoeia, it is not allowed for use in pharmaceuticals. Nor is it permitted for use in food supplements. As such, these segments do not currently offer opportunities for jagua.

Jagua fruit



Jagua tree



Trends

- To meet increased demand for natural cosmetics, manufacturers look for natural alternatives for ingredients. However, usage of chemical colorants in formulations generally fall well within the thresholds to still market cosmetic products as natural. As such, only producers aiming for 100% natural will opt for natural colorants. This lowers the incentives for the cosmetic industry to invest in product development of new natural colorants.
- Cosmetic producers are looking for ways to differentiate their products on the market. As products with interesting stories are becoming increasingly popular among European consumers, European companies are looking for ingredients with (traceable, documented) community and environmental benefits

EU demand

Natural colorants are often imported into the EU, as both climate and costs make production outside of the EU more efficient. For use in cosmetics, these are imported in raw form or as semi-processed colouring matter. For new colorants, such as Jagua, it is necessary to work with strong partners in Europe (processors, distributors), to work on registration and product development, to improve user friendliness (simple, flexible use), and stability.

Several food colour manufacturers and processors in Europe also provide colours to other sectors, such as cosmetic and pharmaceutical industries, and are also actively involved in trading. These include Chr. Hansen (Denmark), Arômes de Bretagne (France) and Quest (the Netherlands). Alban Muller (France) is the only company in Europe that offers Genipa blue (Tinctami line for use in cosmetics).

To determine interest in the product for other cosmetic applications (e.g. anti-inflammatory, anti-bacterial), more information is required. However, companies in Europe are generally interested in well-documented (efficacy, safety) products with such properties for use in skincare products.

Price and price developments

No information available.

Opportunities and threats

Opportunities:

- Next to colouring, Jagua has additional properties; in Cosing, the European cosmetic ingredients registry, it is listed as a skin conditioner, and a masking and perfuming agent.
- In general, blue colour is difficult to achieve and there aren't many natural sources. Once it is allowed for use as a colouring agent, competition does exist, but is expected to be limited.
- Jagua has an interesting history of use. Certifications can add to the competitive advantage, but are not essential (see chapter 4).

Threats:

- Until the product is allowed as colouring agent, cosmetic producers will not be willing to use Jagua in their products. Authorisation requires significant investments beyond the scope of SMEs.
- Other, more commonly used, natural colorants include natural indigo, spirulina (an algae), and *Gardenia jasminoides*. Interesting to note is that *Gardenia* is used as anti-aging cosmetics based on its genipin content.
- Certified natural cosmetics can contain small proportions of synthetic ingredients and usage levels of colorants in formulations fall well within these parameters.
- Although wild-availability of *Genipa americana* is good, unsustainable harvest practices can damage trees.

Recommendations when supporting the jagua chain

Support needs of producers:

Among the selected species, market entry for Jagua will be most complicated due to its novelty on the European market.

- For SME producers, registration as colorant will not be possible. Producers in Colombia and Brazil are further progressed in this respect (processing techniques, technical and safety data), and it might

be more prudent to supply these producers with raw materials or extracts. To do so, species identification is required, to ensure it matches the raw material used by existing producers.

- In the meantime, the feasibility of other applications of the extract should be determined. To do so, research is needed on safety and efficacy, beyond traditional use. Local universities can help build such portfolios. The most interesting option would be to look at the cosmetics market where claim substantiation is often less complicated.
- Extraction might be outside of the scope of SMEs and collector's communities. Also, building such capacities at a sustainable scale might not be feasible considering the limited current market. Partnerships with exporters/processors in the region could be an option.
- Considering the novelty of these applications, SMEs/communities should most likely be linked to exporters.

Support needs to ensure sustainability:

- Although sustainability issues are limited (only the fruits are harvested), establishing sustainable collection practices can ensure this situation continues in the future. Standard operating procedures and training are needed to ensure harvesting takes place in a way that does not damage the tree.
- Certification of sustainable collection practices through FairWild, can support marketing efforts in the cosmetics sector as it can help build up a story around conservation and local benefits.
- These efforts should only be considered when positive market opportunities have been identified.

EUTERPE OLERACEA

Product definition

The açai palm, *Euterpe oleracea*, grows in the Amazon forests of Northern South America. In particular, it is found in periodically flooded areas in Brazil and in coastal swamps of Colombia and Ecuador. Its related species, *E. precatoria*, grows on firm ground and is found in Peru and Bolivia as well. Açai is a clonal plant, which means that multiple shoots originate from an underground rhizome. This makes the palm tree suitable for heart of palm collection, aside from the collection of açai berries.

The palms produce berries twice a year; they are most abundant in the summer season. In the winter or rain season, fewer berries are available and are often consumed domestically. After collection of the berries, they must be processed within 24-48 hours as they are highly perishable. Around 80% of total weight of the fruit is attributed to its seeds. From the fruits, juices and freeze-dried fruit pulp powder are produced, as well as açai oil which is cold-pressed from the seeds.

Termed a superfruit, açai berries, and especially the seeds, contain high levels of antioxidant substances. The fruits also have high anthocyanin content, as well as being a source for calcium, vitamins and dietary fibres, while being low in sugar. They also contain omega 6 and 9 fatty acids (oleic, palmitic and linoleic acids), in a similar ratio to olive oil. Moreover, the fruits have a nearly perfect amino acid balance and essential trace mineral content.

Heart of palm, a vegetable that is also called palmito, is harvested from the inner core of the palm tree, for which stems are felled. As açai palms have several stems, sustainable collection does not harm the tree and has even been shown to increase the tree's fruit production in the remaining stems. Heart of palm needs to be processed within four to five days after collection.

Segments

Açai berries have most potential in food and cosmetic segments. Under the Novel Food regulation, açai (*Euterpe oleracea*) is allowed as a food ingredient. Due to its nutritional value, it is marketed as a superfood and commonly used in beverages, such as fruit juices and smoothies. As a food supplement (powder), it is used to support the immune system and improve overall health. For example, in France and Belgium, açai fruits are allowed for use in food supplements. In Italy, the seeds are also allowed as a source of antioxidants, support digestive system and help the metabolism of lipids and carbohydrates.

Euterpe oleracea
tree



Açai berries



Source: Rare

In addition, açai fruit juices and extracts are listed under INCI as having skin and hair conditioning properties, with dried pulp powder having abrasive properties. The extract made from açai palm heart has emollient and skin conditioning properties as well. These extracts are commonly used in skin care products, such as moisturisers, face or body creams. As they contain antioxidants, they have most potential in anti-aging products, where antioxidants are marketed to combat free radicals and thus reduce signs of aging.

As açai is not listed in the European Pharmacopoeia, it does not have a herbal medicine or medicinal ingredient. However, the fruit is used in food supplements.

Trends

- In Europe, where demand for natural and healthy ingredients in food and cosmetic segments is continually rising, açai fruit extracts are in high demand.
- In food segments, along with its antioxidant activities, açai fruit extracts are used for their vitamin A and C content and find a large market in fruit juices.
- In cosmetic products, the antioxidant properties of açai extract are driving demand for its use as a cosmetic ingredient. In this segment, consumers are increasingly aware of antioxidants and their potential health benefits. Their rise in popularity stems from food products where they are heavily promoted.
- Antioxidants are particularly used in cosmetic products that combat (the signs of) aging, for which there is an increasing demand.

EU demand

Açai fruit is mostly transported in the form of powder, or frozen/pasteurised pulp to Japan, Europe and the US. Industry sources indicate that açai fruits are also available from plantations, but that the quality of these fruits is substantially lower when compared to wild-collected fruits (i.e. lower concentrations of minerals and vitamins).

Demand for açai fruit extracts in both food and cosmetic segments is increasing. Various companies in both segments use açai as an ingredient. For example, [Bioten Cosmetics](#) in cosmetics, [Naturya](#) in food supplements (açai powder), [Sublime Food](#) in food ingredients and [The Berry Company](#).

Palmito, palm heart, is principally exported to France and the USA. The main source of palmito on the global market is Brazil.

Price and price developments

Açai berries are often traded on local markets and prices can vary per season and per day. As supplies of wild-collected açai berries are much larger in summer, prices tend to be lower than in the relative scarcity in winter. In Brazil the fruit is cultivated and minimum and maximum prices for the fruits have been recorded. From 2008 to 2011, the average price for açai fruits increased by 70% to € 0.90 per kg. In the same period, minimum prices have remained stable at € 0.33 whereas maximum prices increased by 60% to € 1.75 per kg. This price increase is an indication for the berry's rising popularity. It can be expected that wild-collected açai berries are traded at higher prices.

Opportunities and threats

Opportunities:

- As fruits need to be processed close to harvesting, this opens up opportunities for value addition in the country of origin. This is particularly true for the production of açai frozen pulp, as this is a relative uncomplicated process.
- Açai berries have a high marketing potential, which is already exploited extensively in European markets. As a result, consumers are well aware of the fruit's benefits. This marketing potential relates to the fruit's exotic origin, antioxidant levels and other nutritional values.
- A value addition option for açai is through certification. Although often aimed at small producer organisations, a Fairtrade standard exists for açai berries. Additionally, FairWild and organic certification offer opportunities. FairWild certification also facilitates market access to producers by showing sustainable collection practices to potential buyers.
- The economic benefits to local communities and its ability to help to protect the Amazon rainforest contribute to the marketing story of wild-collected açai berries. Sustainably-collected berries can be

marketed to preserve the rainforest by combatting the deforestation associated with plantations of açai palms.

Threats:

- Especially in Brazil, açai palms are cultivated and compete with wild-collected berries. Cultivated fruits offer benefits compared to wild-collected berries in terms of cost price, logistics (e.g. processing close to harvesting) and stable supply quantity.
- Competition from other regions in the Amazon is strong on the market for wild-collected açai fruits.

Recommendations when supporting the açai chain

Support needs of producers:

Açai products are already very popular in food and cosmetic segments, which SME producers can benefit from. As such, SME producers should focus on the supply side of açai fruits, as well as the competition with cultivated açai fruits.

- When working with processors and producer organisations, collectors need to ensure that they can transport the fruits to the processor within 24 hours to prevent quality degradation of the berries. Commonly, fruits are collected in the morning and processed later in the day.
- SME producers should carry out a feasibility study to determine their capacity to produce açai extracts or their potential to develop this capacity. If not, partnerships with exporters and processors in the region could be an option.
- In competing with cultivated açai berries, focus on the marketing story of wild-collected açai. This includes its potential to protect and preserve the Amazon rainforest, whereas plantations are leading to deforestation.
- Determine the potential to obtain Fairtrade, FairWild or organic certification. This can add to the marketing story of the fruit and consequently increase its marketing potential.

Support needs to ensure sustainability:

- Currently, there are limited sustainability issues for wild-collected açai berries. The main issue in sustainability of these fruits is concerned with deforestation as a result of cultivated açai berries.
- In the management of açai palm trees, SME producers need to ensure this does not lead to deforestation, as has occurred in various locations in the Amazon. Collectors are involved in enrichment (e.g. planting or relocating seedlings), cleaning and stem cutting.

UNCARIA TOMENTOSA

Product definition

Uncaria tomentosa, Cat's Claw, is indigenous to Central and northern South America, including Bolivia and with Peru as its main source. It is a large, woody vine that grows in the Amazonian forest. A related species, *U. guianensis*, which has a different ratio of oxindole alkaloids, is often used as an adulterant, as it is easier to find and grows lower to the ground. The plant's bark, and sometimes its roots, are wild-harvested and traded. Due to overharvesting, wild-availability and supplies from Peru are reported to have decreased.

Cat's Claw



Source: Kcweb.com

Vines are harvested when they are 8 years old or older (to be sufficiently wide to remove bark), and should be cut at least 20 cm (8 inches) from the ground, to allow for regeneration. In general, the vine is stripped off its bark in the field and the inner stem is discarded. After the bark is collected, it is dried and packaged in waterproof packaging to avoid mould.

The active components of Cat's Claw are prepared with decoctions or in the form of extracts or capsules. Cat's Claw contains several phytochemicals, including alkaloids, anthraquinones, sterols, triterpenes, glycosides, polyphenols and tannins. Of these, oxindole alkaloids are the most studied components.

Cat's Claw liquid extract



Source: Gaia herbs

Segments

Cat's Claw has most potential as an ingredient in the health segment. The bark is allowed in herbal medicine. It is a Novel Food and under the Novel Food

Regulation it is only allowed for use as a food supplement in Europe. This is also the segment where the largest quantities are used Cat's Claw It is most common in products to support or stimulate the immune system, often combined with species such as *Echinacea purpurea*. Supplements containing Cat's Claw are available in the form of standardised capsules or concentrated tablets, bark for tea or liquid concentrates.

Although Cat's Claw is used in cosmetics, and listed in Cosing as having skin conditioning properties, industry sources indicate that its use in the cosmetic segment remains limited. However, current studies on the plant's anti-inflammatory properties can lead to future opportunities for its use in skin care products and cosmeceuticals.

Trends

- Health products (herbal medicine, food supplements) that help improve the immune system are increasingly popular to prevent illnesses and ensure general health and well-being. This is further supported by Europe's aging population and rising health care costs. Increasing awareness of the link between the immune system, stress, energy and sleep supports year-round consumption, instead of during flu season.
- Demand for botanical supplements continues to grow based on the consumer believe that these are healthier and safer options for long-term use than synthetic alternatives.
- Raw materials, are increasingly processed into extracts or oils in the country of origin.
- Future growth of Cat's Claw as an ingredient could be negatively affected by the limited scientific research and marketing of the product (Herbmed, 2013). Some industry sources indicate that the product is over its top in Europe.
- Supplement producers are looking for ways to differentiate their products on the market. A strong dossier of traditional use at the origin is important to communicate to consumers.
- Consumers are increasingly concerned with traceability and sustainability of botanicals not produced in Europe. This is increasing the demand for ethically and sustainably produced botanicals.

EU demand

The market for Cat's Claw is relatively big and well developed, especially in Spain, Germany, Italy, the Benelux and France, as the product is well established in supplement markets throughout Western Europe. Spain plays a relatively important role in importing Cat's Claw. Most exports of Cat's Claw are still traded as semi-processed materials. As a result of stringent legislation for health products, potential for exporting finished products by SMEs is limited.

Price and price developments

In 2010, cat's claw bark powder from Peru was traded at \$ 9.50 per kg.

Opportunities and threats

Opportunities:

- The market for immune support products is one of the most dynamic in Europe, which is supporting the demand for immune stimulating ingredients such as Cat's Claw.
- Cat's Claw has an established market in Europe. Most potential for the product is when exporters or small producer organisations can position it as a specialty health product or ingredient, with a specific story (origin, community benefits, sustainability).
- It is increasingly common that Cat's Claw is exported to Europe in the form of extracts.
- Another value addition option is in certification. As a wild product, Fair-trade certification is not available, but FairWild and organic certification offer opportunities. Especially FairWild can offer benefits considering overharvesting affecting wild-availability in more accessible areas.
- The skin care market offers opportunities when marketing the anti-inflammatory properties of Cat's Claw. Moreover, this market offers strong opportunities to market its long history of use, exotic origin and potential benefits to local livelihoods.

Threats:

- Due to the remoteness of some of the collection areas, transportation costs can be high, making it difficult for remotely located SMEs and collection communities to compete with better connected areas.

- There have been indications of oversupply in Peru in recent years, resulting in a decline of available Cat's Claw in the [Peruvian rainforest](#). This is a threat of future supply limitations.
- As the market for Cat's Claw is well-established, market entry barriers can be substantial (volumes, certification, and quality).
- Limited scientific research in comparison to other immune stimulants (green tea, ginger, turmeric Echinacea, ginseng, eleutherococcus) can limit demand growth.
- As the plant is indigenous to various countries in Central and northern South America, future competition can increase. For example, Bolivian stakeholders have also identified the plant as a commercially viable wild product. Moreover, to cultivation in forest setting is taking place in Peru.

Recommendations when supporting the Cat's Claw chain

Support needs of producers:

Although Cat's Claw is well-established on the market, demand is not dynamic. Therefore, for both the production and market sides, the following recommendations can be made:

- Producers need to identify, verify and document the exact species and its relation to European standards (e.g. compared to Pharmacopeia etc.) through herbarium vouchers confirmed by competent authorities. This is especially pertinent considering the extent of adulteration in the Cat's Claw trade.
- A feasibility based on SME/community capacities is needed to shed light into whether they could export themselves or should be linked to exporters.
- Further processing, especially according to GMP standards, will probably be outside of the scope of SMEs and collector's communities. Building such capacities at a sustainable scale might not be feasible considering limited raw material availability. Partnerships with exporters and processors in the region could be an option.
- Improved marketing stories can be used to position the product. Cat's Claw's long traditional use of more than 2,000 years by indigenous populations of the Amazon, local community benefits, sustainable collection and fair benefits can contribute to this marketing story.
- Furthermore, to improve uptake, research will be needed on safety and efficacy, beyond traditional use. Local universities can help build such portfolios. An interesting option would be to look at the cosmetics market where claim substantiation is often less complicated.
- To support these efforts, improved transparency and traceability of the ingredient is important as well as certification and documentation thereof.

Support needs to ensure sustainability:

Cat's Claw is under threat of overharvesting, which has led to reduced wild-availability in Peru. As such, to ensure sustainability the following steps need to be taken:

- Cat's Claw needs to be harvested sustainably. In particular, vines need to be cut at least 20 cm from the ground to allow for regeneration and ensure future supplies of Cat's Claw.
- Additionally, resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers.

CROTON LECHLERI

Product definition

Croton lechleri, the most common tree source for Dragon's blood, is found in Amazon regions of Bolivia, Brazil, Colombia, Ecuador and Peru. The tree grows between 100m and 2,500m above sea-level and is frequently found along streams and rivers. The density of the tree ranges from 3 to 15 trees per hectare, but can also be found in densities of up to 150 trees per hectare.

The trunk of the tree is cut to obtain a red, viscous latex (resin) called Dragon's blood or Sangre de Drago. It is used by indigenous people to treat various diseases, including digestive disorders, respiratory problems and skin infections and is used for wound treatment. Other species in the *Croton* genus produce this latex, but *Croton lechleri* is the best known and widespread.

***Croton lechleri* trees**



Source: [ThisHerbalLife.com](#)

When trees are 6-7 years old (reaching a diameter of around 25 cm at breast height), commercial latex harvesting can start. Trees commonly yield 2-3 litres of latex. However, as the tree bark does not regenerate, continual tapping for large volumes of dragon's blood is not possible. Instead, it is common practice for tappers to fell the entire tree to increased yields. The species regenerates easily and grows quite fast. As such, reports mention that felling the trees and planting new trees from the seeds is more sustainable and allows seedlings growing around the base of mother trees to reach maturity ([HerbalGram, 2011](#)).

In regional health food stores and medicinal plant markets in Bolivia, Colombia, Ecuador and Peru, a range of latex-based products are sold, such as pills, liquid extracts, soaps and shampoos.

Segments

The main use of dragon's blood is in medicine. This segment represents the strongest driver for the export of dragon's blood. A component of dragon's blood is used in producing a medicinal product (crofelemer). For this medicine, a purified version of the latex is used.

The second segment with potential for dragon's blood is the cosmetic segment, however, opportunities are much lower when compared to the medicinal segment. Under its INCI name *Croton lechleri* resin extract, the ingredient is listed as having skin conditioning properties. It is used in skin care products, such as skin cream, moisturisers and body cream and is marketed as reducing sagging and increasing skin elasticity. Several researches have demonstrated anti-inflammatory and wound-healing activities of Dragon's Blood ([Gupta, 2008](#)) which implies a potential in cosmeceuticals. Anti-inflammatory properties are useful in anti-aging cosmetic products.

It is not listed as a food supplement or authorised novel food ingredient. As such, dragon's blood is not allowed for use in food products in Europe.

Trends

- The EU markets for supplements, including digestive health, is vibrant.
- Cosmeceuticals are in growing demand. These medicinal-cosmetics hybrids tackle issues such as skin damage, but cannot make health claims (without complying with strict pharmaceutical requirements).
- There is an increasing consumer demand for natural and ethically sourced cosmetics.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories, and evocative names.
- For cosmetics products, especially in skin care, there is a continually strong demand for anti-aging products.

EU demand

Dragon's blood for use in pharmaceutical and cosmetic products is exported as a crude resin. Raw materials available in Europe are currently not traceable to the origin, and it is often not clear which species or genus is used. According to industry sources, this makes ensuring quality and quality consistency very difficult.

The pharmaceutical industry was active in product development of the latex and several components that are extracted from it. In 2012, this has led to an FDA approval in the US of a drug which uses a chemical derived from dragon's blood and is used for treating diarrhoea associated with anti-HIV drugs. This drug is called [Fulyzaq](#) (crofelemer) and was initially developed by [Napo Pharmaceuticals](#), which was licensed to [Salix pharmaceuticals](#) in the US and EU and the Swiss company [Glenmark Pharmaceuticals](#) in emerging markets.

Croton lechleri distribution



Source: IUCN, 2000

Dragon's blood powder and resin



Several processors in Europe, such as [Cobiosa](#) in Spain and [Botanica](#) in Switzerland process dragon's blood resin into an extract as a cosmetic ingredient for use in skin and lip care products. Companies using the extract are active in higher price segments, such as [Rodial](#).

Price and price developments

Dragon's blood is available, but at a high price. As such, it is used in extracts at limited concentrations (5-10% to trade-off between efficacy and price).

Opportunities and threats

Opportunities:

- If demand for crofelemer increases, demand for the latex will also increase, both in the USA and in Europe. For pharmaceutical ingredients the product quality required is much higher than for cosmetics.
- According to industry sources, the FDA has recently approved dragon's blood in a medicinal product to treat traveller's diarrhoea. As such, they expect that this will lead to approvals in various other countries as well, resulting in additional export opportunities for SME producers of dragon's blood.
- Extensive research has been conducted on the composition and pharmaceutical uses of Dragon's Blood ([Rain-tree.com, 2002](#)) which could also support building a safety and efficacy dossier for supplements.
- The tree offers opportunities for sustainable management, including reforestation of felled trees. In the past, pharmaceutical company Shaman has already encouraged reforestation of the trees, replanting 3-5 trees when a tree was felled.
- Value addition is possible in terms of certification. FairWild and organic certification offer opportunities.

Threats:

- Cultivated dragon's blood can compete more easily on a stable supply quantity and price than wild-collected dragon's blood. Plantations in the western Amazon Basin, have a higher tree density than when found in the wild (100-400 trees per hectare).
- It is difficult to supply wild-collected dragon's blood at a consistent quality.

Recommendations when supporting the Dragon's Blood chain

Support needs of producers:

- A feasibility based on SME/community capacities is needed to shed light into where producers can compete (cosmetics or pharmaceuticals / EU or USA) and whether they could export themselves or should be linked to exporters. As requirements on product quality standards are lower for cosmetic ingredients, it might be more feasible to initially target cosmetic ingredient buyers.
- Further processing, especially according to GMP standards, will probably be outside of the scope of SMEs and collector's communities. Building such capacities at a sustainable scale might not be feasible. Partnerships with processors in the region could be an option.
- At a later stage, and at a sector level, research is needed on safety and efficacy, beyond traditional use, for use of the product in supplements. Local universities can help build such portfolios.

Support needs to ensure sustainability:

- For wild-collectors of dragon's blood, it is essential to properly define the tree source to make it possible to ensure traceability throughout the value chain starting at the raw material.
- Sustainable management of dragon's blood is needed, including reforestation of felled trees.
- Resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers.
- SME producers need to determine their potential for organic or FairWild certification to ensure sustainable collection and as an opportunity for value addition, for example in terms of a premium for their product.

ADANSONIA DIGITATA

Product definition

The baobab tree, *Adansonia digitata*, grows in a wide area in Sub-Saharan Africa, including Tanzania and Mozambique. The tree's trunk is very wide, in which fibres store water for the dry season. Baobab fruits are green and have a similar shape as cocoa fruits. Both fruits and leaves are collected, with most use for fruits. Leaves can be collected during the wet season, while fruits should be collected during the dry season to prevent rotting. Mature trees (over 60 years old) produce between 160 and 250 fruits (more than 30kg). Fruit pulp in ripe fruit is naturally dehydrated and after collection little or no additional drying is required.

Harvesting season in southern Africa is from May to September. Once harvested, the fruits are transported to processing sites where seeds and fruit pulp are separated. Fruit weight consists of shell (45-48%), seeds (38-40%) and pulp (12-16.5%).

- Fruit pulp contains protein (2-3%), carbohydrates (74-76%) including soluble dietary fibres (25%), and insoluble dietary fibres (25%), various minerals (e.g. potassium, magnesium and zinc), and high levels of vitamin C and calcium. The pulp can be processed into an extract which is high in antioxidant activity.
- Baobab seed oil contains oleic (30-42%), linoleic (20-35%) and palmitic (18-30%) fatty acids, with smaller concentrations of stearic, α linoleic and myristic fatty acids.
- The tree's (young) leaves have high levels essential amino acids and proteins and have high antioxidant activity.

Segments

Different baobab products have potential in cosmetics and food, most notably seed oil and pulp (extract). As baobab is not registered in the European Pharmacopoeia, it cannot be used in pharmaceuticals. For use in cosmetics, extracts from seeds, pulp and leaves have potential (see Table 6). Final products include moisturisers, creams, body oil and body wash products.

Table 6 Baobab derivatives and properties in cosmetics

Baobab derivative	Seed oil/extract	Leaf extract	(Fruit) Pulp extract
Properties	Emollient, skin and hair conditioning	Skin conditioning	Emollient, humectant and skin conditioning
Cosmetic segments	Skin care (anti-aging) and hair care	Skin care	Skin care

As the seed oil is high in omega fatty acids, and demand for it is increasing in Europe, baobab seed oil has good potential in anti-aging products. Moreover, its hair conditioning properties make it an interesting ingredient for the hair care segment. However, as baobab is still a niche product and has a relatively high price, opportunities in this segment would be limited to exclusive hair care products.

The dried fruit pulp powder has potential in food when produced under hygienic conditions. As of 2008, the dried pulp is allowed for use as a food ingredient in Europe. Due to its high nutritional value and antioxidant properties, manufacturers are especially interested to use it to fortify food, or to use it in food supplements. Furthermore, its soluble dietary fibres have prebiotic effects. Baobab fruit pulp is allowed to be used in food supplement in several European countries (e.g. in Belgium, France and Italy), to support overall health, immune system and digestive health. Additionally, since the dried pulp is water-soluble, it can be used to fortify various beverages (fermented milk drinks, smoothies, soft drinks).

Baobab distribution map



Source: "The uses of the Baobab in Africa", G.E.

Baobab tree



Source: BMS-Travellers

Trends

- In both the food and cosmetic segments, the popularity of natural ingredients is rising.
- There is an increased consumer awareness and interest in antioxidants and omega fatty acids in cosmetic and food products.
- For cosmetics products, especially in skin care, there is a continuous strong demand for ingredients which help combat the signs of aging.
- In the food segment, there is a rising trend for natural and healthy supplements. This is the result of a combination of an aging population and an increased awareness of health and prevention of illnesses.

EU demand

Baobab fruits are harvested by rural communities. After sorting and grading, they are sold to processors. These process the fruits into fruit pulp powder and seed oil for exports, and fruit juice and syrup for local markets. When baobab fruit pulp has been (properly) mechanically processed into powder in the country of origin, it can be sold directly in Europe. Baobab seed oil is pressed in the country of origin and exported as crude oil to Europe, where it can be further processed, using deodorisation and ultra-filtration.

Many European companies are now developing and promoting products based on baobab, both as an ingredient and in final products. As an ingredient, pulp powder and oil are easy to preserve and trade and can be found through specialised traders such as [Martin Bauer](#), [Galke](#) and [Earthoil](#). In addition, demonstrating the popularity of baobab, companies exist that have specialised in baobab derivatives (e.g. [Biomega](#)) and have named their company after this African tree, such as [Baomix](#) and [Baobab Fruit Company](#), making use of the iconic image of the tree.

Several companies in health segments offer baobab products, specifically fruit pulp powder, as food supplements. Examples include [Organic Burst](#) and [Minvita](#). A specifically interesting example is [Specchiasol](#), from Italy, which markets probiotic with baobab fruit fibre.

Moreover, in Europe it is mostly smaller cosmetics companies which apply baobab, while in North America larger brands such as [Eli's](#) apply baobab in their products.

Price and price developments

In 2010, baobab seed oil was priced at US\$ 29 (€ 21) per kg of conventional oil and US\$ 43.50 (€ 32) per kg of organic oil. Additionally, also in 2010, [Fairtrade International](#) added baobab to its fresh fruit category. Together with marula, small producers (and collectors) who have been certified receive an extra 50 % over the average market price per kg which is sold to processors or Fairtrade certified buyers.

Opportunities and threats

Opportunities:

- As becomes clear from various examples, such as in [Senegal](#) and [Zimbabwe](#), there are good opportunities for local value addition, in terms of low processing requirements and Fairtrade certification. A Fairtrade standard exists for wild-collected baobab fruits.
- Additionally, demonstrating sustainable wild collection and the mythical status of the tree can contribute to the marketing story of baobab.
- Different products with different applications can be collected and have potential in various segments (leave and seeds for cosmetics, fruit pulp for food (supplements)). As such, SME producers can optimise the yield of baobab trees in various seasons.
- In the food and health segments, baobab fruits have been successfully marketed as a superfruit, building on their high antioxidant activity and nutritional value. The nutritional value of baobab fruit pulp powder also offers opportunities for the powder as a prebiotic.
- Baobab seed oil, though a niche product, is gaining in popularity with its antioxidant activities and high content of omega fatty acids. Its long history of use, its iconic and exotic origin and potential benefits to local livelihoods, can contribute to the marketing story of this particular product.
- Baobab seed oil is a stable oil, which makes it easier to incorporate in cosmetic formulations.

Threats:

- There is competition for baobab from various regions in Africa.
- The tree is hardly ever cultivated due to its slow growth and reproduction cycle (fruits are eaten by animals and seeds leave their dormancy phase when passing through the gut). There have been studies on [cultivation of baobab trees](#), but competition from cultivation is not expected to become substantial.
- The tree is not CITES listed, but is protected in some countries (e.g. South Africa) and licenses are needed to collect the fruits.
- Baobab faces competition from other “superfruits” such as *Myrciaria dubia* (camu camu) and *Malighia glabra* (acerola), and from other prebiotic ingredients.
- Even though the tree is found widespread throughout Africa, they commonly grow as isolated trees. This makes it difficult for SMEs to offer substantial supplies of baobab products.

Recommendations when supporting the baobab chain**Support needs of producers:**

- In marketing stories, exporters should make use of the image of the baobab tree, this is well-known and representative for the region.
- Producers should explore their potential for organic, FairWild or Fairtrade certification. This latter certification standard offers a direct benefit to certified wild collectors of baobab fruits.
- Producers of fruit pulp powder targeting the food sector should comply to quality management systems (HACCP).
- In Southern Africa, the wild-collection and processing of baobab fruits are very well organised with the trade association PhytoTrade. SME producers in Mozambique and Tanzania should determine their possibility to join this trade association to ease access to European markets or link to other processors in the country.
- SME producers need to determine if licenses are needed to collect the baobab fruits, as is the case in South Africa.

Support needs to ensure sustainability:

As cultivation of the baobab tree is complicated and rare, supplies are entirely dependent on wild-collection. Therefore, producers need to ensure sustainable management of the tree to guarantee future available supplies. The main activities are the following:

- Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers. In order to improve sustainable harvesting, [Phytotrade](#) encourages commercial production of baobab fruit and seeds, instead of leaves or bark.
- Certification of sustainability practices through FairWild, Fairtrade and/or organic certification can help to support the credibility of sustainability schemes to buyers and can add to the marketing story when targeting the cosmetics sector.

KIGELIA AFRICANA**Product definition**

The *Kigelia africana* tree (syn. *Kigelia pinnata*), more commonly known as sausage or cucumber tree, grows naturally throughout (sub) tropical Africa. Its name is a reference to the long, sausage-like fruits that grow on the tree. The sausage tree grows in savannah areas, open woodlands and moist places, such as riverbanks, on alluvial soils. In addition, the plant is cultivated as a street plant and grown in Australia to provide shade.

The tree is evergreen, flowers from August to October and bears fruit from December to June. The flowers and later the fruits hang down from branches on flexible, rope-like stems (2-6m). The fruits are grey-brown, from 30 to 100 cm in length and typically weigh between 5 and 10 kg. Fruit pulp is fibrous and contains numerous seeds, as well as fatty acids, sterols and glycosides. They are eaten and spread by mammals and birds. Number of fruit harvested varies considerably per tree, on average trees yield around 40 fruits ([HerbalGram, 2012](#)).

***Kigelia africana* tree**

Source: Ez2plant.com

As the fresh fruit is poisonous and a strong laxative, they are prepared for consumption by drying, roasting or fermentation. Locally, the fruits (and sometimes roots), are used in herbal medicine to treat various ailments, including rheumatism, snakebites, syphilis, epilepsy, respiratory ailments, anaemia and nutritional illnesses. It is also a common ingredient in traditional beer and used in various skin care products. In addition, its timber is also used.

***Kigelia africana* distribution**



Source: Prota4U

Although various products can be derived from the tree, industry sources indicated that the fruit pulp and its extract are most traded and offer the best potential. This extract is obtained with solvent extraction. Additional products are dried leaves and oil pressed from the seeds. Dried leaves of the tree contain essential amino acids, calcium, magnesium and iron. They may be used for animal fodder as well as for human consumption. Seed oil is rich in oleic and essential fatty acids and used as cooking oil.

Segments

The sausage tree has most potential in cosmetics. Three derivatives of the sausage tree are registered in Cosing, namely extracts of bark, fruit and leaves. These all have skin conditioning properties. According to industry sources, most potential in cosmetics is for the fruit extract in skin care products, given their traditional use in Africa. Fruit extracts have antioxidant and anti-inflammatory properties and can be used in anti-aging products, face and body creams and after-sun formulations. Additionally, the extract has potential in cosmeceuticals as well (chapter 3), with its anti-inflammatory properties to treat blemishes.

As sausage fruits are not registered in the European Pharmacopoeia, they are not allowed for use in the pharmaceutical industry in Europe. Additionally, industry sources indicated that the fruits are considered a novel food, and have not been authorised to use as a food ingredient. As registration for these two segments is deemed beyond the scope of SME producers, potential in health and food segments is limited.

Trends

- In the cosmetic segment, the popularity of natural ingredients is rising.
- There is an increased consumer awareness and interest in antioxidants in cosmetic products.
- For cosmetics products, especially in skin care, there is a continually strong demand for ingredients which help combat the signs of aging.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories.
- Cosmeceuticals are in growing demand. These medicinal-cosmetics hybrids tackle issues such as skin damage and blemishes, but cannot make health claims (without complying to strict pharmaceutical requirements).

EU demand

According to industry sources, producing fruit extracts is beyond the scope of SMEs. Therefore, wild-collected fruits are sold to larger associations of processors, such as [Phytotrade Africa](#) or [Africa Organics](#) who produce the fruit extract. This extract can then be exported to EU markets. In other cases, the processing of the fruits takes place in Europe by companies such as [Botanica](#). For now, usage of the extract in Europe remains limited to smaller specialised cosmetics companies.

Other African organisations that have or are developing products based on the sausage tree include [TreeCrops](#) in Malawi and [Katavi botanicals](#). A US company that has already PUT a cosmetic ingredient based on the sausage tree on the market is [Cellbone Technology](#).

Price and price developments

Price information is not available for the sausage tree.

Opportunities and threats

Opportunities:

- There are good opportunities for local value addition, in terms of certification of sustainable wild-collection principles, with FairWild or organic certification.

- The iconic image of the tree can contribute to a marketing story by producers.
- Collection of sausage tree fruits offers an opportunity for SME producers who do not have the capacity to produce extracts as the product can also be exported as raw material.
- Industry sources indicated that the harvesting of the fruits of the sausage tree has a low impact on future supply availability.
- Industry sources point towards an increase in popularity of the fruit extract in Europe.
- Scientific research has been conducted demonstrating the fruit's functional properties.
- The yield of extracts from sausage tree fruit is quite high, as such no availability issues are expected.

Threats:

- SME producers face competition from various cultivated sources. The tree is easily cultivated and tolerates temperatures ranging from 4-40⁰ C. Consequently, it grows in various countries around the world, including Australia, the USA and parts of Southeast Asia.
- Even though sustainability is not endangered by over-harvesting of the fruits, industry sources signalled that the trees are endangered by human influences in term of wildfires, timber use and woodland destruction.

Recommendations when supporting the *Kigelia africana* chain

Support needs of producers:

- As fruit pulp is processed by solvent extraction, this may be beyond the current scope of SME producers. However, a feasibility research based on SME/community capacities is needed to determine whether they can extract sausage tree fruits themselves in the future. Alternatively, partnerships with processors in the region may be an option.
- In Southern Africa, the wild-collection and processing of sausage fruits are very well organised within the trade association PhytoTrade. SME producers in Mozambique and Tanzania should assess their possibility to join this trade association to ease access to European markets.

Support needs to ensure sustainability:

- It is recommended to determine the potential to obtain organic or FairWild certification to ensure sustainable collection and improve the USP for wild-collected sausage tree fruits.
- There are limited sustainability issues for the collection of the sausage tree fruits in terms of overharvesting. However, the influence of other human activities on available supply of the fruits, such as wildfires, timber use and woodland destruction, needs to be determined and minimised.

SCLEROCARYA BIRREA

Product definition

Marula, *Sclerocarya birrea*, grows widely in Sub-Saharan Africa, including Tanzania and Mozambique. It is a medium-sized tree, reaching 18 m in height and grows in medium to low altitude open woodlands, most commonly in semi-arid and savannah regions. During the winter months, it is leafless, it flowers from September to November and bears a plum-like fruit from January to March. Marula fruits are currently wild harvested, but increasing demand could lead to cultivation practices in the future.

In Africa, the plant is an important food, commercial, cultural and medicinal plant that has been used for thousands of years and is found in relative abundance in various southern African countries. While the European market mostly focused on products of Marula fruit, traditionally, many parts of the tree are used. The bark is used in traditional medicine (bark infusions are used against dysentery, diarrhoea, rheumatism and as a prophylactic against malaria) and the wood of the tree is also commonly used. As such, the tree is protected in South Africa.

The trees yield an average of 550-1000 kg of fruit per year, which are mainly collected by women after they have fallen to the ground. The fruit is high in vitamin C, the seed kernels inside, 2-3 per fruit, are rich in oil. The fruits have been used in Africa to brew beer and produce wine and spirits. After removing the pulp, marula

***Sclerocarya birrea*: wild distribution**



Source: Protabase

***Sclerocarya birrea* fruit**



nuts are sundried and cracked to extract the seed kernels. Marula oil is extracted through cold pressing. Traditionally, the oil was used in Africa as a moisturiser, body lotion, to protect against dry skin, as a shampoo and soap and as nose-drops for infants. The seed cake is used as animal feed.

Marula oil has a clear pale colour and has a high proportion of mono-unsaturated fatty acids and a high level of antioxidant activity. Its fatty acid profile consists mostly of oleic acid (70 - 78 %), palmitic (9 - 12 %) and stearic (5 - 8 %) acid. The oil has been compared to olive and sweet almond oil, but is more stable and is reported to have stronger moisturising properties.

Segments

There are several market segments in Europe in which marula products are, or can be, used. The fruits are allowed under the Novel Food Regulation in Europe and are available in jams, juices and liquors (e.g. Amarula liquor). However, most potential for marula products are currently reported in the cosmetic segment. Here, marula oil and fruit extracts are already used for their moisturising, skin and hair conditioning properties. The seed oil is used in skincare products and body and massage oil, while the fruit extracts are used in face cleaners and creams for their antioxidant activity.

As marula products are not registered in the European Pharmacopoeia, they are not allowed for use in pharmaceuticals. Industry sources consider its potential in food supplements to be limited. It is currently not listed on positive lists for inclusion in supplements, although some studies have shown a cholesterol lowering effect and high anti-oxidant activity.

Trends

- In food and in cosmetics, there is an increased consumer awareness and interest in antioxidants. For cosmetics specifically, there is a strong demand for ingredients which help combat the signs of aging.
- Natural and ethically sourced ingredients are increasingly important in food and cosmetics, especially if these ingredients also have active properties of use to formulators and interesting stories of use to marketing staff.
- Cosmetic and food manufacturers are continually looking for ways to differentiate their products. For that purpose, ingredients with interesting marketing stories are particularly useful.

EU demand

Commonly, marula fruits are collected by women. At this level, seed kernels are separated from the fruit pulp. The kernels are then sold to small producer organisations to produce marula oil. Kernels are graded in high and low quality. Oil pressed from low quality seed kernels is used to produce soap.

Industry sources indicate that marula oil is very popular, due to its strong marketing story and high moisturising and conditioning activity. In Europe, its popularity has been rising since the 1990s, for example after being used as an ingredient by the Body Shop. Importers include [Lonza](#) and [Aldivia](#). The latter uses the oil in a patented active ingredient, Marulin, with enhanced antioxidant properties ([OECD](#)). In South Africa, marula juice is used to produce the liquor [Amarula](#), which is sold in Europe as well. This liquor has been marketed by linking it to the image of elephants.

Moreover, several South African companies, such as [African Organics](#), are marketing finished cosmetic products based on marula, amongst others in Europe and the United States.

Price and price developments

In 2010, [Fairtrade International](#) added marula to its fresh fruit category. Together with baobab, small producers (and collectors) who have been certified now receive an extra 50 % over the average market price per kg that is sold to processors or Fairtrade certified buyers.

In 2011, a market report by Indigenous Natural Products in Namibia provided an overview of prices at different levels in the value chain (Table 7). It shows that compared to producer prices of marula oil, the retail prices on the global market increased by more than 100 times as much.

Amarula liquor



Source:
Examiner.com

Table 7 Price breakdown marula oil

Actors in value chain	Price (\$ per kg)	change from previous stage
Producers	2.35	-
Exporting sector	23.44	+897 %
Wholesale	131.25	+460 %
Average retail oil	262.50	+100 %

Opportunities and threats

Opportunities:

- Sustainable collection is possible, both in resource terms (a high percentage of marula fruits can be harvested (92%) without influencing tree populations), in economic terms, as is shown from examples in [East Africa](#) and in [Southern Africa](#) and by working with community groups as is shown by companies such as [alapure](#) and [Marula Natural products](#).
- Interest in marula seed oil is increasing as it offers cosmetic producers a way to differentiate themselves.
- The stability of marula oil makes it easily incorporated in cosmetic formulations.
- There are opportunities for value addition for marula, especially in terms of extracting the oil, when the right quality levels can be assured.
- Certifications, such as organic or FairWild, offer additional value addition opportunities.

Threats:

- As marula trees can also be cultivated, SME producers face competition from these sources. For example, Israel has several marula tree plantations. Cultivated trees offer various benefits to European buyers, such as quality management and higher quantities, thereby reducing prices from currently high prices. However, trees only bear fruit at 19 years of age and are a long-term investment.
- As the tree is found throughout various countries in Africa, future competition can increase.

Recommendations when supporting the marula chain

Support needs of producers:

- Marketing stories can be used to position marula oil in the cosmetic segment. These include the wild-collection of the fruits and their benefits to local communities, the long tradition of use and high content of antioxidant activities.
- In Southern Africa (but also in Kenya), wild-collection and processing of marula is well organised. In Southern Africa, this is done through the trade association PhytoTrade. Also several companies are producing cosmetics products with marula, such as [African Botanics](#). SME producers in Mozambique and Tanzania should determine their possibility to join this trade association or supply South African (or Kenyan) companies to ease access to European markets. Another option is to link to exporters in their own country or region.

Support needs to ensure sustainability:

- Wild-collection needs to be based on standard operating procedures to ensure continued availability.
- Emerging trees need to be protected from grazing, as trees take 19 years to bear fruit.
- Producers should explore the potential for organic or FairWild certification of marula oil. In addition, as collected fruits can obtain a Fairtrade premium after certification, SME producers should determine their potential to obtain this certification standard. These certifications can help support the credibility of sustainability schemes to buyers and add to the marketing story when targeting the cosmetics sector.

BALANITES AEGYPTIACA

Product definition

The *Balanites aegyptiaca* tree, also known as the desert date tree, is native to most of Africa and part of the Middle East and India. In Africa, it is distributed from Mauritania to Somalia in Eastern Africa and southwards to Zambia and Zimbabwe. The tree has a long tradition of use and has been cultivated in Egypt for over 4,000 years. The desert date tree is well adapted to survive the extreme conditions of the desert.

According to industry sources, desert date tree products are used for different purposes. Fruits, leaves and seeds, are used as famine foods in the Sahel area. The trees have a potential as a desert barrier tree, provided that they are managed well. The tree's wood is used for furniture, in fencing and as firewood. These latter can negatively affect sustainability.

Trees begin to flower and bear fruit at 5-7 years old. Maximum seed production is reached when trees reach 15-25 years. In good conditions, mature trees can yield up to 10,000 fruits per year, including during the dry season. Fruits resemble a small date, weigh 5-8 g. and consist of a shell (5-9%), fruit pulp (28-33%), an endocarp (49-54%) and a kernel (8-12%). Locally, the fruits are eaten fresh, used to prepare beverages, cooked foods and medicine and have been used for fermentation to produce liquor. According to industry sources, desert date seeds contain saponins and can be used in soap making.

After the fruits are collected, seeds and fruit pulp are separated. The seeds are dried and crushed to obtain the kernel inside. Two forms of oil extraction exist; kernels are dried, toasted and grinded, after which oil is extracted with [hot water floatation](#). Another form of processing the kernels involves [solvent extraction](#) of ground kernels. The oil consists of palmitic (15%), linoleic (75%) and stearic (10%) acids.

Segments

Industry sources pointed towards reported anthelmintic, antibacterial and anti-cancer uses of the desert date. However, as it is not registered in the European Pharmacopoeia, it is not allowed for use in pharmaceuticals. It is also not registered as a novel food and, according to industry sources, there is no known use for it as a food supplement. As registration for use in these segments is deemed beyond the scope of SME producers, potential for desert date in these segments remains limited.

According to industry sources, the main potential for desert date is in cosmetics. In Cosing, the kernel oil, fruit and seed extracts are registered. The desert date kernel oil is registered to have skin conditioning properties. Within cosmetic products, desert date kernel oil has most potential in skin care products, especially for anti-aging and sun care where its antioxidant and anti-inflammatory properties are of interest. Final products include moisturisers, face and body creams and after-sun cream.

Trends

- There is an increased consumer awareness and interest in antioxidants and omega fatty acids in cosmetic products.
- For cosmetics products, especially in skin care, there is a continuous strong demand for ingredients which help combat the signs of aging.
- In cosmetic segments, the popularity of natural ingredients is rising.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories.

Balanites aegyptiaca tree



Source: Wikipedia

Balanites aegyptiaca seeds



Source: Sudan, IAG

EU demand

Desert date kernel oil is a relatively new product on the market. As such, there is a limited range of EU companies that use it as an ingredient. Those that do, have a special link to natural ingredients, such as [Shea terra organics](#). This company markets the oil by focusing on its traditional use by Egyptian royalty. Other cosmetic companies who use the oil as an ingredient are [So Pure, Bio-ethical Skincare](#) and Aroma Zone. According to industry sources, this latter company offers the oil as an ingredient for do-it-yourself cosmetics. This indicates that the oil is easily incorporated in formulations of cosmetic products.

Price and price developments

Not available.

Opportunities and threats

Opportunities:

- As desert date kernels contain saponins, industry sources indicated that they offer an opportunity for local value addition in soap making.
- Another opportunity for local value addition concerns oil extraction from the desert date kernels, when the right quality levels can be assured. However, solvent extraction will most likely not be possible at community level.
- Certifications, such as organic or FairWild, offer additional opportunities for value addition. Existing organically certified desert date kernel oil indicates that SME producers can obtain organic certification of their product as well.
- Desert date has an interesting history of use, which can contribute to the marketing story and used by cosmetic manufacturers.

Threats:

- Removing the kernels from the desert date seeds is a labour-intensive and time-consuming activity. Moreover, the toasting process can put pressure on local fuel resources.
- There is still a low familiarity among European consumers (and buyers) of desert date tree products.
- The tree is cultivated throughout Africa and the Middle East. As such, SME producers of wild-collected species face competition from cultivated sources.

Recommendations when supporting the desert date chain

Support needs of producers:

The market position of wild-collected desert date is crucial to validate its higher price when compared to cultivated desert date, especially from plantations in India. Recommendations to strengthen this are:

- Clear communication in a marketing strategy is needed, focusing on the story of wild-collection and benefits to local communities in rural Africa.
- As desert date kernel oil is a relatively new product on the market, SME producers need to make use of marketing stories to position desert date kernel oil. An aspect that can be used in a marketing story is its long tradition of use, which, according to industry sources, dates back to use by Egyptian royalty. Other aspects that add to the marketing story include the benefits to local communities, use as an anti-inflammatory, its fatty acids composition and certifications as described in the following section.
- A feasibility based on SME/community capacities is needed to determine the capacity of SME producers in solvent extraction or their option to build required capacities. Alternatively, partnerships with processors in the region could be an option.

Support needs to ensure sustainability:

- Certification of wild collection is an interesting proposition for wild-collected desert date. This could be done through organic wild collection, or with FairWild certification. The latter is important to establish standard operating procedures to ensure continued availability. This also requires resource mapping and management which should be documented to build trust with buyers.
- Suppliers in drought-prone areas can stress the role of the desert date tree against desertification.

MORINGA OLEIFERA

Product definition

Moringa oleifera, (syn. *Moringa Pterygosperma*) commonly referred to as moringa (or drumstick tree), is a tree native to the Himalayan foothills (India, Bangladesh, Pakistan and Nepal). It has become naturalised in various tropical and subtropical areas in Africa. The tree is cultivated extensively throughout the (sub)-tropics and grows best in arid conditions. It grows in coastal Tanzania, from Tanga in the north to Mtwara in the south, as well as in parts of Mozambique. In India, the tree is cultivated in plantations. Industry sources indicated that production in Africa is dominated by smallholder production systems and wild collection. Its contribution to rural livelihoods can be substantial due to its potential for food use and a source of cash income. Products from the tree have multiple cosmetic, medicinal and nutritive uses.

Moringa tree



Seeds and leaves can be collected From November to April. Traditionally, leaves and seed pods are used for nutrition, seeds are pressed for oil for cooking and skin care, and the resulting cake is used for water purification, as fertiliser (nitrogen fixation to improve soil quality) or for animal feed.

Moringa oil is cold-pressed from mature moringa seeds, yielding approximately 35-40% of an odourless, pale yellow oil with a slightly nutty flavour. Reports⁴ have demonstrated antiseptic and anti-inflammatory properties. Moringa seed oil consists of fatty acids, high in omega-9 (80%). The resulting cake can be used for protein derivatives. Moringa seeds are rarely exported to Europe as raw material. In this case, proper drying is essential to prevent moulds.

Another kind of products derived from the tree are moringa leaf extracts which are high in vitamins (A, B and C), minerals and have a high antioxidant activity. These and other moringa products are often further processed in Europe to be used as ingredients for cosmetic and food.

Segments

Moringa seed oil currently has the largest market in Europe, although the American market is much larger. The oil is used mainly in cosmetics, where market entry is easier as lower volumes are required and prices can be higher. The oil is mostly used in skin care products, such as creams, body wash and massage oils, but also has potential for hair-care products (shampoo and conditioner). Other cosmetic sub-segments with a potential for moringa are in fragrances (perfume base) and toiletries (soap). The table included below gives an overview of cosmetic use of products derived from moringa.

Moringa leaf extract	Moringa seed extract	Moringa protein derivative
<ul style="list-style-type: none"> • Skin conditioning properties • Skin care • Perfumery 	<ul style="list-style-type: none"> • Skin conditioning and emollient properties • Skin care • Perfumery 	<ul style="list-style-type: none"> • Commonly derived from seeds or seed cake by European processors • High level of amino acids, which has protecting and restoring qualities • Used in hair products

In the European food segment, moringa leaves are used mostly in teas or energy drinks. They are marketed as caffeine-free energy boosters and superfood, with a composition which is comparable to spirulina. Potential for moringa derivatives (leaf extracts, seed oil) remains limited as their status under Novel Food Regulation is unclear. As of yet, only (whole or powdered) leaves are allowed for food in the EU, while moringa seed and oil can be used in food supplements in some EU countries (e.g. Italy). If extracts (or the oil) become classified as “novel”, a safety assessment is required and, while pending, its application in food is banned. Industry sources indicate these extracts would have a good potential considering high anti-oxidant activity, and its mineral and vitamin content.

⁴ For an overview of these uses, refer to the article “*Moringa oleifera*: A Food Plant with Multiple Medicinal Uses” in the *Phytotherapy Research*, published in 2007, 21, 17-25.

Moringa is not registered in Europe as a pharmaceutical ingredient or herbal medicine. With the high entry barriers for new ingredients (chapter 3), herbal medicine is not a feasible option for moringa.

Trends

- There is demand for cosmetic products without (or low in) preservatives.
- There is a strong interest for active and functional ingredients for the growing natural cosmetics market.
- There is an increasing consumer demand for ethically sourced cosmetics and food (supplements), which could strengthen the use of natural ingredients compared to synthetic alternatives.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories.

EU demand

Most demand for moringa oil for use in cosmetics currently comes from the US, but several European cosmetic manufacturers have picked up on it as a way to differentiate themselves on the market. Currently, most is sourced from plantations in India, but several companies are interested in African moringa oil. An example is the [Body Shop](#).

The main European importers of specialty oils are located in the UK, France, Germany and Italy. An example of an Africa-focussed importer of moringa oil is [Earthoil](#). An example of a raw material imported is Alfred Galke in Germany.

The oil is often exported as crude oil to be further processed in Europe. It can also be used directly in cosmetics, as it requires little further refinement for its colour, odour and stability. However, the specifications of cosmetic manufacturers can require further processing or refining. Due to the high quality and equipment requirements, such secondary processing occurs in Europe.

Industry sources indicate that moringa extracts and protein derivatives could be of interest and could benefit from a “superfood” marketing drive. Several manufacturers show interest in this potential. Due to legislative constraints, products currently on the market are based on whole leaf (powder, dried). Examples of companies include [Jacob Hooy](#) and [Nutramin](#) in the Netherlands and [Hanoju](#) in Belgium, but producers in France, the UK, Germany and Italy are also active on the market. US-based companies, such as X-trine, play a substantial role on the European market, especially in the sport supplement segment.

Price and price developments

In 2012, the average price level of moringa oil ranged between € 20-25 per kg. Prices depend mainly on fluctuating demand from Europe and the US. Moreover, demand from India and other Asian markets for fresh and canned seed pods also influences the price of the oil. Prices for oils produced in India are lower but also more often not dried properly, old or impure.

Opportunities and threats

Opportunities:

- The tree has value-addition potential; European buyers import crude moringa oil, as opposed to importing the oilseeds, which is too expensive. Industry sources have reported community projects with an integrated business model functioning in various African countries such as Cameroon, Uganda, Zambia and Madagascar.
- Due to its long shelf life (up to 5 years with proper processing), moringa oil can be used in cosmetics that use fewer or no preservations.
- Little further refinement is needed, which makes the oil interesting for 100% natural cosmetics companies.
- The active properties of moringa derivatives make them interesting for a variety of cosmetic products, most notably in skin care and anti-aging products (anti-oxidant, anti-inflammatory, emollient, conditioning), but also in hair care (conditioning).
- Locally, moringa leaves, seeds and seed pods are used as a food source, whereas its wood is used as well.
- Moringa’s potential benefits to local livelihoods can contribute to a marketing story by producers. This is particularly relevant for the cosmetics sector.

Threats

- Collectors will face strong competition from plantations in China and India and smallholders in Africa. Organically certified moringa is also available from these countries.
- It is a fast-growing species and relatively simple to cultivate. As such, there is also a risk of over-supply.
- There is still a low familiarity among European consumers (and buyers) of moringa products.
- In terms of marketing, the story on origin favours suppliers from India, not from Africa.
- As with other ingredients for cosmetic products, demand can fluctuate as a result of changing trends. Even though moringa has distinguishing properties, products exist that can be used as substitutes, for which demand can influence demand for moringa, such as baobab and argan.

Recommendations when supporting the moringa chain

Support needs of producers:

The market position of wild-collected moringa is crucial to validate its higher price when compared to cultivated moringa, especially from plantations in India. Recommendations to strengthen this are:

- Clear communication in a marketing strategy is needed for wild-collected moringa to compete with cultivated sources. Producers from Africa can focus on aspects of wild-collection in a marketing story, by stressing the role of moringa trees in poverty reduction of local communities in remote areas of rural Africa and its potential against environmental degradation. Additionally, sustainability certifications as specified in the following section add to the marketing story of moringa.
- A feasibility based on SME/community capacities is needed to shed light into whether they could process and export moringa themselves or should be linked to processing and/or exporting companies.

Support needs to ensure sustainability:

- Although sustainability issues are limited, establishing sustainable collection practices can ensure this situation continues in the future.
- Certification of wild collection is an interesting proposition for wild-collected moringa. This could be done through organic wild collection, or with FairWild certification. The latter is important to establish standard operating procedures to ensure continued availability. This also requires resource mapping and management which should be documented to build trust with buyers.

LITSEA CUBEBA

Product definition

Litsea cubeba (Lour.) Pers. is an evergreen, aromatic tree with dioecious flowers and small pepper-like fruits. It grows wild in Southeast Asian countries, including Vietnam. This species, known by the common name May Chang, is fairly abundant in subtropical forest slopes, at an altitude of 300 – 1,500 m. In Vietnam, it occurs mainly in the mountainous northern provinces, where it is also cultivated as a shadow plant, e.g. for tea.

Litsea cubeba's fruit is processed for its essential oil, which has antibiotic, anti-infectious, anti-inflammatory, antiseptic, insecticidal, sedative and deodorant properties. Essential oil yields from the fruit are 3-5%. The oil's main component is citral, at 70-85% of the oil. The oil can also be extracted from the leaf, but this is considered to be of lower quality. The timber is sometimes used for making furniture and crafts. Plant parts are also used in local medicine.

The essential oil has a lemony fresh and fruity odour. The scent of May Chang has been compared to lemongrass and lemon verbena. It is considered sweeter and finer than lemongrass and a possible fragrance alternative to the costly lemon verbena (not an alternative in terms of therapeutic potential). Citral content is the most important indicator of oil quality and an international standard (ISO 3214:2000) specifies a minimum value of 74%.

Litsea cubeba flowers



Source: *Fragrantica*

Segments

The most widespread use and potential for *Litsea cubeba* in Europe lie within the cosmetics sector. The fruit extract (perfuming) and oil (masking, perfuming and tonic) of *Litsea cubeba* are registered under Cosing.

Litsea cubeba fruits



Source: The Traveling Pharmacist

Litsea oil is used widely in perfumery, the soap industry, sanitary products and as a deodorizer. Nonetheless, citral is one of the 26 declarable EU allergens, is a powerful skin sensitizer. As such application limits apply, especially in leave-on products. Litsea oil is limited to 0.3% in face and hand creams under the International Fragrance Association (IFRA) guidelines, with even tighter restrictions in lip and deodorant products.

In aromatherapy, litsea oil is used for refreshing and rejuvenating as well as stimulating and balancing oneself. This sub-segment presents good opportunities, but there are several competing products on the market.

Trends

- In Europe, there is an increasing consumer interest for natural ingredients in cosmetics, the global natural cosmetics sector is estimated to grow by 5-9% annually.
- The global fragrance industry is interested in natural products to replace synthetic ingredients, but quality consistency, sufficient supplies, stability, and user friendliness need to be assured.
- There is a growing interest in ethically sourced and sustainable products. In addition, consumers are interested in the story beyond ethical certification. In their marketing, cosmetic producers actively communicate the best stories for their ingredients, to improve the connection with the consumer. Communication is done graphically, with short stories on the product, or in the producer's corporate image.

EU demand

Countries with the capacity to fractionate essential oils and chemically convert isolates into products for the fragrance (and occasionally flavour) industries are the major importers of litsea oil. Within Europe, countries such as France, Germany, the UK and Switzerland offer the most interesting opportunities to suppliers of this product.

Price and price developments

According to industry sources, conventional litsea oil is priced at € 12-14/kg, reaching up to € 48-60/kg for organically certified materials. Nonetheless, the price of litsea oil is fairly erratic, as a result of competing economic forces in China, which is the main supplier on the market.

Opportunities and threats

Opportunities:

- Although China dominates the market for litsea oil, opportunities exist for suppliers who are able to offer a better quality without greatly increasing the price above current market prices. Chinese supplies are generally considered to have a low quality profile.
- The growing interest in ethically sourced and sustainable products offers an opportunity for local value addition in terms of organic and FairWild certification.
- Suppliers of sustainably sourced *Litsea cubeba*, which carries certifications such as organic and /or FairWild, can set themselves apart and are able to command higher prices at the high-end market. Sustainability and certifications can contribute to the marketing story of wild-collected *Litsea cubeba*. This is especially relevant in the cosmetics segment.

Threats:

- Wild availability of *Litsea cubeba* is presently not under threat, but the destruction of habitats due to deforestation in the Himalayan region will put increasing pressure on other sources of species.

- In China, *Litsea cubeba* grows naturally in the south of the country, but it has also been successfully domesticated. Large cultivated areas are found in central and eastern China south of the Yangtze River, which makes the country a strong competitor to other suppliers on the market.
- The litsea essential oil competes with lemongrass, another citral-rich oil, in fragrance applications such as household sprays and fresheners. It is less suitable for use in soaps than lemongrass oil since it has less fixative power.
- Cheap synthetic citrals (e.g. turpentine, petroleum hydrocarbons) are available on the market and compete mainly in the lower market segments.

Recommendations when supporting the *Litsea cubeba* chain

Support needs of producers:

Recommendations for *Litsea cubeba* producers are mostly related to establishing a USP for wild-collected raw materials and derivatives with a quality differential compared to Chinese competitors (traceable, certified, product quality).

- Essential oil distilling might be outside of the scope of collector's communities. The feasibility of building such capacities at a sustainable scale must be identified. If not, partnerships with exporters and processors in the region could be an option.
- Exporters and producers should consider niche markets, such as organic, FairWild and Fair Trade. These involve smaller volumes, but also command better prices and usually involve importers who are keen on establishing longer-term relationships.
- Exporters of conventional *Litsea cubeba* oil and/or extracts, should target unsaturated markets, particularly growing economies in Eastern Europe.
- Exporters and producers should promote interesting properties which can give them an advantage over competitors. These can be related to technical aspects such as the oil's citral content or the exotic / wild origin of the raw material. Any claims on technical aspects / properties of the product need to be supported by scientific evidence.
- For new exporters to the European market, certifications for quality control and traceability can function as proof of reliability for potential buyers.
- Exporters need to be ready to provide buyers with complete product documentation (e.g. safety data sheet for oils and extracts) and professional samples.

Support needs to ensure sustainability:

- In the 1980s and 1990s, the over-exploitation of *Litsea cubeba* led to a downfall of its export market in Vietnam. Currently, the sustainability issues for *Litsea cubeba* are more limited, and the market has recovered. However, sustainability will play a larger role in the future, especially concerning wild-collected species. This is the result of the destruction of habitats in the Himalayan region. To ensure sustainable wild-collection according to GACP standards, resource mapping and management is needed. Wild-collection needs to be based on standard operating procedures that ensure continued availability, quality and traceability. This should be documented to build trust with buyers.

ILLICIAM VERUM

Product definition

Illicium verum (commonly known as star anise) trees are found in the wild in humid woodland areas and along streams. They bear leathery, glossy evergreen leaves that are held in clusters of three or more. The flowers can be yellowish green, tinged with pink or dark red, with 7 to 12 petals or petal-like parts apiece. Both leaves and flowers are fragrant. The flowers give way to star-shaped fruits that are fleshy when fresh, but become brown and woody when dry. Star anise is thought most likely to be native to southern China and northeast Vietnam. It has been cultivated since about 2,000 BC.

Illicium verum flowers



Source: Wonder of Spices

Star anise can be found in China, Laos, Vietnam, Korea, Japan,

Taiwan and the Philippines. In Vietnam, specifically, it occurs mostly in the Lang Son province. The fruits of star anise are picked up before they ripen, and are subsequently sun-dried. The fruits are used as a spice (pods and seeds) and for the production of star anise oil by steam distillation.

Segments

Star anise is a highly versatile product, being used in different segments within the European market. Each segment offers its own opportunities, depending on the supplier's focus and capacity to comply with the established requirements.

Food: Star anise was introduced to Europe in the 17th century and is mainly used in baked goods (mostly as a flavouring essential oil), in fruit compotes and jams, and to manufacture anise-flavoured liqueurs, such as Anisette, Galliano, Sambuca and Pernod.

Star anise is also used in several Asian cuisines which grow in popularity in Europe. In Chinese cuisine, it is one of the spices used in five-spice powder blend. It is also used widely in Vietnamese and Indian cuisine.

International quality indications for star anise can be found in ISO 676:1995 standards, which cover various spices and condiments. The European Spice Association also establishes minimum quality requirements for 'Star Anise' which is imported into / marketed in the European market. Refer to 'European Spice Association Quality Minima Document' on the [European Spice Association website](#).

Cosmetics: The fruit/seed oil (masking, oral care, tonic), fruit extract (perfuming and skin conditioning) and fruit water (masking and perfuming) of star anise are registered in Cosing. The most common uses for star anise in cosmetics are perfumery, skin conditioning and oral hygiene (e.g. toothpaste, mouth wash). Star anise oil is also used in household chemical products, such as soap.

Finally, the essential oil of star anise is used in aromatherapy to enhance relaxation, sleep patterns and emotional balance. It helps reduce tiredness or weariness resulting from physical or mental activity.

Pharmaceutical: star anise is also used in human and veterinary medicine and is included in the European Pharmacopoeia for use in pharmaceuticals (dried composite fruit, oil). For pharmaceutical use, producers need to comply with quality requirements for pharmaceuticals (Good Agricultural and Collection Practices (GACP), and Good Manufacturing Practices for processed pharmaceutical ingredients (GMP). Star anise is often used in the treatment of rheumatism and influenza, among other health conditions. Shikimic acid contained in star anise is the key raw material for the manufacture of oseltamivir (Tamiflu), an anti-viral drug. Nonetheless, the Swiss pharmaceutical company Roche now uses shikimic acid mostly derived from microbial fermentation.

In addition, the use of star anise fruit in Europe is allowed in food supplements (amongst others in Belgium, France and Germany); in Italy, the star anise oil is also allowed.

Trends

- Consumers are increasingly concerned with traceability and sustainability of botanicals not produced in Europe. This is increasing the demand for ethically and sustainably-produced / harvested products.
- The large share of ethnic populations in European countries and the rising popularity of ethnic cuisines among Europeans have made spices such as star anise very popular (e.g. Chinese and Indian cuisines).
- The increase in European consumers' dietary requirements and food awareness have established a high demand for healthy food. As such, consumers are including healthier items to their food intake in order to achieve a more balanced diet. Encouraged by scientific studies which are propagated by the food industry (e.g. star anise's anti-fungal properties), consumers are progressively incorporating more spices into their everyday diets.
- Europeans have long used exotic spices in their cuisine mainly as a taste additive. In recent years, companies importing or trading spices have partly shifted their attention from the taste aspect of spices to their use as a health food.

Dried *Illicium verum* fruits and seeds



Source: Wikipedia

- In Europe, there is an increasing consumer interest for natural ingredients in cosmetics, the global natural cosmetics sector is estimated to grow by 5-9% annually.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories, and evocative names.
- The EU markets for supplements, including digestive health, is vibrant. As such, supplement producers are looking for ways to differentiate their products on the market. A strong dossier of traditional use at the origin is important to communicate to consumers.

EU demand

EU demand for star anise stems from industrial demand in specific market segments, as described in the section 1.3 'Segmentation and in Chapter 3'. Please, note that the buyer profile within each of this segment, as well as quality expectations and technical requirements, vary significantly.

Price and price developments

In the last decade, prices for star anise have been highly volatile. In 2005 and 2009, prices soared due to the increasing demand from the pharmaceutical industry and an increasing pressure on supplies, as a result of swine flu pandemics during those years. As mentioned above, star anise is the key raw material for the manufacture of the anti-viral drug Tamiflu.

In recent years, however, star anise has been increasingly replaced by alternative sources. Not only does this take place within the pharmaceutical sector; in the flavouring sector, star anise is increasingly replaced by synthetic alternatives, which has resulted in a downward pressure on prices.

Opportunities and threats

Opportunities:

- Although China dominates the market for star anise, and opportunities are few on the conventional market, potential exists for suppliers who are able to offer a better quality and/or a differentiated product without increasing the price significantly above current market prices. Good traceability is key in establishing a USP compared to Chinese suppliers.
- Suppliers of sustainably sourced star anise, which carries certifications such as organic and/or FairWild, can set themselves apart by focussing on these aspects in their marketing story. As such, they are able to command higher prices at the high-end (niche) market.
- Certifications are options for local value addition. Specifically, the growing interest in ethically sourced and sustainable products is an opportunity for organic and/or Fair Trade-certified star anise. The combination of organic and Fair Trade certification of star anise is especially interesting within the spice sector.

Threats:

- China (Guangxi and Yunnan provinces) produces about 80% to 90% of the world's star anise (mostly cultivated), thus creating strong competition to other suppliers on the market, such as Vietnam.
- Cultivation of star anise is widely practiced and cultivated products are dominant on the market.
- Star anise (*Illicium verum*) is commonly confused with anise (*Pimpinella anisum*), whose taste and aroma are considered purer.
- There have been reported issues with Vietnamese star anise related to adulteration and insufficient quality (management).
- One of the main flavouring components of star anise, anethole, is increasingly derived from alternative sources, either from the high temperature fraction of crude sulphate turpentine (CST) or synthetically, from petrochemical materials.
- The increasing use of shikimic acid derived from microbial fermentation by pharmaceutical companies poses a threat to the commercial use of star anise in the manufacture of drugs such as Tamiflu.

Recommendations when supporting the star anise chain

Support needs of producers:

Marketing the value of wild-collected star anise is crucial to validate its potential weaknesses (availability, price) compared to cultivated star anise. Recommendations to strengthen this are:

- Clear communication in a marketing strategy is needed, focusing on the story of wild-collection and benefits to local communities.

- It is very difficult to compete with cultivated star anise (from China) on the mainstream market. Therefore, consider niche markets, such as organic and Fair Trade. These involve smaller volumes, but also command better prices and usually involve importers who are keen on establishing longer-term relationships.
- For star anise which is exported in dried form, special attention should be paid to the incidence of aflatoxin contamination, which is known to be a problem for many producers. Note that buyers closely monitor this aspect.
- For new exporters to the European market, certifications for quality control and traceability can function as proof of reliability for potential buyers.
- Exporters need to be ready to provide buyers with complete product documentation (e.g. safety data sheet for oils and extracts) and professional samples.

Support needs to ensure sustainability:

- Sustainability will play a larger role in the future, especially concerning wild-collected species. As such, certification of wild collection is an interesting proposition for wild-collected star anise. This could be done through organic wild collection, or with FairWild certification. The latter is important to establish standard operating procedures to ensure continued availability. This also requires resource mapping and management which should be documented to build trust with buyers.

OENOCARPUS BATAUA

Product definition

The *Oenocarpus bataua* (common names: bataua, patawa, sehe, seja, ungurahui, hungurahua or mingucha) is a large single-stemmed palm that can grow to a height of 26 meters and 15-25 cm in diameter. It is found throughout the Amazon basin, from Bolivia in the south, to Panama in the north, and from Belém (Brazil) in the east to the Chocó (Colombia) in the west. It is commonly found in lowland forest, with large tracts formed in inundated forests. It can be found at low elevations, but also in Eastern Andean slopes up to 1,000 meters. In Bolivia, the bataua palm is found in the departments of La Paz, Cochabamba, Santa Cruz, Beni and Pando. In Peru and in Ecuador, it can also be found throughout areas covered by the Amazon rainforest.

The bataua fruit is comprised of nearly 39% pulp (exocarp and mesocarp) and 61% seeds. The pulp contains 18% oil.

The traditional method used to extract oil from bataua involves the following procedure: soaking the fruits in water which helps to separate the pulp from the seeds, shredding the fruit and then placing the pulp in a container of water that is boiled until the oil appears. When extracting oil with a mechanical press, the pulp is preheated to gain a higher yield.

The oil extracted from the mesocarp of bataua has a greenish yellow and transparent liquid, with little odour and taste, and has the physical appearance and composition of fatty acids that are similar to olive oil (*Olea europaea*).

Segments

Although the bataua fruit pulp and oil are traditionally used as food items in the Amazon region, there is no reported use of the species within the European food industry.

In this respect, most opportunities for bataua can be found within the European cosmetics sector, in the form of oil. Bataua oil is mostly suitable for use in skin, body, hair and bath care formulations intended to repair and replenish moisture, being registered in CosIng for the following applications:

- *Oenocarpus bataua* fruit oil: emollient, moisturising
- *Oenocarpus bataua* seed oil: emollient

Oenocarpus bataua trees



Source: Water Gardeners International

Oenocarpus bataua fruits



Source: Fruitpedia

Trends

- Consumers are increasingly concerned with traceability and sustainability of botanicals not produced in Europe. This is increasing the demand for ethically and sustainably-produced / harvested products.
- In Europe, there is an increasing consumer interest for natural ingredients in cosmetics; the global natural cosmetics sector is estimated to grow by 5-9% annually.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories, and evocative names.
- Innovation is the driving force in the cosmetics sector. However, stringent European legislation makes it more difficult for European importer SMEs to offer new ingredients to European manufacturers (e.g. REACH increases costs).

EU demand

Demand for bataua oil (commonly under trade names patauá or seje oil) in the EU stems mainly from specialised cosmetic (ingredient) companies in Western Europe. It represents a niche market, and some of the companies involved in the trade and processing of this species are: [Skincare Amazonia](#), [OFCA Simple Nature](#), [Akoma](#) and [Waliwa](#).

Price and price developments

No information available.

Opportunities and threats

Opportunities

- Bataua palms are slow-growing and difficult to cultivate. Therefore, there is little potential for competition outside of traditional wild-collection areas.
- The Amazon origin of Bataua (oil) offers important marketing potential for this product, since it offers economic benefits to local communities and helps to protect the Amazon rainforest. Producers can use this in their marketing story to position the product on the European market.
- Bataua oil offers an interesting proposition for (natural) cosmetics companies to engage in an innovative ingredient.
- Bataua oil's physical and chemical similarity to olive oil can be used in a marketing strategy and as a basis for product development.
- Certifications offer options for local value addition. As a wild product, Fairtrade certification is not available, but FairWild and organic certification offer opportunities. These certification schemes can also facilitate market access to producers by showing sustainable collection practices to potential buyers. This will show buyers that future availability is better secured.

Threats

- Bataua (oil) does not have a consolidated market in Europe, which poses various risks to new entrants, such as identifying/ targeting potential buyers, identifying quality and volume requirements, developing a marketing strategy, etc.
- Within the cosmetics market, bataua oil competes with other vegetable oils, many of which are sourced from Amazon palms / trees and containing a similar marketing story (e.g. forest preservation, community-based production). This is the case of buriti oil (*Mauritia flexuosa*) and Brazil nut oil (*Bertholletia excelsa*). Vegetable oils from other origins, such as argan oil (*Argania spinosa*), could also represent strong competition to bataua oil in the European cosmetics market.

Recommendations when supporting the bataua chain

Support needs of producers:

- Clear communication in a marketing strategy is needed. Producers can use marketing stories that focus on the story of wild-collection and its benefits to local communities, as well as its benefits in the conservation of the Amazon rainforest.
- For new exporters to the European market, certifications for quality control and traceability can function as proof of reliability for potential buyers.

- It is also important that producers/exporters verify if they are able to source a stable supply of consistent quality.
- Producers need to be ready to provide buyers with complete product documentation (e.g. chemical analysis, safety data sheet for oils and extracts) and professional samples. Presenting complete documentation is especially important for suppliers of relatively new ingredients such as bataua oil to attract interest and gain trust of buyers.

Support needs to ensure sustainability:

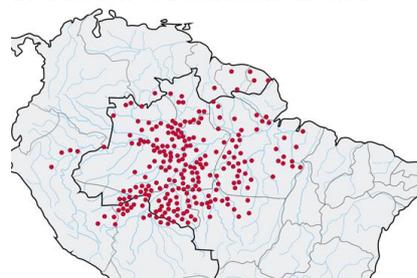
- Bataua palms are difficult to cultivate, as such, supplies rely on wild-collection only. In order to protect the species and ensure future supplies, sustainable management and harvesting of the fruits is key.
- Certification of wild collection is an interesting proposition for bataua oil. This could be done through organic wild collection or with FairWild certification. The latter is important to establish standard operating procedures to ensure continued availability. This also requires resource mapping and management which should be documented to build trust with buyers.

BERTHOLLETIA EXCELSA

Product definition

The Brazil nut tree, *Bertholletia excelsa* H.B.K. is native to the Amazon rain forest and can reach approximately 50 m in height. The tree can be found in the (non-flooding) humid Amazon areas of Venezuela, Colombia, Bolivia, Peru, Guyana and Brazil. In Bolivia, this area corresponds to the North of the country, encompassing the Department of Pando, the Province of Vaca Diez (Department of Beni) and the Province of Iturrealde (Department of La Paz). In Peru, Brazil nut trees can be found mostly in the Province of Madre de Dios.

Distribution of *Bertholletia excelsa*



Source: Pesquisa FAPESP

The fruit of Brazil nut has been traditionally gathered by indigenous groups of the Amazon region, and is hardly ever cultivated. Brazil nuts are traded in their shells, shelled, or as chipped or broken nuts. The proteins found in Brazil nuts are very high in sulfur-containing amino acids like cysteine (8%) and methionine (18%) and are also extremely rich in glutamine, glutamic acid, and arginine. The presence of these amino acids (chiefly methionine) enhances the absorption of selenium and other minerals in the nut.

***Bertholletia excelsa* pod and nuts**



Source: Only Foods

The seed kernel of the Brazil nut should be white, of a solid consistency with a sweet-oily flavour. Misshapen, discoloured or inedible nuts are considered as 'bad' nuts. After counting, up to 10% of bad nuts are tolerated in international trade.

The Brazil nut has an oil content of around 65-70%. The oil extracted from Brazil nuts is a clear yellowish oil which has a sweet smell and taste. Brazil nut oil contains mainly palmitic, oleic and linoleic and alpha linolenic acids and small amounts of myristic and stearic acids and phytosterols. The absolute saturated fat content of Brazil nuts is among the highest of all nuts, surpassing even macadamia nuts.

***Bertholletia excelsa* tree**



Source: WWF

Segments

Brazil nut is widely used in the food industry. It is either consumed as a healthy snack (raw / roasted, sweetened or salted) and as part of snack mixtures (e.g. dried fruits and nuts). The nut is also used in products such as chocolate bars, crunch bars and even in pesto (i.e. as a pine nut replacer). Brazil nut oil does not find many applications in the food industry; the oil is mostly used as a high-end oil for salad dressings.

In this respect, most opportunities for Brazil nut oil can be found within the European cosmetics sector. Brazil nut oil is mostly used as a moisturizing ingredient in anti-aging formulations, forming a natural protective film on the skin and preventing moisture loss. It is also used in products such as shower creams, shampoos, as well as in skin and hair conditioning/repair products.

Bertholletia excelsa is registered in CosIng for a number of applications in the European cosmetics industry:

- *Bertholletia excelsa* seed oil: emollient, skin conditioning (CAS-No: 356065-50-4)
- *Bertholletia excelsa* flower extract: skin conditioning
- *Bertholletia excelsa* pericarp extract: skin conditioning
- *Bertholletia excelsa* seed extract: skin conditioning
- *Bertholletia excelsa* seed oil peg-8 esters: hair conditioning, skin conditioning
- *Bertholletia excelsa* seed oil polyglyceryl-6 esters: emollient, emulsifying
- *Bertholletia excelsa* seed powder: abrasive
- Peg-5 *Bertholletia excelsa* seed oil glyceryl esters: skin conditioning

Trends

- Consumers are increasingly concerned with traceability and sustainability of botanicals not produced in Europe. This is increasing the demand for ethically and sustainably-produced / harvested products.
- The increase in European consumers' dietary requirements and food awareness have established a high demand for healthy food. As such, consumers are replacing snacks such as cookies and crisps for edible nuts / nut & dried fruit mixes, which often include Brazil nuts.
- In Europe, there is an increasing consumer interest for natural ingredients in cosmetics, the global natural cosmetics sector is estimated to grow by 5-9% annually.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories, and evocative names.

EU demand

EU demand for Brazil nut stems from industrial demand in specific market segments, as described in the section 1. 'Segments' and in Chapter 3 Please, note that the buyer profile within each of this segment, as well as quality expectations and technical requirements, vary significantly.

Price and price developments

Brazil nut prices are influenced by a number of factors: crop level, international demand, transit time, weather conditions, etc.

The 2013 Brazil nut crop was marked by delays and low levels of collection, mostly due to the collapse in 2012 prices and its consequential effect on financing for the 2013 crop collection. As a consequence, collection ran from January to April, having to face unusually high precipitation levels in the Amazon region.

By June 2013, lower supplies and rising demand rose price levels to over US\$ 4.00/ lbs for deliveries in the 2nd half of the year. By September and October 2013, however, demand slowed down and prices declined by 2-3% ([Global Trading & Agency](#)).

Opportunities and threats

Opportunities

- Brazil nut trees are hardly ever cultivated/ 'cultivable' and are highly sensitive to their ecosystem. Therefore, there is very little potential for competition outside of traditional wild-collection areas.
- Wild-collected Brazil nuts have a strong marketing potential, as they offer economic benefits to local communities and help to protect the Amazon rainforest. Sustainably-collected nuts can be marketed as a means to preserve the rainforest.
- Brazil nuts have an established and expanding demand within the food industry, whereas the cosmetics industry provides a similar scenario for Brazil nut oil.
- In spite of Brazil's competitive advantage in being the original supplier of Brazil nuts internationally, Bolivia is the main supplier of in-shell and shelled nuts to the EU. Peru also increases its presence into the European market as an alternative source for Brazil nuts and Brazil nut oil.

Threats

- Brazil nut is currently classified as vulnerable to extinction, according to the [IUCN Red List of Threatened Species](#).
- Brazil nuts have received particular attention from the industry in recent years due to the high levels of aflatoxin contamination detected. In this respect, quality controls in Europe have become stricter.
- Brazil nut is part of a competitive edible nut market which includes various other products such as macadamia nuts, cashew nuts, almonds, etc.
- Within the cosmetics market, Brazil nut oil also competes with other vegetable oils, especially those with an exotic profile and a strong marketing story (e.g. community-based production). This is the case of sachu inchi (*Plukenetia volubilis*) oil and argan (*Argania spinosa*) oil, for instance.

Recommendations when supporting the Brazil nut chain

Support needs of producers:

- Clear communication in a marketing strategy is needed, focusing on the story of wild-collection and benefits to local communities and to the conservation of the Amazon rainforest. Producers should focus on these aspects in a marketing story for Brazil nut (oil), which is of particular importance in the cosmetics segment. Additionally, sustainable certifications as discussed in the following section can add to the marketing story.
- Exporters of Brazil nuts must apply several measures to minimise the levels of aflatoxin and other contaminants:
 - Good Agricultural and Collection Practices (GACP): e.g. drying after harvesting, maximum of one month storage by the collector in a well-ventilated space, and cover during transport.
 - Good Manufacturing Practices (GMP) for processing: e.g. throwing out rotten nuts during sorting, hygienic conditions during shelling, sorting, and slicing.
 - HACCP systems for traceability and quality control.
- For new exporters to the European market, certifications for quality control and traceability can function as proof of reliability for potential buyers.
- Exporters need to be ready to provide buyers with complete product documentation (e.g. safety data sheet for oils and extracts) and professional samples.

Support needs to ensure sustainability:

As Brazil nut trees are rarely cultivated, supplies rely solely on wild-collection. As discussed in this factsheet, the tree is classified as vulnerable to extinction. Consequently, sustainable management of the trees and sustainable harvesting of Brazil nuts is key to ensure future supply. The following activities are relevant in this respect:

- Resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers.
- Certification of wild collection is an interesting proposition for Brazil nut (oil). This could be done through organic wild collection or with FairWild certification. The latter is important to establish standard operating procedures to ensure continued availability. This also requires resource mapping and management which should be documented to build trust with buyers.

ANIBA ROSAEODORA

Product definition

The rosewood tree (*Aniba rosaeodora*) is the source for rosewood essential oil. This tree should not be confused with species of the *Dalbergia* genus, which are also called rosewood. Rosewood trees grow in the Amazonian rainforest, and are native to Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname and Venezuela. According to industry sources, Brazil has been the most common source of rosewood oil, but overharvesting has led to deforestation and reduced availability of the tree in Brazil. The tree can grow up to 40-50 meters high, has a reddish bark and yellow flowers.

**Sectional plane of
Rosewood tree**



Source: Pure Intent Essentials

Rosewood trees need to be at least 40 years old before they can be harvested for essential oil production. The trees are commonly felled during the flood season, from April to July, as the high water level helps to transport (float) the wood to processing sites. With steam distillation, an essential oil is obtained from the wood chippings of the trunk. Around 100kg of wood produces 1kg of essential oil. As the oil contains 75-95% of linalool, it was mainly used as a source for linalool before synthetic alternatives became available.

An ISO standard was developed ([ISO 3761:2005](#)) for the essential oil, as Oil of Rosewood, Brazilian type (*Aniba rosaeodora* Ducke or *Aniba parviflora* Mez.). This standard specifies characteristics to improve assessment of the quality.

In Brazil, the IBAMA (Brazilian Institute of Environment and Renewable Natural Resources) has imposed [strict constraints the on production of rosewood oil](#). These were developed together with the [INPA](#), the Brazilian National Institute of Amazonian Research. They include the planting of new trees, creating an up-to-date inventory and a procedure for reporting inventories. Producers of rosewood oil in Brazil need to obtain approval from the IBAMA for oil production.

Segments

Rosewood oil is most commonly used in cosmetics and specifically in perfumery. Under INCI it is registered as having astringent, masking, perfuming, skin conditioning and tonic properties. When rosewood oil was more widely available, it was used as a fragrance in soaps as well. However, as its price increased due to declining availability, it has become too expensive for these products. Instead, it is an ingredient in more expensive perfumes.

The oil is not registered for use in pharmaceuticals, food or food supplements. As such, it is not allowed for use in these segments.

Trends

- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories. In their marketing, cosmetic producers actively communicate the best stories for their ingredients, to improve the connection with the consumer. Communication is done graphically, with short stories on the product, or in the producer's corporate image.
- In Europe, there is an increasing consumer interest for natural ingredients in cosmetics, the global natural cosmetics sector is estimated to grow by 5-9% annually.
- The global fragrance industry is interested in natural products to replace synthetic ingredients, but quality consistency, sufficient supplies, stability, and user friendliness need to be assured.
- There is an interest in ethically sourced and sustainable cosmetic products.

EU demand

A research report on the exploitation of rosewood in Brazil has reported significant declines in supply in the previous century ([May and Barata, 2004](#)). From exports of 360 tonnes annually between 1945-1974, exports declined to around 20-30 tonnes in the period 2000-2003.

According to members of the [Plant Committee of CITES](#), the wood of rosewood trees is not traded, as extraction for essential oil is much more profitable. Commonly, Brazilian producers of rosewood oil purchase wood from harvesting crews, after which essential oil is produced and exported to international markets. Due to price increases, regional demand for rosewood oil has diminished. Importers include the USA, France, Belgium and Germany.

Industry sources indicated that rosewood oil is very popular on international markets. However, as it is listed in CITES, emphasis on sustainable collection is key. In addition, companies are developing alternatives to rosewood oil. For example, [Elixens](#) now offers a natural, sustainably sourced, alternative to rosewood oil with the same odour.

Price and price developments

According to research reports on exploitation of rosewood in Brazil, alternatives to rosewood oil are priced much lower, such as synthetic linalool and Ho wood oil ([May and Barata, 2004](#)).

Opportunities and threats

Opportunities:

- There is a good market for rosewood oil in Europe. Current demand is higher than what South American countries, especially Brazil, can supply.
- There is substantial opportunity for new players to enter the market if they can show a sustainable management scheme which ensures future availability and traceability to the source. Such a management system should be properly documented and preferably certified (e.g. FairWild certification).
- Due to its high price, rosewood oil is commonly adulterated, for example with Ho Wood essential oil (*Cinnamomum camphora*) or Palmarosa essential oil. Producers of rosewood oil that can demonstrate that they sell the genuine, unadulterated essential oil and ensure traceability of the oil are at a comparative advantage.

Threats:

- Overharvesting of rosewood has led to the inclusion of the species in [Appendix II of CITES](#), meaning that export permits are required before the tree or its products can be exported. An annotation indicates that these are required for logs, sawn wood, veneer sheets, plywood and extracts. Finished products are not considered to be covered by this annotation.
- As its price has increased, rosewood oil is increasingly replaced with substitutes, both natural and synthetic (e.g. synthetic linalool). Examples of natural alternatives include Ho wood oil and Indian rosewood oil (*Dalbergia* spp.). According to industry sources, companies using the latter oil can claim that their product contains rosewood, although it is produced from a different botanical source.
- Plantations of rosewood are technically viable, but would require a very long time frame. However, there have been reports of rosewood plantations in Brazil, which were established in the 1970's ([May and Barata, 2004](#)).

Recommendations when supporting the rosewood chain

Support needs of producers:

- SME producers need to determine their current or potential future capacity of distillation of the wood. If distillation is not feasible, partnerships with processors and exporters in the region could be an option.
- In addition, processors and exporters need to be ready to provide their buyer with complete product documentation (e.g. safety data sheet, proper species identification) and professional samples.

Support needs to ensure sustainability:

As rosewood oil already has a position in the market and demand is higher than available supplies, recommendations for focus mostly on sustainable production of the oil:

- As rosewood is listed on CITES, several steps need to be taken before SME producers are allowed to export rosewood or its derivatives. A country's national Scientific Authority needs to endorse the harvesting of rosewood trees, whereas national Management Authorities are responsible for administering the licensing system of CITES. SMEs need to contact their [National Management Authority](#) to obtain an export permit, which is needed to export rosewood or its derivatives, including the essential oil.
- A management plan needs to be developed for the sustainable management and harvesting of rosewood. As an example, SME producers can refer to a [national management plan](#) for red stinkwood, as has been developed for Cameroon by CIFOR in cooperation with GTZ and TRAFFIC.
- Resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards, for example in replanting rosewood trees for each tree that is cut down. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers. Certification according to the FairWild standard could further build this case.
- In addition, SME producers can improve sustainability of rosewood production by looking at the requirements laid down by the IBAMA in Brazil. For example, these involve the replanting of two trees for every tree that has been cut down and producing a barrel of essential oil for every 80 trees planted.
- The feasibility of obtaining rosewood oil from [leaves of the tree](#) should be identified, as this is a more sustainable source than the trees heartwood. Techniques are being developed to use this more sustainable source of rosewood oil. However, it requires additional labour to collect sufficient

branches and leaves for essential oil production. Industry sources signalled an interest in such an oil if this is of sufficient quality.

- SME producers need to ensure traceability of rosewood oil to satisfy concerns of buyers on its origin and to communicate the sustainability of production. Along with adulteration and sustainable production of rosewood oil, illegal felling for oil production is an issue as well.

TABEBUIA SERRATIFOLIA

Product definition

The yellow lapacho (*Tabebuia serratifolia*) is a tree native to South and Central America. More specifically, it is found in Bolivia, Brazil, Colombia, Ecuador, Guyana, Mexico, Paraguay and Peru. It has also been introduced in other parts of the world, namely the Caribbean Islands, the US, Kenya and India ([University of Florida](#)). Use of this particular species is less widespread in Europe when compared to another specie of the same genus; pink or purple ipe, also known as pau d'arco (*T. impetiginosa* syn. *T. avellaneda*).

Yellow lapacho tree



Source: [anna-wwwelascom.blogspot.com.br](#)

Main use of yellow lapacho is for timber, as it is a tropical hardwood. In addition, the bark of the tree has been used as a tea or tincture in traditional medicine to treat various diseases. These include fighting various infectious diseases, stomatitis, anemia, malaria, ulcers and some skin affections, such as cutaneous leishmaniasis.

The bark of yellow lapacho, much like other species of the *Tabebuia* genus, is a natural source for lapachol, a compound that is researched for potential anti-cancer activities ([Epifano e.a., 2014](#)). This compound appears to have anti-inflammatory, antimalarial and immune-modulating activities. In addition, research has demonstrated antiparasitic properties of yellow lapacho ([Jiménez-González, 2013](#)).

Segments

Currently, yellow lapacho is only allowed for use in the cosmetic segment in Europe. Both *Tabebuia* bark extract and *Tabebuia serratifolia* wood extract are registered as having skin conditioning properties. These extracts have the same properties as pink ipe extracts. Additionally, the traditional use for yellow lapacho in skin affections adds to the potential of yellow lapacho in topical applications. Examples include skin care products and cosmeceuticals.

Yellow lapacho bark



Source: [Maya-ethnobotanics](#)

For future use, the food supplement segment in Europe offers better opportunities. However, the regulatory framework for the use of yellow lapacho in this segment is unclear, and the species might have to undergo approval under Novel Food Regulation (Chapter 4). Pink ipe (an aforementioned other specie of the same genus) is allowed for use in food supplements in Europe, as supporting the immune system and improving general health as a tonic. This helps to build the case for registration of yellow lapacho, as these are similar species and are used in a similar way.

Trends

- EU buyers are looking for sustainable sources of *Tabebuia* species.
- Consumers are increasingly concerned with traceability, ethical sourcing and sustainability of botanicals not produced in Europe. This is increasing the demand for ethically and sustainably produced botanicals for use in cosmetics and as food supplements.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories.
- Cosmeceuticals are in growing demand. These medicinal-cosmetics hybrids tackle issues such as skin damage and blemishes, but cannot make health claims (without complying with strict pharmaceutical requirements).
- Health products (e.g. food supplements and herbal teas) which help improve the immune system, are increasingly popular to prevent illnesses and to ensure general health and well-being. This is further supported by Europe's aging population and rising health care costs. Increasing awareness of the link between the immune system, stress, energy and sleep supports year-round consumption, instead of during flu season.

- Supplement producers are looking for ways to differentiate their products on the market. A strong dossier of traditional use at the origin is important to communicate to consumers.
- Demand for botanical supplements continues to grow based on the consumer believe that these are healthier and safer options for long-term use than synthetic alternatives.

EU demand

Even though the regulatory framework for yellow lapacho is unclear, it is sold as a food supplement by some EU companies. For example, the [Energy Group, a.s.](#), a Czech producer of natural herbal products and food supplements, sells yellow lapacho as a herbal tea. This producer has subsidiaries in other European countries as well; however, some of these only use pink Ipe as an ingredient. Outside of Europe, several companies are selling food supplements containing yellow lapacho. These include [Tropilab Inc.](#) (USA), selling yellow lapacho as medicinal tea and tincture and [Shaman's Garden](#) (New Zealand), selling capsules and powdered form of yellow lapacho.

Conversely, purple or pink Ipe is sold to a broader extent as food supplements (herbal tea, capsules or tincture) both in Europe and outside of Europe. Examples of European companies include [Salus Natur-Arzneimittle GmbH & Co](#) (Germany) and [Health Aid](#) (the UK). In the USA, which has a larger market for these botanicals in food supplements, companies include [Nature's Answer](#), [Traditional Medicinals](#), as well as the [Monterey Bay Spice company](#), which sells pink Ipe as a powder and tea.

Pink Ipe is also sold as a botanical ingredient for cosmetics by [Naturex](#) (France), one of the main companies developing botanical ingredients for food, cosmetics and pharmaceutical industries. [Phiwana](#) (Germany), a subsidiary of the Czech Energy Group a.s., uses pink Ipe in one of their toothpastes.

Price and price developments

No price information available.

Opportunities and threats

Opportunities:

- Industry sources indicated that pink Ipe has well-publicised sustainability issues, due to its wide use in the timber sector. In turn, yellow lapacho could be offered as an alternative source, with a better sustainability profile. Moreover, harvesting the bark for use in the health and cosmetic segments is not as detrimental for the species' survival as logging.
- In this respect, yellow lapacho can be marketed under a sustainable management scheme, which ensures future availability and traceability to the source. Such a management system should be properly documented and preferably certified (e.g. FairWild certification). The combination with Forest Stewardship Council (FSC) certification for the forest area could offer additional sustainable marketing opportunities, as yellow lapacho is also used by the timber industry.
- The use of yellow lapacho as a food supplement or herbal tea, does not require extensive processing or extraction (i.e. the dried bark is used for these purposes).
- Traditional use of yellow lapacho in fighting infections and skin affections adds to the marketing story of the tree product in health and cosmetic segments in Europe.

Threats:

- The scattered distribution of yellow lapacho trees in the wild presents a logistical challenge to collectors / producers.
- The demand stemming from the timber industry represents a threat to the sustainable harvest for yellow lapacho bark.
- In spite of its potential applications, the regulatory framework for yellow lapacho for food (supplement) use is unclear.
- Further processing of yellow lapacho bark for cosmetic segments involves solvent extraction, which is deemed beyond the scope of collector communities.

Recommendations when supporting the yellow lapacho chain

Support needs of producers:

For exports to Europe, SME producers need to focus on both production in the country of origin and the demand side in Europe. In terms of production, sustainability and value addition opportunities are

important. Regarding European demand, SME producers need to place their product on the market appropriately.

- A feasibility research based on SME/community capacities is needed to assess their possibilities to extract yellow lapacho bark in the future. Partnerships with processors in the region could be an option.
- SME producers should determine the additional opportunities for residual products in harvesting yellow lapacho for timber production, e.g. sawdust for use in herbal teas.
- A feasibility based on SME/community capacities is needed to shed light into whether they could export themselves or should be linked to exporters.
- SME producers need to be accurate when referring to both the botanical and common names used for yellow lapacho, as these are sometimes used interchangeably. For example, pau d'arco is used as a common name for various *Tabebuia spp.*
- Moreover, to add to the marketing story of yellow lapacho, SME producers can build on the tree image, benefits to local communities and traditional use.
- Linking up with EU companies could facilitate the process for clarifying the regulatory framework for yellow lapacho in food (supplements) use. If application for Novel Food status is necessary, EU companies have the capacity to do so, whereas this is deemed beyond the scope of SME producers/community capacities.

Support needs to ensure sustainability:

- Resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers.
- It is recommended to determine the potential to obtain organic or FairWild certification, possibly combined with FSC certification for the forest area, to ensure sustainable collection and improve the USP for wild-collected yellow lapacho.
- Yellow lapacho offers an interesting sustainability proposition to EU companies already engaged in the trade and processing of pink ipe in health or cosmetic segments.
- SME producers of yellow lapacho need to make a clear separation from pink lapacho in the marketing story and positioning on the EU market, as trade of this specie is seen as unsustainable.

KRAMERIA LAPPACEA

Product definition

Peruvian rhatany (*Krameria lappacea*, syn. *K. triandra*) is a slow-growing, low shrub, which grows in semi-desert areas on mountain slopes of the Andes, at elevations of up to 3,600 m above sea level. As the plant is semi-parasitic, it needs a host plant in order to survive, for which a variety of host plants have been identified (Brokam e.a., 2012). The plant is found in Peru, southern Ecuador, northern Argentina, Chile and Bolivia. However, as of yet, Peru is the main source for commercial production of rhatany.

Krameria lappacea



Source: Dr. Hauschka

Traditionally, the plant has been used for traditional medicine and as a natural dye plant, due to its high tannin content. The root and its derivatives were used to treat inflammation, minor injuries, digestive issues, mouth ulcers and to clean teeth. Between 1850 and 1920 the plant became well known and used in Europe for treating internal problems, mostly in dental care.

Dried rhatany roots



Source: Wikipedia

For use in domestic and international market, the roots of rhatany are harvested and dried. The roots reaches a minimum size for harvest when the plant is 8-15 years old. As commercial interest is in its roots, the entire plant is harvested leaving the plant no chance to regenerate after harvesting. The red roots contain tannins and neolignans, which are the likely cause for its pharmaceutical effect. For use in cosmetics and pharmaceuticals, an extract or tincture is obtained with solvent extraction of the roots.

Due to extensive and unsustainable harvesting, particularly in Peru, natural availability of rhatany has substantially declined in collection areas. As such, there are issues in sustainability that need to be addressed by collectors and SME producers of rhatany roots.

Segments

According to industry sources, rhatany is mostly used for its astringent and antiseptic properties. In addition, research has identified anti-inflammatory properties (Brokamp, 2013). It is most commonly used in dental care products, such as toothpaste and mouthwash. In Europe, these products are generally categorised as cosmetic products. Therefore, for these ingredients, the INCI name of rhatany is used; *Krameria triandra* root extract. However, if such a product would be marketed with medicinal claims, such as treating sensitive teeth or containing an active ingredient, it is categorised as a medicinal product. In this case, it is subject to medicinal legislation.

Rhatany is registered in the European Pharmacopoeia as Rhatany root and as Rhatany tincture. As such, it is used in the pharmaceutical segment in Europe as well. In this segment, the root and tincture are used to treat minor inflammations of the mouth and throat, such as stomatitis, gingivitis and pharyngitis (ESCOMP Monographs 2nd Edition Supplement, 2009). In addition, the root is allowed for use in food supplements in Europe. However, potential in these health segments is deemed limited when compared to the cosmetics segment.

Trends

Rhatany has an established market in Europe, which is unlikely to change much in the future. As such, there are no relevant trends on the market side.

EU demand

Peru, the main supplier of rhatany, exports around 30 tonnes of roots annually ([Brokam e.a., 2012](#)). Most exports go to Germany, where rhatany extracts are produced and re-exported. Other importers are France, Spain and the USA.

The main European company that uses rhatany as an ingredient is [Weleda AG](#), an international producer of natural cosmetics and pharmaceuticals. In a private-public-partnership with the German institute GTZ (Gesellschaft für Technische Zusammenarbeit), research has been undertaken to develop a harvest protocol with best collection practices and which defined sustainable levels of harvesting in a designated collection area. Together with INRENA (Peru's National Institute for Natural Resources), Weleda AG has established a protected area for collection in Peru of 2,000 ha. For this area, a maximum allowed harvest of 2 tonnes was established.

Other users of rhatany include [Parodontax](#), part of [GlaxoSmithKline](#), and [Wala Heilmittel GmbH](#), under the brand [Dr. Hauschka Med.](#)

Price and price developments

No price information available.

Opportunities and threats

Opportunities:

- There is a good market for rhatany roots and extracts in Europe.
- There is substantial opportunity for new players to enter the market if they can show a sustainable management scheme which ensures future availability and traceability to the source. Such a management system should be properly documented and preferably certified (e.g. FairWild certification).

Threats:

- Due to overharvesting in certain areas in Peru, wild availability of rhatany has declined substantially.
- As further processing of rhatany involves solvent extraction, this is deemed outside of the scope of SMEs and collector's communities capabilities.

Recommendations when supporting the rhatany chain

Support needs of producers:

- Further processing, especially according to GMP standards, will probably be outside of the scope of SMEs and collector's communities. Building such capacities at a sustainable scale might not be

feasible considering limited raw material availability. Partnerships with exporters and processors in the region could be an option.

Support needs to ensure sustainability:

Ensuring a sustainable supply of rhatany is key for future availability of the species. Research has determined that cultivation of rhatany is theoretically possible, but not economically viable. This is the result of the need for host plants in cultivating rhatany, as well as its slow growth.

- A management plan needs to be developed on sustainable collection of rhatany, as has been developed for Peru by [Botconsult GmbH](#) in cooperation with Weleda AG and GTZ. This management plan covered the protected collection area in Arequipa, established by Weleda AG and INRENA in 2003.
- Resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers. Certification according to the FairWild standard could further build this case.
- Research conducted by Weleda AG and GTZ indicates that for sustainable harvesting of rhatany, yield should not exceed 5% in a collection area ([Weleda, 2008](#)).
- In addition, this research has led to the recommendation of enrichment planting. This involves sowing seeds of rhatany during harvesting process, as well as refilling excavation holes.
- Furthermore, in order to allow regeneration of the plant, only the roots should be harvested at a minimum of 8-15 years old, as described in the Product Definition.
- Certification of sustainability practices through FairWild can help to support the credibility of sustainability schemes to buyers.

PRUNUS AFRICANA

Product definition

Prunus africana (syn. *Pygeum africanum*), more commonly known as (red) stinkwood or pygeum, is an evergreen tree which grows naturally in tropical and sub-tropical Africa, particularly in Eastern Africa. In Tanzania it grows in the Eastern Arc Mountains and several other highland areas. In Mozambique it is found to a lesser extent, particularly in Drakensberg. The tree has a broad but fragmented distribution as it is limited to an annual temperature range of 18-26°C, annual rainfall from 890-2,600 mm and at an elevation of 900-3,400m.

Originally, harvest of the bark was for subsistence and local use, which has shifted in the last 40 years to large-scale commercial use for international trade. Red stinkwood trees are used in local traditional medicine (bark) and for hardwood. Its fruits are a food source for endemic birds and mammals. Harvesting of red stinkwood bark is undertaken from standing trees, with the majority of trees being stripped to a height of 3-4 m, often from the complete trunk. This extensive bark removal is a cause of considerable die-back in the tree crowns.

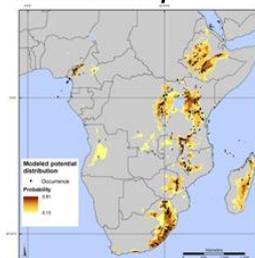
Not only are the environments in which it grows under various threats, the tree itself is prone to illegal logging, whereas the bark is sold as a “by-product”. Moreover, due to improper and overharvesting of the bark for export to pharmaceutical industries, red stinkwood is on the list of endangered species since 1995 (CITES appendix II). In Tanzania specifically, the tree is mentioned to be “of urgent concern”. Industry sources state that a resource management plan and proper implementation are needed for harvesting and export of red stinkwood products.

Segments

Most potential for red stinkwood is in pharmaceuticals. The bark of red stinkwood is registered in the European Pharmacopoeia and a rapporteur is assigned to assess it for a Community herbal monograph to facilitate its use in herbal medicine.

Medicinal products from the bark are used to treat benign prostatic hyperplasia. According to industry sources, use as food supplements is only possible in Africa,

Red stinkwood distribution map



Source: Vinceti e.a., 2013

Red stinkwood



Source: AfricaMuseum.be

since European legislation is too restrictive as it is considered a medicine. However, according to country lists of ingredients for food supplements, red stinkwood bark is allowed for use in food supplements in Belgium and France (with a notification to consult health professional before use).

CosIng lists red stinkwood as having skin conditioning properties. However, potential in cosmetic segments is limited when compared to pharmaceutical segments, considering its high price and limited availability. As red stinkwood is not allowed under Novel Food Regulation, it is not allowed for use in food products in Europe.

Trends

Red stinkwood has an established market in Europe, which is unlikely to change much in the future. Moreover, due to stringent legislative requirements, the pharmaceutical segment is not a trend-sensitive segment. Therefore, there are no relevant trends on the European market for SME producers of stinkwood.

EU demand

Retail value of *Prunus africana* products is estimated at over USD 200 million annually, and possibly considerably more. In Cameroon in 2005 (the peak year for export), the value of the trade was estimated at around USD 500,000 at harvester level and USD 3 million at export level ([CITES, 2008](#)).

Large traders in Hamburg control the bulk of sales of raw materials of red stinkwood, such as [Paul Muggenburg](#). Industry sources indicate that there is an established pharmaceutical market, which is concentrated in a few large players. These include [Indena](#) (Italy), with further downstream pharmaceutical companies such as [Abbott Products SAS](#) and [Mylan SAS](#).

Main red stinkwood for export originates in Cameroon. At 3,500 tonnes a year, red stinkwood bark harvesting is relatively large compared to other tree species.

Price and price developments

No price information is available

Opportunities and threats

Opportunities:

- There is a good market for red stinkwood bark and extracts in Europe.
- There is substantial opportunity for new players to enter the market if they can show a sustainable management scheme which ensures future availability and traceability to the source. Such a management system should be properly documented and preferably certified (e.g. FairWild certification).
- Vinceti e.a. ([2013](#)) indicated that populations in Kenya and Tanzania are of great conservation value and sustainable management of these sources is of high importance.

Threats:

- Overharvesting of red stinkwood has led to inclusion of the species in [Appendix II of CITES](#), meaning that export permits are required before the tree or its products can be exported.
- Additionally, CITES has recommended a suspension of trade in red stinkwood from Tanzania (the CITES Standing Committee has recommended member states not to except permits from Tanzania). The reason for this suspension is that the country has not complied with [article IV](#) of the Convention (Regulation of trade in specimens included in Annex II). More specifically, the country is lacking in the [regulation and monitoring of export permits](#) and demonstrating that trade in the species is not detrimental to its survival.
- In addition to overharvesting of red stinkwood, the forests in which it grows are unsustainably managed.
- According to analysis on the populations of red stinkwood in Africa, future supplies of the tree may further decline due to climate changes ([Vinceti e.a., 2013](#)).
- Value addition opportunities in terms of further processing are limited. Industry sources signalled that to produce red stinkwood extracts for medicinal purposes, extraction and spray-drying equipment is required.

Recommendations when supporting the red stinkwood chain

Support needs of producers:

Given the endangered profile of red stinkwood, recommendations for producers revolve around efforts to ensure sustainability as listed below.

Support needs to ensure sustainability:

The trade suspension needs to be lifted if legal exports of red stinkwood from Tanzania are to resume. In order to accomplish this, several steps need to be taken. Some of these are not possible to achieve by SME's alone, such as the change in legislation and supervision in Tanzania.

- The CITES Standing Committee has set up a [Working Group in 2008](#) to guide several African countries in the implementation of CITES for red stinkwood. As of yet, Tanzania has not sufficiently implemented the convention of CITES. Lessons can be learned from experiences in Cameroon in terms of [management plans](#) and [resource assessments](#).
- Tanzania needs to demonstrate [compliance with paragraphs 2a and 3](#) on export permits for red stinkwood and the responsibilities of the Scientific Authority.
- A management plan needs to be developed, as has been developed for Cameroon by CIFOR in cooperation with GTZ and TRAFFIC. To implement the recommendations of CITES Standing Committee in 2008, CITES has developed [Guidelines for a management plan](#), on a national level.
- Resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers. Certification according to the FairWild standards could further build this case.
- According to industry sources, a feasibility study should be conducted to determine whether there is sufficient potential for SME producers in agro-forestry cultivation of red stinkwood. It takes 8 years before obtaining a first harvest.
- Certification of sustainability practices through FairWild can help to support the credibility of sustainability schemes to buyers.

XIMENIA AMERICANA

Product definition

Ximenia americana, also known as yellow or sour plum, is the source for ximenia seed oil. The plant is a shrub or small tree which originated in Central America, but is naturalised and widespread across southern Africa, South America and Australasia as well. It grows in semi-desert, open country at low altitudes, such as coastal savannahs and plains. Ximenia is drought resistant and produces flowers and fruits throughout the year. In Southern Africa, another Ximenia species, *Ximenia caffra* is used in a similar manner as *americana*, but this species is not known in Europe, therefore, this study focuses on *Ximenia americana*.

Ximenia fruit



Source:
Acguanacaste

Fruits of ximenia are oval and green, turning yellow to orange/red upon ripening.

The fruits contain a juicy pulp which is high in vitamin C. The fruits are traditionally eaten raw and used for food products, such as jellies and drinks. The tree is used as firewood and for charcoal production.

The tree yields approximately 50kg of fruits per year, which are wild harvested. After harvest, the seed kernels are removed. Ximenia seeds have a fatty kernel with a brittle shell. The kernels yield a pale yellow oil at a rate of 60-70%. Its fatty acid composition is mainly made up of oleic (54-72%), stearic (4-15%), linoleic (1-10%) and linolenic (10%) acids. In addition, it contains the active component ximenynic acid, which is claimed to have anti-inflammatory properties ([Vermaak e.a., 2011](#)). Traditionally, the oil has been used as an emollient and a skin and hair conditioner.

Locally, other parts of the plant are used as well. The roots, leaves and twigs are used in traditional herbal medicinal. Herbal medicinal uses for the roots include skin problems, ulcers, abdominal pains and haemorrhoids. Leaves and twigs are used to treat fever, headaches, toothache, angina and constipation. The bark and roots are used to tan leather as they are high in tannin. Additionally, essential oils can be extracted from the heartwood, flowers and bark.

Segments

Ximenia seed oil has most potential in the cosmetic sector. Currently, it is not allowed in Europe as a medicinal, food or food supplement product. Registering the oil for these segments is complicated and deemed beyond the scope of collectors and small producer organisations.

Under INCI it is registered as having emollient and masking properties. In addition, it has been reported to have anti-inflammatory and anti-aging properties. As such, ximenia oil has potential in skin care products, especially in anti-aging and sun care products. Final products include moisturisers, face and eye creams, after-sun products, body oil, lip balms and soap. Its conditioning properties can also be used in hair care products, such as hair oils and conditioners. Additionally, the oil has potential in cosmeceuticals as well (chapter 3), with its anti-inflammatory properties to use on eczema and blisters.

Trends

- In the cosmetic segment, the popularity of natural ingredients is rising.
- For cosmetics products, especially in skin care, there is a continually strong demand for ingredients which help combat the signs of aging.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories.
- Cosmeceuticals are in growing demand. These medicinal-cosmetics hybrids tackle issues such as skin damage and blemishes, but cannot make health claims (without complying with strict pharmaceutical requirements).

EU demand

Industry sources state that ximenia oil is not traded as a bulk botanical, but rather as specialty. These sources also indicate that the oil contains microbes which are difficult to remove with filtration. As such, refining of ximenia oil is required, before the oil is used in ingredients, which reduces its use in the market. It is estimated that, globally, less than 3 tonnes of ximenia oil is produced per year ([The Pure Oils Company](#)).

Members of [Phytotrade Africa](#) in Namibia and Swaziland produce the oil, such as [Swazi Secrets](#). According to industry sources, producer groups in Ghana and Swaziland produce ximenia oil as well, which is sourced by [Sheabutter Cottage](#).

In terms of cosmetics, sources pointed towards various cosmetic manufacturers, who use the oil as an ingredient. These include the [Body Shop](#), [Melvita](#) and [Tautropfen](#).

[Indena](#), one of the largest EU ingredient producers for pharmaceutical, food and cosmetic segments, offers a cosmetic ingredient called [Ximenoil](#). This ingredient contains ximenynic acid as well as polyunsaturated fatty acids. Even though it is derived from sandalwood (*Santalum album*), ximenia could have potential as an alternative to sandalwood, as it also contains ximenynic acid, and is a much cheaper source.

Price and price developments

Most recent price information dates from 2010. Wild-collected, uncertified crude ximenia oil from Southern Africa was priced at US\$ 36.50 per kg (around € 26.50). Research in Ethiopia stated that wild-collectors of ximenia fruits collected on average 50 kg of fruit per year, which represented an average income of US\$ 186 per year ([Feyssa e.a., 2012](#)).

Opportunities and threats

Opportunities:

- Certification offers opportunities for local value addition. According to industry experts, there is a potential to organically certify ximenia oil as organic oil exists on the market (from Phytotrade Africa). However, further refining, depending on the method of refining, could make the oil unsuitable for this segment.
- Ximenia's contribution to rural livelihoods can be substantial due to its potential for food use and a source of cash income. Products from the tree have multiple cosmetic, medicinal and nutritive uses.
- Ximenia seeds have a high oil yield.
- Natural regeneration capacity of ximenia is good, indicating that with sustainable management it is possible to secure future supplies.

- Ximenia oil can be used in a wide range of cosmetic products, most importantly in anti-aging skin care products or cosmeceuticals for its anti-inflammatory properties.

Threats:

- A study in Ethiopia showed that ximenia is threatened as the roots and bark are used in herbal medicine and were overexploited (Feyssa e.a., 2012). In addition, it reported that the trees were threatened by agricultural expansion. Care should be taken in sustainable collection of the fruits in Mozambique and Tanzania, as these are potential problems in these countries as well.
- Refining processes or further (high-tech) filtering of ximenia oil is often required for cosmetic use. This reduces its potential in the market as many competing oils do not require this.
- Although not done extensively, it is possible to cultivate ximenia trees. SME producers of ximenia oil can face competition from cultivated sources in the future if demand for the oil or other products from the tree increase.

Recommendations when supporting the ximenia chain

Support needs of producers:

- Producers need to identify the exact species and its relation to products demanded by European cosmetic producers. If producing *Ximenia caffra*, SMEs need to determine whether buyers in Europe are also accepting oil from this specie as ximenia oil. Swazi Secrets, for example uses oil from both species in its products, while in Europe, producers mention *Ximenia americana* seed oil specifically.
- Marketing stories can be used to position ximenia oil in the cosmetic segment. These should focus on the wild-collection of the fruits and their benefits to local communities, its traditional use and the oil's anti-inflammatory properties.
- In Southern Africa, wild-collection and processing of ximenia fruits is well organised. This is done through the trade association PhytoTrade. In addition, the oil requires refining, which can be done by South African companies or by European companies. SME producers in Mozambique and Tanzania should determine their possibility to join this trade association or supply South African companies to ease access to European markets. Another option is to link to exporters in their own country or region.

Support needs to ensure sustainability:

- Although sustainability issues are limited for ximenia oil, establishing sustainable collection practices can ensure this situation continues in the future. Standard operating procedures are needed to ensure sustainable collection and continued availability. This should be documented to build trust with buyers.
- SME producers need to determine their ability to certify ximenia oil, with organic certification or FairWild. According to industry sources, this should be possible. These certifications, especially FairWild, can help to support the credibility of sustainability schemes to buyers and can add to the marketing story when targeting the cosmetics sector.

MELALEUCA LEUCADENDRA

Product definition

The cajuput tree (*Melaleuca cajuputi*; syn. *M. leucadendra* and *M. leucadendron*) is an evergreen tree which occurs in South-East Asia and Australia. As the tree is known under various botanical names, its true origin is unclear. In addition, it has been cultivated in Asia for several centuries, clouding the limits of its natural range. It grows in Malaysia, Indonesia, Australia, Papua New Guinea, from Malaysia to Thailand and Vietnam. According to industry sources, the cajuput tree found in Vietnam is known as *M. cajuputi*. Generally, the tree is found in swampy coastal areas of countries with tropical climates. The tree is also cultivated as an ornamental tree.

An essential oil is obtained from the leaves and twigs of the tree with steam distillation, generating 1kg of essential oil per 100kg raw material. Leaves can be harvested throughout the year. Depending on its origin, chemical composition of cajuput oil differs. The main constituent is cineol, which should account for 45-55 % of the oil.

Cajuput tree



Source: Antica
Erboristeria Romana

Traditionally, the leaves of the cajeput tree are used against pain, burns, colds, influenza and dyspepsia. Wood of the tree itself is used in construction of houses.

Segments

According to industry sources, main potential for cajeput oil is in cosmetics, particularly in fragrances and perfumery, with some uses in aromatherapy as well. For use in cosmetics, several products derived from the tree are registered with having masking, perfuming or tonic properties. These include extracts and essential oil derived from cajeput leaves. In addition, cajeput fruit extracts are registered as having skin conditioning properties and can be used in various skin care products.

According to industry sources, there are no obstacles for the use of cajeput oil in the food segment, where its main uses are in beverage flavourings. In addition, cajeput tree is allowed for food supplement use in several countries, including Belgium, France and Italy. For this use, the tree is referred to as *M. cajuputti*. For use in food supplements, leaves and twigs are allowed. In Italy, bark and oil are also allowed for use. However, applications for cajeput are deemed limited in food supplements.

Cajeput is not registered in the European Pharmacopoeia, as such it is not allowed for use in pharmaceuticals. A different species in the genus, tea tree oil, is registered for pharmaceutical use under the name *Melaleuca aetheroleum*. However, this does not cover cajeput oil as the chemical composition registered is too different from cajeput oil.

Trends

- In Europe, there is an increasing consumer interest for natural ingredients in cosmetics, the global natural cosmetics sector is estimated to grow by 5-9% annually.
- There is a growing interest in ethically sourced and sustainable products. In addition, consumers are interested in the story beyond ethical certification. In their marketing, cosmetic producers actively communicate the best stories for their ingredients, to improve the connection with the consumer. Communication is done graphically, with short stories on the product, or in the producer's corporate image.
- Cosmetic producers are looking for ways to differentiate their products on the market, amongst others in terms of specific marketing stories, and evocative names.
- The global fragrance industry is interested in natural products to replace synthetic ingredients, but quality consistency, sufficient supplies, stability, and user friendliness need to be assured.

EU demand

According to industry sources, there is a substantial shortage on the market for cajeput oil. Indonesia and Vietnam are the main sources for cajeput oil, with a difference in qualities of the oil. Traditionally, there has been a preference for oils from Indonesia, but due to decreased supplies and lower availability of pure cajeput oil, buyers are switching to Vietnamese sources. Industry sources indicated that Indonesia has local demand for the oil as well, for religious purposes.

UNIDO (2006) reported that Vietnam exports 10-12 tonnes of cajeput oil. Industry sources indicated that currently, exports from Vietnam have increased to 20 tonnes, to cover supply decreases from Indonesia. These exports are all from wild-harvested sources. European demand is estimated at a few tens of tonnes annually. Main destinations of essential oil exports from Vietnam are France, the Netherlands and Japan (UNIDO, 2006).

As a functional ingredient for cosmetics, cajeput oil is traded by EU buyers such as [Inovia International](#) and [VossenBio](#). Cajeput oil is also sold for aromatherapy use, for example by [Pravera](#) under the brand Primavera Skin Care and Aromatherapy, [Aromed](#) and [Herbacos](#).

Price and price developments

According to industry sources, cultivated conventional cajeput oil is priced at around € 10-11 per kg.

Opportunities and threats

Opportunities:

- As industry sources have indicated a shortage on the market for cajeput oil, SME producers that can supply sustainably sourced cajeput oil are at an advantage.
- More specifically, supplies of cajeput oil from Indonesia, one of the main producers, have declined in the last few years. As a result, EU buyers are increasingly looking for supplies in Vietnam.
- There is a potential for certification standards (organic, FairWild or Fairtrade) in cajeput production. These certifications can also facilitate market access to producers, by showing sustainable collection practices to potential buyers and contribute to the marketing story.
- Cajeput oil is sometimes adulterated, for example by using rosemary and turpentine oils which are dyed and infused with camphor. Producers of cajeput oil who can demonstrate that they sell the genuine, unadulterated essential oil and ensure traceability of the oil, have a competitive advantage.

Threats:

- There are some conservation concerns for collection of cajeput leaves in the Mekong Delta. According to the [World Agroforestry Centre](#), the cajeput forests in this region lose around 5,000 ha of the remaining 120,000 ha annually, due to illegal cutting and burning.
- Cajeput oil competes with lower priced alternatives such as eucalyptus oil, which have high content of cineol.
- In addition, cajeput oil competes with cultivated sources as well. For example, a newspaper in Vietnam reported that a cajeput tree plantation of 10,000 ha exists in the south of Vietnam, with trees destined for wood production ([Viet Nam News, 2012](#)). These trees could also be used for the production of cajeput oil.

Recommendations for SME producers

Support needs of producers:

- Producers need to identify the exact species and its relation to European standards (e.g. compared to Pharmacopeia etc.) through herbarium vouchers confirmed by competent authorities.
- A feasibility based on SME/community capacities is needed to shed light into which segments producers can compete in (cosmetics, food) and whether they could export themselves or should be linked to exporters. As requirements on product quality standards are lower for cosmetic ingredients, it might be more feasible to initially target cosmetic ingredient buyers.
- Furthermore, SME producers need to determine their current or potential future capacity of distillation of cajeput leaves. If distillation is not feasible, partnerships with exporters and processors in the region could be an option.
- As adulteration of cajeput oil from Indonesia is an issue, SME producers need to ensure that they offer a pure, unadulterated oil. Producers and exporters need to be ready to provide EU buyers with complete product documentation (e.g. safety data sheet, proper species identification) and professional samples.

Support needs to ensure sustainability:

- Sustainability issues in overharvesting are limited, as collection of cajeput leaves for oil production does not harm regeneration of the tree. However, as described under the threats for cajeput oil, some conservation concerns exist for cajeput trees due to illegal cutting and burning. Therefore, resource mapping and management is needed to ensure sustainable wild-collection according to GACP standards. Wild-collection needs to be based on standard operating procedures to ensure continued availability. This should be documented to build trust with buyers.
- Certification of wild collection is an interesting proposition for wild-collected cajeput. This could be done through organic wild collection, or with FairWild certification. The latter is important to establish standard operating procedures to ensure continued availability. This also requires resource mapping and management which should be documented to build trust with buyers.

9. Conclusions

This study was focused on answering the question “*What is the commercial potential for wild-collected botanicals for BTC target groups through sustainable trade schemes*”. Furthermore, Chapter 8 recommended 20 key botanicals which allow for “*the development of viable economic alternatives for the local communities*”.

Different countries with different approaches

Looking at development and commercial potential requires the analysis of both the supply and the demand context. Chapter 2 provided the context on the supply side. It showed that the six countries researched differ greatly in terms of the development of the domestic and/or export oriented wild-botanical sector. Differences are also large in terms of the legislative framework for access and sustainable use of wild resources, and especially the implementation and enforcement of this framework on the ground. As such, the countries differ in terms of the pressure put on wild resources, as well as their capacity to manage these pressures with appropriate systems.

The research showed that development of the industry is at an advanced stage in Latin America (although focused more on export of raw materials and derivatives), and in Vietnam (increasingly focused on supplying regional and local (herbal medicine) markets with final products). In these more developed countries, (sustainable) use of wild resources is much higher on the policy agenda and has been supported by various programmes of donors and national governments. This has resulted in a vibrant industry with links to wild-collection and cultivating communities, especially in Peru and Vietnam. However, also their governments, institutions, companies and communities have not always been successful in ensuring sustainable supply and avoid a reduction in wild availability. This occurs especially when commercial interest takes off strongly (e.g. Brazil nut, dragon’s blood, rosewood).

- ➔ *It is both required and imperative in these countries to consider resource assessment and resource management when engaging with local communities to develop income generation activities based on wild resources.*

In contrast, the organisation of collection, trade, processing and export of wild collected botanicals is in a more nascent state in Tanzania and especially Mozambique. The actual situation on the ground requires additional research. On the other hand, various species have been identified as having a high potential, such as Baobab and Marula, while other species are long established on the European market such as *Prunus africana*.

Both countries have established legislative frameworks for resource use, but its implementation on the ground is unclear. In Tanzania, wild-availability of some species have come under pressure due to high demand from North America and Europe, whereas in Mozambique civil strife led to the non-accessibility to wild resources and the lack of a knowledge base. Communities in these African countries often lack information on what to collect and how the value chain is structured downstream, including issues related to international market access.

- ➔ *Although in these countries sustainable resource management is important to ensure future supply, attention is especially needed for value chain development. Communities should be linked to distribution channels; either linking them to processors and exporters in their own countries, or to market players in better developed countries in the region (Kenya, South Africa) is a key aspect.*

EU demand for wild-collected ingredients

As chapter 6 reported there has been an increase in EU imports of botanicals in the last few years, for both raw materials and derivatives thereof. Suppliers in developing countries (DCs) play a particularly large role in supplies of MAPs, tanning extracts, essential oils and natural gums and resins. Regarding wild-collected botanicals and derivatives, industry sources across the food, health and cosmetic segments indicated that there is a growing demand for these ingredients. Demand stems from the superior nutritious quality of these ingredients, active properties and marketing story when compared to cultivated varieties.

Furthermore, EU demand and potential has been identified for the species in the priority list presented in chapter 8. For several species on this list, a high international demand was even the main cause for its supply shortages and sustainability. For example, red stinkwood, rosewood and dragon's blood all suffered from overharvesting due to their popularity on the market.

Sustainability views across different industry segments

To do justice to different biodiversity in the focus countries, it was needed to take a broader perspective to botanicals. As such, the study not only considered medicinal and aromatic plants for medicine, but also looked at a wider diversity of wild plants (oil seeds and fruits, resins) for a variety of segments, including cosmetics, food supplements and herbal medicine.

What becomes apparent when considering these different segments is that the value of sustainability is different, but that it adds value in all of them. This can be, for example, in terms of higher prices, product differentiation, facilitated market access or increasing trust with buyers.

In general, industry sources indicate that certified wild-collected ingredients (organic, FairWild) are in short supply on the European market, which makes it risky for manufacturers to develop certified consumer products. However, they expect that supply will be further broadened and intensified, which will make companies increasingly interested in buying (more) certified wild-collected ingredients.

In terms of sustainability, the pharmaceutical market is especially focussed on supply security. **Pharmaceutical (and herbal medicine)** companies spend great sums of money on product development and market authorisation of each product they put on the market. Changing suppliers is expensive, as market authorisations are linked to specific raw material sources. As such, the (threat of) species becoming unavailable is a high risk. Showing sustainable sourcing practices is imperative for manufacturers to even consider working with a supplier.

In terms of certification, FairWild can provide a framework to show sustainable resource management of wild plants and can help to build trust. However, sustainable supply can also be shown in terms of standard operating procedures and their proper documentation, without being necessarily certified. The actual certifications such as FairWild (and organic for cultivated sources) have limited value to companies working in these segments as they are not allowed to label their final products accordingly. However, some European herbal medicine companies (only) use organic ingredients to adhere to their company philosophy. FairWild could potentially contribute to such a company philosophy by covering their wild collected raw materials.

Certification is much more common for food and **food supplements**, as well as herbal teas. Organic is increasingly important for these segments, especially in Western and northern Europe. At the same time, Fair Trade (for cultivated) and FairWild certification can help to ensure to buyers that production of ingredients products does not harm local communities, which could jeopardize the buyer's image. Currently, Fair Trade systems are most established in the herbal tea market.

Next to certification, the product's story (e.g. in terms of production process, benefits to the community, exotic origin, etc) has a value in these segments as well. It is important to note that in general, the more 'medicinal' a product is, the less interest there will be in the ethical and environmental aspects of its production, as consumers of health products are principally focused on its functional characteristics and less so on fair practices along its supply chain.

In **cosmetics**, certification showing sustainable production is growing the fastest. Entering the market with new ingredients, especially products originating from biodiversity will bring a certain sustainability expectation from consumers. The most established is organic certification, while Fair Trade certified cosmetics are growing strongly, but are constrained by the limited range of Fair Trade certified ingredients available (especially outside vegetable oils and butters). This makes it more difficult for formulators to develop Fair Trade cosmetics. However, availability is increasing. A possible future equivalency agreement between Fair Trade and FairWild could help solve part of this issue by providing formulators with access to fair wild ingredients. For now, FairWild certified ingredients do not add to the 'fair content' calculation of Fair Trade products.

Industry sources indicated that sustainability and CSR are becoming important across the different segments. In terms of company sourcing policies and procedures, this often involves sending

questionnaires to suppliers in order to determine how they address sustainability in their own sourcing and production processes. These issues are also included in supplier audits, if/ when they take place. In general, however, companies lack active engagement with their suppliers in creating a joint sustainable supply chain; the physical distance to suppliers cannot always be compensated by virtual communication, and buyers often find it difficult to dedicate the same amount of time and resources to individuals in their wide supplier base. In addition, questionnaires/auditing processes do not always make a distinction between cultivated or wild-collected supplies.

Value addition beyond sustainable trade schemes

Next to broadening our perspective in terms of the type of product and the market segment, it is also important to broaden our perspective regarding value addition, and move beyond sustainable trade schemes. Even though sustainability certifications are important for wild-collected species, particularly to compete with cultivated products, product and supplier quality remain of prime importance. As such, the following issues should be considered in any intervention:

- ***Quality management and traceability:*** Different quality management systems apply (Chapter 4), depending on the segment selected. Some (e.g. GACP, GMP for pharmaceuticals; HACCP for food) are required, others (GMP for cosmetics) could facilitate market access by building trust among buyers, or might be required by particular buyers.
- ***Further processing:*** At the moment, most species researched that can easily be exported as raw materials, such as resins, are exported as raw materials without further processing. Close consideration needs to be given to processing opportunities for BTC target communities and SMEs.
 - Such consideration needs to be sensitive to the particular context, to the particular species and to the particular extraction process (e.g. solvent extraction will not be possible at community level, but might be possible within the country of origin).
 - Consideration needs to be paid both to feasibility in terms of human resources for proper quality management and documentation, as well as economic viability (e.g. does it in fact make economic sense to extract in the origin country).
 - Among the priority species, extracting oil from oil seeds and processing baobab pulp into powder offer most potential for value addition at community level as these processes are manageable by small producer organisations. Extraction of essential oils can in cases be done at a community level, while producing other extracts (especially solvent extraction) is not viable. In cases, especially in Latin America and Vietnam, there are processors in the country with such capacities. The required standards and certification increase from cosmetic ingredients, to food ingredients and are highest for pharmaceutical ingredients.
- ***Proper documentation:*** Proper identification of the species and compliance with documentation requirements for the segment targeted and the type of ingredient provided is vital to be successful on the European market and add value to products.
- ***Building the right story for the right segment:*** Manufacturers in Europe, especially those of supplements and cosmetics, need to differentiate themselves from their competition. Stories on traditional use and production practices, community and ecological benefits are important tools for companies to do so. Producer organisations can help building these stories. Especially stories that build connections, for example illustrating the interdependence of people, plants and animals are powerful communication tools.

Differentiated development approach required

Realism is needed in the design of interventions to develop viable economic alternatives for local communities. Capacity building needs can be substantial, in terms of quality control and management, market orientation and selection, building up proper documentation, applying suitable certifications and standards and in terms of marketing and sales. Moreover, resource mapping and establishing resource management plans (including standard operating procedures to ensure sustainable collection practices) is complicated and usually requires external expertise.

Based on an assessment of local capacities, it will need to be determined what can be handled locally, what should be handled by (possible) processors or exporters commercialising or extracting the products, and what should be the role of development programmes. Similarly, the role of buyers should be assessed regarding possibilities to create partnerships in product development and R&D, including elements such as technology transfer (e.g. extraction techniques) and technical assistance (e.g. in improving product quality and product development). Such results could also be achieved with a broader involvement of actors, via Public-Private Partnerships (PPPs).

Additional practical issues that need to be considered in interventions on sustainable collection include:

- Access to wild resources for certifiers (safety, access rights)
- Literacy and cultural differences
- Awareness of the need for sustainable collection
- Resistance in terms of conflicts to traditional practices
- An assessment of domestication practices for the given species, and whether that poses an opportunity to sustainably expand the supply base or a competitive threat to the wild-collected material

Additional research needs

Building linkages between producers and companies processing or commercialising wild botanicals is important. Partnerships with other stakeholders, including universities, NGOs, buyers and donors can provide a vital push to interventions that aim to support commercial activities based on wild resources. Within the scope of this study, no additional research could be done on the availability of such local counterparts. Before interventions are considered, it is recommended to further investigate the potential partnerships with private, public and civil society actors.

During the research stage, several species which also have potential on the European market were identified, reflecting the rich biodiversity of the target countries. As such, the list of species presented in this study is non-exhaustive. Further research into the market opportunities for other wild-collected species would contribute to the expansion of the knowledge base of these resources.

Literature sources

Vietnam

Asian Development Bank (ADB), Viet Nam, Environment and Climate Change Assessment:
<http://www.gms-eoc.org/uploads/resources/237/attachment/ADB%20viet-nam-environment-climate-change.pdf>

Decision 1976/QĐ-TTg, 2013, *Approval of Nationwide Plan of Medicinal Material Development to 2020 and Direction to 2030*

Italian Trade Agency, 2013, Brief Sector Note on Pharmaceutical Industry in Vietnam:
<http://www.ice.it/paes/asia/vietnam/upload/198/Sector%20notes%20on%20Pharmaceutical%20Industry%20in%20Vietnam%20-%20Dec%202013.pdf>

TRAFFIC Greater Mekong Office, Back-to-Office Report – *Mission to the buffer zone of the Nam Xuan Lac Species and Habitat Conservation Area (NXL SHCA) in Bac Kan province* (May 29 to June 5, 2013)

TRAFFIC Southeast Asia Report, 2008, *An Overview of the use of Plants and Animals in Traditional Medicine System in Viet Nam*, compiled by Nguyen Dao Ngoc Van and Nguyen Tap

TRAFFIC Southeast Greater Mekong Programme, *Resource Assessment Report for Almomum and Alpinia Species in the Buffer Zone of Nam Xuan Lac species and Habitat Conservation Area, Cho Don District, Bac Kan Province*, by Ass. Prof. Dr. Nguyen Van Tap

Vietnam BioTrade Project, BTO Report – *Mission to Cao Bang and Lao Cai* (January 20-31, 2013), by Heimo, C.R.

Vietnam Environment Monitor, 2005, Biodiversity:
http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/VN_Env_Monitor_05.pdf

South America: Bolivia, Ecuador, Peru

Biocomercio Andino - <http://www.biocomercioecuador.ec>

Bussman, R., 2013, *The Globalization of Traditional Medicine in Northern Peru: From Shamanism to Molecules*: <http://www.hindawi.com/journals/ecam/2013/291903/>

Convention on Biological Diversity - <http://www.cbd.int>

Coporación Andina de Fomento CAF, 2011, *Experiencias de Biocomercio Sostenible en Bolivia*:
<http://www.productosbiodiversidad.com.bo/images/publicaciones/ExperienciasBiocomercioSostenibleFAN%202010.pdf>

Diario 16, 2011, *PNUD Reconoce a Perú como « Superpotencia de Biodiversidad »*:
<http://diario16.pe/noticia/9747-pnud-reconoce-a-perao-como-superpotencia-de-biodiversidad>

El Día, 2013, *Biocomercio genera \$us 250 millones*:
http://www.boliviarrural.org/index.php?option=com_content&view=article&id=2084:biocomercio-genera-us-250-millones&catid=50&Itemid=41

FAO, 2012, *Aumenta en Perú el comercio de productos de biodiversidad*:
<http://www.fao.org/agronoticias/agro-noticias/detalle/en/c/155840>

Herbario Nacional de Bolivia, 2006, *Plantas medicinales en los Andes de Bolivia*:
<http://www.beisa.dk/Publications/BEISA%20Book%20pdfer/Capitulo%2017.pdf>

La Hora, 2013, *Plantas medicinales de exportación*:
[http://www.lahora.com.ec/index.php/noticias/show/1101583888/-1/Plantas medicinales de exportaci%C3%B3n.html#.UyMTgvldUvx](http://www.lahora.com.ec/index.php/noticias/show/1101583888/-1/Plantas%20medicinales%20de%20exportaci%C3%B3n.html#.UyMTgvldUvx)

No Maderables – Diagnostico: <http://www.biotrade.org/ResourcesNewsAssess/bolivia-assessment-naturalingredients.pdf>

PFNM (Bolivia), Ingredientes Naturales Procedentes de Productos Forestales

The Globalist, 2009, *Health in the Andes: The Modern Role of Traditional Medicine (Part I)*:
<http://www.theglobalist.com/health-in-the-andes-the-modern-role-of-traditional-medicine-part-i/>

Today in Ecuador, 2013, *Ancestral medicine regains favor in Ecuador*:
<http://www.todayinecuador.com/noticias-ecuador/ancestral-medicine-regains-favor-in-ecuador-580023.html>

Transition to a Green Economy: http://www.unep-unctad.org/cbtf/publications/UNEP%20Peru%20Biotrade%20Study%20V_01_%2017%20july%20FINALAN-Clean.pdf

UNEP and UNCTAD, 2011, *The Potential of BioTrade in Peru as a Catalyst for*

UNEP, 2012, *Green Economy and Trade Opportunities*:
[http://www.unep.org/greeneconomy/Portals/88/documents/research_products/Tradeopportunities/Peru%20\(FORMATTED%20v%203\).pdf](http://www.unep.org/greeneconomy/Portals/88/documents/research_products/Tradeopportunities/Peru%20(FORMATTED%20v%203).pdf)

UNIDO report, 2006, *Medicinal Plants Originating in the Andean High Plateau and Central Valleys Region of Bolivia, Ecuador and Peru*: http://www.unido.org/fileadmin/import/58569_medical_final.pdf

Africa: Tanzania and Mozambique

Blomley, R. and Akida, A., FAO, *Trends in Forest Ownership, Forest Resources Tenure and Institutional Arrangements: Are they contributing to better forest management and poverty reduction?*, Case Study from the United Republic of Tanzania, at <http://www.fao.org/forestry/12511-0a38b2dd54443592fd647a92d27de18fc.pdf>

Blomley, T. and Iddi, S., 2009, *Participatory Forest Management in Tanzania*, at <http://www.tzonline.org/pdf/participatoryforestmanagement2009.pdf>

Division of Environment, Vice President's Office, United Republic of Tanzania, 2009, *Fourth National Report on Implementation of Convention on Biological Diversity (CBD)*,

EarthTrends, 2003, *Biodiversity and Protected Areas*, at www.vub.ac.be/klimostoolkit/sites/default/files/documents/tanzania_bd.pdf

Frontier Tanzania Technical Report, 1993, *Medicinal Plants of the Tanzanian Coastal Forest*, compiled by Paul Matthews

Giliba, R.A. e.a., 2010, *non-timber forest Products and their Contribution to Poverty Alleviation and Forest Conservation in Mbulu and Babati Districts – Tanzania*, *Journal of Human Ecology*, 31(2), 73-78, at <http://www.krepublishers.com/02-Journals/JHE/JHE-31-0-000-10-Web/JHE-31-2-000-10-Abst-PDF/JHE-31-2-73-10-2090-Giliba-R-A/JHE-31-2-73-10-2090-Giliba-R-A-Tt.pdf>

Hamisy, W.C., Mwaseba, D., Zilihona, I.E. and Mwihomeke, S.T., 2000, *Status and Domestication Potential of Medicinal Plants in the Uluguru Mountain Area, Tanzania*, Wildlife Conservation Society of Tanzania

Kayombo, E. e.a., 2013, *Prospects and Challenges of Medicinal Plants Conservation and Traditional Medicine in Tanzania*, at <http://www.omicsonline.org/prospects-and-challenges-of-medicinal-plants-conservation-and-traditional-medicine-in-tanzania-antp.1000108.php?aid=19669>

LANDac, 2012, *Mozambique Food Security and Land Governance Factsheet*, compiled by th Royal Tropical Institute in the Netherlands, at <http://www.landgovernance.org/system/files/Mozambique%20Factsheet%20-%202012.pdf>

Marshall, N.T., 1998, *Searching for a Cure: Conservation of Medicinal Wildlife Resources in East and Southern Africa*, TRAFFIC International

MBB Consulting Services South Ltd, in association with African Business Access, 2006, *A Study into the Potential of Aromatic Plants for Essential Oils in Mozambique*,

Mhamba, R. M., and Mbirigenda, S., 2010, *The pharmaceutical industry and access to essential medicines in Tanzania*, EQUINET, at www.equinet africa.org/bibl/docs/DIS83TZN%20medicines%20mhamba.pdf

Ministry for the Coordination of Environmental Affairs, 2009, *The National Report on Implementation of the Convention on Biological Diversity in Mozambique*,

Nahashon, M., 2013, *Conservation of Wild-harvested Medicinal Plant Species in Tanzania*, Uppsala University, Department of Earth Sciences

Owuor, B.O., Kamoga, D., Kung'u, J. and Njoroge, G.N., 2006, *Some Medicinal Trees and Shrubs of Eastern Africa for Sustainable Utilisation and Commercialisation*, ANAFE, ICRAF and Sida

Rights and Resources Initiative at www.rightsandresources.org

UNIDO and Ministry of Industry and Trade of the United Republic of Tanzania, 2012, *Tanzania Industrial Competitiveness Report 2012*, at www.unido.org/fileadmin/user_media/Services/PSD/TanzaniaIndustrialCompetitivenessReport2012-ebook.pdf

UNIDO, 2004, *Compendium of Medicinal and Aromatic Plants*, volume 1, at [http://institute.unido.org/documents/M8_LearningResources/ICS/80.%20Compendium%20of%20Medicinal%20and%20Aromatic%20Plants-%20Africa%20\(vol.%20I\).pdf](http://institute.unido.org/documents/M8_LearningResources/ICS/80.%20Compendium%20of%20Medicinal%20and%20Aromatic%20Plants-%20Africa%20(vol.%20I).pdf)

Wily, L.A. e.a., 1999, *Community-Based Forest Management in Tanzania: An Overview of the Process*.

Winrock International, 2006, *Summary of case study, Tanzania*, at <http://www.profor.info/Documents/pdf/livelihoods/TanzaniaCaseStudy.pdf>

Species factsheets

Amazon Oil, *Pataua Oil* - (*Oenocarpus bataua*, *Arecaceae*): <http://www.amazonoil.com.br/en/products/oils/pataua.htm>

American Botanical Council, www.herbalgram.org

American Herbal Products Association: <http://www.ahpa.org>

BBC, 2003, *Nut harvest sustains Bolivian Amazon*: <http://news.bbc.co.uk/2/hi/business/2807293.stm>

BBC, 2007, *Brazil nuts' path to preservation*: <http://news.bbc.co.uk/2/hi/6298997.stm>

Bhuinya, T., Singh, P. and Mukherjee, S.K., 2010, *Litsea Cubeba - Medicinal Values* – published in J. Trop. Med. Plants. Vol. 11. No. 2 (Dec' 2010):

http://www.academia.edu/841689/LITSEA_CUBEBA_MEDICINAL_VALUES_-_BRIEF_SUMMARY

Brokamp, G., 2013, *Biology, sustainability and socio-economic impact of wild plant collection in NW South America*, Inaugural-Dissertation, Freie Universität Berlin

Brokamp, G., e.a., 2012, *Parasitism and haustorium anatomy of Krameria lappacea (Dombey) Burdet & B.B. Simpson (Krameriaceae), an endangered medicinal plant from the Andean deserts*, Journal of Arid Environments 83, 94-100

Bussmann, R.W. and Zambrana, N.Y., 2012, *Facing global markets – usage changes in Western Amazonian plants: the example of Euterpe precatoria Mart. And E. oleracea Mart.*, Acta Societatis botanicorum Poloniae

Centre for the Promotion of Imports from developing countries (CBI), *Market Intelligence*, http://cbi.eu/marketintel_platform

Chempakam, B. and Balaji, S., 2008, *Star Anise* – published in Parthasarathy: http://eprints.manipal.edu/19/1/Star_Anise.pdf

CIFOR, 2009, *Guidance for a National Prunus africana Management plan*, Cameroon

CITES, 2008, Cunningham, A.B., *Prunus africana: in situ conservation, sustainable management & governance*, <http://www.cites.org/sites/default/files/common/prog/african-cherry/11-CUNNINGHAM.pdf>

CITES, 2008, *Workshop on Implementation of Review of Significant Trade (RST) Recommendations for Prunus africana*, <http://www.cites.org/common/prog/african-cherry/14-NDF-SupportingDocument.pdf>

CITES, 2010, ANAFOR, *Preliminary report on sustainable harvesting of Prunus africana (Rosaceae) in the North West region of Cameroon*,

http://www.itto.int/files/user/cites/cameroon/NDF_Prunus_ANAFOR_North%20west_Cameroon_c.pdf

CITES, 2010, Notification to the parties, *Annotation for Aniba rosaeodora (Brazilian rosewood), Bulnesia sarmientoi (palo santo) and Euphorbia antisiphilitica (candelilla)*,

<http://www.cites.org/eng/notif/2010/E036.pdf>

CITES, 2011, *Aniba rosaeodora* (Decision 15.90), <http://www.cites.org/eng/com/pc/19/E19-16-04.pdf>

CITES, 2011, *IFRA Position on CITES rules for Guaiacwood and Rosewood*,

<http://www.cites.org/sites/default/files/common/com/pc/19/E19i-09.pdf>

CITES, 2012, *Evaluation of the review of significant trade*, (red stinkwood)

<http://www.cites.org/sites/default/files/eng/com/ac-pc/AC26-PC20/E-AC26-PC20-07.pdf>

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),

www.cites.org

Eco Ola, 2013, *Ungurahui Oil - Oenocarpus Bataua – Specifications sheet*: <http://eco-ola.com/specsheets/ungurahui-oil-specsheet.pdf>

Elixens Group, 2011, *Focus: A sustainable and economic alternative*, Market News,

http://www.elixens.com/index.php?option=com_acymailing&ctrl=archive&task=view&mailid=11&key=44b4eaac8c8f9277d10a61a99b907417&tmpl=component&lang=en

- Engels, G., 2011, *Dragon's Blood*, HerbalGram, <http://cms.herbalgram.org/herbalgram/issue92/HerbPro.html?ts=1393162286&signature=066182a8200f6550acae09c03c9fe9e9&ts=1394815770&signature=3cb7ff0e8e26e0385686d92280636a40&ts=1394815771&signature=486997792806fe2d509527f2ccb05f9a>
- ETC Group, 2013, *Potential Impacts of Synthetic Biology on Livelihoods and Biodiversity: Eight Case Studies on Commodity Replacement* – submitted to the Convention on Biological Diversity: [https://www.cbd.int/doc/emerging-issues/emergingissues-2013-07-ETCGroup\(1\)-en.pdf](https://www.cbd.int/doc/emerging-issues/emergingissues-2013-07-ETCGroup(1)-en.pdf)
- ETC Group, 2013, *Synthetic Biology: Livelihoods and Biodiversity - Star Anise*: http://www.etcgroup.org/files/Final_CBD_Star%20Anise_case_study_TA.pdf
- Fairtrade, 2010, *Fairtrade standards for Baobab and Marula*, http://www.fairtrade.net/fileadmin/user_upload/content/2009/resources/2010-07_factsheet_baobab-marula.pdf
- FAO, 1995, Rosewood oil, <http://www.fao.org/docrep/v5350e/v5350e06.htm>
- FAO, *Discussion on Some Non-Wood Forest Products*: <http://www.fao.org/docrep/v0782e/v0782e06.htm>
- FAO, *Litsea Cubeba Oil*: <http://www.fao.org/docrep/v5350e/v5350e09.htm>
- FAO, *Prunus africana: Money growing on trees?*, <http://www.fao.org/forestry/13008-031d7c29d2ea155ae24eaaffaedb07b7a.pdf>
- Feyssa, D. H. e.a., 2012, *Uses and management of Ximenia americana, Olacaceae in semi-arid East Shewa, Ethiopia*, Pakistan Journal of Botany, 44(4), 1177-1184
- Food Navigator, 2002, *EU bans poisonous strains of Star Anise*: <http://www.foodnavigator.com/Legislation/EU-bans-poisonous-strains-of-Star-Anise>
- Gielen Aroma, 2007, *Melaleuca leucadendra*, <http://www.gielenaroma.nl/index.php?page=melaleuca-leucadendra>
- Gruenwald, J., 2009, *Novel botanical ingredients for beverages*, Clinic in Dermatology, 27, 210-216
- Gupta, D., Bleakley, B., and Gupta, R.K., 2008, *Dragon's blood: Botany, chemistry and therapeutic uses*, Journal of Ethnopharmacology, 115, 361-380
- Heinrich, M., Dhanji, T., and Casselman, I., 2011, *Açai (Euterpe oleracea Mart.) – A phytochemical and pharmacological assessment of the species' health claims*, Phytochemistry Letters, 4, 10-21
- Idepro IFD Desarrollo empresarial, 2010, *Cadena productiva de la castaña*: <http://www.idepro.org/castana.html>
- INP Market Bulletin, 2011, *Indigenous Natural Products in Namibia*
- ITC, 2007, *Overview of world production and marketing of organic wild collected products*, Technical paper, http://www.intracen.org/uploadedFiles/intracenorg/Content/Exporters/Sectors/Fair_trade_and_environmental_exports/Biodiversity/Overview_World_Production_Marketing_Organic_Wild_Collected_Products.pdf
- ITC, 2012, *The North American Market for Natural Products; Prospects for Andean and African Products*, Technical paper
- IUCN, 2000, Newsletter of the Medicinal Plant Specialist Group of the IUCN Species Survival Commission

Jiménez-González, F.J., Veloza, L.A. and Sepúlveda-Arias, J.C., 2013, *Anti-infectious activity in plants of the genus Tabebuia*, <http://www.scielo.org.co/pdf/unsc/v18n3/v18n3a02.pdf>

KAITE, *Social Investment in Zimbabwe*, <http://www.oecd.org/greengrowth/19%20Collenberg%20OECD%20191112.pdf>

Krong Heng Yen - Institute Of Research, Development and Commercialization, Universiti Teknologi Mara, Malaysia, 2005, *Essential Oils from Litsea Species*: http://eprints.uitm.edu.my/7366/1/LP_KHONG%20HENG%20YEN%2005_24.PDF

Lohlum, S.A., 2012, *Enhancing the Chemical Composition of Balanites aegyptiaca Seeds through Ethanol Extraction for Use as a Protein Source in Feed Formulation*, *Sustainable Agriculture Research*, 1(2), <http://www.ccsenet.org/journal/index.php/sar/article/viewFile/19301/12762>

May, P. H. and Barata, L.E.S., 2004, *Rosewood Exploitation in the Brazilian Amazon: Options for Sustainable Production*, *Economic Botany*, 58(2), 257-265, <http://www.bioone.org/doi/full/10.1663/0013-0001%282004%29058%5B0257%3AREITBA%5D2.0.CO%3B2>

Natural Futures Programme, 2007, *The Commercial Potential Scale of the Natural Products Sector in Namibia (Sclerocarya birrea, Ximenia spp.)*

Natural Resources Institute (NRI), 2012, *Report on Marketing and Regulatory Opportunities for Africa, (Adansonia digitata)*

New Agriculturalist, 2006, *A good time for Brazil nuts*: <http://www.new-ag.info/en/focus/focusItem.php?a=1083>

OECD, *Aid-For-Trade: Case Story*, <http://www.oecd.org/aidfortrade/47764748.pdf>

Oils and Plants, www.oilsandplants.com

Okia, C.A., e.a., 2011, *Harvesting and Processing of Balanites aegyptiaca Leaves and Fruits for Local Consumption by Rural Communities in Uganda*, *Journal of Food Technology*, 9(2), 83-90, <http://www.medwelljournals.com/fulltext/?doi=jftech.2011.83.90>

Pacheco/Palencia, L., e.a., 2008, *Chemical Composition, Antioxidant Properties, and Thermal Stability of a Phytochemical Enriched Oil from Açai (Euterpe oleracea Mart.)*, *Journal of Agricultural and Food Chemistry*, 56, 4631-4636

Phytotrade Africa, trade association, www.phytotrade.com

Rainforest Alliance, *Brazil Nut Tree (Bertholletia excelsa)*: <http://www.rainforest-alliance.org/kids/species-profiles/brazil-nut-tree>

Rainforest Conservation Fund, *Oenocarpus bataua (Ungurahui)*: <http://www.rainforestconservation.org/agroforestry-ethnobotany/agroforestry-ethnobotany/oenocarpus-bataua-ungurahui/>

Rain-Tree, *Sangre de Grado "Dragon's Blood"*, Technical Data Report, <http://www.rain-tree.com/reports/sangre-de-grado-techreport.pdf>

RainTree, Tropical Plant Database, <http://rain-tree.com/plants.htm#.UyMnPPI5NZs>

Reynel, C. e.a., 2003, *Árboles útiles de la Amazonía Peruana*, <http://www.greentrack-travel.com/uploads/9/2/9/7/9297216/arboles-peruana.pdf>

Schippmann, U., Leaman, D. and Cunningham, A.B., 2006, *A comparison of cultivation and wild collection of medicinal and aromatic plant under sustainability aspects*.

Schulze, M., e.a., 2008, *Evaluating ipê (Tabebuia, Bignoniaceae) logging in Amazonia: Sustainable management or catalyst for forest degradation?*, Biological conservation, 141, 2071-2085

Shanley, P., e.a., Rainforest Alliance Project, funded by USAID, 2000, *The Management and Marketing of NTFPs: Certification as a Tool to Promote Sustainability*.

Simpson, B.B., 1991, *The Past and Present Uses of Rhatany (Krameria, Krameriaceae)*, Economic Botany, 45(3), 397-409

Species+, www.speciesplus.net

Surh, J. and Yun, J.M, 2012, *Antioxidant and Anti-inflammatory Activities of Butanol Extract of Melaleuca leucadendron L.*, Preventative Nutrition and Food Science, 17(1), 22-28,
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866767/>

Tropilab Inc, www.tropilab.com

UNCTAD, 2005, *Market Brief in the European Union, Adansonia digitata*, Baobab

UNCTAD, 2005, *Market Brief in the European Union, Genipa americana*, Jagua, huito

UNECE, 2013, *Standard DDP-26: Inshell Brazil Nuts*:
http://www.unece.org/fileadmin/DAM/trade/agr/standard/dry/dry_e/DDP26_InshellBrazilNuts_2013_e.pdf

UNIDO, 2006, *Compendium of Medicinal and Aromatic Plants, Volume II*,
<http://www.scribd.com/doc/51244494/>

Vermaak, I. e.a., 2011, *African seed oils of commercial importance – Cosmetic applications*, South African Journal of Botany, 22, 920-933

Vinceti, B. e.a., 2013, *conservation Priorities for Prunus africana Defined with the Aid of Spatial Analysis of Genetic Data and Climatic Variables*,
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0059987>

Weigend, M. and Dostert, N., 2005, *Towards a standardization of biological sustainability: Wildcrafting Rhatany (Krameria lappacea) in Peru*, IUCN Medicinal Plant Conservation

Weigend, M., and Dostert, N., botconsult GmbH, *Sustainable Wild Harvest of Ratanhia (Krameria lappacea)*

Weinstein, S. and Moegenburg, S., 2004, *Açai Palm Management in the Amazon Estuary: Course for Conservation or Passage to Plantations?*, Conservation & Society, 2, 2

Weleda-Naturals GmbH, 2008, *Research on medicinal plant cropping by WELEDA*, www.weleda-naturals.de

World Agroforestry Centre, <http://www.worldagroforestrycentre.org/>

WWF Global, 2007, *Harvesting nuts, improving lives in Brazil*: <http://wwf.panda.org/?92320/Harvesting-nuts-improving-lives-in-Brazil>

Xiong, Cindy, 2009, *An Introduction to Chinese Star Anise Oil – presented at IFEAT International Conference in Shanghai*: <http://www.ifeat.org/wp-content/uploads/2012/10/Xiong+-+Star+Anise+Oil.pdf>

Annex I

Legislative requirements are the minimum requirements which must be met by exporters of food, cosmetic or health products marketed in the EU and EFTA countries. Products which fail to meet these requirements are denied market access. The EFTA States, with the exception of Switzerland, take part in the European Economic Area (EEA). This means that Liechtenstein, Norway and Iceland follow EU legislation in general. In Switzerland, the legislation deviates slightly, but it is increasingly becoming harmonised to EEA provisions.

The main legislative and non-legislative requirements are listed in the tables below. These are separated into requirements for natural ingredients for food, cosmetics and health products. Please note that there are overlaps across the different industries in some cases. Food supplements are categorised as food ingredients and thus have to adhere to the legislation of food in addition to legislation specific to food supplements. Medical nutrition products are classified regulated as dietary foods for special medical purposes. For these two product groups in particular, authorised health claims are of importance. Cosmeceuticals are classified as cosmetics, except if they make a medicinal claim in which case they are considered as medicinal products.

Requirements listed below are categorised in the different segments; food, cosmetics and/or health products (which includes food supplements, medical nutrition and herbal medicine)

Legislative requirements	Applicable legislation	Food, cosmetics or health products
The EU sets requirements on the classification, labelling and packaging (CLP) of substances and mixtures. This covers packaging of chemical substances, as well as required symbols and phrases warning users and providing safety advice that should be used on the labels.	Regulation (EC) 1272/2008	All product groups
EU packaging legislation restricts the use of certain heavy metals, among other requirements	Directive 94/62/EC EU legislation on packaging (waste)	
The EU sets requirements for wood packaging materials , such as packing cases, boxes, crates, drums, pallets, box pallets and dunnage	Directive 2000/29/EC	
CITES regulates trade in (among others) wild-collected plants and gives a detailed list of species of which trade is prohibited, restricted or bound to certain rules.	Regulation (EC) 338/97, Regulation (EC) 865/2006	
The Novel Food Regulation covers foodstuffs from new plant sources, but also “exotic” natural foodstuffs or ingredients which were not “consumed to a significant degree within the EU before 15 May 1997”. Ingredients for food supplements and medical nutrition which do not meet these requirements will need to be approved under this legislation.	Regulation (EC) 258/97; Recommendation 97/618/EC	Food
The EU has set a list of permitted additives and enzymes and a number of requirements for flavourings and their use in foodstuffs intended for human consumption.	Regulations (EC) 1331/2008; No 1332/2008; No 1333/2008; No 1334/2008	
In the EU, there are rules for the marketing and use of extraction solvents used in the production of foodstuffs and food ingredients.	Directive 88/344/EEC	
In the EU, irradiation of food is permitted only in specific cases. At the moment, the only food categories allowed to be irradiated under EU legislation are: dried aromatic herbs,	Directives 1999/2/EC; 1999/3/EC Decision	



spices and vegetable seasonings.	2002/840/EC	
All food products entering the EU are subject to official controls to check whether they are in compliance with the relevant food legislation. Some specific products are subject to an increased level of control.	Regulations (EC) 882/2004; (EC) 669/2009	
The EU wants to prevent misleading claims by allying the use of nutrition or health claims to certain conditions related to nutritional profiles of foods.	Regulation (EC) 1924/2006	Food (supplements) and medical nutrition
Food supplements are subject to specific legislation, which lays down compositional (for minerals and vitamins) and labelling requirements, but still leaves composition beyond minerals and vitamins (e.g. essential fatty acids, fibre and various plants and herbal extracts) to the discretion of national authorities. Please note that nutrition labelling for foodstuffs mentioned below does not apply to foods supplements.	Directive 2002/46/EC	Food supplements
EU established legislation concerning specific labelling and composition for dietary foods for special medical purposes . This legislation comes in addition to EU legislation on food labelling, which provides an overview of general food labelling requirements applicable to all foodstuffs. In addition, it outlines requirements related to nutrition and allergens labelling. <i>Please note that Regulation (EU) No 609/2013 on 'Food for Specific Groups' was adopted in June 2013 and will apply from July 20th 2016. It aims to provide a better environment for businesses, better application of rules, and better protect consumers on the content and marketing of these "special" food products.</i>	Directive 1999/21/EC Directive 2006/82/EC Regulation (E U) 609/2013	Medical nutrition
Responsibility regarding data collection and registration on potential risks of chemicals (REACH) is on the importer, yet impact on the exporter. Within the natural ingredients for cosmetics particularly applicable for essential oils . The burden of proof rests with the EU manufacturer/importer that wishes to use this exemption.	Regulation (EC) 1907/2006	Herbal medicine and cosmetics
Pharmaceutical or medicinal products must be produced according to so called Good Manufacturing Practices (GMP).	Directive 2003/94/EC EU Guidelines to GMP for Medicinal Products for Human and Veterinary Use	Pharmaceuticals (including pharmaceutical ingredients)
The EU has established procedures for pharmaceutical products and ingredients , in order to ensure that products are safe and effective.	Directive 2001/83/EC	
Pharmaceutical ingredients must be produced according to Good Agriculture and Collection Practices (GACP) requirements. Pharmaceutical grade ingredients need to be supplied for use in medicinal products for human use. Quality and traceability standards for MAPs and extracts are much higher than for dietary market, where food grade ingredients are required.	Requirement on GACP for starting materials of Herbal Origin (Herbal Medicinal Products)	
The Traditional Herbal Medicinal Products Directive (THMPD) Directive sets a simplified, 'fast-track' for herbal medicines that can demonstrate certain requirements. All	Directive 2004/24/EC Amending Directive 2001/83/EC	Herbal medicine

herbal medicines marketed in the EU need a licence.		
A marketing authorisation for (natural) Pharmaceutical products is required. The EU has established procedures for pharmaceutical products and ingredients, in order to ensure that products marketed are safe and effective.	EU legislation on Marketing Authorisation for (Natural) Medicinal Products	
The Cosmetics Directive includes, among other things, restrictions on substances in cosmetic product and labelling requirements.	Directive 76/768/EC	Cosmetics

Additional non-legal requirements reach beyond legislation, as industries and companies can go further in their requirements than legislation. Again these requirements are categorised into the different segments covered in this study; food, cosmetics and/or herbal medicine (pharmaceutical) products. These requirements are more relevant for food and cosmetics than for herbal medicine industries, as legislation is already more specific in terms of standards, documentation and certification in those industries.

Non-legislative requirements	More information	Food, cosmetics or health products
 <p>ISO 9001:2008 sets out the criteria for a quality management system. The standard is based on several quality management principles including a strong customer focus, the motivation and support of top management, the process approach and continuous improvement.</p>	<ul style="list-style-type: none"> - ISO 9001:2008 - ISO 22000 (food) - ISO 22716:2007 (Cosmetics) 	All product groups
 <p>EU buyers may expect you to comply with their supplier codes of conduct regarding social responsibility, which are often based on the ILO labour standards. This can be the importer's own code of conduct or a code of conduct as a part of an initiative in which the importer is participating. The adoption of those standards is most common among large-scale importers, food manufacturers and retailers.</p>	<ul style="list-style-type: none"> - Business Social Compliance Initiative (BSCI) - Social Accountability 8000 (SA 8000) - Occupation Health and Safety Assessment Series (OHSAS) 	
 <p>Supplier Ethical Data Exchange (SEDEX) offers an online database which allows members to share information on: Labour Standards, Health & Safety, The Environment and Business Ethics depending on the particular industry and role in supply chain.</p>	Online database of SEDEX	
Buyers need well -structured product and company documentation . Suppliers must have a detailed technical data sheet available upon request, including an analysis of the product, which confirms the absence of contaminants and show that you meet their product specifications.	Websites of European buyers with examples of Safety Data Sheets (SDS)	
Your sampling method should result in lot representative samples on what you can deliver in the quantities, quality and lead time as specified by the buyer and in your technical data sheet.		
Pay attention to strict compliance with delivery terms as agreed upon with your buyer.	International delivery terms	
 <p>There are also non-legal requirements related to sustainable wild-collection of MAPs and equitable</p>	<ul style="list-style-type: none"> - UNCTAD BioTrade 	

 <p>sharing of benefits from biodiversity. Examples are the UNCTAD BioTrade Initiative Principles and Criteria or FairWild Principles and Criteria which collectors use to add value to their product. Furthermore, for food supplements, FairTrade certification can be relevant. Known labels are FLO or FairForLife, which has a separate module specifically for wild-collected products. Ethical BioTrade is also applicable to wild-collection.</p>	<p>Initiative</p> <ul style="list-style-type: none"> - FairWild Standard - FairForLife (Wild-collection module) - Union for Ethical BioTrade 	
  <p>In addition to mandatory HACCP standards, EU food industries increasingly demand compliance with more comprehensive food safety standards. The need for this depends on the profile of your buyer; usually large retailers and manufacturers and private label manufacturers are more demanding and will require compliance with for example,</p> <ul style="list-style-type: none"> • British Retail Consortium (BRC): it contains more extensive rules on Good Manufacturing Practices (GMP) than HACCP, e.g. regarding organisation and communication. • International Food Standard (IFS): corresponds to ISO 9001, but with a focus on food safety, HACCP, hygiene, the manufacturing process and business surroundings. 	<ul style="list-style-type: none"> - British Retail Consortium (BRC) - International Food Standard (IFS) - Prerequisite programmes (PRPs) 	Food (including food supplements and medical nutrition)
 <p>Standards for organic cosmetics mentioned below require certain thresholds of organically certified organic ingredients to be used in certified cosmetics products. Organic ingredients need to comply with requirements on the production and labelling for organic products as established by the EU. This regulation legally only applies to food products, but standards for organic cosmetics are based on this regulation.</p>	Regulation (EC) 834/2007	A non-legislative requirement for herbal medicine and cosmetics
  <p>International Fragrance Association (IFRA) Standards form the basis for the globally accepted and recognized risk management system for the safe use of fragrance ingredients and are part of the IFRA Code of Practice.</p>	IFRA Code of Practice	Cosmetics
 <p>Cosmos and NaTrue standards, and other standards of national certification bodies, specify what cosmetic products need to comply with to be certified natural and organic. Although not directly applicable to ingredient producers, it is important to be aware of these standards in terms of permitted processes and additives.</p>	<ul style="list-style-type: none"> - Cosmos - Natrue 	
 <p>Good Manufacturing Practices (GMP) is not obligatory for producers of cosmetics ingredients, but compliance can provide a competitive advantage on the European market GMP Guide for cosmetic ingredients.</p>	The European Federation for Cosmetic Ingredients (EFfCI) provides a guide with GMP principles.	

Annex II

Long list of wild-collected species identified per country (selected species highlighted in grey)

Latin America	Species (Botanical name)	Source
Bolivia	<i>Acanthostyles buniifolius</i>	UNCTAD BioTrade
	<i>Baccharis dracunculifolia</i>	UNCTAD BioTrade
	<i>Bertholletia excelsia</i>	UNCTAD BioTrade
	<i>Hedeoma mandoniana</i>	UNCTAD BioTrade
	<i>Juglans boliviana</i>	UNCTAD BioTrade
	<i>Porophyllum ruderale</i>	UNCTAD BioTrade
	<i>Rubus boliviensis</i>	UNCTAD BioTrade
*	<i>Schinus molle</i>	UNCTAD BioTrade
	<i>Tagetes terniflora</i>	UNCTAD BioTrade
	<i>Theobroma grandiflorum</i>	UNCTAD BioTrade
	<i>Aniba roseodora</i>	UNIDO, Klaus Dürbeck
	<i>Boldoa fragans</i>	UNIDO, Klaus Dürbeck
	<i>Cinchona calisaya</i>	UNIDO, Klaus Dürbeck
*	<i>Euterpe oleracea</i>	Klaus Dürbeck
	<i>Genipa americana</i>	UNIDO, Klaus Dürbeck
	<i>Myroxylon balsamum</i>	UNIDO, Klaus Dürbeck
	<i>Opuntia ficus indica</i>	UNIDO, Klaus Dürbeck
	<i>Quillaja saponaria</i>	Klaus Dürbeck
	<i>Rosa canina</i>	UNIDO, Klaus Dürbeck
Peru	<i>Croton dracanooides</i>	PromPeru
	<i>Dracontium loretense</i>	PromPeru
	<i>Gentianella alborosea</i>	PromPeru
	<i>Geranium dielsianum Knuth</i>	PromPeru
	<i>Krameria lappacea</i>	PromPeru
	<i>Mansoa alliacea</i>	PromPeru
	<i>Maytenus macrocarpa</i>	PromPeru
	<i>Minthostachys mollis</i>	PromPeru
*	<i>Phyllanthus niruri</i>	PromPeru
*	<i>Schinus molle</i>	PromPeru
*	<i>Uncaria tomentosa</i>	PromPeru
	<i>Tabebuia serratifolia</i>	UNIDO
Ecuador	<i>Amaranthus hybridus</i>	Convention on Biological Diversity (CBD)
	<i>Cinchona pubescens</i>	Convention on Biological Diversity (CBD)
	<i>Croton lechleri</i>	Convention on Biological Diversity (CBD)
	<i>Equisetum bogotense</i>	Convention on Biological Diversity (CBD)

	<i>Maytenus krukovii</i>	Convention on Biological Diversity (CBD)
	<i>Ocotea quixos</i>	Convention on Biological Diversity (CBD)
	<i>Oenocarpus bataua</i>	Convention on Biological Diversity (CBD)
*	<i>Phyllanthus niruri</i>	Convention on Biological Diversity (CBD)
	<i>Smallanthus sonchifolius</i>	Convention on Biological Diversity (CBD)
	<i>Tropaeolum tuberosum</i>	Convention on Biological Diversity (CBD)
*	<i>Uncaria tomentosa</i>	Convention on Biological Diversity (CBD) / Proyecto PALMS
	<i>Ceroxylon echinulatum</i>	Proyecto PALMS
*	<i>Euterpe precatoria/oleracea</i>	Proyecto PALMS
	<i>Prestoea acuminata</i>	Proyecto PALMS
	<i>Aphandra Natalia</i>	Ximena Buitrón Cisneros
	<i>Astrocaryum chambira</i>	Ximena Buitrón Cisneros
	<i>Astrocaryum standleyanm</i>	Ximena Buitrón Cisneros
	<i>Attalea colenda</i>	Ximena Buitrón Cisneros
	<i>Bactris gasipaes</i>	Ximena Buitrón Cisneros
	<i>Geonoma macrostachys</i>	Ximena Buitrón Cisneros
	<i>Iriartea deltoidea</i>	Ximena Buitrón Cisneros
	<i>Parajubea cocoides</i>	Ximena Buitrón Cisneros
	<i>Pholidostachys sinathera</i>	Ximena Buitrón Cisneros
	<i>Phytelephas aequatorialis</i>	Ximena Buitrón Cisneros
	<i>Wettinia quinaria</i>	Ximena Buitrón Cisneros
Africa		
Mozambique		
	<i>Albertisia delagoensis</i>	TRAFFIC, 1998
	<i>Ansellia africana</i>	TRAFFIC, 1998
	<i>Brackenridgea zanguebarica</i>	TRAFFIC, 1998
	<i>Cardiogyne africana</i>	TRAFFIC, 1998
	<i>Dietes iriodes</i>	TRAFFIC, 1998
	<i>Euclea natalensis</i>	TRAFFIC, 1998
	<i>Gloriosa superba</i>	TRAFFIC, 1998
	<i>Harpagophytum procumbens</i>	TRAFFIC, 1998
	<i>Jateorhiza palmata</i>	TRAFFIC, 1998
*	<i>Ricinus communis</i>	TRAFFIC, 1998
	<i>Tabernaemontana elegans</i>	TRAFFIC, 1998
	<i>Terminalia sericea</i>	TRAFFIC, 1998
	<i>Warburgia salutaris</i>	TRAFFIC, 1998
	<i>Bridelia cathartica</i>	National Report on Implementation of the Convention on Biological Diversity in Mozambique, 2009
	<i>Diospyrus rotundifolia</i>	Ibid, CDB 2009
	<i>Garcinia livingstonei</i>	Ibid, CDB 2009
	<i>Mimusops caffra</i>	Ibid, CDB 2009
	<i>Phoenix reclinata</i>	Ibid, CDB 2009
	<i>Psydrax obovata</i>	Ibid, CDB 2009
	<i>Sclerocarya birrea</i>	Ibid, CDB 2009

*	<i>Sizygyum cordatum</i>	Ibid, CDB 2009
	<i>Strychnos spinosa</i>	Ibid, CDB 2009
	<i>Terminalia sericea</i>	Ibid, CDB 2009
	<i>Trichilia emetic</i>	Ibid, CDB 2009
	<i>Vageria infausta</i>	Ibid, CDB 2009

Tanzania		

	<i>Cassia abbreviata</i>	Conservation of Wild-harvested Medicinal Plant Species in Tanzania - Michael Nahashon, 2013
*	<i>Acacia kirkii</i>	Ibid, Michael Nahashon, 2013
	<i>Acacia nilotica</i>	Ibid, Michael Nahashon, 2013
	<i>Adansonia digitata</i>	Ibid, Michael Nahashon, 2013
	<i>Afzelia quanzensis</i>	Ibid, Michael Nahashon, 2013
	<i>Albizia anthelmintica</i>	Ibid, Michael Nahashon, 2013
	<i>Annona cherimola</i>	Ibid, Michael Nahashon, 2013
*	<i>Annona senegalensis</i>	Ibid, Michael Nahashon, 2013
	<i>Annona squamosa</i>	Ibid, Michael Nahashon, 2013
	<i>Bonamia mossambicensis</i>	Ibid, Michael Nahashon, 2013
	<i>Bruguiera gymnorhiza</i>	Ibid, Michael Nahashon, 2013
	<i>Cassia alata</i>	Ibid, Michael Nahashon, 2013
	<i>Cassytha filiformis</i>	Ibid, Michael Nahashon, 2013
	<i>Cephalosphaera usambarensis</i>	Ibid, Michael Nahashon, 2013
	<i>Ceriops tagal</i>	Ibid, Michael Nahashon, 2013
	<i>Cinnamomum cassia</i>	Ibid, Michael Nahashon, 2013
	<i>Cinnamomum verum</i>	Ibid, Michael Nahashon, 2013
*	<i>Cinnamomum zeilanicum</i>	Ibid, Michael Nahashon, 2013
	<i>Corymbia citriodora</i>	Ibid, Michael Nahashon, 2013
	<i>Corymbia maculata</i>	Ibid, Michael Nahashon, 2013
	<i>Dalbergia melanoxylon</i>	Ibid, Michael Nahashon, 2013
	<i>Delonix regia</i>	Ibid, Michael Nahashon, 2013
	<i>Dichrostachys cinerea</i>	Ibid, Michael Nahashon, 2013
	<i>Embelia schimperi</i>	Ibid, Michael Nahashon, 2013
	<i>Erythrina abyssinica</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus camaldulensis</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus cloeziana</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus drepanophylla</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus globulus</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus grandis</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus paniculata</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus pellita</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus robusta</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus saligna</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus sideroxylon</i>	Ibid, Michael Nahashon, 2013
	<i>Eucalyptus tereticornis</i>	Ibid, Michael Nahashon, 2013
	<i>Ficus sur</i>	Ibid, Michael Nahashon, 2013
	<i>Ficus sycomorus</i>	Ibid, Michael Nahashon, 2013

	<i>Holarrhena pubescens</i>	Ibid, Michael Nahashon, 2013
	<i>Hugonia arborescens</i>	Ibid, Michael Nahashon, 2013
	<i>Indigofera lupatana</i>	Ibid, Michael Nahashon, 2013
	<i>Lagenaria siceraria</i>	Ibid, Michael Nahashon, 2013
	<i>Milicia excelsa</i>	Ibid, Michael Nahashon, 2013
	<i>Myrsine africana</i>	Ibid, Michael Nahashon, 2013
	<i>Ocotea usambarensis</i>	Ibid, Michael Nahashon, 2013
	<i>Persea americana</i>	Ibid, Michael Nahashon, 2013
	<i>Pithecellobium dulce</i>	Ibid, Michael Nahashon, 2013
	<i>Prunus africana</i>	Ibid, Michael Nahashon, 2013
*	<i>Securidaca longipedunculata</i>	Ibid, Michael Nahashon, 2013
	<i>Senna didymobotrya</i>	Ibid, Michael Nahashon, 2013
	<i>Senna siamea</i>	Ibid, Michael Nahashon, 2013
	<i>Sideroxylon inerme</i>	Ibid, Michael Nahashon, 2013
*	<i>Strychnos spinosa</i>	Ibid, Michael Nahashon, 2013
	<i>Suregada zanzibariensis</i>	Ibid, Michael Nahashon, 2013
	<i>Syzygium aqueum</i>	Ibid, Michael Nahashon, 2013
	<i>Syzygium aromaticum</i>	Ibid, Michael Nahashon, 2013
*	<i>Tamarindus indica</i>	Ibid, Michael Nahashon, 2013
	<i>Uvaria catocarpa</i>	Ibid, Michael Nahashon, 2013
	<i>Uvaria kirkii</i>	Ibid, Michael Nahashon, 2013
	<i>Uvaria leptocladon</i>	Ibid, Michael Nahashon, 2013
	<i>Uvariadendron kirkii</i>	Ibid, Michael Nahashon, 2013
	<i>Warburgia stuhlmannii</i>	Ibid, Michael Nahashon, 2013
	<i>Warburgia ugandensis</i>	Ibid, Michael Nahashon, 2013
	<i>Ximenia americana</i>	Ibid, Michael Nahashon, 2013
	<i>Xylopiya aethiopica</i>	Ibid, Michael Nahashon, 2013
	<i>Zanha africana</i>	Ibid, Michael Nahashon, 2013
	<i>Zanthoxylum chalybeum</i>	Ibid, Michael Nahashon, 2013
	<i>Zanthoxylum usambarensis</i>	Ibid, Michael Nahashon, 2013
*	<i>Acacia hockii</i>	ANAFE/Sida, 2006
*	<i>Acacia mellifera</i>	ANAFE/Sida, 2006
	<i>Acacia nilotica</i>	ANAFE/Sida, 2006
	<i>Acacia senegal</i>	ANAFE/Sida, 2006
	<i>Acacia seyal</i>	ANAFE/Sida, 2006
	<i>Acacia tortilis</i>	ANAFE/Sida, 2006
	<i>Acokhanthera schimperi</i>	ANAFE/Sida, 2006
*	<i>Adansonia digitata</i>	ANAFE/Sida, 2006
	<i>Albizia amara</i>	ANAFE/Sida, 2006
	<i>Albizia coriaria</i>	ANAFE/Sida, 2006
*	<i>Annona senegalensis</i>	ANAFE/Sida, 2006
	<i>Azadirachta indica</i>	ANAFE/Sida, 2006
	<i>Azanza garckeana</i>	ANAFE/Sida, 2006
	<i>Balanites aegyptiaca</i>	ANAFE/Sida, 2006
	<i>Boscia coriacea</i>	ANAFE/Sida, 2006
	<i>Bridelia micrantha</i>	ANAFE/Sida, 2006

	<i>Cajanus cajan</i>	ANAFE/Sida, 2006
*	<i>Carica papaya</i>	ANAFE/Sida, 2006
*	<i>Carica papaya</i>	ANAFE/Sida, 2006
	<i>Carissa edulis</i>	ANAFE/Sida, 2006
	<i>Carissa edulis</i>	ANAFE/Sida, 2006
	<i>Catha edulis</i>	ANAFE/Sida, 2006
*	<i>Cinnamomum zeylanicum</i>	ANAFE/Sida, 2006
	<i>Cissus cornifolia</i>	ANAFE/Sida, 2006
	<i>Commiphora africana</i>	ANAFE/Sida, 2006
	<i>Diospyros mespiliformis</i>	ANAFE/Sida, 2006
	<i>Draceana steudneri</i>	ANAFE/Sida, 2006
	<i>Entada abyssinica</i>	ANAFE/Sida, 2006
	<i>Erythrina abyssinica</i>	ANAFE/Sida, 2006
	<i>Ficus sur</i>	ANAFE/Sida, 2006
	<i>Ficus sycomorus</i>	ANAFE/Sida, 2006
	<i>Flacourtia indica</i>	ANAFE/Sida, 2006
	<i>Flueggea virosa</i>	ANAFE/Sida, 2006
	<i>Garcinia buchananii</i>	ANAFE/Sida, 2006
	<i>Grewia bicolor</i>	ANAFE/Sida, 2006
	<i>Jatropha curcas</i>	ANAFE/Sida, 2006
	<i>Jatropha multifida</i>	ANAFE/Sida, 2006
	<i>Kigelia africana</i>	ANAFE/Sida, 2006
	<i>Lannea alata</i>	ANAFE/Sida, 2006
	<i>Lantana trifolia</i>	ANAFE/Sida, 2006
	<i>Maerua decumbens</i>	ANAFE/Sida, 2006
	<i>Mangifera indica</i>	ANAFE/Sida, 2006
	<i>Melia azedarach</i>	ANAFE/Sida, 2006
	<i>Moringa oleifera</i>	ANAFE/Sida, 2006
	<i>Psidium guajava</i>	ANAFE/Sida, 2006
	<i>Psidium guajava</i>	ANAFE/Sida, 2006
	<i>Psorospermum febrifugum</i>	ANAFE/Sida, 2006
	<i>Punica granatum</i>	ANAFE/Sida, 2006
	<i>Rauvolfia vomitaria</i>	ANAFE/Sida, 2006
	<i>Rhus natalensis</i>	ANAFE/Sida, 2006
*	<i>Ricinus communis</i>	ANAFE/Sida, 2006
	<i>Rubus apetalus</i>	ANAFE/Sida, 2006
	<i>Salvadora persica</i>	ANAFE/Sida, 2006
	<i>Sapium ellipticum</i>	ANAFE/Sida, 2006
	<i>Sarcocephalus latifolius</i>	ANAFE/Sida, 2006
*	<i>Schinus molle</i>	ANAFE/Sida, 2006
	<i>Sclerocarya birrea</i>	ANAFE/Sida, 2006
	<i>Securidaca longepedunculata</i>	ANAFE/Sida, 2006
*	<i>Senna didymobotrya</i>	ANAFE/Sida, 2006
	<i>Solanum aculeastrum</i>	ANAFE/Sida, 2006
	<i>Spathodea campanulata</i>	ANAFE/Sida, 2006
	<i>Steganotaenia araliacea</i>	ANAFE/Sida, 2006

*	<i>Tamarindus indica</i>	ANAFE/Sida, 2006
*	<i>Tamariundus indica</i>	ANAFE/Sida, 2006
	<i>Vernonia amygdalina</i>	ANAFE/Sida, 2006
	<i>Zanthoxylum chalybeum</i>	ANAFE/Sida, 2006
	<i>Ziziphus mauritiana</i>	ANAFE/Sida, 2006
*	<i>Acacia mellifera</i>	TRAFFIC, 1998
	<i>Acalypha fruticosa</i>	TRAFFIC, 1998
	<i>Cadaba farinosa</i>	TRAFFIC, 1998
	<i>Dioscorea dumetorum</i>	TRAFFIC, 1998
	<i>Ehretia amoena</i>	TRAFFIC, 1998
	<i>Harrisonia abyssinica</i>	TRAFFIC, 1998
	<i>Milicia excelsa</i>	TRAFFIC, 1998
	<i>Steganotaenia araliacea</i>	TRAFFIC, 1998
	<i>Wedelia mossambicensis</i>	TRAFFIC, 1998
<hr/>		
Asia		
Vietnam		
*	<i>Acorus gramineus</i>	TRAFFIC resource assessment
*	<i>Adenosma caeruleum</i>	TRAFFIC resource assessment
*	<i>Ageratum conyzoides</i>	TRAFFIC resource assessment
*	<i>Aglaomorpha coronans</i>	TRAFFIC resource assessment
*	<i>Alocasia sp.</i>	TRAFFIC resource assessment
*	<i>Alpinia spp.</i>	TRAFFIC resource assessment
*	<i>Amomum spp.</i>	TRAFFIC resource assessment
*	<i>Ampelopsis cantoniensis</i>	TRAFFIC resource assessment
*	<i>Artemisia vulgaris var.indica (Willd.)</i>	TRAFFIC resource assessment
*	<i>Celosia argentea</i>	TRAFFIC resource assessment
*	<i>Cibotium barometz</i>	TRAFFIC resource assessment
*	<i>Curcuma zedoaria</i>	TRAFFIC resource assessment
*	<i>Dioscorea sp.</i>	TRAFFIC resource assessment
*	<i>Dracaena gracillis</i>	TRAFFIC resource assessment
*	<i>Dracaena cambodiana</i>	TRAFFIC resource assessment
*	<i>Flickingeria fimbriata</i>	TRAFFIC resource assessment
*	<i>Gnetum montanum</i>	TRAFFIC resource assessment
*	<i>Gynostemma pentaphyllum</i>	TRAFFIC resource assessment
*	<i>Homalomena occulta</i>	TRAFFIC resource assessment
*	<i>Illicium verum</i>	TRAFFIC resource assessment
*	<i>Imperata cylindrica</i>	TRAFFIC resource assessment
*	<i>Jasminum nervosum</i>	TRAFFIC resource assessment
*	<i>Kadsura roxburghiana</i>	TRAFFIC resource assessment
*	<i>Lactuca india</i>	TRAFFIC resource assessment
	<i>Leea rubra</i>	TRAFFIC resource assessment
*	<i>Litsea cubeba</i>	TRAFFIC resource assessment
*	<i>Oroxylum indicum</i>	TRAFFIC resource assessment
*	<i>Pandanus tonkinensis</i>	TRAFFIC resource assessment
*	<i>Passiflora foetida</i>	TRAFFIC resource assessment
*	<i>Phyllanthus amarus</i>	TRAFFIC resource assessment

*	<i>Rhus chinensis</i>	TRAFFIC resource assessment
*	<i>Sarcandra glabra</i>	TRAFFIC resource assessment
*	<i>Schefflera spp</i>	TRAFFIC resource assessment
*	<i>Scoparia dulcis</i>	TRAFFIC resource assessment
*	<i>Senna tora</i>	TRAFFIC resource assessment
*	<i>Siegesbeckia orientalis</i>	TRAFFIC resource assessment
*	<i>Smilax glabra</i>	TRAFFIC resource assessment
*	<i>Smilax spp</i>	TRAFFIC resource assessment
*	<i>Spatholobus parvifolius</i>	TRAFFIC resource assessment
*	<i>Stemona tuberosa</i>	TRAFFIC resource assessment
*	<i>Streptocaulon juvenas</i>	TRAFFIC resource assessment
*	<i>Strychnos wallichiana</i>	TRAFFIC resource assessment
*	<i>Tinospora sagittata</i>	TRAFFIC resource assessment
*	<i>Trichosanthes sp.</i>	TRAFFIC resource assessment
*	<i>Typhonium trilobatum</i>	TRAFFIC resource assessment
*	<i>Uncaria spp.</i>	TRAFFIC resource assessment
*	<i>Alpinia spp</i>	BTO report, 2013
*	<i>Amomum aromaticum</i>	BTO report, 2013
*	<i>Amomum villosum</i>	BTO report, 2013
*	<i>Ficus spp.</i>	BTO report, 2013
*	<i>Kadsura roxburghiana</i>	BTO report, 2013
*	<i>Lonicera japonica</i>	BTO report, 2013
*	<i>Lygodium flexuosum</i>	BTO report, 2013
*	<i>Myrica spp.</i>	BTO report, 2013
*	<i>Phyllanthus emblica</i>	BTO report, 2013
*	<i>Ricinus communis</i>	BTO report, 2013
*	<i>Ruta graveolens</i>	BTO report, 2013
*	<i>Sarcandra glabra</i>	BTO report, 2013
*	<i>Smilax glabra</i>	BTO report, 2013
*	<i>Spatholobus suberectus</i>	BTO report, 2013
*	<i>Tacca plantaginea</i>	BTO report, 2013
*	<i>Adenosma indianum</i>	Government decision, 2013
*	<i>Adenosma spp. (A. caeruleum; A. bracteosum)</i>	Government decision, 2013
*	<i>Amomum spp.; A. vilosum; A. xanthioides; A. longiligulare</i>	Government decision, 2013
*	<i>Ampelopsis cantoniensis</i>	Government decision, 2013
*	<i>Artemisia indica</i>	Government decision, 2013
*	<i>Cibotium barometz</i>	Government decision, 2013
*	<i>Cyperus spp.; Cyperus stoloniferus; C. rotundus</i>	Government decision, 2013
*	<i>Dracaena cambodiana</i>	Government decision, 2013
*	<i>Drynaria spp.; D. quercifolia; D. bonii</i>	Government decision, 2013
*	<i>Gardenia augusta</i>	Government decision, 2013
*	<i>Homalomena spp. (H. occulta; H. tonkinensis)</i>	Government decision, 2013

*	<i>Jasminum</i> ssp.; <i>Jasminum nervosum</i> ; <i>J. subtriplinerve</i>	Government decision, 2013
*	<i>Melaleuca leucadendra</i>	Government decision, 2013
*	<i>Prunella vulgaris</i>	Government decision, 2013
*	<i>Schefflera heptaphylla</i>	Government decision, 2013
*	<i>Siegesbeckia orientalis</i>	Government decision, 2013
*	<i>Smilax glabra</i>	Government decision, 2013
*	<i>Stemona tuberosa</i>	Government decision, 2013
*	<i>Streptocaulon juvenas</i>	Government decision, 2013
*	<i>Strychnos</i> ssp.; <i>S. nux-vomica</i> ; <i>S. wallichiana</i>	Government decision, 2013
*	<i>Tinospora sinensis</i>	Government decision, 2013
*	<i>Typhonium trilobatum</i>	Government decision, 2013
*	<i>Uncaria</i> spp.; <i>U. sinensis</i> ; <i>U. cordata</i>	Government decision, 2013
*	<i>Vitex</i> ssp. (<i>Vitex rotundifolia</i> ; <i>V. trifolia</i>)	Government decision, 2013
*	<i>Acorus</i> spp.	TRAFFIC, 2008
*	<i>Adenosma</i> spp.	TRAFFIC, 2008
*	<i>Amomum</i> spp	TRAFFIC, 2008
*	<i>Ampelopsis cantoniensis</i>	TRAFFIC, 2008
*	<i>Cassia tora</i>	TRAFFIC, 2008
*	<i>Cibotium barometz</i>	TRAFFIC, 2008
*	<i>Cyperus stoloniferus</i>	TRAFFIC, 2008
*	<i>Docynia indica</i>	TRAFFIC, 2008
*	<i>Homalomena</i> spp.	TRAFFIC, 2008
*	<i>Illicium verum</i>	TRAFFIC, 2008
*	<i>Milletia</i> sp.	TRAFFIC, 2008
*	<i>Siegesbeckia orientalis</i>	TRAFFIC, 2008
*	<i>Smilax</i> sp.	TRAFFIC, 2008
*	<i>Spatholobus</i> sp.	TRAFFIC, 2008
*	<i>Stemona tuberosa</i>	TRAFFIC, 2008
*	<i>Strychnos</i> spp.	TRAFFIC, 2008
*	<i>Vitex</i> spp.	TRAFFIC, 2008
*	<i>Acorus gramineus</i>	TRAFFIC, 2013
*	<i>Adenosma caeruleum</i>	TRAFFIC, 2013
*	<i>Ageratum conyzoides</i>	TRAFFIC, 2013
*	<i>Aglaomorpha coronans</i>	TRAFFIC, 2013
*	<i>Alocasia</i> sp	TRAFFIC, 2013
*	<i>Alpinia</i> spp	TRAFFIC, 2013
*	<i>Amomum</i> spp	TRAFFIC, 2013
*	<i>Ampelopsis cantoniensis</i>	TRAFFIC, 2013
*	<i>Artemisia vulgaris</i> var. <i>indica</i>	TRAFFIC, 2013
*	<i>Celosia argentea</i>	TRAFFIC, 2013
*	<i>Cibotium barometz</i>	TRAFFIC, 2013
*	<i>Curcuma zedoaria</i>	TRAFFIC, 2013
*	<i>Dioscorea</i> spp.	TRAFFIC, 2013
*	<i>Dracaena gracillis</i>	TRAFFIC, 2013

*	<i>Draceana cambodiana</i>	TRAFFIC, 2013
*	<i>Flickingeria fimbriata</i>	TRAFFIC, 2013
*	<i>Gnetum montanum</i>	TRAFFIC, 2013
*	<i>Gynostemma pentaphyllum</i>	TRAFFIC, 2013
*	<i>Homalomena occulta</i>	TRAFFIC, 2013
*	<i>Imperata cylindrica</i>	TRAFFIC, 2013
*	<i>Jasminum nervosum</i>	TRAFFIC, 2013
*	<i>Kadsura roxburghiana</i>	TRAFFIC, 2013
*	<i>Lactuca indica</i>	TRAFFIC, 2013
*	<i>Leearubra</i>	TRAFFIC, 2013
*	<i>Litsea cubeba</i>	TRAFFIC, 2013
*	<i>Oroxylum indicum</i>	TRAFFIC, 2013
*	<i>Pandanus tonkinensis</i>	TRAFFIC, 2013
*	<i>Passiflora foetida</i>	TRAFFIC, 2013
*	<i>Phyllanthus amarus</i>	TRAFFIC, 2013
*	<i>Rhus chinensis</i>	TRAFFIC, 2013
*	<i>Sarcandra glabra</i>	TRAFFIC, 2013
*	<i>Schefflera spp</i>	TRAFFIC, 2013
*	<i>Scoparia dulcis</i>	TRAFFIC, 2013
*	<i>Senna tora</i>	TRAFFIC, 2013
*	<i>Siegesbeckia orientalis</i>	TRAFFIC, 2013
*	<i>Smilax glabra</i>	TRAFFIC, 2013
*	<i>Smilax spp</i>	TRAFFIC, 2013
*	<i>Spatholobus parvifolius</i>	TRAFFIC, 2013
*	<i>Stemona tuberosa</i>	TRAFFIC, 2013
*	<i>Streptocaulon juvenas</i>	TRAFFIC, 2013
*	<i>Strychnos wallichiana</i>	TRAFFIC, 2013
*	<i>Syzygium aromaticum</i>	TRAFFIC, 2013
*	<i>Trichosanthe ssp.</i>	TRAFFIC, 2013
*	<i>Typhonium trilobatum</i>	TRAFFIC, 2013
*	<i>Uncaria spp</i>	TRAFFIC, 2013

*species recurring within and across country lists

Annex III

List of operators (Operators in bold are the one which were interviewed)

Country	Company	Position value chain	Products	Website
Italy	Carlo Sessa	Trader	MAPs, extracts, essential oils	www.carlossessa.it
Italy/ Senegal	Baobab Fruit Company	Producer, trader	Baobab derivatives	www.baobabfruitco.com
Austria	Biomega	Trader	Baobab derivatives	Organic-ts.de
Netherlands	Biohorma BV	Manufacturer	Herbal medicines and food supplements	www.biohorma.nl
Germany	Meschede Trading & Consulting	Trader	Essential oils (cajeput oil)	www.meschede.com.de
Germany	Dr. Wilmar Schwabe GmbH & Co. KG	Manufacturer	Herbal medicines and food supplements	www.schwabe.de
Germany	Alfred Galke	Trader	MAPs (50% wild collected)	www.galke.com
Germany	Salus Haus	Manufacturer	Herbal medicines, teas, food supplements	www.salus.de
Germany	Martin Bauer	Importer and processor	MAPs, extracts, teas	www.martin-bauer-group.com
Germany	Mane Fragrance	Manufacturer	Flavouring and fragrances (ingredients)	www.mane.com
Germany	Wild Flavors GmbH	Producer	Ingredients	www.wildflavors.com
Germany	Govanida Natur GmbH	Manufacturer, retail	Cosmetics, supplements, Ayurveda traditional medicine	www.govindanatur.de
Germany	Logocos Naturkosmetik	Manufacturer	Cosmetics (marula)	www.logocos.de
Norway	Sorze4 AS	Manufacturer	Food and beverages (açai)	www.sorze4.com
France	Quimdis	Importer and processor	Ingredients	www.quimdis.com

			(açaí, rosewood, cajeput, litsea, brazil nut)	
France	Elixens	Processor	Ingredients	www.elixens.com
France	Clarins Group	Manufacturer, retail	Cosmetics (marula)	int.clarins.com www.clarins.fr
UK	Earthoil	Producer, processor, distributor	Organic cosmetic ingredients (star anise, baobab, moringa, marula)	www.earthoil.co.uk
UK	Peter Jarvis Cosmetic Developments Ltd	Processor and development	Botanical extracts	www.pjd.co.uk
UK	Elixarome	Trader, processor	Essential oils, fragrances	www.elixarome.co.uk
UK	Neals Yard Remedies	Manufacturer, retail	Cosmetics (baobab)	www.nealsyardremedies.com
UK	Inovia International	Manufacturer	Functional ingredients (rosewood, Tólu, cajeput, baobab, marula, ximenia, moringa)	www.inovaiinternational.co.uk
UK	Dr. Jackson's	Manufacturer, retail	Cosmetics (baobab, marula, sausage tree)	www.drjackson.co.uk
Switzerland	Botanica	Processor	Extracts; ingredients (sausage tree, baobab, Cat's Claw, moringa, yellow lapacho, rhatany, dragon's blood)	www.botanica.ch
Belgium	BioVita	Wholesaler	Health products	www.biovita.be
Belgium	Vossen & Co	Trader	Organic essential oils (cajeput, litsea, star anise)	www.vossenbio.com
South Africa	Africa Organics	Processor, Manufacturer	Cosmetics and cosmetic ingredients	www.africaorganics.co.za
Brazil	Beraca	Producer, processor	Ingredients for cosmetics, food, health	www.beraca.com
Mozambique	Bio Óleos de Miombo	Processor, manufacturer	Cosmetics and cosmetic ingredients (marula)	www.biooleos.com

Tanzania	Pure Baobab Oil	Producer, processor, distributor	baobab oil	www.purebaobaboil.com
Peru	Candela	Processor, manufacturer	Cosmetics and Food Ingredients (Brazil nut oil)	www.candelaperu.net
Ecuador	Fundación Chankuap	Support organisation to producer communities	Ingredients for cosmetics, food, health	www.chankuap.org
Bolivia	Madre Tierra Amazonía	Producer, processor	Ingredients for cosmetics and food	www.exclusivamenteboliviano.com/es/perfil.asp?empresa=Madre_Tierra_Amazonia_SRL&sector=Biocomercio_Bolivia
Bolivia	Bolexport	Export-promoting company linked to micro and small enterprises	Ingredients for cosmetics and food	www.bolexport.com
Vietnam	Star Aniseed	Processor, exporter	Ingredients for food (star anise)	www.staraniseed.com
Vietnam	Essential oils	Processor, exporter	Essential oils (star anise, cajeput)	essentialoivietnam.com
Bolivia	Manutata	Processor, exporter	Ingredients for cosmetics and food (Brazil nut)	www.manutata.com
Peru	Inka Natural	Processor, exporter	Ingredients for cosmetics and food	www.inkanatural.com
Ecuador	Nativa Ecuador	Association promoting the natural ingredient sector in Ecuador	Ingredients for cosmetics, food and pharmaceuticals	www.nativaecuador.org
Swaziland	Swazi Secrets	Processor, exporter	Cosmetics and cosmetic ingredients (marula, ximenia)	www.swazisecrets.com
South Africa	Phytotrade Africa	Trade associations	Ingredients	www.phytotrade.com

Annex IV

List of experts

Country	Expert	Position	Organisation
Bolivia	Steven Magariños	Market Analyst	Instituto Boliviano de Comercio Exterior (IBCE)
Peru	Guadalupe Amesquita	Specialist in Sustainable Trade	PromPerú
Ecuador	Dr. Ximena Buitrón Cisneros	Independent consultant for organisations and companies	Independent consultant
		Member of FairWild Board of Trustees	FairWild
USA	Josef A. Brinckmann	Consultant on Market Intelligence for Medicinal and Aromatic Plants & Extracts	Independent consultant
		Member of FairWild Board of Trustees	FairWild
Germany	Klaus Dürbeck	Chief Executive of Klaus Dürbeck Consulting	Klaus Dürbeck Consulting
		Chair of FairWild Board of Trustees	FairWild
Belgium / France	Walter de Boeck	Sourcing & Export Manager	Nateva

TRAFFIC offices consulted:

East and Southern Africa	Julie Thompson
Vietnam	Nguyen Thi Mai and Naomi Doak