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Value Chain Analysis Indonesia Botanical Extracts

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Content

List of Sources

CBI, 2018, Mission Report — CBI Country Management – VCA NI

CBI, 2018, Market Intelligence, Natural Ingredients for Cosmetics, Natural Food Additives and Natural Ingredients for Health

Control Union, n.d., Control Union Certifications, Organic Certification Programmes

Daunmas, 2016, Price List Extract Powder

IFEAT, 2014, IFEAT Conference, news from around the globe

IPD, 2016, Sector Scan Indonesia — Cosmetic

Kementerian Pertanian, 2016, Rencana Strategis Kementerian Pertanian 2015-2019

KPMG, 2017, Finance in Indonesia: Set for a new path?

Market Insider/ITC, 2016, Essential Oils and Oleoresins

Ministry of Agriculture, 2015, Strategic plan ministry of Agriculture

Ministry of Trade of Indonesia, 2011, Indonesian Essential Oils, The Scents of Natural Life

Nusaroma, 2015, Indonesia Made a Major Contribution to the World of Essential Oils

Organic Trade Association, 2018, Global Organic Trade Guide Indonesia

SIPPO, 2018, Indonesian essential oil overview, presentation

Wulandari et al., 2017, Access to finance from different finance provider types: Farmer knowledge of the requirements

Glossary

ADB: Asian Development Bank
AFFI: Indonesian Flavour and Fragrance Association
APSKI: Employer Association for Food Supplements
ASEAN: Association of Southeast Asian Nations
BRC: British Retail Consortium
BSO: Business support organisation
CBI: Centre for the Promotion of Imports from Developing Countries
CSR: Corporate social responsibility
DAI: Dewan Atsiri Indonesia (Indonesian Essential Oils Association)
DC: Developing country
DFID: Department of Foreign and International Development (UK)
DG: Directorate General
EC: European Commission
EU: European Union
FAO: Food and Agriculture Organization of the United Nations
FFI: Fauna and Flora International
FSSC: Food Safety System Certification
GACP: Good agricultural and collection practices
GMP: Good manufacturing practices
GPJ: Gabungan Pengusaha Jamu, the Indonesian Herbal and Traditional Medicine Association
HACCP: Hazard Analysis and Critical Control Points
IFEAT: International Federation of Essential Oils and Aroma Trades
IPD: Germany's Import Promotion Desk
ISO: International Standards Organization
ITC: International Trade Organization
ITPC: Indonesian Trade Promotion Center
JICA: Japan International Cooperation Agency
MoA: Ministry of Agriculture
MEF: Ministry of Environment and Forestry
MoI: Ministry of Industry
MoMaF: Ministry of Marine Affairs and Fisheries
MoT: Ministry of Trade
MT: Metric tonne
NPOP: National Programme for Organic Production
NGO: Non-governmental organisation
NRSC: Natural Resources Stewardship Circle
PERKOSMI: Indonesian Cosmetics Association
PMC: Product-market combination
R&D: Research and development
REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals
SIPPO: Swiss Import Promotion Programme
SME: Small and medium-sized enterprises
SOP: Standard operating procedure
UNIDO: United Nations Industrial Development Organization
USD: United States dollar
USP: Unique selling point
VCA: Value chain analysis

Executive Summary

This CBI-commissioned value chain analysis (VCA) identifies opportunities and obstacles in the Indonesian plant extracts sector, vis-à-vis European markets for extracts intended for use as a traditional food ingredient, food supplement or as an ingredient for cosmetics, but especially value-added products, such as extracts based on traditional use for food, health or beauty. This analysis identifies characteristics of trends, demand, requirements and options for value addition, describes the actors and relations in the value chain, identifies clear obstacles and opportunities and proposes targeted interventions.

In addition to this VCA report, CBI developed two additional reports: on seaweed extracts and essential oils.

Chapter 1: The European Market

Based on information on trends, demand, requirements and value addition propositions, the study shows good potential for Indonesian extracts on the European food supplement and cosmetics markets. The study also shows how Indonesia's strong traditional knowledge on the use of natural products for food, health and beauty could be leveraged to develop innovative and proprietary extracts for European markets.
These qualities are in demand among European manufacturers seeking to differentiate themselves in the market. However, Indonesian producers have yet to leverage favourable European market trends such as increased demand for organics and compliance with corporate social responsibility (CSR). In addition, Europe imposes strong requirements on producers willing to do business with European companies, while European buyers currently do not picture Indonesia as a source of such innovative extracts. The table below summarises these aspects of the European market trends, demands, requirements and the opportunities and the potential for Indonesian plant extracts and traditional food ingredients for food supplements.

Indicator	**Extracts as traditional food ingredients for European food supplement markets**	**New cosmetic extracts related to Jamu**
European market trends	++ Europe looks for differentiation and provenance	++ Europe looks for differentiation and provenance
European demand	+ Growing market for innovative extracts	+ Growing market for innovative extracts
Market requirements	- High requirements for market entry	- High requirements for market entry
Value addition opportunities	++ High margins on proprietary extracts	++ High margins on proprietary extracts
Potential for Indonesia	**+++++++**	**+++++**

Chapter 2: Value Chain Structure and Governance

Chapter 3 shows that the Indonesian value chains for extracts intended for use in the pharmaceutical or herbal medicine sectors, are transparent. Outside of these markets, value chains are longer and more complicated, reducing the level of traceability. There is little coordination among actors in the value chain, spread among suppliers of cosmetics, fragrance and flavours, pharmaceuticals, Jamu, and supplements, each industry with its own sector association, namely the Indonesian Cosmetics Association (PERKOSMI), the Indonesian Essential Oils Association (DAI) and the Association of Herbs and Traditional Pharmaceutical Producers (GPJ). The extracts sector as a whole is not considered by government organisations in their policies or support activities and the service industry to the sector is not well developed in key needed services, such as efficacy research. The value chains typically involve:

- Different producers of raw materials, such as farmers, wild collectors and company plantations;
- Traders at different levels, covering a community, district, province or other regions;
- Extraction companies mostly focusing on or integrated with domestic companies specialised in cosmetics, food supplements or pharmaceuticals.

Chapter 3: Opportunities and Obstacles in the Value Chain

In terms of obstacles, Chapter 3 identifies the following key issues:

- Indonesian SMEs lack knowledge specifically on:
    - European market trends, so they do not develop products which meet market needs, and do not leverage high-growth segments in Europe.
    - European market access requirements and standards, so they do not comply with quality, documentation and certification, or the right route to introduce innovative products to the European market.
- Extraction companies have no contact with European buyers, so they do not learn about buyers' requirements and do not communicate with buyers on product development and improvement.
- The current low-skilled human resources available to the sector, for example in areas such as product development, leads to unstandardised extracts which do not meet EU buyers' requirements.
- In terms of innovation, European buyers do not see Indonesian extract exporters as prospective suppliers of proprietary extracts.
- For extracts, there is no vision on development of the sector, which is also reflected in the unclear legislation on access and benefit sharing (ABS). The local business support organisations (BSOs) do not offer sufficient services to meet the needs of exporting companies.
- Research and development (R&D) actors are not well connected with the private sector. More research in, for example, organic production and safety and efficacy of extracts is also necessary to compete in value-added markets.

Chapter 3 identifies the following opportunities:

- Good availability of raw materials and options to increase raw material supply;
- Growing demand in the European market;
- Documented traditional knowledge to meet demand for innovation;
- High-quality extraction companies;
- Strong local market.

Chapter 4: Possible Interventions and Support Activities

Chapter 4 proposes the following interventions for Indonesia's plant extracts for food supplements and cosmetics:

- Improve sector coordination;
- Set up best practices for supply chain management, sustainability and USPs, and product introduction to Europe;
- Develop market information tools for the sector;
- Develop service delivery of BSOs;
- Build workforce skills, HR capacities
- Curricula development;
- Support on access and benefit sharing (ABS).

Conclusions

The conclusions recommend focus on specific market segments, key considerations and risks associated with possible interventions. In relation to market segments, the research team recommends a market focus on the food supplement and cosmetics sectors. In terms of key considerations for interventions in the plant extracts sector, the research team recommends:

- Making a business case for developing innovative extracts for European markets, providing strong support to selected companies.
- Strengthen the business case for the CBI to obtain best results by:
    - Building interest among government institutions and BSO to invest in a business enabling environment for the sector;
    - Enticing more companies to invest in extract development;

- Manage risks using a combination of proprietary and extracts, in addition to better-known and commodity extracts.

The research team identified the following key risks for possible CBI interventions:

- Commitment of companies;
- Government interference;
- BSO resources and capacities;
- EU regulatory changes;
- Dissent among sector stakeholders.

1. Introduction

1.1 EU market segmentation for plant extracts

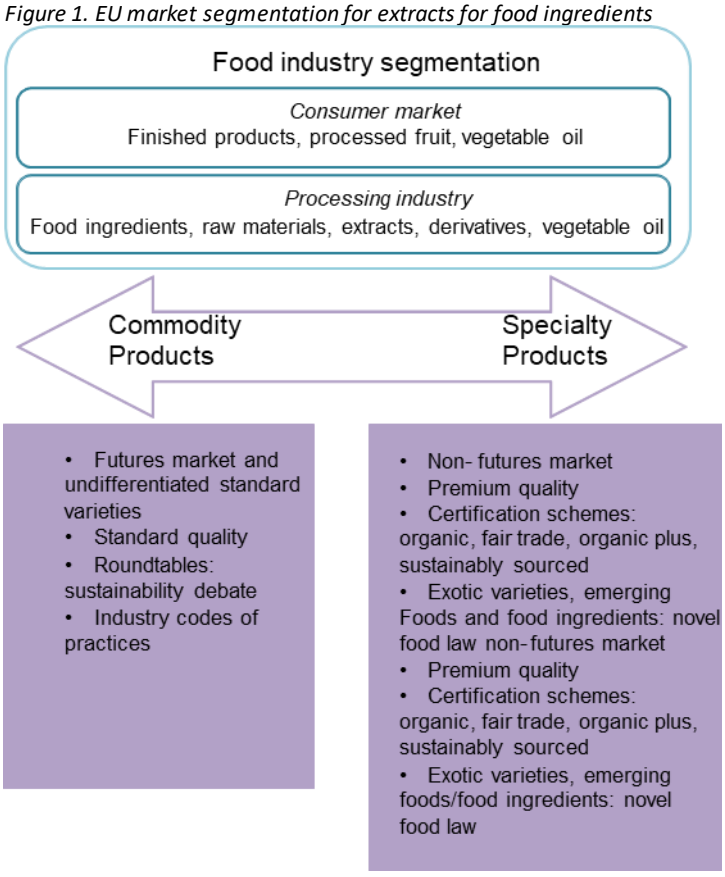
This VCA considers three market segments according to the industry in which the extracts are used:

- Food and feed;
- Cosmetics;
- Health, focusing on food supplements.

1.1.1 Food and feed industry

Plant extracts are used in different food products. Extracts are mostly used for flavour and for their active benefits. Some colourants are also based on plant extracts. Plant extracts can be further segmented into specialty ingredients and commodity ingredients.

Figure 1. EU market segmentation for extracts for food ingredients



Specialty products can be of premium quality, certified, exotic and relatively new to the market. Commodity products are of standard quality and traded in large quantities, some even through futures markets.

In addition to the food industry, animal nutrition is also a big and growing market in Europe. The use of extracts is growing particularly in feed additives, similarly to food supplements, as discussed under health below. This segment falls under a separate regulatory framework from food (see section on European requirements).

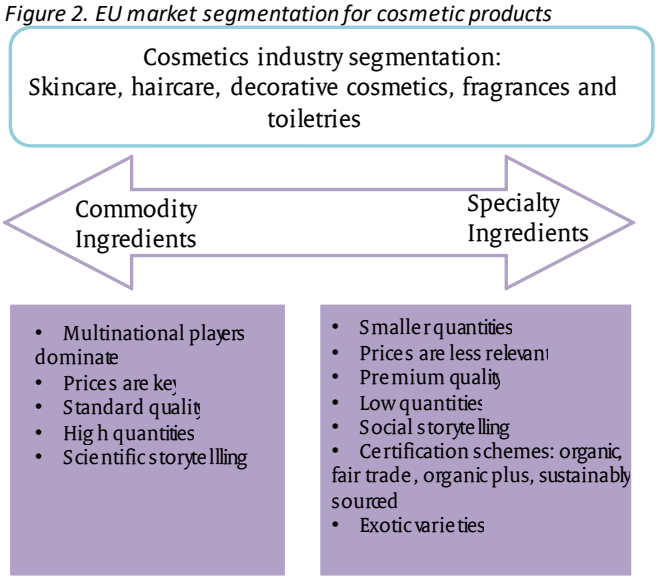
1.1.2 Cosmetic industry

Developing countries supply many different extracts to cosmetic producers in the EU, often through intermediaries, such as traders, distributors and processors, or with the support of agents. The cosmetic industry is divided into five main segments — skin care, hair care, decorative cosmetics, fragrances and toiletries — each with many different sub-segments. Of these segments, toiletries, skin and hair care represent the largest segments in the cosmetics industry with approximately 25% market share each, followed by fragrances and decorative cosmetics, which have about 15% and 10% respectively. Extracts are used mostly for their active properties such as anti-microbial, anti-oxidant, soothing, astringent, cooling, conditioning, toning, deodorising, among others. However, some extracts are also used as or in fragrances, or as a natural support to other functionalities such as UV protection, or preservation.

Demand can be divided between conventional or commodity and specialty ingredients. Specialty ingredients are traded in smaller quantities and are often used for additional marketing potential in addition to their functionality or activity. These ingredients, for instance, may carry a certification for social or environmental standards, may be rare, have exclusive and strong marketing and storytelling qualities, sometimes all of these combined. They are more used in exclusive, natural, organic or ethical products.

Commodity ingredients serve as the basis for many products, including both conventional and natural cosmetics products requiring large and constant ingredient quantities at highly competitive prices.

Figure 2. EU market segmentation for cosmetic products

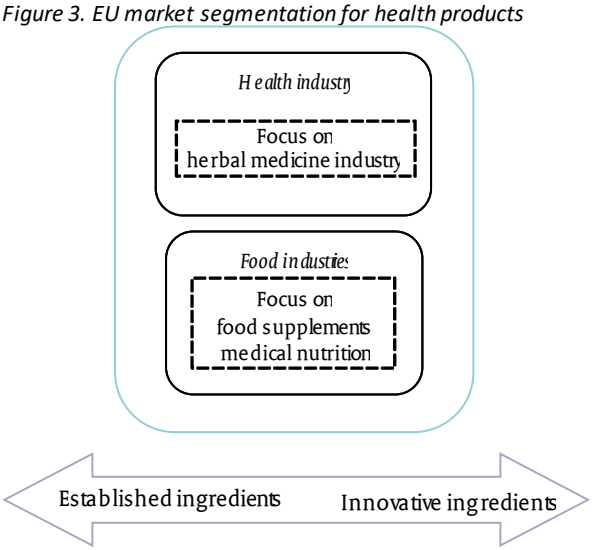


1.1.3 Health industry

Plant extracts are used both in herbal medicine and health food industries, such as in food supplements and medical nutrition. Innovation is more feasible and welcomed by companies in the health food industry. Both cover a range of indications, as shown in the table below.

Due to the high costs associated with research and market authorisation to establish efficacy and safety of new herbal medicine ingredients, the industry focuses on ingredients that have community monographs with either documented or well-established traditional use. Most ingredients have established markets, as they have been used for a long time. These markets focus on high, documented quality and full traceability. New entrants and innovations might not be feasible in this segment. However, once relations have been established, companies do not easily switch suppliers and the margins are generally higher than in the health food industry. Several plant extracts from Indonesia are included in European monographs, but opportunities in this segment are too narrow in terms of development potential, also potentially benefiting too few companies, to justify emphasis in a future CBI programme.

Figure 3. EU market segmentation for health products



Health food industries offer more opportunities for innovation and market entry. There are fewer regulatory for health foods than pharmaceuticals, which more tightly regulated. Companies in the health food industries are looking for new ingredients to diversify and distinguish themselves in the market. There is strong market growth and opportunities for innovation in terms of new products, new origins and new stories, all of which could offer strong opportunities for Indonesian producers to leverage their long, local traditions of using various plants and their extracts for health purposes.

The rate of innovation depends on the specific indication for which food supplements are used. For example, innovation in terms of new ingredients is more prevalent in food supplements aimed at improving digestive health than for stress and anxiety conditions, which is dominated by several well-established species. Recent changes in novel food legislation are expected to greatly increase the pace of innovation in this area, broadening opportunities for Indonesian suppliers.

Table 1. Ingredients per health application

Application	Natural ingredients used
Aromatherapy	Essential oils
Digestive health	Peppermint, Roman camomile, green tea, turmeric, ginger, boldo leaf, fennel, black psyllium, senna, psyllium, aloe vera, aloe ferox, rosemary, artichoke, fumitory
Cognition	Ginkgo biloba, lemon, bacopa, Spanish sage, gotu kola, huperzine A, ashwagandha, rosemary
Energy	Rhodiola, gingko, ginseng, ginger, turmeric, Siberian ginseng or eleuthero, maca, tea, yerba mate, citronella, lemongrass, camu camu, long jack
Immune system	Echinacea, ginseng, eleuthero, turmeric, ginger, green tea extracts, cat's claw
Joint health	Cayenne, nettle, devil's claw, ginger, turmeric, eucalyptus, boswellia, wintergreen, comfrey, meadowsweet
Obesity	Dandelion root, wormwood, bladderwrack, fennel, senna, green tea
Stress and anxiety	St John's wort, valerian, passionflower, lavender, German camomile, lemon balm, rhodiola, Siberian ginseng, eleuthero
Vascular system	Hawthorn, cardamom, butcher's broom, hibiscus/roselle, horse chestnut, ginkgo biloba, garlic, gotu kola, cayenne, Hazel, green tea, linseed oil

The medical nutrition market also offers current opportunities, having various products launched especially in the German market, but recent regulatory changes have narrowed the window into this market, in effect making it unattractive as of 2019.

1.2 Indonesian natural ingredient product groups

This VCA looks into plant extracts. A plant extract is a substance made by extracting part of a plant's raw material, often by using a solvent such as ethanol, CO_2 or water. Plant extracts can be traded in various forms, for example as tinctures, in liquid form or powder. They are used in the food, cosmetics and health industries for their active or functional properties.

This VCA covers the following plant extracts:

- Extracts traditionally used as food, particularly in food supplements in Indonesia which could meet the demands in Europe for various health indications, or in overlapping areas such as sports nutrition. Extracts must provide evidence of 30 years of medicinal use to comply with European traditional foods legislation. In addition to plant extracts, dried and ground products can also be relevant.
- Extracts for cosmetics, in particular those based on Indonesian beauty rituals and on traditional use of natural ingredients for cosmetics, which also meet the quality, safety and efficacy requirements of the European industry.

1.3 Structure of this report

This report is structured in six chapters. Chapter 1 is just an introduction. In Chapter 2, Indonesia's plant extract sector is discussed under four themes:

- European market trends;
- European demand;
- Market requirements;
- Value addition opportunities.

Chapter 3 looks at the structure and governance of the sector looking into the actors, influencers and supporters, the governance structure of the value chain and the horizontal and vertical relationships among them.

Chapter 4 identifies key opportunities and obstacles along the value chain and in terms of the business enabling environment. Chapter 4 also discusses specific risks to CSR in the value chain. In Chapter 5, we propose possible interventions and support activities for the extracts sector, focusing on resolving issues with plant extracts. In Chapter 6, we provide a conclusion associated to an intervention logic and risks.

2. The European Market for Plant Extracts

This chapter discusses the European market for plant extracts under four themes:

- European market trends;
- European demand;
- Market requirements;
- Value addition opportunities.

2.1 Trends in the European market

Natural and plant-based

Consumer demand for natural products is increasing. Consumers often see natural products as healthier alternatives to synthetic products, a view which companies increasingly exploit in their marketing strategies. To respond to this trend, producers tend to replace chemical ingredients with natural ingredients.

- This switch provides more evidence of the growing use of plant extracts across different health indications, including in segments such as sports nutrition, where plant proteins have been replacing animal proteins. Increasing demand from vegetarian and vegans in Europe, as well as across wider segments of the population have been driving this trend.
- Cosmetics manufacturers include natural certifications to attest the naturalness of their products.

There is also an increasing drive for the use of more natural extraction techniques, for example CO_2 extraction. Having the capability to use these techniques is more the exception than the rule in Indonesia's extract production industry. Natural extraction is relevant to active properties of plant extracts, such as using fewer synthetic actives, while maintaining high performance, but also to functional properties of plant extracts, such as smell, taste, etc. Indonesia's extract industry and its BSO seem unaware of this trend in Europe. Buyers confirm that Indonesian suppliers are mostly offering a limited range of commodity extracts, and are not known for their innovation in extending their product ranges.

Organics

Helped by an increased demand for natural food supplements, the market for organic ingredients is also growing. Organic products normally represent a small part of the overall market, depending on the specific product and market. The most mature markets in the EU are in Northwestern European countries, such as Germany, Switzerland the UK and the Nordic countries. The fastest growing markets for organic ingredients are currently in Eastern European countries.

- Organics are a key trend for the food and health sector, particularly for the introduction of new ingredients for food supplements, where there is a strong expectation for organics.
- The organic trend is also highly relevant for cosmetics, particularly for skincare. However, since certified organic cosmetics can also include some non-organic materials, extracts (which are used in a small amount) are not as commonly used to reach organic thresholds, like oils are, for example.

In general, few Indonesian companies are investing in this trend as their domestic clients are not asking for it. There is hardly any knowledge of this European trend among Indonesia's extraction companies. Stakeholders indicate that, particularly in Java, organic production is difficult because of the high-residue content in the soil, which are also detected after conversion periods. Other countries, such as India, Peru, Colombia and South Africa have a head start over Indonesia in this aspect.

Substantiation of claims

Substantiation of claims has always been important for ingredients, but various legal requirements have put product claims to consumers under tighter scrutiny.

- The EU has harmonised the use of nutrition and health claims for food products, rejecting many claims and negatively affecting the market for extracts. In terms of health products, efficacy and safety substantiation is fully established in pharmaceutical legislation. For supplements, claims for botanical ingredients have not yet been harmonised and are currently based either on 'pending claims' or claims for minerals and vitamins, which have found more agreement on efficacy among EU countries.
- For cosmetics, legal requirements place clear obligations on manufacturers to ensure claims made are actually valid. Cosmetic manufacturers have much less room for the product claims they can make, so they have become more demanding about the validity of suppliers' claims. More documentation is required to convince buyers to take a product forward, although it is still not necessary to go down the entire R&D chain to pique the interest of buyers. A key issue to take into account before investing in substantiation of claims is whether the ingredient is on China's positive list. When not listed, an ingredient is much less likely to be picked up by the European cosmetics industry.

On the one hand, this offers opportunities for producers to make stronger claims, but on the other hand, it can negatively affect innovation and lead to strong demands on efficacy and safety data. Most Indonesian companies, especially SMEs, offer products with claims based on traditional use or on well-established documentation. This is further explained under Chapter 3.

Traceability

Traceability within value chains is very important due to legislative and buyer requirements, such as certification schemes. Following good practices guidelines in production, harvesting and processing is also increasingly important to access the European market. A new ingredient will look much more attractive to a European buyer or partner when the supplier can demonstrate full traceability.

In this context, the adoption of verifiable, documented traceability systems takes on even more importance for suppliers, helping them to compete with suppliers from countries where traceability is problematic, such as China. In addition to stricter controls, buyers require certifications from recognised and trustworthy sources, which can demonstrate the supplier's commitment to high and consistent quality and safety.

In general, Indonesia is seen as lagging in traceability. Being seen as a new entrant to the market will be problematic for buyers. Traceability is also a requirement for extract companies to operate in the Indonesian domestic market, supplying the Indonesian herbal medicine and pharmaceutical industry. Local extraction companies indicated that they can provide traceability, which will be further explained under chapters 3 and 4.

Sustainability and ethical sourcing

Awareness among consumers is growing about the effects their purchasing behaviour has on social conditions in production countries, including a growing interest in the source of ingredients. This enhanced consumer interest results in the increased demand for ethically produced products, particularly those that have fair trade or other ethical certifications. Consumers, however, do not always demand these certifications. In fact, there is a growing demand to go beyond certifications, to explain to consumers what true, local benefits the products they buy generate. On the other hand, some buyers are foregoing certification to integrate CSR in their supplier audits and questionnaires. Buyers increasingly refer to registration in the Supplier Ethical Data Exchange (SEDEX) as an expectation.

Sustainability offers opportunities for companies in marketing (premium, market access) and supply (ensuring future availability, which is especially relevant for wild-collected products). Working on sustainability is not yet high on the agenda among Indonesian extraction companies, even for those already exporting, which makes Indonesia less attractive to buyers compared to other suppliers. This is further explained under chapters 3 and 4.

Companies look for differentiation

In mature EU markets, companies try to differentiate themselves from their competitors, which can be done in various ways. In relation to ingredients, some of the approaches include certification, adding specialty ingredients to final products, such as origin-specific or ingredients based on specific land species, adding functionalities to final products or building a story around the key ingredients in the product. Differentiation is a strong driver for the use of natural

extracts and also a driver for the identification of new ingredients. For example, supplement manufacturers include natural extracts to vitamin and mineral products for the sake of differentiation, while still using the claims associated with the minerals or supplements.

These developments also lead to a strong, supply-driven growth of intermediate product categories such as food supplements and cosmeceuticals. These products are marketed as 'health products', without having to deal with the regulatory hurdles of pharmaceutical products. They contain active ingredients, but cannot make medicinal claims, which is relevant for natural extracts, especially those with active benefits or an interesting history of use.

Indonesian extraction companies have only a limited knowledge of this trend, being particularly unaware of what European buyers are looking for in terms of the specific requirements and kinds of ingredients. Indonesia is not present in the novel food market yet, despite having the biodiversity and the traditional knowledge to rival key players, such as Peru.

Vertical integration of supply chains — Responsibility for quality enforcement along the chain

Many European manufacturers are strengthening their supply chain management and rationalising their value chains, which results in:

- Middlemen (local traders, brokers or agents) with a limited value addition function being cut out of value chains, both in Europe as well as in source countries, such as Indonesia. In the Indonesian extracts trade, middlemen continue to play a vital role, especially for SMEs. Few Indonesian companies have tried to get closer to sources and offer traceability, especially those supplying to pharmaceutical companies, or which make part of one.
- Processors, manufacturers and retailers are working with fewer preferred suppliers (importers and producers), on whom they place the responsibility for product quality and delivery volumes. A tighter control over the chain allows them to improve traceability, monitor product safety and quality and achieve process improvements. Manufacturers look for close relationships, especially for strategic ingredients, such as performance extracts or key extracts related to their marketing story.

Sustainable wild collection

In the case of wild collection, sustainability has become more important due to legal requirements, such as the Convention on Biological Diversity, in addition to CSR and economic perspectives. The availability of wild-collected materials has been reduced by encroaching cities and agricultural zones, retiring collectors and disinterest from young rural populations in collecting, in addition low prices and overharvesting.

Sustainability of supply, in terms of quantity and quality, as in consistency in the active content, is increasingly relevant to EU buyers of ingredients, especially when they need to make large investments in product development and documentation. That is the case of performance extracts, for example, where it is doubtful that an EU buyer would invest in product development if a sustainable supply was not assured. Consequently, European buyers are becoming more involved in the sustainable management of natural resources to secure supplies.

Exporters are then required to make their supply chains more transparent and take more responsibility to ensure sustainability of raw material production. Some companies in Indonesia practise sustainable wild collection practices, for example, Sido Muncul in the herbal medicine industry, which has a strong mission of community development and sustainable trade. We have not seen commitments to sustainable collection among SMEs, and there seemed little understanding of their responsibility in their supply chain, as explained in Chapters 3 and 4.

Natural extracts for health products

A changing perception of health, the ageing population and the threat of antimicrobial resistance drive up the European demand for plant extracts for health products. Updated legislation offers opportunities for product development in food supplements. Efficacy and traceability is vital, but the market is also increasingly driven by sustainability and storytelling. Traditional healing systems play an important role. While traditional Chinese medicine

(TCM) and Ayurveda have a strong position in comparison with Western traditions, Jamu is not well known in Europe. Most opportunities for product development and innovation lie in the food supplements sector. Key trends include:

- Increased options for market entry of new products through legislative developments, as in the revised Novel Food Regulation.
- European consumers are taking more responsibility for their personal health, integrating mental and physical well-being.
- Europe populations are ageing, becoming even more important targets for European manufacturers.
- Growing sales of food supplements, at 9.6% per year over the period 2016–2024.
- Growing sales of sport supplements, at 8.1% per year over the period 2017–2022.
- Growing consumer demand for organic ingredients, fair-trade ingredients in food supplements, and buyers demands for proof of sustainable sourcing and CSR compliance.
- In terms of indications, a growing demand for joint health products, especially natural products, such as turmeric, and health products to relieve symptoms related to stress.
- The growing popularity of herbal teas for health.
- Increased global demand for European herbal medicinal products.
- The growing market of herbal veterinary medicine and feed supplements.
- Increased attention for natural health products as an alternative or supplement to antibiotics.

Natural extracts for cosmetics

The use of natural extracts continues to play an important role in the development of cosmetic products, increasingly linked to environmental and social responsibility issues. Efficacy, however, is the first consideration for consumers, who are also interested in the stories behind the ingredients used in cosmetic products. There are opportunities to meet the market's needs in terms of new active or functional natural extracts. Proving safety in all its aspects is also important: safe in terms of proof of efficacy, safe to process and use, and safe in terms of supply sustainability.
Trends in natural extracts for cosmetics include:

- Increasing sales of natural cosmetics in Europe (8.8% per year over the period 2016–2024) is boosting the use of natural extracts. The market for natural extracts is growing strongly in Eastern Europe, driven by increased consumer spending in natural cosmetics.
- Marketing extracts on cosmetic product labels prefer 'extracts that perform as' over avoids 'contains extracts of', since efficacy comes first in the choice of extract.
- Cosmetic manufacturers combine product performance with a story, which can be related to the ingredient in terms of its sustainability (fair, organic, natural) or provenance (tradition of use, production, local benefits). Local beauty rituals, such as Balinese spa, or related to traditional healing, such as Jamu, generate interest.
- Natural, organic, and fair are certifications which are growing in demand from consumers. Private sector sustainability standards, such as NaTrue, and Cosmos are experiencing a period of strong growth.
- Extraction facilities and skills are widely available in developing countries, enabling producers to meet EU market requirements.

As mentioned above, there is very limited knowledge among Indonesian extraction companies on such trends in Europe, and there is no action taken to benefit from them. Industry stakeholders and international buyers expressed a need for awareness raising among Indonesian extraction companies on the opportunities international markets can offer to them.

2.2 European market demand

Europe imports large quantities of raw plant materials as well as extracts. A substantial part of these extracts are used in supplements and herbal medicine industries. The raw materials for many extracts cannot be produced or collected in the wild in Europe because of the local climate. Even for products traditionally grown in Europe, production in other areas of the world is often much more economical.

In 2017, European imports of raw materials amounted to €823 million, and € 764 million for plants. On average, extract imports are growing stronger, as buyers are more likely to source extracts directly from the source, instead of from European processors.

For extracts, growth in value and volume have been rather equal at 11%, while for raw materials, the 18 % growth in volumes has far exceeded the growth in value, which mean an average decrease in prices between 2013 and 2017.

Germany is the main European importing country of raw materials and plant extracts. It is also a key European trading and processing hub, which is particularly dominant in raw plant materials. Germany also plays a key role for extracts for health purposes, not only in Europe but also in supplying to the North American and Asian markets. France also counts with several important extraction houses partially focusing on the health sector, as well as a strong extraction sector focusing on cosmetic applications. Some key cosmetic distribution companies are also French. However, ingredients in general is a very globalised industry, with key players spread out across Europe.

The European demand in the cosmetics, and in the food and health markets, has been driven by the following factors:

- For food supplements, future market growth is expected because of the growth of the natural supplements industry, as well as the increasing use of extracts in conventional supplements. Extract imports are expected to outperform raw material imports in the short term.
- In cosmetics, future growth in demand for extracts is driven by the growth of the natural cosmetics industry, as well as the increasing use of natural performing extracts in the conventional cosmetics industry. The strong drive for innovation, which is partly based on ingredients, leads to an increased interest in non-European cosmetic traditions and beauty rituals as an important source of inspiration. There is a strong demand for innovative ingredients.

Table 2 European imports of medicinal and aromatic plants

	Imports in EU-28 from Indonesia in 2017, in tonnes and million €		**Annual growth or decline since 2013, in value**	**Main importing country in 2017, in value**	**Main country of origin**
Plants for perfumery, medicaments or insecticidal purposes	340,679 tonnes	€823 million	8%	Germany (31%)	Germany (11%), India (10%), USA (9%)
1302.19 — Vegetable saps and extracts, excluding liquorice, hops and opium	56,684 tonnes	€764 million	11%	Germany (26%), France (18%)	Germany (14%), China (10%), France (10%)

Indonesia plays a very small role in this market, largely limited to raw plant materials mostly exported to the Netherlands.

Table 1 European imports of medicinal and aromatic plants from Indonesia

	Indonesia's market share in Europe, in value	**Imports of EU-28 from Indonesia in 2017, in tonnes and million €**		**Annual growth or decline since 2013, in value**	**Main importing country from Indonesia in 2017, in value**
12119086 — Plants for perfumery, medicaments or insecticidal purposes excl. ginseng roots, coca leaf, poppy straw, ephedra and Tonquin bean…	0.00%	262 tonnes	€1.6 million	7%	Netherlands (53%)
1302.19 Vegetable saps and extracts (excluding liquorice, hops and opium)	0.03%	8 tonnes	€0.2 million	19%	France (41%), Netherlands (24%)

European market players

European SMEs are driving innovation in terms of using new ingredients in food supplements in Europe, when they can overcome the legal barriers. However, large companies control the demand in the market, for example, Arkopharma, the largest natural supplement producer in Europe. Private label manufacturers are also important

players, including Nateva, and brands such as Biovita, Purasana, Solgar, BioCare, A. Vogel, Higher Nature, Terranova, and Salus. Examples of importers include Martin Bauer, Naturex, Krautermix, Worlee and the Organic Herb Trading Company.

For cosmetics, European SMEs are the main incubators developing new business propositions, including new ingredient use. These companies are closely watched by large multinational brands, both for acquisition and inspiration. Examples of large innovative brands include Weleda, Body Shop, Lush, L'Occitane en Provence and Yves Rocher. Italy alone counts more than 753 SME cosmetic companies, many with a natural focus.

Table 4 Number of cosmetics SMEs in different EU countries

Italy	753
France	714
UK	445
Germany	395
Poland	371
Spain	342
Switzerland	216
Sweden	196
Hungary	185
Czech Republic	149
Netherlands	146

Source: Cosmetics Europe, 2018

Traders, processors and distributors include Nateva, Greentech, Quimdis, Azelis, Martin Bauer, Naturex, Terra Provence, Carlo Sessa, PfannenSchmidt, Roeper, Innovia, Unichem and Provital.

Price developments

Import prices of extracts remained fairly stable between 2013 and 2017.

Table 5. European import prices of 1302.19 Vegetable saps and extracts (excluding liquorice, hops, opium), in €/kg

2013	2014	2015	2016	2017
13.3	14.2	13.6	12.5	13.5

Source: Eurostat, 2018

Buyer perception

Many of the interviewed buyers are active in Indonesia and source a variety of products including essential oils and extracts. Their impression of Indonesia as a supplier in relation to quantities, quality, prices and supply consistency is mostly OK. This can be interpreted as a positive perception, since European buyers have high requirements and OK implies that the offers comply with their requirements.

The main concerns of buyers about Indonesian extract exporters relate to inconsistency in quality, and issues that have been identified with contamination by pesticide residues, phthalates and iron. European buyers relate these problems mostly to SME exporters; The top players' products are considered high quality. Buyers indicate that smaller companies have difficulties to meet the requirements in relation to standardisation, facilities compliance, quality consistency, documentation and reliability. They relate this to insufficient knowledge on quality control and management and different perceptions on communication.

Moreover, buyers do not identify Indonesia as a supplier of innovative ingredients for cosmetics, supplements or food, since Indonesian producers come across as failing to understand the market and its needs. One buyer also indicated that he did not expect Indonesian exporters to invest in efficacy research. On the other hand, a buyer indicated a strong interest in Indonesia as a source if suppliers could provide 'ethno-botanical raw materials to be implemented in modern cosmetic concepts'.

The interviewed buyers could not rate the performance of Indonesia compared to other countries. The preferred supplier country depends on the specific product that they are looking for, and buyers consider the competitiveness of individual suppliers instead of entire countries.

2.3 European requirements

Ingredients based on Indonesian traditional knowledge and biodiversity will possibly trigger the application of Indonesian and European legislation based on the Convention of Biological Diversity and in particular the Nagoya Protocol on ABS. Especially for ingredients based on wild ingredients, due diligence is needed to find whether the species used are endangered under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), in which case particular rules apply for access to the resources. As mentioned in earlier, Indonesia has not enacted relevant legislation yet, and still has work to do in terms of implementation capacities and systems. Therefore, we cannot yet determine whether the business enabling environment would be conducive to trade in case ABS rules were triggered.

Food and health ingredients

Food products and ingredients are covered by an extensive body of legislation. The most important aspects of these laws deal with food safety, which includes hygiene, pesticide residues, contaminants, microbiological criteria, permitted additives, and processes and systems to control these requirements, such as tests and Hazard Analysis and Critical Control Points (HACCP). In addition, buyers can demand food safety, traceability and sustainability standards beyond legislative requirements, e.g. ISO 22000, depending on which specific buyer.

The most established certifications among Indonesian producers are ISO 9001 and HACCP, with some companies making progress towards ISO 22000 and the Food Safety System Certification FSSC 22000, which is the main full food safety management standard in Indonesia. An estimated 30% of medium to large companies in the Indonesian food sector are certified for the FSC 22000 standard. In this particular sector, several companies have ISO certification. In addition, most companies have good manufacturing practices (GMP) certification, which is required for pharmaceuticals. Even though the GMP applied is according to Indonesian legislation, it is expected that the step to comply to EU GMP will be much smaller.

Although food supplements and medical nutrition are regulated as food products and are regulated under food laws, in marketing terms they are more aligned to the health sector. The main legislative difference compared to other food products is in specific labelling and composition requirements. An important aspect to labelling is the claim made, which needs to be supported by efficacy research. However, for existing extracts, efficacy is usually well understood and doesn't require research by suppliers. In Indonesia, experience with efficacy research is not strong, as national legislation for food supplements currently does not allow claims. Moreover, herbal medicine producers mostly base their claims on traditional heritage and only in rare cases substantiate it with pre-clinical data or clinical data.

The EU has specific novel food legislation, which applies to the use of new ingredients in food. The revised Novel Food Regulation entered into force on 1 January 2018. This new regulation simplifies the notification process of food products classified under the category 'traditional food from third countries', setting up a centralised authorisation process that makes approval processes faster. More specifically, the possibility to have safety documentation based on third-country use will open opportunities for suppliers to market new products in the European market. In this regard, Indonesian producers might benefit from the strong history of use of many products under the Jamu system of natural health and its documentation in Indonesian literature. However, considering that experience with preparing documentation sets in Indonesia is likely limited, taking advantage of this opportunity will require professional support, capacity building support and new sector associations.

Cosmetic ingredients

For cosmetic products, legislative requirements are less stringent than for food and health. However, for some product groups, legislative requirements make the introduction of new ingredients costly:

- REACH strongly affects market options for new ingredients, unless they are not chemically modified. Due diligence is the responsibility of the importer, but Indonesian exporters should have identified their own obligations in terms of REACH prior to market entry.
- European cosmetics legislation restricts the use of certain ingredients, such as preservatives, colourants and UV filters, to those mentioned in positive lists. Adding new ingredients to these positive lists is very expensive and should not be considered for this product market combination. In terms of preservatives, there is currently a strong market interest in preservative alternatives and extracts, for example, which have a high antioxidant or antimicrobial activity. This will require Indonesian companies to address functional properties of their extracts, which should be possible in partnership with local universities.
- European legislation has specific demands on efficacy and safety data of cosmetic products. Although this legislation is meant for cosmetic manufacturers in Europe, they will demand information from their suppliers. Experience with efficacy research is not strong in Indonesia, since most natural ingredients used in cosmetics are well understood or are sourced from international extract producers via local distributors.
- China list: Although not part of European legislation, introducing to the European market ingredients which are not listed for use as cosmetics in China requires close consideration. Suppliers will need to identify specific cosmetic manufacturers which have no interest in marketing their cosmetic products in China and the distributors which supply to them.

Non-legislative requirements are very relevant as this sector strongly relies on the story backing the final product, in addition to the efficacy or functionality of ingredients. Buyers normally demand additional certifications and marketing materials, such as those promoting Indonesia as the origin, in addition to documentation on safety, efficacy, stability and dosage, to differentiate products from those of competitors. Indonesia has a lot of potential in terms of storytelling, but this potential is currently not being used to gain exposure in international markets.

2.4 Value addition

Local value addition by quality management and traceability

Buyers look at product quality first, but they are increasingly placing emphasis on quality management and transparency along the chain. Improving supply chain transparency makes it easier for EU companies to comply with legislative requirements and certification standards. Suppliers who are able to offer full traceability to their buyers have a competitive advantage.

Opportunities to add value to raw materials include proper identification, harvest, collection and post-harvest handling and documentation complying with good agricultural and collection practices (GACP) and good agricultural practices (GAP) to get a higher price for the raw materials. Organic certification may add support to a product's documentation and quality. Even when buyers are not in the market for organics, they might pay a premium for a traceable, well-documented supply of a good quality product.

For processed ingredients and food supplements, HACCP is compulsory. In addition to the minimum and mandatory standards of production, larger retailers and processors in the EU increasingly demand compliance with standards such as the British Retail Consortium (BRC), the International Food Standard (IFS) and ISO 22000. Compliance with these standards improves traceability and quality control within the value chain and gives companies a competitive advantage. Although not designed for cosmetic ingredients, these certifications can also add value, or give additional confidence to buyers. Moreover, there are specific, non-compulsory guidelines on GMP for the production of cosmetic ingredients by EFFCI, The European Federation for Cosmetic Ingredients.

Processing at origin

There is a general shift in processing from the EU to countries of origin. Producing extracts can add considerable value to products when compared to exporting raw materials. Exporters can also add value to their products by improving

standardisation, which requires appropriate technological improvements, such as meeting local capacities. Quality and food safety management are of the utmost importance.

Buyers place especial trust in Indonesia when it comes to the supply of basic extracts. One buyer mentioned that Indonesia had 'some of the highest quality extraction companies in Asia'. There is less of an expectation to find proprietary and performance extracts in Indonesia, so it will be necessary to build awareness among European buyers about Indonesian ingredients and their history of use, as well as the qualities of Indonesian exporters to supply these ingredients according to buyers' requirements.

Local value addition by improving sustainability

Sustainability is a major issue for European companies and consumers. Obtaining certifications, developing marketing stories and adopting CSR practices can add value to products, open up opportunities and facilitate market access.

- *Certification*: Organic and fair-trade products represent niche markets, but their sales in Europe have been growing considerably for several years now. Certified products are priced at a premium when they are sold as organic or fair trade. Considering the national market focus of Indonesian extraction companies, very few companies currently consider ethical certification as value added.
- *Marketing stories*: In addition to complying with certification standards, there are opportunities to add value by employing marketing stories, which mostly involve the product's origin. It may include the local tradition of use, production methods, benefits for communities or the environment, the identity of producers, the environment of production, etc. Increasingly, these marketing stories require strong documentation to back real benefits. Several companies, mostly in herbal medicine or cosmetics, are adding marketing stories to their products.
- *CSR and company codes of conduct*: By implementing CSR policies or company codes of conduct, companies can set themselves apart from their competitors. Such codes include social and environmental parameters that demonstrate an exporter's commitment to sustainable principles. Although basic compliance is increasingly becoming a market requirement, going beyond the basics can add value to a product and facilitate market access, as some European companies which are committed to sustainability require such codes or policies from their suppliers. Indonesian companies often do not have written codes or other documents to substantiate and promote their CSR practices.

R&D

Value addition increases along the research chain. As suppliers invest in various R&D steps, they may add intellectual property value to their product, resulting in much higher prices for their extracts and USPs among the competition. Research costs depend on the type of indication and efficacy that needs proof, as well as what kind of evidence is required for the particular market segment, such as clinical tests. Costs do go up when moving from cosmetics to food supplements and medicine. Testing in general is considered prohibitively expensive for producers of medicines in developing countries.

The 'traditional food window' and the 'traditional herbal medicine track' use of a product for a particular indication can be proven through documentation and can result in the possibility of making claims on the product. As Indonesia's legislation for food supplements currently does not allow claims, producers have little experience with efficacy research. Plus, herbal medicine producers mostly base their claims on traditional heritage and only in rare cases substantiate it with pre-clinical data or clinical data. Local R&D capacities in this area are also limited, as described in Chapter 3.

Pre-clinical cosmetic research can be conducted in Indonesia in partnership with universities, but is often performed in-house by cosmetic companies, which would make it possible for the development of extracts with sufficient efficacy data to interest European buyers or partners.

3. Structure and Governance of the Plant Extracts Value Chain

This chapter describes the structure and governance of the plant extracts value chain (VC), looking into:

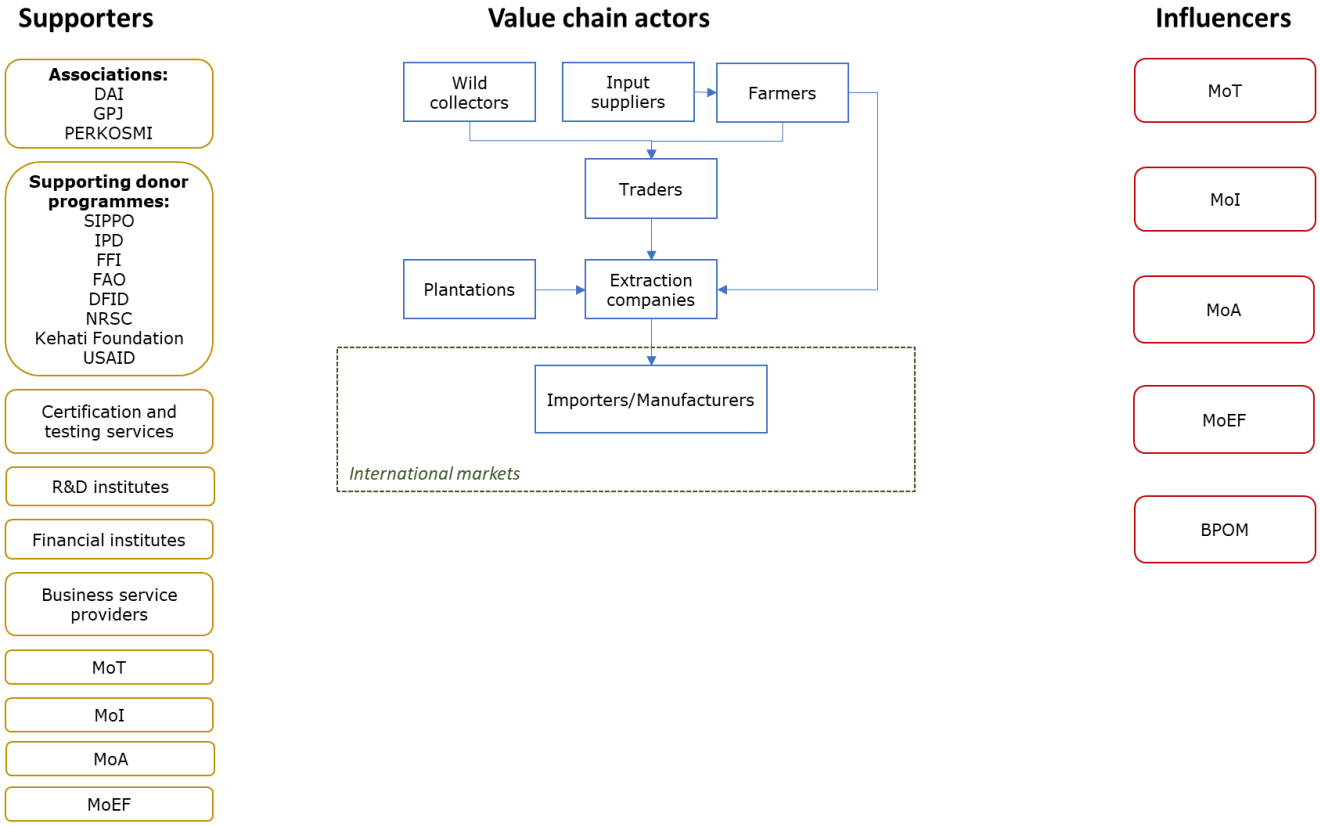
- What are all the actors, influencers and supporters in the VC? How many are active in each part of the VC?
- What is the governance structure of the VC and how are the actors working together?
- What are the horizontal and vertical relationships between these actors, influencers and supporters?

Please note that organisations can have different roles. For example, government agencies often have both an influence role, setting the rules, and a support role, helping value chain actors to comply with the rules. We discuss:

- Value chain actors: All actors from input supply up to buyers in Europe;
- Value chain supporters: Industry associations, international organisations, donors, local NGOs, government organisations and other supporters in key services such as certification, testing, R&D and financial services;
- Influencers: The key rules and responsibilities making up the enabling environment as well as the ministries setting and implementing these rules.

Figure 4 below provides a representation of the value chain for traditional ingredients for European food supplement markets. Section 3.7 discusses these different players, starting with value chain actors, moving to influencers and finally discussing the various value chain supporters.

Figure 4. Value chain of traditional ingredients for European food supplements



3.1 Value chain actors

3.1.1 Input suppliers

Availability of quality seeds and seedlings differs between different extract crops. There will be more availability of main commodity crops than minor crops used for extracts, which may be an issue for some raw materials used as traditional ingredients. Many however are produced in large scale in Indonesia, including local varieties of ginger and turmeric. Providing superior seeds and seedlings to farmers is a key focus area in the Strategy Sector of the Ministry of Industry.

Agricultural inputs such as fertilisers, pesticides and herbicides are easily available in Indonesia, but knowledge about their application is limited. There is also little knowledge about what pesticides and herbicides are permitted under specific standards and certifications and which ones are acceptable for buyers.

3.1.2 Wild collectors

Several raw materials for extracts are collected in the wild, for example dragon's blood resin. Collection is done throughout Indonesia wherever relevant species are available. Collectors, who for the most part are women, also live in the poorest communities, having little alternative income.

Training of collectors on sustainable collection practices is very limited in scope in Indonesia, even though it is mandated by Indonesian legislation. How and when collection takes place depends on how collectors are linked to traders and distributors connected to the internal and international markets. For collectors operating in the value chain of herbal medicine and pharmaceutical industries, business relations are usually quite strong and in several cases extraction companies indicated that they trained communities on good collection practices. For collectors without such a connection, the value of plant material is low.

Collectors are often involved in initial post-harvesting procedures. Communities sometimes organise storage in local collection centres, while waiting for collectors to pick up the materials.

3.1.3 Farmers

In terms of volume, raw materials for extracts mostly originate from cultivation — in number it is likely that wild resources play a more important role. For several crops, extract production is only one of the uses: ginger and turmeric, for example, are also used as a spice or essential oil. Other products, in contrast, are produced exclusively for the extract industry, such as gotu kola. No information is available on the number of farmers.

Some farmers are organised in farmer groups or cooperatives. The percentage of organised farmers is not known. Farmers usually engage in initial processing, mostly drying, although when required for extraction, some plants are used fresh. The scale of production is generally very low, leading to a strong fragmentation of production and high costs. The application and knowledge of GAP for a particular crop is often limited, but higher for spice crops. This is both due to the weak extension services provided by the private sector and government institutions, as well as to the lack of remuneration for quality, as discussed below.

The lack of extension affects product volumes, pushing the productivity of many estate crops in Indonesia substantially below that of other ASEAN countries and competitors such as China and India. It also affects quality, in terms of residues, microbiology, variation in composition, adulteration and misidentification.

Extension is much stronger when farmers supply to pharmaceutical and herbal medicine industries, and their extraction companies. As these industries face much higher requirements in terms of raw material quality, they engage more closely with their producers to apply GAP, standardisation, botanical identity and post-harvest practices.

3.1.4 Traders

Traders operate at different levels in the extracts value chain. Local traders collect raw plant materials at farms and collection communities, then pass them on to larger traders. In addition to connecting producers to markets in Java, these larger traders often perform other tasks, such as additional drying, repacking or providing documentation. Dried raw materials then move up to larger wholesalers of medicinal and aromatic plants, which are mostly based in Java and supply processors as well as export markets.

The more levels involved, the more traceability is at risk. However, traceability is better assured in the value chains of pharmaceuticals and herbal medicine companies.

3.1.5 Extraction companies

The following data gives an overview of Indonesia's extraction companies:

- There are up to 30 extract companies active in Indonesia[1]. This number could not be verified since the sector is not well organised, spread under DAI for fragrance products, GPJ for herbal medicine products and PERKOSMI for cosmetics.
- This VCA identified 29 extract companies, of which 26 are based in Java as follows:
    - 11 in West Java;
    - Six in East Java;
    - Six in Central Java;
    - Two in Jakarta;
    - One in Banten.
- Two companies are located in North Sumatra;
- One company is located in Bali.

As mentioned earlier some companies also produce essential oils, especially those focusing on commodity products. Some companies are part of pharmaceutical, herbal medicine, supplements or cosmetics companies. The vast majority of the companies in the sector are privately owned, although some of the largest ones are publicly traded, as they are part of larger pharmaceutical conglomerates. All companies are mostly owned by Indonesian interests. In the essential oils industry and the seaweed industry, fewer companies are family businesses.

A key outcome of the VCA was that none of these companies is using 100% of their capacity, some producing well under their production capacity. Moreover, some producers are offering a wide range of products, many of which are not common or known in Europe. These 'unknown' products could be suitable for entry into the European market as extracts based on traditional use for food and health, which would obviously require a market potential assessment to determine the possibility of market entry and to assess the potential size of the market. Traditional use of plants and plant extracts for food or health use is well documented in Indonesia. Local extraction companies would also be able to use such references for inspiration for future product development of the apparently thousands of ingredients in jamu, of which only 400 are used regularly.

Although Indonesian extraction companies offer products aimed at the health sector, some of these products will also have cosmetic benefits.

Sourcing practices

Most extraction companies depend on suppliers for their raw material needs. Nine companies buy all their ingredients from producers or traders, while four produce part of their raw materials on their own plantations, which are often strategic ingredients with a strong need for control. Those supplying partly into the herbal medicine and the pharmaceutical sector need better control of raw materials, so several companies provide training to

[1] The local team visited 13 exporters during the field work. An international expert visited two additional exporters along with the local team. Because of the short duration of the visit, not all questions in the questionnaire could be discussed with one company in detail, so this company is not included in the statistics shown in Annex 1, which is based on the 13 companies visited by the local team.

farmers and collectors on GACP. Some raw materials are used fresh and are sourced direct from producers in the region.

In contrast to essential oil exporters and seaweed processors, extraction companies buy directly from producers more often. Traders also play an important role. Some of Indonesia's extraction companies actually source all of their extraction needs from traders, but all companies will source at least part of their raw material needs through this channel.

Table 6 below provides insights into the types of tools and processes producers put in place to support quality sourcing. It shows a close connection with suppliers, with most producers working with a list of approved suppliers and many doing regular audits. Moreover, most producers support their suppliers more directly in terms of quality improvement, inputs and financing. Quality is also ensured through quality control staff and factory gate checks.

Table 6 Application of sourcing tools and practices, based on 13 interviewed companies

To facilitate your sourcing, do you have:	**YES**	**NO**
Written specifications agreed with your suppliers?	30%	70%
A list of approved suppliers?	90%	10%
Factory gate quality checks?	90%	10%
Quality control staff?	100%	0%
Regular supplier audits and visits?	80%	20%
Quality, input or financial support for suppliers?	70%	30%
Batch number?	100%	0%

The main sourcing challenges mentioned by the respondents are:

- Quality consistency 80%
- Raw material availability 70%
- Non-consistency on raw material quality 50%
- Logistics, transportation 50%

Some companies also mentioned a lack of quality control by farmers, and strong fluctuations in the prices of raw materials.

Processing practices

The interviewed companies engage in different types of extraction with varying degrees of sophistication among them. Some use simple extraction with water, while others have advanced extraction facilities. Further in the process, some companies use advanced equipment for spray concentration and drying, while others have more basic equipment for these tasks.

In terms of certification, most companies comply with GMP certification: Twelve out of 13 companies are GMP certified. Although equivalence with EU GMP cannot be ascertained, this at least shows that companies have a high level of quality management in place. The main challenges these Indonesian companies face in their processing include:

- Difficulties to comply with all pharmaceutical standards;
- Difficulties with access to market information on standards and requirements;
- Difficulties with standardisation and achieving the percentage of active ingredient buyers request;
- Low-skill workforce;
- Difficulty to access finance.

Some companies needed to cease production because of increasing requirements from the domestic market. Other companies have seen their markets shrink, when some of their buyers opted for suppliers with higher standards in product quality and safety management. On the other hand, higher local standards will make it easier for companies to enter international markets such as in Europe.

Management practices

Ninety percent of the interviewed companies indicated that they have a business plan. The management needs mentioned were mostly related to sales, with a need for better management of export marketing and branding. However, the companies were also keen on improving their R&D and innovation processes, as well as to build capacity of their compliance staff to ensure better handling of regulatory affairs, such as certification, documentation and audits. During the company visits, it also became apparent that the companies could benefit from improved availability of information on market and requirements, in particular for international markets. There was little knowledge to inform the strategy about products in demand, market segments, such as indications, activities or functionalities of interest in Europe, and changes in legislation.

Marketing practices

Most Indonesian natural extracts are sold on the domestic market to manufacturers of herbal medicines, supplements and cosmetics as well as to pharmacies and Jamu practitioners who dispense traditional healing products to consumers through traders. Ninety percent of the interviewed companies sell 80% or more of their production on the domestic market. Only one interviewed company exclusively targets export markets. Where companies do export, they do so mostly to Southeast Asia, North America and the Middle East. Only one company exports to Europe, but most expressed interest in entering that market.

According to European buyers, Indonesian extracts are relatively more expensive than their counterparts from India and China, the main competing countries, which is considered a problem, since these extracts can be sourced from many different locations. Buyers also indicate that this is likely due to the scale of production and processing. In these basic extracts, Indonesia does not have a clear USP currently.

Developing extracts based on local traditions for food, health and cosmetics can be beneficial in this sense, as Indonesian suppliers would have no or less competition for their particular products, although they still might face competition from substitute products. Moreover, the storytelling behind traditional uses would be very attractive to European consumers. Industry players stressed that extraction companies should look beyond Jamu, as Indonesia counts more than 1,000 indigenous communities, each with their own natural health and beauty traditions.

In terms of quality, one buyer indicated that Indonesia has some exemplary extract producers, operating at the highest quality level. However, other buyers indicated that quality in Indonesia is more suitable for basic extracts and that in some cases appropriate certification is missing. On the other hand, some problems were reported, in particular the standardisation of active ingredient content. There is currently no expectation that Indonesian exporters can provide proprietary extracts with proven efficacy. This was also supported by GPJ, who stated that its members operate mostly based on references to traditional heritage, using the great wealth of information available on indigenous species. In this sense, there is knowledge on what plants do and, in some cases, there is information on why plants have a specific function — either based on traditional knowledge or knowledge on the composition of the product. However, this information is not supported by pre-clinical research.

Some buyers indicated that the largest suppliers from Indonesia might be able to develop market understanding, R&D capacities and financial resources. Partnerships with local universities were also mentioned as an important resource for developing extracts. However, we must note that only very few European buyers currently buy extracts from Indonesia.

The main challenges Indonesian companies face to compete in export markets are:

- Knowledge about market prices, and how to compare on active ingredient content;
- Difficulty with meeting European regulatory and quality standards, and with standardising products;
- Knowledge about product demand in export markets;
- Lack of market access opportunities and buyer networks;
- High marketing costs to enter export markets and participate in trade fairs;
- Lack of export experience and dealing with international buyers.

In terms of strengths to export to Europe, Indonesian companies mention their R&D facilities and their adherence to GAP.

3.1.6 European trade and industry

Europe is a leading market for extracts in the world. European buyers play a large role in the Indonesian extracts market by setting standards for quality, prices and ways of doing business. Many of the European companies sourcing extracts in Indonesia have established partnerships with their suppliers to source directly from Indonesia instead of through traders.

Before they start buying from a supplier, European buyers perform a due diligence process to mitigate risks such as insufficient quality or sustainability issues. This process requires an investment of time from both the buyer and the supplier, which must be earned back afterwards through long-term trade.

The partnerships still rely to a considerable extent on trust between buyer and supplier, which is built over time as the companies learn about each other's business and interests.

European companies that have strong relationships with their trusted Indonesian suppliers, sometimes invest in the supplier if there is a clear business case to be made. Indonesian suppliers are often interested in investments by European companies when the investments can lead to product improvement and when they need technical assistance from their European partner.

The sustainability trend in Europe stimulates companies to become more involved in their supply chains. Large multinationals, more specifically, are implementing sustainability policies which force them to take more responsibility for sustainability in their supply chains. They first learn better how their supply chains are organised, requiring their suppliers to provide transparency through questionnaires or audits. Based on the information about sustainability issues, European companies may require their suppliers to take measures to improve sustainability. In some cases, when European companies identify major sustainability issues which cannot be addressed by their suppliers alone, they will offer technical support.

3.2 Influencers

Food legislation in Indonesia is quite similar to European legislation, covering hygiene and food safety, residues and microbiology. Industry sources indicate that the differences lie mostly on weak enforcement, particular when it comes to smaller companies, or the implementation of particular regulatory areas into guidelines. Compliance in Indonesia does not necessarily mean that companies could also comply with standards expected in Europe.

Indonesia does not have separate legislation for functional foods and food supplements anymore. The previous legislation was very strict on substantiation of claims, in accordance with international best practices, requiring market authorisation for each product. Due to the low level of skill, both within the private sector and among authorities, a decision was made to lift this legislation. Functional foods and food supplements are now included as food for special purposes, under which claims are not possible, creating confusion among consumers.

Traditional medicine law in Indonesia does allow strong claims. Indonesian herbal medicine legislation considers three types of herbal medicines:

- Those based on traditional heritage — which requires only empirical data to market a product;
- Those including pre-clinical data — which need to be registered with the Ministry of Health. Only 60 of such formulations are on the market;
- Phytopharmaceuticals — which require clinical data. There are only eight ingredient blends on the market, six of which are produced by conventional pharmaceutical companies.

It is important to consider that many Jamu products are actually not traditionally consumed as medicine but as food supplements or cosmetics, under which claims are also not possible, harming the Jamu industry in Indonesia. Indonesia's traditional medicine legislation is based on World Health Organisation standards, which now also requires that manufacturers in the country adhere to GMP, resulting in the closure of many smaller producers.

Since 2010, the regulatory and administrative compliance rules for cosmetics have significantly improved in Indonesia, as the country implemented the ASEAN Cosmetic Directive (ACD). By implementing the ACD, Indonesia aligns itself with the rest of ASEAN member countries, greatly increasing the market for its cosmetics industries, since the ACD is modelled after the corresponding EU directive. The ACD also brings Indonesian producers much closer to the EU market, for example, for establishing research proposals (RPs), product information files (PIFs), ingredient annexes, GMPs and feasibility studies for the Import Promotion Desk (IPD). Finally, the ACD has also raised the bar for ingredient producers in Indonesia which supply the domestic industry, meaning that existing suppliers should have capacities to supply international markets as well.

Indonesia's proposed law on access to genetic resources of species and benefit sharing, published in 2018, and now under final review before approval by parliament, is also an important factor. The bill covers the genetic resources of wild plant species, as well as the genetic resources linked to traditional knowledge on the use of those species for both non-commercial (taxonomic research, species identification and distribution, conservation research) and commercial purposes (bioprospecting, technology development, and other activities to obtain financial benefits). The proposed law also sets up the responsibilities of the relevant parties, including the applicant (whether a foreign or an Indonesian partner is required), the competent authority (Ministry of Environment and Forestry), resource owners, documentation (material transfer agreement), benefit sharing, and the roles of other stakeholders which need to issue an opinion, such as the Indonesia Institute of Sciences (LIPI) and the Ministry of Research, Technology and Higher Education, in case of foreign applicants. Once approved, the new law will replace Indonesia's previous legislation on access to resources, which was considered cumbersome and unclear and did not support Indonesia's obligations as a party to the Nagoya Protocol. However, as discussed below, there is more work to be done in terms of implementation of capacities and systems in Indonesia.

The Ministries of Agriculture, Forestry and Environment, Industry, Trade, Health, and Finance, are all involved in different stages of the plant extracts industry. Each agency will oversee, regulate and develop specific parts of the industry. The Ministry of Forestry is now combined with Ministry of the Environment.

Table 2. Roles of Indonesian government agencies in the extracts trade

Ministry	Scope and role	Specific to the plant extract sector
Agriculture and Rural Development	Agriculture policies and farmers development, including farm and plantation plants, such as turmeric and ginger	• Ministry provides supporting services • No information was provided on agricultural policies from MoARD
Forestry and Environment	Forestry policies, covering forest plants, such as agarwood, massoia, sandalwood, ABS focal point, access to biological resources, collection permits, benefit sharing	• MoEF is responsible for forestry policies, covering forest plants, such as. agarwood, massoia, sandalwood, and ABS policies • Ministry provides supporting services
Industry	Industrial policies, processing, export	• There is little awareness of the potential of traditional Indonesian foods or cosmetic ingredients from Indonesian beauty traditions among buyers from the European food supplements or cosmetics industries. The MoI's essential oils strategy could benefit the extracts industry in Indonesia, supporting raw material production for extract processing. • Relevant directorate generals to the sector include: ○ SMEs focusing on food products; ○ Agro-processing; ○ Chemicals and upstream manufacturing, including companies working in the cosmetics sector;

		○ International cooperation, marketing and trade promotion. • The ministry has a strong focus on the development of value-added products, as well as stimulating development outside of Java.
Trade	Trade policies, trade promotion	• MoT has an export development strategy on key issues, including product development, market information, coaching, matchmaking, and trade agreements • A plant-specific strategy does not seem to exist
Cooperatives and SME	Developing SMEs and home industries	None identified
Health	Ensuring health standards and issuing health certificates for products and factories	None identified
Finance	Export and import duties and taxes	None identified
National Education	Education and scientific research	None identified
BPOM (National Agency of Drug and Food Control of the Republic of Indonesia)	Protecting public health	• Non-ministerial government organisations • Control and supervision of prescription and over-the-counter medications, vaccines, biopharmaceuticals, dietary supplements, food safety and cosmetics

Source: Adjusted from MoT, Indonesian Essential Oils, 'the scents of natural life'

On the provincial and regency level, regional governments administer national programmes and extend the reach of the national government to producers in local communities. Agriculture and forestry are often managed by one department, usually called *dinas pertanian, kehutanan dan perkebunan* or department of farming, forestry and plantation. Similarly, industry, trade and cooperatives are managed by one department, usually called *dinas perindustrian, perdagangan dan koperasi* or department of industry, trade and cooperatives.

3.3 Supporters

3.3.1 Industry organisations

The extracts industry is partly represented by three associations: DAI for fragrances, GPJ for herbal medicine products and PERKOSMI for cosmetics.

DAI

DAI was founded in 2007 to address large supply and price fluctuations of essential oils and regulatory issues. It's a private association with 31 member companies. Its 2017 budget was USD 60,000. Its aim is to support and assist essential oil business players, companies or individuals, to further develop their products and market access. Although many of its members produce extracts, DAI does not include the extracts industry in its mandate, outside of certain aroma chemicals.

GPJ

Gabungan Pengusaha Jamu (GPJ), the Indonesian Herbal and Traditional Medicine Association has a large membership based. Currently, GPJ has 900 members and a 10-person secretariat, covering a good portion of the industry. Most members are producers of supplements and herbal and traditional medicine. The organisation also has 10 members producing ingredients. Several manufacturers also produce their own raw materials, some of which could also be interested in marketing their own ingredients.

Stricter rules by BPOM, the Indonesian food and drug authority, forced 300 companies to close their doors in recent years. The new rules mandate companies to adhere to GMP standards, instead of HACCP, increasing barriers to the market. Only 200 members have been able to comply so far. Supporting compliance is a key driver of GPJ, which is working with the Ministry of Industry in this area. Other activities include:

- Providing information on legislation and markets;
- Technical assistance to members;
- Consumer outreach and campaigning on Jamu;
- Matchmaking and fairs;
- Stimulating the use of local ingredients.

The organisation is financed by membership fees based on size. Some services are offered using government programmes for technical assistance. It doesn't charge for its service delivery. Most extract companies interviewed for this VCA are members of GPJ and indicated benefiting from the association's information sharing, networking opportunities, domestic product promotion, and advocacy before the government. They see gaps in information and support with regulatory compliance, market access information, especially for international markets.

PERKOSMI

The Indonesian Cosmetics Association, PERKOSMI, focuses on lobbying for an improved enabling environment in Indonesia and the countries in the ASEAN Cosmetics Association, improving compliance of cosmetics companies, and developing capacities for R&D, finance and business planning, marketing and sustainability. The association boasts 400 members in 2014, predominantly final product manufacturers.

Out of the seven working groups, R&D, international trade and raw materials — which represents raw materials traders, distributors and producers — are the most interesting ones. Members of the raw materials group are mostly importers and distributors, as only very few companies produce raw materials in Indonesia, some being subsidiaries of foreign companies. Interviewees indicated that the Indonesian cosmetics industry is highly dependent on imported raw materials and ingredients and there is little connection between domestic ingredient suppliers and Indonesian cosmetic manufacturers. The organisation has several extract producers among its members. Respondents showed little interest in working with ingredients in Indonesia.

Other organisations

- The Indonesian Society for Functional Food and Nutraceuticals gathers representatives from academia, manufacturers, public sector stakeholders as well as others interested in developing the industry.
- APSKI, the Employer Association for Food Supplements represents the food supplements industry, working on sector coordination, advocacy and awareness raising among consumers. The current membership of 51 companies consists of manufacturers and distributors of final products and raw materials. Its work depends on member fees to fund specific activities. The membership is limited outside of Java, where it is difficult to identify new companies. The organisation has only one current member which is an extract producer.

3.3.2 International organisations, local NGOs and foundations

SIPPO

SIPPO, the Swiss Import Promotion Programme helps builds capacity for export promotion boards and sector-wide associations in six business sectors, in eleven developing and transitional countries. The programme is managed by Swisscontact in partnership with BHP Brugger and Partners and Helvetas Swiss Intercooperation. In Indonesia, SIPPO is working on fish and seafood, natural ingredients and technical wood and is developing last-mile services for four Indonesian BSOs. The activities of SIPPO with the Indonesian Ministry of Industry are relevant to the plant extracts sector. SIPPO works specifically on last-mile support, supporting expansion and quality of BSO services for their members' exports, including in the following areas:

- Market intelligence — providing intelligence and building capacities to produce and disseminate;
- B2B matchmaking — supporting matchmaking activities, building capacities, and networking;
- Client management — helping BSO members understand buyers' needs and join buyer networks in the market.

SIPPO supports each organisation based on annual plans, which are part of a strategy targeting the year 2020. SIPPO has expressed a strong interest in cooperating with CBI and IPD in their activities in the natural ingredients sector.

IPD

IPD, Germany's Import Promotion Desk, has chosen Indonesia as one of its partner countries to work in the natural ingredients and timber sectors. In natural ingredients, IPD works with various spices, essential oils and extracts, coconut products and seaweed products.

IPD works directly with Indonesian companies, linking them to European buyers, particularly German buyers, at key trade fairs such as SIAL, Anuga, in-cosmetics, Biofach, Fi&Ni, Hi&Ni. IPD also helps Indonesian business support organisations improve service delivery to their members through workshops. It partners with MoI and MoT through the National Export Development directorate general. IPD has expressed a strong interest in cooperating with CBI and SIPPO in their activities in the natural ingredients sector. IPD has a particularly strong network in the organics sector, as well as with ethically committed, patient-involved and innovative buyers in Europe. As such, IPD could play a key role in facilitating this sector, by supporting market access and supplier-buyer linkages for new extracts from Indonesia.

FFI

Fauna and Flora International, or FFI, is a global, UK-based charity focused on nature conservation. It historically focused on conservation aspects, such as setting up conservation zones, but has more recently been shifting towards sustainable use of conservation areas, as well as supporting local communities to develop livelihoods to achieve sustainable conservation area management and sustainable use systems. FFI focuses strongly on communities, developing activities more for community enterprises and less for international market access or linkages with bigger processors in Indonesia.

FAO

The Food and Agriculture Organization of the United Nations (FAO) works in Indonesia on three priority areas: agriculture, marine affairs and forestry. The clearest link to an upcoming CBI programme is in forestry, where FAO is working on:

- Strengthening forest management unit for sustainable forest management and community empowerment;
- Securing tenure rights for forest and landscape-dependent communities, linking science with policy to advance tenure security, sustainable forest management and people's livelihoods — CIFOR (MSP) (FAO, 2018).

Both projects look at non-timber forest products (NTFPs) such as medicinal and aromatic plants.

DFID

Palladium is implementing Partnerships for Forests, a 5-year programme of the UK Department of Foreign and International Development (DFID). The partnerships developed under the programme among private sector companies, public sector actors and communities that depend on forests for their livelihoods serve to catalyse investment in forests and sustainable land use.

In Indonesia, Partnerships for Forests is working with a group of Ecosystem Restoration Concessions (ERC) holders. ERCs emerged in 2004 in the context of the Indonesian government's desire to create an alternative to the conversion of degraded forests and wastelands into plantations. A licence gives the concession holder the right to manage natural forests for restoration, conservation and sustainable use of forest resources.

Partnerships for Forests supports six ERC organisations: PT Restorasi Ekosistem Indonesia, PT Restorasi Habitat Orangutan Indonesia, PT Ekosistem Khatulistiwa Lestari, PT Rimba Raya Conservation, PT Sipef Biodiversity Indonesia, and PT Alam Bukit Tigapuluh. The programme assesses and recommends viable business cases for these organisations. The overall goal is to set up value chains that will bring high-potential business opportunities to

market to increase revenue of ERC companies. The programme works with anchor commodities which include forest honey, rattan, rubber and dragon's blood, but the ERCs aim to commercialise a range of NTFPs. The programme is currently in the phase of identification of products of interest and conducting feasibility studies and business planning.

NRSC

The Natural Resources Stewardship Circle (NRSC), is an initiative of the cosmetics and fragrances industry leaders. These brands, ingredient manufacturers and producers came together to jointly tackle key sustainability issues in the value chains of natural ingredients which have strategic importance to the industry. NRSC's guidelines, which were launched at COP 10 of the Convention on Biological Diversity (CBD), focus on environmental sustainability, as well as improved living conditions of producers. The promotion of ABS principles is integral to its work, incorporating them in the supply chain assessments and awareness workshops for its members. In the future, NRSC aims to develop and test ABS protocols with indigenous communities.

NRSC can leverage its member base for future CBI activities in the extracts sector and can share knowledge on, or support activities regarding ABS.

KEHATI Foundation

KEHATI Foundation, the Indonesian Biodiversity Foundation, is an Indonesian grant-awarding and advocacy organisation. KEHATI supports innovation in conservation, management and utilisation of Indonesian biodiversity. It works with central and regional governments, business communities, universities, NGOs, local community organisations, professional associations and the media, in forest and agricultural ecosystems. Within forest ecosystems, KEHATI focuses on the improvement of forest governance policy, particularly the policy imbalance between local forest management and centralised forest management authorities. KEHATI is also closely involved in the drafting of Indonesia's new biodiversity legislation. KEHATI could act as an important resource, if CBI decides to engage in product market combinations related to wild-collected plants, or in interventions to Indonesia's ABS legislation. A particular interest raised was to leverage CBI's interventions to develop best practices on effective application of ABS in internationally operating value chains and share lessons learned. Showing a profitable business case could help change perceptions of Indonesian entrepreneurs from 'business as usual' to practising sustainable business.

USAID

There are very few areas in Indonesia where the work of CBI and The United States Agency for International Development (USAID) overlap, which is on USAID's activities in sustainable land-use management and practices in eight landscapes on four provinces: Papua, Central Kalimantan, North Sumatra, and Aceh.

3.3.3 Other private sector players

During our interviews, we found that extraction companies make use of various services, most notably agronomy to support farmers and good practices, and financial services, such as loans. In fewer cases they use certification services, testing services for heavy metal and microbiology, and marketing promotion.

Table 8. Use of business services by extraction companies, based on 13 interviewed companies

Types of services	Percentage of interviewed companies outsourcing this service	Details on the service
Financial services	31%	Loans, accounting
R&D and testing	15%	pesticides and heavy metal tests
Certification	23%	ISO certification, mostly with SGS
Agronomy	77%	Hiring support to farmers' cooperatives
Processing	23%	Equipment suppliers, local consultants for production system and distribution system
Logistics and export	23%	SAP PT Telkom Indonesia, or airfreight cargo through TNT

Marketing and promotion	15%	Developing promotional materials

Certification and testing

Considering the size of the private sector in Indonesia, the availability of certification services, both in terms of auditing and inspection as well as capacity building and business consulting, is limited.

The following certifiers provide voluntary certification in Indonesia:

- Ecocert IMO
- Control Union
- ACT Thailand
- BIOCert Indonesia

Other key certification bodies such as BCS, Ökogarantie, KIWA and CERES do not appear to have operations in Indonesia. Control Union has a relatively dominant position in the organic certification market, offering certification for the organic standards of the EU, USDA and the Japanese Agricultural Standard (JAS). Internal staff estimate that Control Union accounts for up to 90% of the market.

Fair-trade certification is less common. Fair-trade certifiers for natural ingredients offer certification services in Indonesia, but have very low outreach. Ecocert, for example, has one operator, IMO has seven operators , one being the essential oils company Tripper, while Flo-Cert has 68 operators, of which 90% produce coffee and tea.

In terms of training and business consulting for certification, local suppliers and certifiers indicate a limited capacity for voluntary certifications. Moreover, these often also act as inspectors, which is not an ideal situation.

In terms of management, more options are available for quality and food safety certification. Training, inspection and certification bodies operating in Indonesia include:

- SGS
- TÜV
- SAI
- Bureau Vertitas
- Lloyds
- Sucofindo

These bodies offer a full range of food safety testing, inspection and certification services for Global Food Safety Initiative (GFSI) standards such as FSSC 22000, BRC, and ISO standards ISO 9001, ISO 22200 and ISO 14000. SGS is the market leader in Indonesia with an estimated 25% market share.

For pharmaceutical ingredients and pharmaceutical products, the Indonesian food and drug authority has established and mandated GMP certification.

For testing services which are not available in Indonesia, these certifier use their global network of testing facilities in more sophisticated locales such as in Singapore or Bangkok. Some also indicated that, for efficacy testing of pharmaceuticals, for example, labs in those cities offer more professional and well-recognised services. Within Indonesia, this kind of research is mostly done in-house or through universities. Leading universities mentioned included the University of Indonesia and Bogor Agricultural University.

Several national institutes offer testing services, including: the Laboratory For Quality Testing Of Goods, BPMBEI, of the Ministry of Trade (MoT), which provides quality and safety testing for consumer products, and Balai Besar Kimia dan Kemasan (BBKK) of the Ministry of Industry (MoI), which provides testing on packaging for foods (Sector Scan IPD). Local governments test the quality of seaweed.

R&D

Universities that have agriculture, farming, biology, botany, chemistry, chemical engineering, or pharmacy programmes can be involved in developing the extract industries. However, extracts do not seem to benefit from the kind of academic backing that the seaweed and essential oils sectors enjoy. Several universities were mentioned during the research, such as the Bogor Institute of Agriculture (IPB) with its Tropical Biopharma Research Centre in Bogor, which is focuses specifically on R&D of medicinal and aromatic plants. For cosmetics, the Gahdja Mada University and the University of Surabaya have some experience in the field of extracts.

Moreover, there are several public sector research institutes relevant to the industry. A key institute is the Indonesian Medicinal and Aromatics Crops Research Institute or IMACRI, which is commonly known by its Indonesian acronym Balittro, short for *Balai Penelitian Tanaman Obat dan Aromatik*, which is a unit of the Ministry of Agriculture located in Bogor. IMACRI works closely with IPB (Bogor Agricultural University) conducting research on technical aspects of cultivating medicinal and aromatic crops, developing better plant varieties and seeds and assisting companies in quality control.

Industry resources indicate that research on cultivation and processing is done by, or in cooperation with universities or research centres, but that research on efficacy is more done by companies in-house. This is in particular done by larger cosmetic, pharmaceutical and herbal medicine companies such as Sido Muncul and Martha Tilar and not much by SMEs and extract companies. Costs might be considered too high and risky for SMEs. The use of foreign R&D institutes is also limited.

In general, cooperation between R&D institutes and companies is positive, both for testing and research services, but many companies do not make use of the opportunities provided by R&D institutes. In particular for research, there is an expectation of private sector funding, so larger companies more commonly engage with R&D institutions. Industry sources also indicated that the more advanced cooperation is in agronomy, less so in value addition.

In terms of R&D for processing, relevant institutes include:

- The Post-Harvest Research Centre under the Ministry of Agriculture;
- The Agro-Industry Research Centre under the Ministry of Industry for processing quality improvements and standardisation;
- Bogor Agricultural University, which also works on processing technology.

Finance

Indonesia scores quite well in terms of access to credit in comparison with other countries. The World Bank ranked the country 55th among member states.

Indonesia has a very well developed financial sector, with around 10 commercial banks operating across the country. The biggest players include Mandiri, BRI, BNI and BCA, but more than a 100 smaller operators and 1,600 rural banks operate in Indonesia. Compared to other countries, finance for Indonesia's agricultural sector is well developed, with the sector accounting for 8% of the outstanding loan portfolio, compared to its 14% share of GDP.

However, earlier reports indicated that financial services, especially for SMEs, remain rather one dimensional, focusing on credit with less access to other financial services needed for investment and exports. Moreover, there are indications that finance to companies on the outer islands (70% of outstanding loans is in Java) and women-led SMEs is more problematic — out of an estimated 58 million MSMEs in Indonesia, approximately only 12% have access to credit due to lack of formal financial statements, credit history or collateral (KPMG, 2017).

Farmers lack knowledge finance providers' requirements and access is limited (Wulandari, 2017). Although investments are often small — between $200 and $1,000, for example, for applying good practices in seaweed — financing is still required. For low-income farmers, financing usually comes from the informal sector or from traders, as issues with collateral affect them more strongly than SMEs. Products are often also considered inappropriate to

small-scale farming (SAFIRA, 2018). Practitioners in Indonesia indicate that the costs of getting farmers ready for finance are high, including improving financial literacy, group formation and management, financial management, in addition to building connections in the chain with providers of inputs, post-harvest equipment. According to industry stakeholders, financial institutions in Indonesia do not consider these groups as good business cases.

3.3.4 Government organisations

Six government organisations support the extract sector, the Ministry of Trade, Ministry of Industry, Ministry of Agriculture and Rural Development, the Ministry of Environment and Forestry, the Ministry of Tourism, and LIPI.

Table 9: Focus areas and activities of government agencies

Organisation	Focus areas and activities
Ministry of Trade – DG National Export Development	Five departments are relevant to the sector: • Export training — export skills development • Export development cooperation • Export product development — capacity building of private sector • Promotion and branding — market entry facilitation and branding • Export market information — collect and share third party information; ITPC develops trade attaché reports
Ministry of Industry	MoI wants to improve its activities through: • implementing international best practices for export development and promotion; • improved understanding of supplier needs; • product-market matching and matching companies to appropriate matchmaking activities; • improved inter and intra-organisation coordination; • capacity development at regional level. The Directorate of Access to Industrial Resources and International Promotion, conducts last-mile activities (Anuga Sial, Biofach, in-cosmetics). Other relevant trade fairs, such as Fi&Ni, Hi&Ni and Vitafoods were not yet considered. Other DGs of this Ministry could engage more deeply in value chains, for example supporting industrial development, access to equipment, human resource development, R&D, quality and GMP and certification
Ministry of Agriculture and Rural Development	MoARD stimulates farming as businesses, looking at increasing value and competitiveness of agricultural commodities especially at farm level. For the extract sector, the Ministry's strategic plan aims to: • Increased stabilisation of production to also stabilise prices; • The development of economic value agricultural commodities, which could include organic oils; • Encourage the advancement of agro and bioindustry; • Increase farmers' incomes. To achieve these aims, the Ministry works on capacity building and integration of best practices in production and post-harvest, such as through extension services; provides training and offers access to production or post-harvest equipment. MoARD also wants to develop partnership between farmers and traders or processors.
Ministry of Environment and Forestry	MoEF is responsible for providing physical access to forest resources and ensuring applicants meet the obligations for collection permits for sustainable resource management). Capacities for effectively supporting, administering, assessing, enforcing and sanctioning access are limited, resulting in overexploitation of resources. The Ministry acts as national focal point on ABS. It will be responsible for the implementation of the upcoming biodiversity law and Indonesia's Biodiversity Strategy. Implementation modalities for this legislation are still unclear as legislation has not yet been enacted.
Ministry of Tourism	Promotes Indonesian traditional extract products, especially for spa, jamu-based beverages and food industries, participated in the spa and herbal tourism exhibition in April 2018 in Paris.
LIPI, Indonesian Institute of Sciences	LIPI is the governmental authority for science and research. It consists of 47 research centres and manages four botanical gardens in Indonesia: Bogor, Kebun Raya Cibodas, Purwodadi and Bali. LIPI is also an important entry point for companies aiming to commercialise products based on Indonesian biodiversity as LIPI needs to provide a positive recommendation.

4. Opportunities, Obstacles and Sustainability for the Plant Extracts Sector

The goal of this chapter is to determine the key opportunities for growth and the key obstacles to Indonesian plant extracts exports to Europe, focusing on the exporting companies and their supply chains. Information on CSR is also provided.

Chapters 2 and 3 provided information on how the value chain for plant extracts functions and what are the challenges along the chain. However, several of these challenges can be considered superficial.

Chapter 2 showed a series of opportunities and issues which affect the ability of Indonesian exporters to introduce and successfully export plant extracts to Europe. Several Indonesian extraction companies already produce according to domestic quality requirements for cosmetics, food and pharmaceuticals. These high-quality companies should be able to meet European requirements relatively easily. Several trends offer good opportunities for value addition, such as an increasing demand for sustainably produced ingredients, local processing and direct sourcing. Moreover, European consumers are highly interested in new products based on traditional health or beauty systems and European companies are keenly looking for new innovative ingredients to meet this demand.

- Specifically for food and health supplement use, Chapter 2 demonstrated the wide scope of traditional extracts used for health products in Indonesia. Changes in the novel food legislation greatly increased the opportunities to market these products in Europe, based on strong and documented histories of use in Indonesia. Many of these or comparable products are already consumed in Europe.
- Specifically for cosmetics, there is a substantial case for extracts traditionally used for cosmetics in Indonesia. The ability to market them in Europe can be greatly increased by using the strong and documented histories of use in Indonesia. Moreover, market access requirements for cosmetics are lower than for new food or pharmaceutical ingredients.

On the flip side, most Indonesian extraction companies have little experience with the EU market, and EU buyers do not expecting innovative health or cosmetics ingredients to come from Indonesia. Moreover, meeting market demands for sustainability is important for new entrants. They might also be required to provide organic certification, which is not common in the Indonesian extracts industry, since it is not demanded by domestic clients. Finally, European buyers have expressed concerns when working with Indonesian SMEs in terms of inconsistency in quality, adherence to quality control standards and food safety, as well reliability and communication. Particular to cosmetics, the limited use of jamu-based plant extracts in modern cosmetics in Indonesia, can be an issue.

Chapter 3 showed several strengths of Indonesia's plant extract sector. It showed that extraction companies linked to pharmaceutical industries have systems in place for quality management and traceability. Several leading companies working with essential oils were shown to be highly successful on export markets and considered top-notch on a global level. On the negative side, Chapter 3 provided a range of strongly interrelated issues which reduce the ability to introduce new extracts, particularly for SMEs, within the value chain and in the business enabling environment. These include:

- Low quality of raw material;
- High costs of raw materials due to fragmentation in production;
- Non-standardisation of extracts;
- Weak food safety standards of SMEs;
- High and costly requirements of international markets;
- Low knowledge of international market requirements to develop suitable products;
- No contacts with EU buyers.

Figure 5. Obstacles and opportunities along the value chain

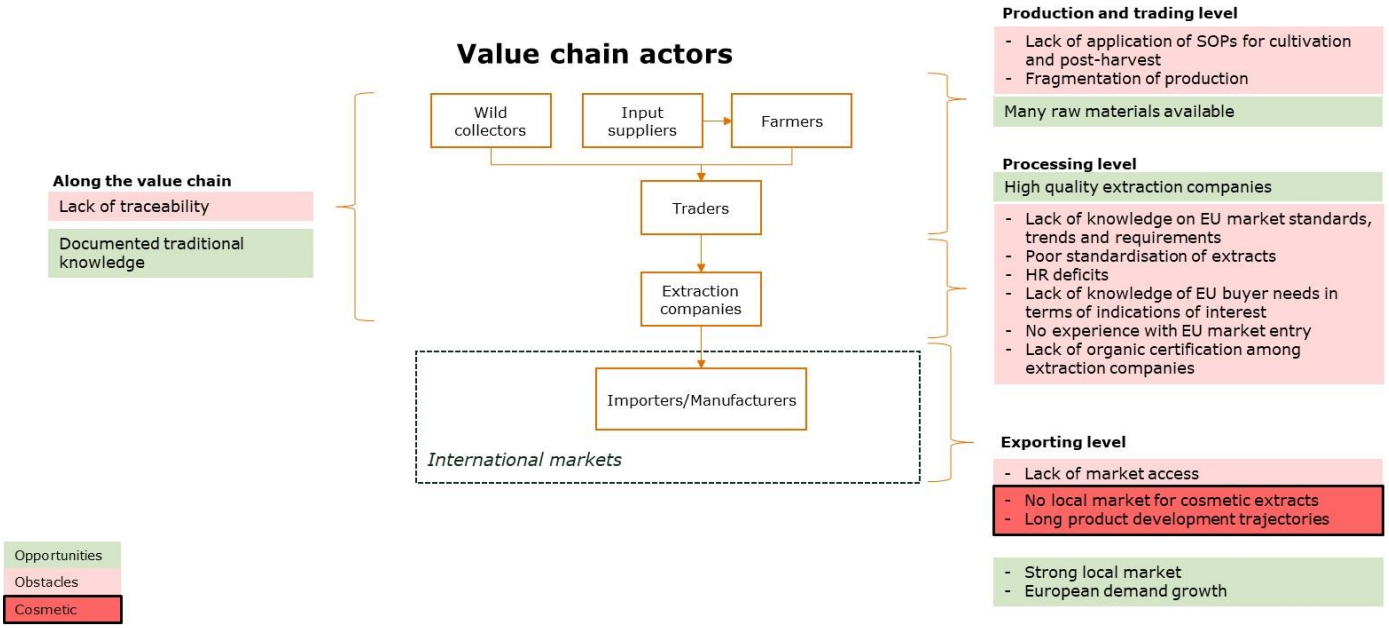
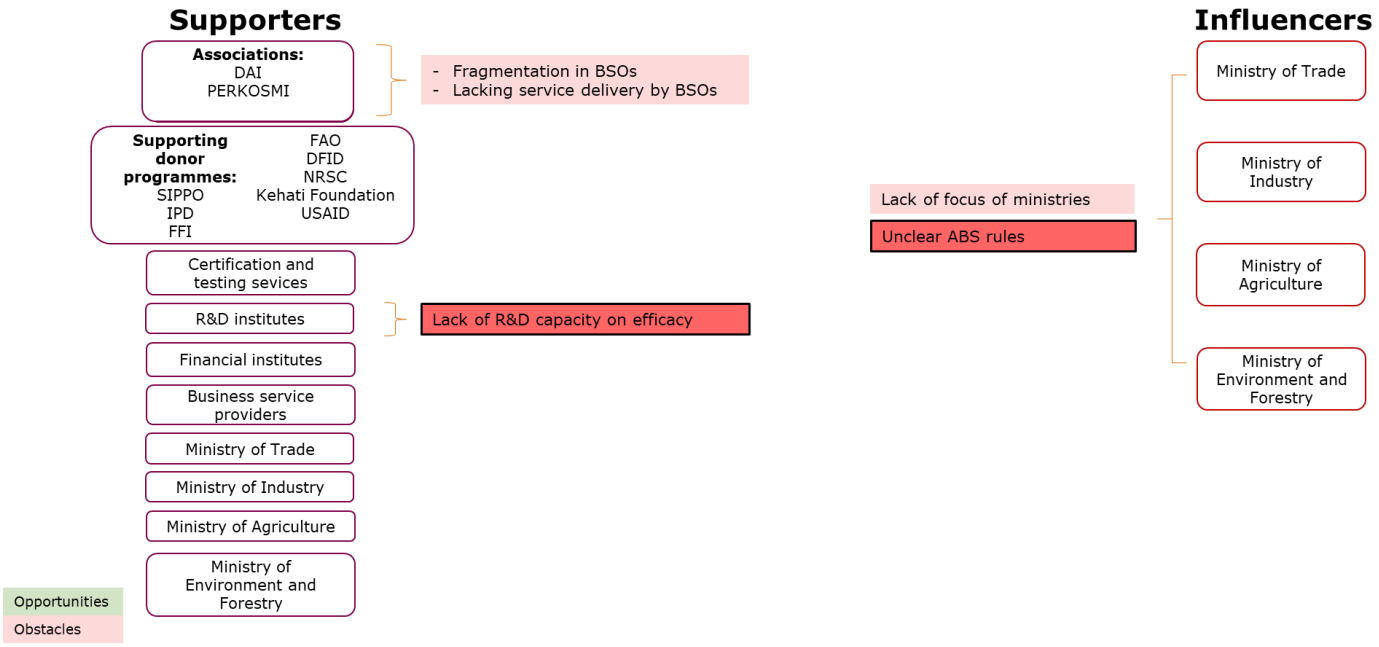


Figure 6 Obstacles and opportunities related to supporting services and influencers



4.1 Key obstacles to growth of exports to Europe

The research team concluded that there are several root causes behind these issues which will need to be resolved in order to introduce Indonesian plant extracts to markets in Europe. These causes can be grouped in four areas:

- Fragmentation in production results in high prices of raw materials, making new value chains more costly.
- Producers lack an understanding of buyers' needs to identify and develop suitable products for the European market.
- Producers lack knowledge of market access requirements and standards, as well as the technical skills to implement them and develop extracts suitable for international markets, including the development of suitable standard operating procedures (SOPs) for production and processing.

- The fragmented and limited structure to support companies in the sector, including unclear access to resources and benefit sharing and low capability of performing efficacy research.

Table 10 below provides key obstacles in the value chain and in the business enabling environment. For this table, it is important to consider different levels of traceability and quality management among companies in the sector, particularly those that are part of supplying to pharmaceutical companies, and smaller SMEs active in the sector which have great difficulty meeting such standards.

Table 3. Obstacles in the value chain

What is the obstacle?	How does this obstacle hinder exports?
Sourcing	
Lack of traceability: Traceability is present in value chains controlled by herbal medicine and pharmaceutical industries, however in other chains it is usually only available up to the trader level, as raw materials from different wild collection communities and farmers get mixed together.	• Traceability is a legal requirement for food exports to Europe. Extraction companies which cannot provide traceability cannot export to Europe. • Not being able to offer fully traceable products impedes Indonesian exporters from entering the market with traditional ingredients.
Lack of application of SOPs: Indonesian farmers do not apply SOPs, especially those not supplying to the herbal medicine and pharmaceutical value chains. Other extraction companies do not invest in the application of good practices. The lack of SOPs results in inconsistent quality or low quality of raw materials available to extraction companies.	• Inconsistent quantities reduce the competitiveness of extraction companies by increasing their costs due to the low use of production capacity and increases risk to EU buyers. • Fluctuations in quality make it difficult to standardise extracts and reduce their suitability for international markets.
Fragmentation of production: Production of raw materials for extracts is mostly done by smallholders. Productivity at this level is low due to the lack of application of modern techniques, high yielding varieties and the lack of SOPs (see above). Fragmentation results in higher costs for companies to set up systems of documentation, certification, consolidation, and quality improvement. It makes setting up new supply chains for raw materials particularly costly.	• Raw materials costs are relatively high, resulting in high extract costs and a loss of competitiveness in international markets.
Processing	
Lack of knowledge of EU market standards, trends and requirements: Companies do not have the right information available to them in order to guide their business in terms of: • Applying the right production processes to meet standard and documentation requirements; • Developing the right product for the right market.	• Companies produce products which are not attractive for the market, or not suitable in terms of standards, documentation and certification, and cannot export them to Europe. • Indonesian companies do not have a USP for the EU market in terms of product and story.
Lack of knowledge of EU buyer needs in terms of indications of interest: Indonesian companies do not know what European buyers are looking for in supplements and cosmetics, in terms of active or functional properties, and how their product could fit and compete.	• Product development according to European market needs is limited, making the offer of Indonesian extraction companies less attractive to European buyers.
Lack of organic certification among extraction companies: Due to their local market focus, organic certification is very limited among extraction companies in Indonesia. For innovative food supplement ingredients, including extracts marketed as traditional foods, there would be a strong expectation from buyers that products would be organically certified.	• Not having organic certification reduces the exportability of Indonesian traditional ingredients.
Poor standardisation of extracts: Indonesian suppliers lack knowledge on which marker, the specific chemical component in an extract, to standardise in their extracts. They also lack the capabilities to standardise their extracts according to international best practices.	• Non-standardised extracts fetch low prices and are not attractive to many European buyers.

HR deficits: Company management staff lack skills in terms of export marketing, branding, R&D and innovation processes according to EU buyer needs and market trends, and European compliance.	• Lacking human resources makes it difficult for extraction companies to effectively market products in Europe.
No experience with EU market entry for traditional food: Indonesian extraction companies do not have experience with the different steps of developing extracts as traditional food, or proprietary extracts for cosmetics, according to EU requirements in terms of documentation development.	• Product development according to European market requirements is limited.
Exports	
Limited local market for indigenous cosmetic extracts Few ingredients related to Indonesian beauty traditions get added to formulations by Indonesian cosmetic manufacturers. There are few extracts available off the shelf with efficacy and safety data for the national market.	There are relatively few extracts available which would be marketable in Europe at short notice making more investments needed before exports can take place.
Long product development trajectories for cosmetics Although the European cosmetic sector is highly innovative, it takes a long time before products are used in cosmetic formulations.	Exporting new proprietary extracts to Europe will not start quickly after the start of an intervention and is prone to risk. This means companies return on investment (ROI) will take time. As such, it is good that extraction companies also have known extracts for the EU market.
Lack of market access: Limited market exposure and the lack of close contacts with buyers makes it difficult for Indonesian extraction companies to develop extracts suitable for the European market. In reverse, not having suitable products makes it difficult to build relations with buyers.	• Indonesian extraction companies do not offer products which are suitable for the European market, or only provide basic extracts. • Indonesian extraction companies cannot justify investments as they lack a clear window into the European market.
No expectation from EU buyers: There is currently no expectation among buyers that Indonesian exporters can provide new innovative food supplement ingredients based on traditional food or proprietary extracts with proven efficacy.	• Substantial awareness raising and marketing will be needed to convince buyers of Indonesian innovative ingredients and proprietary extracts before companies can become successful in international markets.

Table 4. Obstacles in the enabling environment

What is the obstacle?	**How does this obstacle impede exports?**
Supporters	
Fragmentation in BSOs: the extracts industry is partly represented by three associations: DAI for fragrances, GPJ for herbal medicine and PERKOSMI for cosmetics. Extraction companies along these different market segments do not cooperate on non-competitive issues. This makes it difficult to develop and implement a joint vision for the sector. The fragmentation also undermines the bargaining position of the sector to advocate for an improved business enabling environment with public institutions.	• Key obstacles to reach export markets require joint sector action, for example creating market access, providing information and skills to meet buyer requirements, R&D and efficacy. These issues not being resolved reduce the ability of individual extraction companies to export to Europe.
Lacking BSOs service delivery: BSOs with members in the sector have priorities for other products, such as essential oils for DAI, final products for GPJ and PERKOSMI. As such, there are no services developed specifically for the extraction sector. Key needs of the industry are not identified and currently not met, especially: • access to information; • market access; • training and capacity building to resolve bottlenecks in the value chain, such as SOPs, supply fragmentation, compliance, market access; • R&D and efficacy; • advocacy and strategy development with ministries.	• Extraction companies, especially SMEs, lack the resources to improve their supply chain, processing, product and marketing, which reduces their ability to export or add value to their products.

Lack of R&D capacity on efficacy: The availability of local R&D capacities on efficacy of traditional ingredients is limited. Moreover, academic institutions lack courses on herbal medicines and phytotherapy. Without engaging with laboratories in other countries, Indonesian companies would be able to offer only basic proof of efficacy.	• Indonesian extraction companies are less able to develop IP on their extracts, reducing their competitiveness and the value added of their products.
Influencers	
Lack of focus from ministries: Ministries of Agriculture, Forestry and Industry do not have a focus on the extracts industry while the sector can only marginally benefit from other strategies. Obstacles impeding exports which are beyond the capacities of most individual stakeholders in the value chain do not get resolved, including: • SOPs and fragmentation at production; • Human resources; • Market access and information.	• Extraction companies, especially SMEs, do not receive support to improve their supply chain, processing, product and marketing, reducing their ability to export or add value to their exports.
Unclear ABS rules: Indonesian ABS legislation has recently been drafted but has not been approved in parliament. Implementing structures and tools still need to be developed. • European buyers might be reluctant to engage while the specific application of the new legislation remains unclear. • Other buyers have worked before in countries where ABS is very new and are willing to engage with Indonesian authorities, which could offer an opportunity to leverage the CBI intervention to develop a strong business enabling environment with respect to ABS.	• Products cannot be exported to Europe if ABS is not handled according to local and EU legislation.

4.2 Key opportunities for growth of exports to Europe

Below are the key opportunities in the value chain and the business enabling environment provided by supporting services and influencers.

Table 5. Opportunities in the value chain

What is the opportunity?	How does this opportunity support exports?
Sourcing	
Documented traditional knowledge: Traditional use of plants and plant extracts for food supplements, herbal medicine and beauty rituals is well documented in Indonesia.	• Indonesian extraction companies would also be able to use such references for inspiration for future product development. • Stories of traditional use are highly attractive in the European market and could support the marketability of products.
Many raw materials available: Indonesian extraction companies can tap into a large production of different raw materials for extraction, except for organic raw materials.	• Indonesian companies can export a large variety of different extracts based on existing raw materials supply.
Processing	
High-quality extraction companies: Indonesia counts several high-quality extraction companies that can deliver products according to international market expectations or local pharmaceutical and herbal medicine standards.	• These extraction companies will be able to take up new products with relative ease. • These high-quality companies can act as successful cases of business 'not' as usual, which is usually the best way to convince other companies to work in a more effective way, as well and improve their supply chain, processing and marketing.
Exporting	
Strong local market: As opposed to seaweed extracts and essential oils, Indonesian extraction companies have a strong local market where they generate their turnover.	• Local sales can be leveraged to invest in international market entry.

This is also the case for many products which would be considered traditional food in Europe.	
European demand growth: The European market for extracts is growing strongly and imports from developing countries are increasing, as buyers place more trust on basic extracts coming from these countries.	• The growing market for extracts gives more opportunities for Indonesian extraction companies to supply to European buyers.
Traditional food window: The new novel food legislation in Europe makes it possible to market food products according to local safe use.	• Indonesia has a large range of products which have local documented safe use and could be exported to Europe once documentation to European standards has been developed.

No opportunities were identified for supporters or influencers.

4.3 Sustainability challenges and opportunities

According to an IPD report, Indonesia is relatively advanced in ensuring CSR through public and private sector actions when compared to competing countries in the region. From the fieldwork for this VCA, the following picture of the status of CSR in Indonesia's plant extracts industry appears. First, knowledge on CSR is limited and focused on compliance with legislation, 'not doing wrong, instead of doing good'. Second, knowledge of CSR expectations in Europe is low. During interviews with extract processors and other stakeholders in Indonesia, no key CSR issues were identified. However, there are several issues which merit additional research:

- Child labour could happen in farms and is difficult to verify due to a lack of traceability to source. It is common for children to help parents, for example with collecting plant materials around the house, or close to the community. Children may also accompany parents during harvest and will be expected to lend a hand in the process.
- In terms of environmental legislation compliance and environmental harm, the main issues identified were excessive pesticide use, a lack of waste management and waste water treatment, and unsustainable wild collection of raw materials.

4.4 Conclusions

Based on chapters 2, 3 and 4, we draw the following conclusions on Indonesia's value chain for plant extracts for food supplements and cosmetics.

Extracts as traditional ingredients for European food supplement markets

- This sector scores high on production and demand, and very high on export capacity, trends and value addition opportunities, but low on market access requirements.
- There are several obstacles in the value chain, but most can be resolved in the short to medium term once the business case is understood, benefiting a large group of companies which will add value to their products.
- Other obstacles can be resolved in the medium to long term without requiring much further external support. Once certain processes have been set into motion, value chain actors, influencers and supporters in the value chain are expected to be able to continue to develop the sector in a sustainable way and have a big impact on Indonesia's extract exports.

This sector offers good grounds for interventions, which will be discussed in Chapter 5. However, we recommend to focus on a mix of innovative extracts with existing extracts when working with companies towards market entry.

New cosmetic extracts related to Jamu

- This sector scores high on demand and export capacity, and very high on trends and value addition opportunities, but low on market access requirements.
- There are several obstacles in the value chain, but most can be resolved in the short to medium term once the business case is understood, benefiting a large group of companies which will add value to their products.
- Other obstacles can be resolved in the medium to long term without requiring much further external support. Once certain processes have been set into motion, value chain actors, influencers and supporters in the value chain are expected to be able to continue to develop the sector in a sustainable way and have a big impact on Indonesia's plant extract exports.

This sector offers good grounds for interventions, which will be discussed in Chapter 5. However, we recommend focusing on a mix of innovative extracts with existing extracts when working with companies towards market entry.

5. Possible Interventions and Support Activities for Plant Extracts

The table below shows the interventions proposed for plant extracts. It links these interventions to opportunities and obstacles each intervention addresses, describing what role local and development partners could play in each intervention. The table also describes how CBI can provide support initiatives. The activities mentioned below are expected to also benefit producers of seaweed compounds.

Table 64. Proposed interventions for PMC

What is the solution?	What does it address?	What should local actors, influencers and supporters do?	What are outside supporters doing?	How can CBI contribute?
Development of a sector strategy and roadmap A sector strategy needs to be developed for the extracts industry from source to market, looking at different uses (e.g. cosmetic, food, pharmaceutical), types (wild, cultivated, biodiversity-related). The sector strategy needs to bring together the different ministries involved, BSOs and companies in the sector. Such a sector strategy should be kept as simple as possible to quickly start working, focusing on: • Sector vision (based on realistic market expectations, from MI); • It needs to make this vision happen, looking at key obstacles in the VCA, such as ABS, BSO service delivery, traceability, SOPs and fragmentation of production, R&D, processing quality, MI, HR development, market access; • Responsibilities, especially those of BSOs and Ministries, and process drivers; • Organic product development including development of relevant documentation, registration and certification with new companies; • Which BSOs do what in terms of extracts, or a need for a specific BSOs or working group; • Actions and budgets.	**Obstacles** • Fragmentation in BSOs; • Lacking service delivery by BSOs; • Lack of R&D capacity on efficacy; • Unclear ABS; • No expectations from EU buyers; • Lack of focus of ministries. **Opportunity** • European demand growth	• MoT, MoI, MoA and MoEF do not have specific strategies nor a roadmap for the sector and need to define their role and commitment to the sector. They might have resources to drive the process. • DAI, GPJ, and PERKOSMI as sector associations involved in the sector need to define their role and commitment and consider cross-sector issues related to health, food and cosmetics.	Several donors are active, including DFID, FAO and USAID. Specific activities in business enabling environment need to be identified.	• Start the process by organising a first strategic conference with relevant stakeholders; • Bring BSOD experts in to facilitate the process; • Bring in buyers and high-profile speakers who can bring about change; • Input of MI to kick-start the process.
Develop market intelligence tools for the sector Market intelligence is needed to address several issues in the sector and provide input for other interventions: • Documented traditional knowledge on traditional food and beauty relevant to the EU market is strong, but fragmented over institutions, publications, stakeholders	**Obstacles** • Lack of knowledge on EU market standards, trends and requirements;	• MoT, MoI, MoA and MoEF each need to provide inputs specific to their mandates. MoT and MoI both have market intelligence activities, but	• SIPPO can build market intelligence capacities with DAI and MoI, and perhaps MoT, although here they do not focus on natural ingredients.	• Provide tailored intelligence in an inclusive way with Indonesian stakeholders;

and experts. A directory of resources as well as research outcomes would benefit the sector and can be translated into factsheets and news items for buyers and suppliers; • Identify raw materials available; • Identify market potential for key products in Europe, matched to trends, indications, growth markets, and segments and buyers; • Identify products where traditional food window applies; • Develop MI documents to guide local stakeholders with future production selection in terms of indications, actives and functionalities of interest, competing extracts, segments and buyers; • Develop MI documents to provide guidance on Traditional Food market placement and other buyer requirements. Care must be taken in separating non-competitive from competitive issues, and company and sector responsibilities. Where possible, development of MI should be used to improve capacities of companies, associations and relevant ministries.	• Lack of knowledge of EU buyers' needs in terms of indications of interest; • HR deficits; • No expectations from EU buyers; • Lacking service delivery by BSOs. **Opportunities** • Documented traditional knowledge; • Many raw materials available; • European demand growth; • Traditional food window.	this sector does not appear on their radar yet. • DAI, GPJ and PERKOSMI as sector associations involved in the sector need to define their role and commitment.		• Organise trainings and develop tools with CBI experts to transfer knowledge; • Support development of intelligence on traditional use, raw materials.
Build HR capacities Train key staff in companies on important HR issues identified in this VCA. • Export marketing in coordination with BSOs and engagement with European companies and distributors; • Branding in coordination with BSOs; • R&D and innovation in coordination with BSOs and R&D institutes; • Product development focused on European compliance, in coordination with BSOs and R&D Institutes, including in Europe; • Technical safety, efficacy, functionality documentation and certification.	**Obstacles** • Lack of knowledge on EU market standards, trends and requirements; • Lack of knowledge of EU buyer needs in terms of indications, actives, functionalities of interest; • Poor standardisation of extracts; • HR deficits; • Lack of market access; • No experience with EU market entry; • Specific to cosmetic extracts: long product development trajectories.	• Technical training could for example be delivered by European buyers, or technical institutes; • MoI might have resources to drive the process.	None identified	CBI can deliver training on issues such as export marketing, branding, R&D and innovation and European Compliance through its export network.
Curricula development In coordination with R&D institutes, enterprises and international experts, develop curricula to cover specific technical skills needed by the sector:	• Lack of knowledge on EU market standards, trends and requirements;	• R&D institutions; • MoI or the Ministry of National Education might	None identified during the research, but PUM could play role.	Provide input on international market requirements.

• SOPs for organics • Extraction and standardisation, product development; • Efficacy; These activities should preferably be within the scope of an export development component.	• Poor standardisation of extracts; • HR deficits; • Lack of R&D capacity on efficacy; • No experience with EU market entry; • Lacking service delivery by BSOs.	have resources to drive the process.		
BSO service delivery development, either public or sector associations For future service delivery, it is important that BSOs develop services which are needed by the industry. To make them affordable, as well as a good business model for BSOs, this needs to be preceded by an assessment of buyers' needs. Moreover, it is important to consider how these services can be sold to a wider audience of companies, since each BSO has a much wider membership than extracts. • MI, focusing on market potential assessment and MAR; • Advise on extracts for traditional food, cosmetic extracts linked to ABS; • Training modules focused on HR development for extraction companies; • Guidance tools and coaching on product development and market entry; • Export marketing. This should be accompanied with support on costing and pricing to develop a sustainable business model.	**Obstacles** • Lack of knowledge on EU market standards, trends and requirements; • Lack of knowledge of EU buyer needs in terms of indications, actives, functionalities of interest; • HR deficits; • No experience with EU market entry for traditional food; • No experience with EU market entry; • Lack of market access; • Fragmentation in BSOs; • Lacking service delivery by BSOs; • Specific to cosmetic extracts: long product development trajectories; • No expectations from EU buyers. **Opportunities** • Documented traditional knowledge; • European demand growth; • Traditional food window.	• MoI and MoT could play a role, particularly in funding activities; • DAI, PKJ and PERKOSMI need to identify members' needs and translate these into a service portfolio relevant to their members.	• SIPPO can assess BSOs in different aspects of export promotion in collaboration.	• Business support organisation development through training.
Support on ABS After the new biodiversity bill becomes law, work must begin on its implementation to:	**Obstacles** • Lack of focus of ministries; • Unclear ABS;	• MoEF and LIPI needs to buy in to the process;	• Several donors are active, including DFID, FAO and USAID. Specific activities in business enabling	CBI can share experiences, and link to European experts in ABS.

• Train MoEF staff in tools development, working with companies, provincial and district governments; • Support the development of implementation tools and guidelines which are supportive to business; • Support the development of procedures, work flows and clear responsibilities at different government levels; • Support the delivery of private sector guidance documents; Sharing lessons learned and facilitate south-south peer learning can be a powerful tool in this respect. Where possible, training should be provided in a train-the-train format to ensure that skills are passed on to the provincial and district levels. Moreover, links should be sought with export development activities.	• Lack of R&D capacity on efficacy.	• MoEF might have resources available to drive this process; • European sector associations can share insights.	environment need to be identified; • NRSC (when linked to cosmetics), FFI and KEHATI can provide technical advice and training; • Not researched within the scope of this research, the GiZ ABS Initiative can play a role.	
Tool development for traceability, fragmentation and SOPs, and organic production Many tools, such as Koltiva, already exist to make value chains more efficient. They can be explored and linked to additional sector needs, for example to facilitate: • Training farmers on SOPs for organic production; • Traceability; • Documentation development needed for compliance with GACP, organic and other certifications.	**Obstacles** • Lack of traceability; • Lack of application of SOPs for cultivation and post-harvest; • Fragmentation of production; • Lack of organic certification among extraction companies; • Poor standardisation of extracts; **Opportunity** • Many raw materials available.	• IT service providers to develop tools; • BSOs to manage and provide technical inputs and link to member needs; • MoA and MoI might have resources available to drive this process.	• None, but needs further follow-up with identified donors, as well as donors' experience in this field, such as Swiss Contact, which funded earlier Koltiva tools.	CBI can provide input on international market requirements.
Export development An export coaching project should focus on piloting traditional foods **and cosmetic extracts based on Indonesian beauty rituals** from Indonesia to have lasting impact. Disseminating such results is likely to lead to crowding-in by other extraction companies. Key components need to feed in and benefit from other activities, and as such need to be delivered with or through partners: • Quick identification of committed high-quality extraction companies and European partners; • Buyer missions to build trust and improve perception of Indonesian suppliers and continued matchmaking;	**Obstacles** • Lack of knowledge on EU market standards, trends and requirements; • Lack of knowledge of EU buyers' needs in terms of indications, actives, functionalities of interest; • Poor standardisation of extracts;	• MoA and MoI might have resources available to drive this process; • DAI, GPJ and PERKOSMI as sector associations involved in the sector need to define their role and commitment; • European service providers (traditional food applications, efficacy and safety research);	• IPD can leverage its network for matchmaking activities.	CBI has experience in implementing export coaching projects, but could use support for particular components.

• Piloting ABS compliance in Indonesia with partnerships of EU-Indonesian companies and using lessons learned to provide inputs for the development of implementation tools by the Ministry of Forestry and Environment; • Product development including standardisation, efficacy and development of relevant documentation, and engaging with European companies on further product development; • Piloting traditional food applications in Europe; • Possible trade fair participation for wider sales of extracts, and market connection for basic extracts; • Dissemination of results and tools nationally through associations, conferences and ministries, and internationally in conferences and trade fairs. In the meantime, a group of 'weaker' extraction companies can be taken along in the export coaching and benefit from these activities. To reduce risk to companies, it is advised that they do not exclusively focus on innovative products.	• No experience with EU market entry for traditional food; • Lack of market access; • No expectation by EU buyers; • Lacking service delivery by BSOs; • Lack of R&D capacity on efficacy; • Unclear ABS; • Specific to cosmetic extracts: long product development trajectories. Opportunities • High-quality extraction companies; • Strong local market; • European demand growth; • Traditional food window.	• Connect with MoI trade attaches in target markets and leverage trade agreements of Indonesia; • European, Southeast Asian and Indonesian service providers (efficacy and safety).		

6. Conclusion

This concluding chapter looks into potential options for CBI interventions in the plant extracts sector, as follows:

- Market segment versus product approach;
- Intervention logic and key considerations for interventions to succeed;
- Risks.

Market segment

This VCA links specific products to specific markets. The focus markets for the research on plant extracts were their use as traditional food ingredients for food supplements markets and for cosmetics markets. In both markets, there is a strong need for new innovative extracts, as well as a continuous need for commodity and more established extracts which can supplement the portfolio of Indonesian extract producers.

Their use as herbal medicine, although a growing sector in Europe, was not considered due to the limited size of that market niche, as well as the high requirements it poses to suppliers. Moreover, the growing market for plant extracts in feed supplements and veterinary medicine was also not considered for similar reasons. In conclusion, the research team proposes a combined market focus on cosmetics and food.

Intervention logic

The research team expects that interventions in the extracts sector can have a large impact, but some of that impact will only occur in the long term, particularly when systemic obstacles have been addressed.

- Key for interventions in this sector is to show the business case of developing innovative extracts for European markets. Considering the limited attention afforded to the sector at this point, CBI will probably need to take the lead in showing this business case through working with a first group of companies in an intensive way. On the other hand, there will be much less need for coordination when compared to essential oils, particularly the seaweed extracts sector.
- This business case is needed to show more companies the opportunities in this sector; to show to relevant BSOs that this is a sector of interest which requires specific consideration, and to demonstrate to ministries that the sector requires specific policies and incentives as well investments in the business enabling environment.
- In this process, tools to be developed for HR capacity building in the sector, CSR compliance, etc., can be transferred to other players in the sector.
- Based on the first few success cases, increased interest from the public sector could be used to tackle systemic issues, such as ABS, solving HR deficits in the sector, resolving market access difficulties and working on curricula development to provide opportunities for a following group of companies to benefit from an improved business enabling environment.
- To spread risks and to ease market entry in Europe, it is important to support companies offering innovative or specialty and conventional or commodity extracts to the market.

Risks

We identified the following key risks for interventions in the plant extracts sector during the research:

- Participating companies do not meet commitments for new cosmetic extracts;
- Government interference;
- No government support to interventions;
- BSO capacity and resources are insufficient;
- EU legislation change;
- Environmental contamination and damage risks, mostly related to pesticides and unsustainable collection;
- No agreement among sector stakeholders can be reached;
- Market changes reduce demand for product.

CSR risks in terms of child labour and labour rights could not be sufficiently researched, so further research is required to clarify the scope, impact and likelihood of these risks.

Annex I — Longlist of Companies Identified and Shortlist of Companies Interviewed

Long lists of companies in Extracts

Name of company	Region (propinsi)
Air Mancur, PT	Central Java
Aroma & Co, CV	North Sumatra
Aromindo, CV	West Java
Bali Extract Utama	Bali
Berkah Alam Nusantara, PT	West Java
Bintang Terang Lestari, CV	West Java
Eratama	East Java
Gorom Kencana	East Java
Green Zone Herbal, PT	Banten
Haldin Pacific Semesta, PT	Jawa Barat
Herbacore Gresik Indonesia, PT	East Java
Herbal Indo Utama, PT	East Java
Indaroma/Essaroma Indonesia, PT	West Java
Indesso Aroma, PT	West Java
Indofarma, PT	West Java
Industri Jamu Borobudur, PT	Central Java
Industri Jamu Dan Farmasi Sido Muncul, PT	Central Java
Insular Multi Natural, PT	West Java
Inti Sumatera Global, CV	North Sumatra
Irawan Djaja Agung, PT	East Java
Jutarasa Abadi, PT	Jakarta
Konimex, PT	Central Java
Mustika Ratu, PT	Jakarta
Natura Laboratoria Prima, PT	East Java
Phytochemindo Reksa, PT	West Java
Sari Alam Sukabumi, PT	West Java
Semarang Herbal Indo Plants, PT	Central Java
Tri Rahardja, PT (Javaplant)	Central Java
Zena Nirmala Sentosa, PT	West Java

Short lists of companies in Extracts

PT Indofarma (Persero) Tbk
PT Martina Berto, Tbk (Herbal Div.)
PT Solo Global Health
PT Merpati Mahardika
PT Tri Rahardja (Javaplant)
PT Natura Laboratoria Prima
PT Zena Nirmala Sentosa (Garcia)
CV Bintang Terang Lestari (Daun Mas)
CV Aromindo
PT Van Aroma
PT. Industri Jamu Borobudur
PT. Semarang Herbal Indoplant
PT Irawan Djaja Agung