

Market Study of Non-Cocoa Products for Cocoa Agroforestry Farmers



Report



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Executive Summary

Diversifying and improving income of cocoa farmers is one of the objectives of the developPPP project of “Regenerative Cocoa Production to Support Livelihood Development in Viet Nam” (ReCoPro) of GIZ and Puratos Grand Place Vietnam. To achieve this, the project conducted a market study to develop an overview of potential non-cocoa income products to be integrated into a cocoa agroforestry system, focusing on the production volume in the region and on household level, product growth trends and potential, market status of the products, potential for market access; map the value chains for key products in the list, including challenges and recommendations; and propose market access and product promotion plans for the key products.

A 4-step approach was applied to conduct this study of which the first stage was the identification of crops and types of animal husbandry that are suited for cocoa agroforestry systems in Dak Lak and Lam Dong provinces. Based on the list of products identified at step 1, step 2 applied in-depth interviews with representatives of local authorities and departments to select the products with the greatest potential based on three criteria: innovative capacity, ability to overcome market turbulences and affordability of labour and financial investment. From the result of step 2, step 3 analysed current and new value chains to explore market opportunities, while step 4 was to develop plans for market access and product promotion.

The selected products, namely passion fruit, soursop, white turmeric, lemon grass, yellow camellia and fish mint, have a lot of potential for market development, so that cocoa farmers can achieve superior business performance and hereby improve their income. Farmers in Ea Kar district can diversify their products by cultivating and processing passion fruit and soursop and access new markets for their business. White turmeric and lemon grass is recommended for Cat Tien district because the powder from white turmeric can be used as spice and traditional medicine, while lemon grass can be used to produce oil, a traditional medicine for pain relieve, stomach problems and fevers. For Da Teh district, yellow camellia and fish mint are more recommended. Yellow camellia is a medicinal plant which improves soil fertility and can be processed into tea and other dried products. Fish mint contains many nutrients, has a cooling effect and can be consumed as a vegetable, a juice and in powder form.

The study also suggests market access and product promotion plans for those selected products, including capacity building on marketing for cooperatives and cocoa farmers, coaching on processing and packaging for cooperatives, organising or participating in marketing events to introduce products of districts, developing e-commerce for cooperatives and linking up and contracting with local traders or processing companies.

1. Introduction

In Viet Nam, cocoa has the potential to become an increasingly important sector, driven by increasing market prices which is not only contributing to local economic growth, but also local farmers' livelihoods, especially in the Central Highlands and the Mekong Delta. However, realising the full potential of the cocoa sector requires overcoming significant challenges, including the historical decline in cocoa cultivation area from 25,700 ha in 2012 to 5,028 ha in 2019 (Hồng, Hà, Hương, & Hoa, 2022). Various reasons causing this problem are price falls, disrupted supply chains, inappropriate selection of cultivated areas, limitations in planting techniques, lack of state support policies and climate change issues. Consequently, farmers have replaced cocoa with other crops with higher productivity and income.

Given the advantages of cocoa to local economic development, livelihood improvement for farmers, high adaptation potential to climate change and positive impacts on biodiversity, different efforts have been made to regenerate cocoa farming such as developing shade-grown cocoa and applying climate-smart agriculture techniques and agroforestry on cocoa farms. However, the sustainable development for the cocoa industry is not only based on alternative techniques in cocoa production but also on the ability of cocoa farmers to generate an adequate income. This means that farmers need to have another complementary income source from crops that can be integrated into cocoa farm so that they can optimise their income.

The DeveloPPP project of GIZ and Puratos Grand Place Vietnam (PGPV) aims to increase the base of cocoa sourcing in Viet Nam along with increasing resilience and livelihoods of farmers and farming systems. DeveloPPP is a funding programme of the German Federal Ministry for Economic Cooperation and Development (BMZ). It is aimed at companies that want to invest sustainably in a developing or emerging country and expand their local operations.

The project is conducted in three districts: Ea Kar (Dak Lak province), Cat Tien and Da Teh (Lam Dong province), in which diversifying farmers' income sources from cocoa agroforestry system is one of the key objectives of this project. To achieve this, the project explores innovative non-cocoa products which can be integrated into cocoa farms and provide supplementary or alternative income sources to reduce the risk of income loss for farmers. Moreover, these non-cocoa products need to have a market so that the farmers can achieve a superior performance from their business. In particular, the potential non-cocoa products are evaluated by three criteria including (1) innovation - the ability of products to be diversified by processing fresh harvest and access to new markets to improve their product value so farmers can achieve a premium price and optimise their income; (2) ability to overcome market turbulences such as price falls, change of customer demands and competition; and (3) affordability of investment in terms of labour and financial resources for farmers.

To achieve the above mentioned objective, this study was conducted across the three districts of the project from November 2023 until August 2024 to develop an overview of potential income products, product growth trends and potential, market status of the products, potential for market access; map the value chains for key products in the list, including challenges and recommendations; and propose market access and product promotion plans for the key products.

The report is structured in four sections of which the first and second sections focus on the introduction and the approach to conduct the assignment. The third section presents the findings from the study, while the fourth section discusses the plans for market access and product promotion.

2. Approach

The study applied both literature review and field data collection to identify the products with the greatest potential to generate additional income for farmers. The literature review identified products from crops or animal husbandry that can be intercropped or integrated into cocoa agroforestry systems and where there are significant market opportunities. Meanwhile, the field data collection verified the suitability of the identified products to local environmental and climate conditions and their ability to achieve higher prices in the marketplace. The approach was conducted in four steps as presented in figure 1.



Figure 1: Approach to identify non-cocoa products

Step 1: Desk study to identify non-cocoa products that can be integrated into cocoa agroforestry systems, are suitable to local natural conditions and have significant market opportunities

The objective of this step was to identify non-cocoa products that have been integrated into cocoa agroforestry systems through conducting a desk study. To ensure the suitability of the identified products to local natural conditions, reports, publications, governmental decisions and planning documents that were conducted or issued in the two provinces Dak Lak and Lam Dong and the three districts Ea Kar, Cat Tien and Da Teh were analysed. Moreover, secondary data from statistical yearbooks, websites and annual social economic reports of districts were also explored to get a comprehensive overview of non-cocoa products in the project areas.

From this step, a list of current and potential non-cocoa products was identified to be used for the second step of consultation through structured interviews. The initial list of innovative non-cocoa products is presented below:

Table 1: List of potential non-cocoa products from the literature review

	Ea Kar	Cat Tien	Da Teh
Cash crop	Macadamia	Durian	Pepper
	Soursop	Avocado	Durian
	Paulownia	Cashew	Tangerine
	Lychee	Pepper	Pomelo
	Coffee	Coffee	Coffee
	Cashew	Orange	Persimmon (<i>Diospyros kaki</i>)
	Pomelo	Persimmon (<i>Diospyros kaki</i>)	Cashew
	Durian		Pineapple
	Pepper		
	Passion fruit		
	Black bean		
Herbal and medicinal plant	Moringa oleifera	White turmeric (<i>Curcuma zedoaria</i>)	Fish mint
	“se” Ginger	Ming aralia (<i>Polyscias fruticosa</i> (L.) Harms)	Chili
		<i>Ampelopsis cantoniensis</i> (chè dâý)	Yellow camellia
		Lemon grass	
Animal husbandry	Cattle	Cattle	Cattle
	Pig	Pig	Pig
	Goat	Goat	Goat

Source: Consultant' s review in 2024

Step 2: Consultation to prioritise the most suitable non-cocoa products with the greatest potential

The objective of step 2 is to select the most suitable products from the list in step 1. To achieve this, in-depth interviews were conducted with key informants from agriculture extension services, Department of Agriculture and Rural Development (DARD) at district level and commune authorities who are knowledgeable about the agriculture production and market at district and commune level and cocoa farmers themselves. Interviewees were given the list of products identified at step 1 and the criteria for product selection (see table 2) and were asked to give their ideas or information about each product based on the criteria.

Since the aim of the study was to select the two most suitable products with the greatest potential per district, the interviewees were required to select the products based on their own perceptions. The products which have the highest number of selections were then selected for further review in step 3 and step 4. The interview questions focused on the situation of agriculture production and the comparative advantage of agriculture products at district and commune level, the market as well as plans and strategies for agriculture products in the coming time.

Table 2: Criteria for product selection

Criteria	Explanation
Innovative capacity	It refers to the ability to diversify products through processing fresh harvest and to access new markets with higher prices.
Ability to overcome market turbulences	It refers to the resilience to withstand price fluctuations, enabling a stable household income. Moreover, the selected product should have an outstanding quality that can compete with rivals from other provinces or regions.
Affordability of labour and financial investment for farmers	It refers to the possibility that farmers can cultivate the products, using their existing knowledge and experience, and can afford initial costs and operation costs without any loans or with small loans.

Step 3: Value chain analysis to map and explore the potential for market development

This sequential step was applied to map the product supply chains from producers and farmers to traders, processors, wholesalers and retailers. Based on the products identified in step 2, this step explored current and potential future market channels that farmers can use for trading and marketing. To do this, in-depth interviews were conducted with traders to identify the possibility of product development, anticipate market opportunities and identify current supply chain practices from farmers to wholesalers.

Step 4: Development of market access and product promotion plans

During the interview, the interviewees were asked to give recommendations to improve market access and product promotion for selected products. Based on the list of recommendations, the consultant suggests market access and product promotion plans which are presented in detail in section 4.

3. Findings

3.1 Agriculture Production at the Project Sites

The data on agriculture production in the three districts indicated that fruit trees and other crops are prioritised for cultivation due to favourable natural conditions for cropping and district plans for restructuring the agriculture sector.

Ea Kar district has an area of 103,747 ha, of which 50,155 ha are used for agriculture production, accounting for 48.34% (UBND huyện Ea Kar, 2023a). Most of the agricultural area is used to plant perennial crops such as cashew, pepper, rubber, coffee and tea. A small area is used to grow tobacco, pipe tobacco and fiber crops such as cotton, jute, sedge, etc. which have high yields. In addition, natural conditions are favourable for agroforestry. In 2023, the total production value of all economic sectors was estimated to be 13.74 trillion VND, an increase of 10.3% compared to 2022. Of which production value from agriculture, forestry and fisheries is estimated to be 6.54 trillion VND, an increase of 6.9% compared to 2022. In general, agricultural, forestry and fishery production maintain a stable development. The total amount of harvested food grains is estimated to be 155,580 tons, an increase of 4.3% compared to the corresponding period in 2022. Ea Kar farmers are proactive in converting to crops that are suitable to local natural conditions and bring high economic efficiency to farmer households such as pomegranate, longan and durian (UBND huyện Ea Kar, 2023b).

Cat Tien district has a total cultivated area of over 20,000 ha, of which annual crops occupy 11,704 ha and perennial crops occupy 8,324 ha. The average agricultural production value of Cat Tien district has increased by 3.33% annually, of which the production value per unit area in 2023 reached 70 million VND/ha/year. The cultivation sector accounts for 63.63%, livestock husbandry accounts for 31.07% and services 5.3% (UBND huyện Cát Tiên, 2023a). The district has 808.39 ha of fruit trees, of which 491.92 ha have been harvested. Productivity reached 92.23 quintal/ha. The coffee area is 546.5 ha, an increase of 1.46% compared to 2020 (UBND huyện Cát Tiên, 2023b). The increase in coffee area is mainly due to additional planting and crop conversion from cashew to coffee to increase productivity and economic efficiency. Although productivity has increased over time, it is still much lower than the average level of many years ago due to the impact of anthracnose epidemics and mosquito bugs in previous years.

Da Teh district has a cultivated area of 23,509 ha, of which over 851 ha have been VietGAP certified, 19 ha have been recognised for climate smart agriculture, applying technologies such as greenhouse systems, automatic air conditioning and humidity sensor systems, and 12 ha have been certified for organic production. Currently, there are 571 ha of durian in the area that have been granted a Production Unit Code. The value of harvested products per unit area reached 105.2 million VND/ha. The local agriculture industry develops stably. In 2023, Da Teh district has increased the total cultivated area to over 24,000 ha, striving to bring the value of harvested products per unit area to 110 million VND and to have a total area of about 930 ha with a planting area code (rice: 260 ha, durian: 670 ha) and converting 300 ha of cashew and mixed farms with low efficiency (UBND huyện Da Teh, 2023b). In recent years, the district authority of Da Teh has supported better branding and quality improvements of agricultural products with competitive value and high export demand such as applying production codes for durian, building the Da Teh green-skin grapefruit brand, strengthening market linkages associated with cooperative development, developing agricultural products that meet One Commune One Product (OCOP) criteria and promoting agricultural product processing (UBND huyện Da Teh, 2023a).

3.2 Key Product Selection

Originating from the rainforest, cocoa thrives in agroforestry systems alongside a diverse range of other crops and farm animals. This approach, promoting agrobiodiversity, utilises cocoa as the primary crop while integrating additional income streams. The following product list, compiled from interviews, represents the potential of this system, aiming for diversification without limiting possibilities.

Animal husbandry plays an important role in cocoa farming by effectively utilising farm residues like leaves, cocoa pods and other residues as feed and transforming them into manure as organic fertiliser for cocoa and other crops. While this closed-loop farming is a sustainable practice, interviewees drew several reasons for not adopting this approach: (1) despite the small scale of cattle, goat and pig production, raising these animals is labour-intensive and time-consuming, offering limited returns on investment; (2) the high initial investment of approximately 20 million for one cattle surpasses the financial capability of most households; (3) although pig production is better aligned with the capacity for investment of households, the outbreak of African Swine Fever without any effective vaccinations or treatments pose a significant risk. Considering these factors, animal production was excluded from the selection of potential products.

3.2.1 Selecting Key Products in Ea Kar District

Although all products meet the three selection criteria to one extent or another, according to interviewees' opinions, the products in table 3 were prioritised for further analysis. Passion fruit was selected as the most suitable non-cocoa products by seven out of 22 interviewees, followed by soursop and lychee. The remaining products, including macadamia, “se” ginger and black bean, were selected by one or two interviewees. Meanwhile paulownia and moringa were not selected at all. Based on this selection, passion fruit and soursop were selected to explore their value chains and develop market access and product promotion plans. Some further explanations are:

- **For passion fruit:** Fresh passion fruit can be processed to increase product value. Moreover, the product's selling price has increased from 5,000 VND/ kg to 8,000 VND/ kg since 2023. Besides, traders in Ea Kar district and neighboring districts have a high demand of the product to produce tea, jam, and dried passion fruit. This context signals the potential of passion fruit intercropping into coco agroforestry system. It is important to note that passion fruit, a perennial vine, can be strategically integrated into cocoa farms for the first three years. Grown in a bower system, passion fruit provides essential (temporary) shade for young cocoa trees while generating additional income through early fruit harvests.
- **For soursop:** Although soursop and lychee were both selected by an equal number of interviewees, soursop was selected for further analysis because of three reasons: (1) lychee is not suitable for cultivation in the whole district due to different soil fertility among communes in Ea Kar district; (2) the lychee market is well developed in the district, however, this commodity depends on the purchasing power of a big trader who collects and exports lychee to China. There is no other option for farmers to diversify their market. If China stops importing lychee, farmers will face difficulty in selling their product; (3) the lychee selling price is decided by this single trader, so farmers have little chance to negotiate the price. Unlike lychee, soursop has a greater adaptability to various soil types and is beneficial to cocoa farming. Soursop does not only provide permanent shade for cocoa trees but also serves as a habitat for weaver ants, natural predators of cocoa-damaging mosquito bugs. This intercropping strategy does not only generate additional income but also enhances ecological balance within the cocoa farm and the soursop market is more diverse, offering farmers more sales opportunities. In addition, soursop can be processed into tea and jams to increase the product value.

Table 3: Assessment of the potential of selected non-cocoa products in Ea Kar district

Non-cocoa products	Number of interviewees selecting product as the best option	Criteria description		
		Innovative capacity	Ability to overcome market turbulences	Affordability of labour and financial investment for farmers
Passion fruit	7	Can be processed into jam, syrup and juice Enriches soil fertility for cocoa plantation	High product yield Price has increased and remained stable for the past three years.	Pilot models have been established with low investment costs.

Non-cocoa products	Number of interviewees selecting product as the best option	Criteria description		
		Innovative capacity	Ability to overcome market turbulences	Affordability of labour and financial investment for farmers
			Three big traders in the district with high purchase capacity, including a big processing company (the company of Chanh Vuong BH)	
Soursop	5	Can be processed into jam, juice and tea	Stable price, high demand from tea processing companies	Average initial cost around 17 million VND/ha
Lychee	5	High quality well recognised and many exporting opportunities	Price has increased during the last five years, big traders in the district and a great number of traders from the North	Average investment cost from 22 million VND/ha, technical support from district staff available
Macadamia	2	Visually appealing, nut can be processed to macadamia oil and defatted macadamia meal (used as food or feed), by-product can be used to make organic fertiliser	Stable price, great number of traders, popular brand name, availability of processing in the district	Investment cost from 21 million VND/ha, existing experience and skills in management and processing
Black bean	2	Improves soil fertility before replanting coffee, possible to intercrop in newly established cocoa farm, can be roasted and processed into a tea-like infusion	Two big traders in the district, stable price	Low investment cost
“se” Ginger	1	Can be processed into ginger tea, ginger liniment, etc.	High density of local actors, stable price, high market demand	Low investment cost
Moringa (<i>Moringa oleifera</i>)	N/A	High nutritional level for home consumption, potential for processing and product	High demand from domestic and export market, stable price, high product yield	Low investment cost

Non-cocoa products	Number of interviewees selecting product as the best option	Criteria description		
		Innovative capacity	Ability to overcome market turbulences	Affordability of labour and financial investment for farmers
		diversification, can be processed into freeze dried moringa leaf powder		
Paulownia	N/A	Can be used for timber processing and furniture exporting	Availability of traders in the commune, market price of paulownia timber: 40 million VND/m ³	Low investment cost, some farmers have been trained on paulownia production

3.2.2 Selecting Key Products in Cat Tien District

Durian and white turmeric (*Curcuma zedoaria*) were selected by most interviewees in Cat Tien district. Four out of fifteen interviewees selected durian as the most suitable crop with high potential market value because of the following reasons. Firstly, durian benefits from diverse market channels encompassing a network of local traders and wholesalers in Ho Chi Minh City who will export the product to other countries. Secondly, the selling price of durian has shown stability and a gradual upward trend in recent years, particularly when the local authority developed the production code for durian to be exported to China. Lastly, initial durian production cost is relatively low at about 17 million VND/ha for an intercropping system. However, durian cultivation may face challenges and risks. The rapid durian sprawl can lead to oversupply, potentially causing price fluctuations and market instability. Additionally, the model is labour-intensive, especially during the dry season, and is susceptible to production losses due to weather extremes. For these reasons, durian has not been selected as a potential product and has been replaced by lemon grass.

Although the cultivation area of lemon grass in Cat Tien is small and fragmented (about 1 ha), *Cymbopogon flexuosus* and *Cymbopogon citratus* are two lemon grass varieties which are commonly grown by local farmers and have market potential as Pibo Lavender Farm in Da Lat city collects this crop for oil processing. Furthermore, lemon grass is well developed in full sun but it also tolerates partial shade, effectively mitigating soil erosion on sloping terrain while improving soil fertility. As a result, lemon grass is recommended to be intercropped in cocoa farms.

Similarly, white turmeric was selected by three interviewees which is more than other fruit trees and crops. Although white turmeric has not been widely planted yet, DARD in the district and the agriculture extension service have informed farmers about its market potential. White turmeric has many advantages due to the availability of big traders in the district and in Da Lat city. Moreover, the product can be processed into jam and used as a medicinal herb with a high and stable selling price. Integrating white turmeric in agroforestry does not require high investment.

Table 4: Assessment of the potential of selected non-cocoa products in Cat Tien district

Non-cocoa products	Number of interviewees selecting product as the best option	Criteria description		
		Innovative capacity	Ability to overcome market turbulences	Affordability of labour and financial investment for farmers
Durian	4	Diverse market channels	Stable price, high density of traders, fruit cooperative trader in the commune	17 million in VND/ha for intercropping, cultivation requires significant labour, especially in dry season, rapid increase of durian area increases the risk of disease
White turmeric (<i>Curcuma zedoaria</i>)	3	Can be processed into jams and used as medicinal herb, enriches soil fertility for cocoa production	High product yield, price increases remained stable for the past three years, stable market channels in the district	Some pilot models have been established with low investment.
Avocado	2	Diverse market channels	Stable price, high volume of product consumption	Farmers can afford the production cost and have experience in cultivation.
Cashew	2	Diverse market channels, processing companies in the district	High volume of product consumption	Farmers have more than 20 years experience in cultivation and skills in processing.
<i>Ampelopsis cantoniensis</i> (chè dâý)	2	Can be used as medicinal herb	High product yield, price increases remained stable for the past three years, stable market channels in the district	Government support for pilot models, training and processing
Lemon grass	1	Can be used as medicinal herb	High product yield, price increases and remained stable for the past three years, stable market channels in the district	Government support for pilot models, training and processing
Pepper	1	Diversification through product processing, well-known brand name	Stable price, high volume of product consumption	Farmers are able to invest in this model from their own financial resource.

Non-cocoa products	Number of interviewees selecting product as the best option	Criteria description		
		Innovative capacity	Ability to overcome market turbulences	Affordability of labour and financial investment for farmers
Polyscias fruticosa (L.) Harms	N/A	Can be used as medicinal herb	High product yield, price increases remained stable for the past three years, stable market channels in the district	Government support for pilot models, training and processing

3.2.3 Selecting Key Products in Da Teh District

Among eight potential products in Da Teh district, durian and yellow camellia were selected by most interviewees. Five interviewees selected durian and three selected yellow camellia. Yellow camellia provides better market opportunities compared to pepper or pomelo.

Yellow camellia was first intercropped in coffee farms by Da Lat Farmers' Union in 2013 aiming to increase household income and improve soil fertility. Because this medicinal plant can be processed to make instant tea, freeze-dried yellow camellia tea and matcha yellow camellia tea powder which have a high market demand, yellow camellia has been scaled up to other districts in Lam Dong province such as Da Huoai, Di Linh, Lac Duong and Da Teh. At first sight, the production scale in the district is small, yet it has a large potential for scaling up. Secondly, the district authority has a plan to develop more market opportunities for this product by processing it into tea and supplying herbal tea companies in the district and Da Lat city. Consequently, productivity and yields could be higher and the product could get premium prices after being processed into tea. On average, a tree produces 1-2 kg of fresh flowers each year, equivalent to about VND 1 million. Taking care of the yellow camellia tree is not too difficult. It is recommended to plant it under trees with a wide canopy, luminescent around the base of the tree, and fertilise it with organic fertilisers. The product is well adapted to local natural conditions, however, integrating yellow camellia as a companion crop in cocoa agroforestry presents challenges and requires careful planning and consideration of their individual needs such as soil profile, light and nutrients as well as potential interactions with other crops in the cocoa agroforestry system. While it offers an attractive side product, yellow camellia requires strong technical capacity to enable good farming results and strict procedures in post-harvest processing. One of the challenges for processing yellow camellia is freeze-drying technique to keep the high quality of the flower, which is new to local farmers. To ensure successful cultivation of yellow camellia, buyers, processors and agricultural extension officers should be consulted to determine the most suitable practices in the area.

Since the market for fish mint has not been explored yet and is not as well recognised, the product has not been selected by many people. However, this product has a large potential on the market. Three big companies, Dalat Nutrition Food (DLNF), Dalat Farm and Da Lat ICHIFOODS, purchased around 50 tons of fish mint per year for processing fish mint powder in the past. Moreover, this kind of crop is suitable for the local conditions, especially when grown under the tree canopy. The total cost for 500m² of fish mint is about 2 million VND with a productivity of 0.25 ton/500m² every two

months. The price of fish mint has increased during the last three years from 30,000VND/kg to 50,000 VND/kg which confirms the potential of this product for cocoa farms.

Table 5: Assessment of the potential of selected non-cocoa products in Da Teh district

Non-cocoa products	Number of interviewees selecting product as the best option	Criteria description		
		Innovative capacity	Ability to overcome market turbulences	Affordability of labour and financial investment for farmers
Durian	5	Diverse market channels	Stable price, high density of traders, fruit cooperative trader at commune level	17 million VND/ha, experience and skills in cultivation
Yellow Camellia	3	Can be processed into tea and used as other medicinal herb	High product yield, possible to get premium price, processing facility in the neighbour Da Huoai district	Government support for medicinal plant development, experience of farmers
Pomelo	2	Diverse market channels	Stable price, high density of traders, fruit cooperative trader at commune	Farmers can invest in this model based on their financial resource and skills in preventing insects and disease.
Fish mint	1	High market demand for fish mint powder, consumed as vegetable and juice for treatment	High product yield, stable market channels in the district	Low investment cost
Pepper	N/A	Diverse product processing, well-known brand name	Stable price, high volume of product consumption	Farmers have financial resources and experience, however, they lack experience in preventing diseases.
Tangerine	N/A	Diverse market channels, processing companies in the district	High volume of product consumption	Financially affordable and cultivation skills
Pineapple	N/A	Can be processed into jam and juice	Stable price, strong trader network	Low investment cost
Chili	N/A	Fresh chili can be sold to local customers, remaining product to be supplied to Binh Dai Duong Food Company to produce chili sauce	High product yield, stable price	Low investment cost

3.3 Value Chain Analysis of Key Products at District Level

3.3.1 Passion Fruit and Soursop Value Chains in Ea Kar district

Passion Fruit Value Chain

Integrating passion fruit in cocoa farms can be considered an effective solution that meets the objectives of stabilising the local cocoa area and increasing income for households. However, passion fruit should be grown when the cocoa tree's canopy has not yet closed.

Ea Kar district is one of 15 districts of Dak Lak province, located on an average height of 800-1,200m above sea level and the soil has pH values between 5.5-6.0, so this area is suitable for passion fruit cultivation. Passion fruit serves as a temporary shade tree, windbreak and moisture retention for young cocoa trees, limiting water evaporation during the dry season, creating a stable ecological environment, coping with climate change and creating the basis for sustainable agricultural development. The young cocoa trees need temporary shade and intercropping trees to cover, protect and improve soil fertility. Besides, passion fruit has great potential for market development, thereby creating a stable income for cocoa farmers. There are around 20 ha of passion fruit in Ea Kar district, of which the average area per commune is about 2 ha and the productivity stands at 1 ton/ha for intercropped cultivation. Most households in Ea Kar district planted 400 passion fruit plants/ha, which is intercropped with coffee and cocoa trees with a density of 5m x 5m.

The passion fruit value chain at Ea Kar district is simple. After harvesting, 75% of passion fruit are supplied directly from farmers to traders in the district at 5,000 VND/kg. 35% is then sold on the district market or to coffee shops while the other 40% is supplied to big traders in Buon Me Thuot city. Around 25% of products are sold to the wholesaler in Tan An market in Buon Me Thuot city where the selling price is around 7,000 VND/kg (excluding transportation cost).

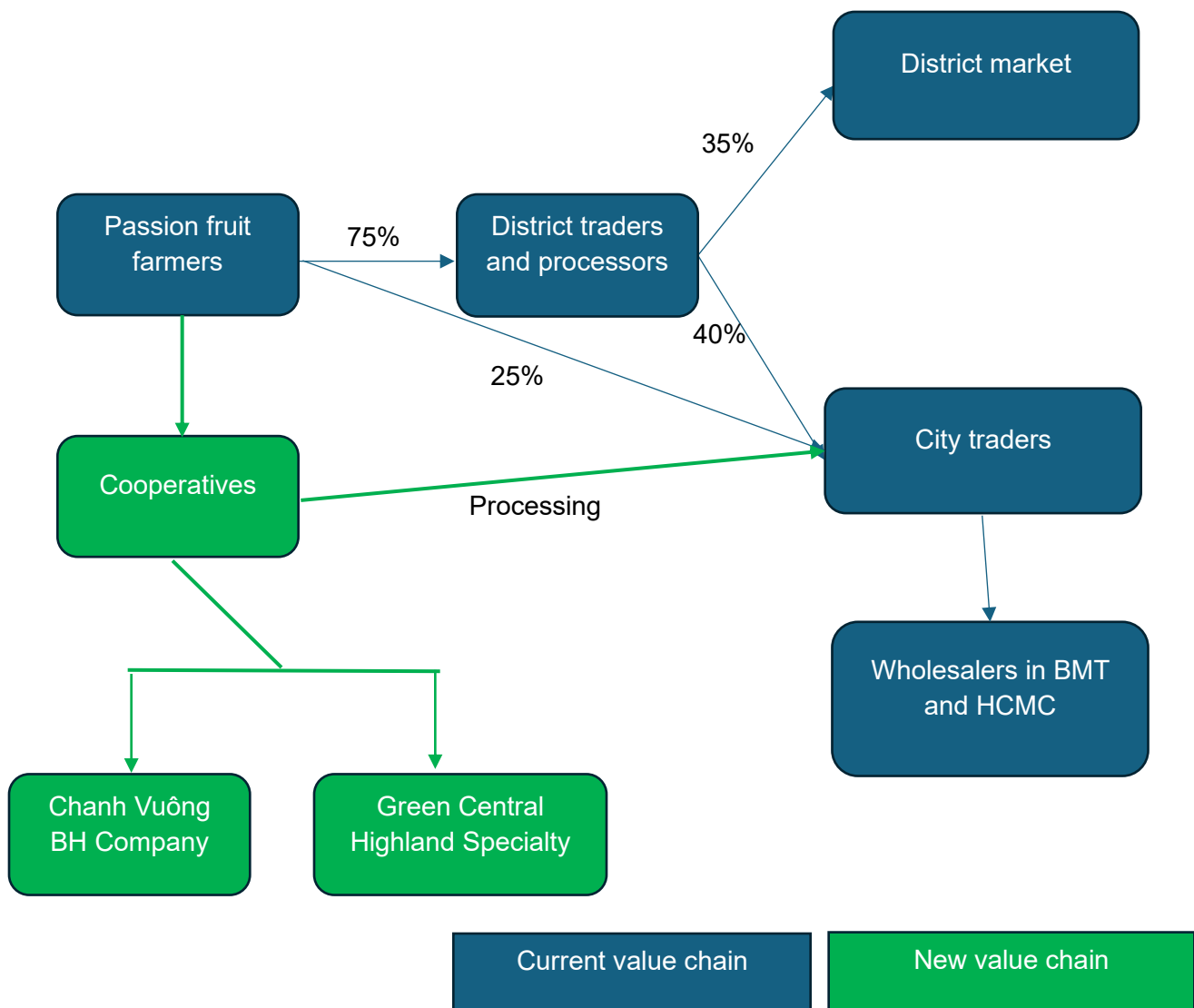


Figure 2: Current and new proposed value chain of passion fruit at Ea Kar district

The study explores other opportunities for passion fruit business which has not been taken advantage of yet by farmers. There are two companies that buy around 100 tons of passion fruit per year to produce jam and syrup, the company of Chanh Vuông BH in Cu M’ gar district and Green Central Highland Specialty in Buon Me Thuot city. The selling price of passion fruit to these companies is 10,000 VND/kg. However, farmers and traders in Ea Kar district do not have access yet to those companies. Besides the companies, cooperatives in the district can also do this processing themselves and sell it to coffee shops or supermarkets in the district and in the city.

Soursop Value Chain

In recent years, growing soursop has been a priority for many farmers to convert and replace ineffective crops. Intercropping this tree in cocoa farm does not only increase economic efficiency than growing cocoa in a monoculture, but also has a shading effect and limits water evaporation,

thereby helping to reduce the amount of water and watering frequency for cocoa trees, especially in the dry season. Additionally, intercropping soursop in cocoa agroforestry provides a double ecological benefit. First, they offer a natural habitat for weaver ants, which prey on mosquito-like insects that harm cocoa plants. This reduces the need for pesticides, promoting a more sustainable agricultural practice. Secondly, diversifying crops on the same plot decreases costs, achieves higher profits and is better adapted to climate change.

Ea Kar district has around 3,247 ha of fruit trees. Oranges, tangerines and pomelo are in Cư Elang, Ea Ô, Cư Prông and Ea Păl communes; lychee is in Ea Sar, Ea Sô and Ea Tih communes and each of the remaining communes have soursop with 3.5 ha on average. Before 2015, monoculture was the prevalent method applied for soursop cultivation. However, due to low productivity and price, farmers have shifted from soursop to coffee or durian production. The area previously dedicated solely to soursop is now coffee or cocoa farms with soursop being intercropped. The productivity of soursop is about 25 tons/ha in average of which one soursop tree at six years old can produce 90-110 kg of fruit per year. The current value chain of soursop fruit in Ea Kar district is presented in the following figure 3.

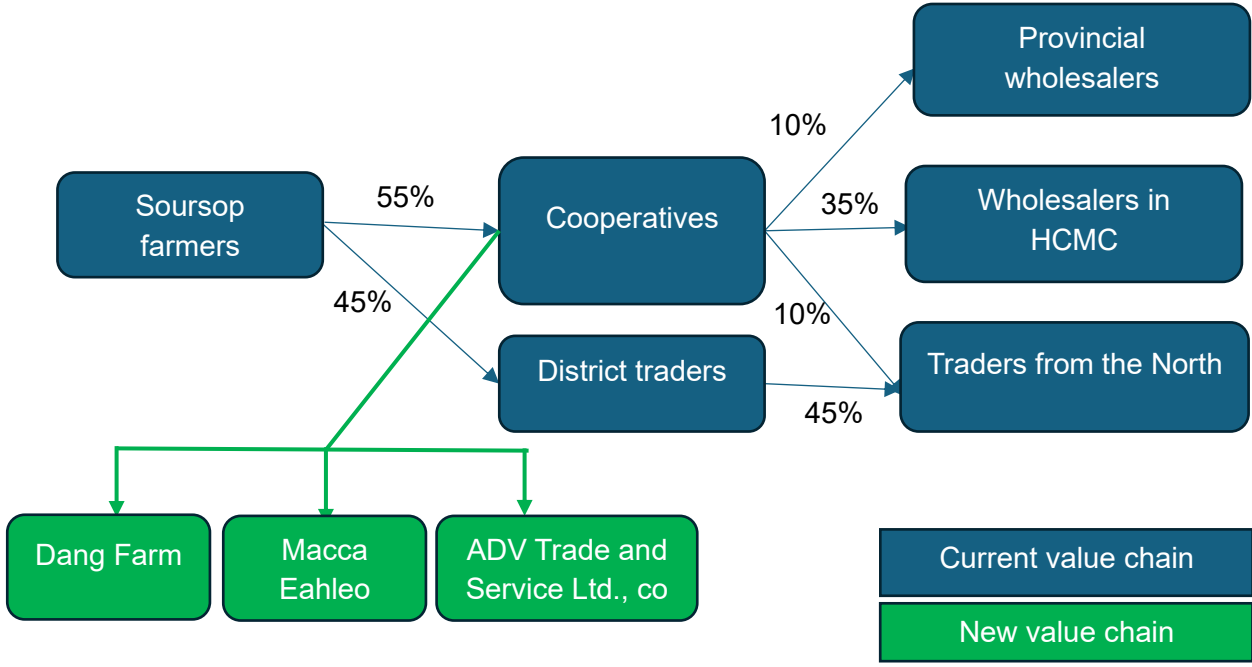


Figure 3: Current and new proposed value chain for soursop product

The soursop value chain in Ea Kar district is quite diverse and the product has been supplied to wholesalers in big cities such as Ho Chi Minh City and Ha Noi. The study indicates that more than half of the soursop production has been supplied to the cooperatives Lam Tien Trade and Agriculture Services (Ea Kmut commune), Truong Xuan Agriforestry and Services (Ea Tih commune) and Hop Nhat Agriculture Service (Ea O commune). The remaining 45% of soursop production was directly sold to traders in the district. After collecting soursop from farmers, the cooperatives supply 35% of products to wholesalers in Ho Chi Minh City and the remaining 20% are sold to shops in Buon Me Thuot city and traders from the North. Besides, there are four traders who collect soursop from farmers and then sell them to traders from the North.

There are also other opportunities to diversify products from soursop trees such as processing leaves into tea and jam and producing dried soursop but those have not been made use of by soursop farmers in the district because of two reasons. Firstly, the study found that soursop farmers and cooperatives lack access to information related to these products processed from soursop. Secondly, the production scale in the district is still small so the requirements of companies that process products from soursop cannot be met.

Yet, the demand is there. Dang Farm in Cu M'gar district which produces tea from soursop leaves and fruits buys up to 90 tons of soursop per year at 15,000 VND/kg. Macca Eahleo Cooperative in Ea Đrăng town in Ea Hleo district and ADV Trade and Service Ltd., co in Buon Me Thuot city annually collects 150 tons of soursop at around 13,000 VND/kg from districts in Dak Lak to produce jam and dried soursop. Moreover, diversifying products from fruit trees is one of the provincial and district policies under the OCOP programme and Decree No 98/2018/ND-CP to encourage closer linkages between farmers and enterprises to increase product value.

3.3.2 White Turmeric (*Curcuma zedoaria*) and Lemon Grass Value Chains in Cat Tien District

White Turmeric

White turmeric (*Curcuma zedoaria*) is a herbaceous plant, up to 1.5m tall. It grows wild in many places like stream banks, abandoned fields and mountainous areas. The white turmeric root is cylindrical, 2-5cm long and 1-3cm in diameter. In traditional medicine, white turmeric is used to treat anemia, loss of appetite, chronic intestinal fungus and stomach ulcers, enhancing bile secretion and increasing digestive tract tone. In recent years, intercropping white turmeric in coffee or cocoa farms has increased since the medicinal plant increases soil nutrients, thereby promoting the growth and development of coffee or cocoa plants. At the same time, intercropping white turmeric in cocoa farms also brings economic benefits to farmer households.

In Cat Tien district, there are neither statistical data about the area of white turmeric nor relevant studies on this kind of medicinal plant. However, the result from interviewing key informants indicated that the area of white turmeric is less than 1 ha from 25 households that grow white turmeric around the fences of coffee farms. Due to the favourable natural conditions, the productivity of white turmeric is relatively high at 39 tons/ha. Currently, farmers sell around 80% of the product to commune traders at 30,000 VND/kg, meanwhile 20% of the product is directly supplied to district collectors who process it into powder. The commune traders then supply 15% of the white turmeric to customers on commune and district markets for medicinal plants, while the remaining 40% and 25% are sold to restaurants and other costumers in Da Lat city, respectively.

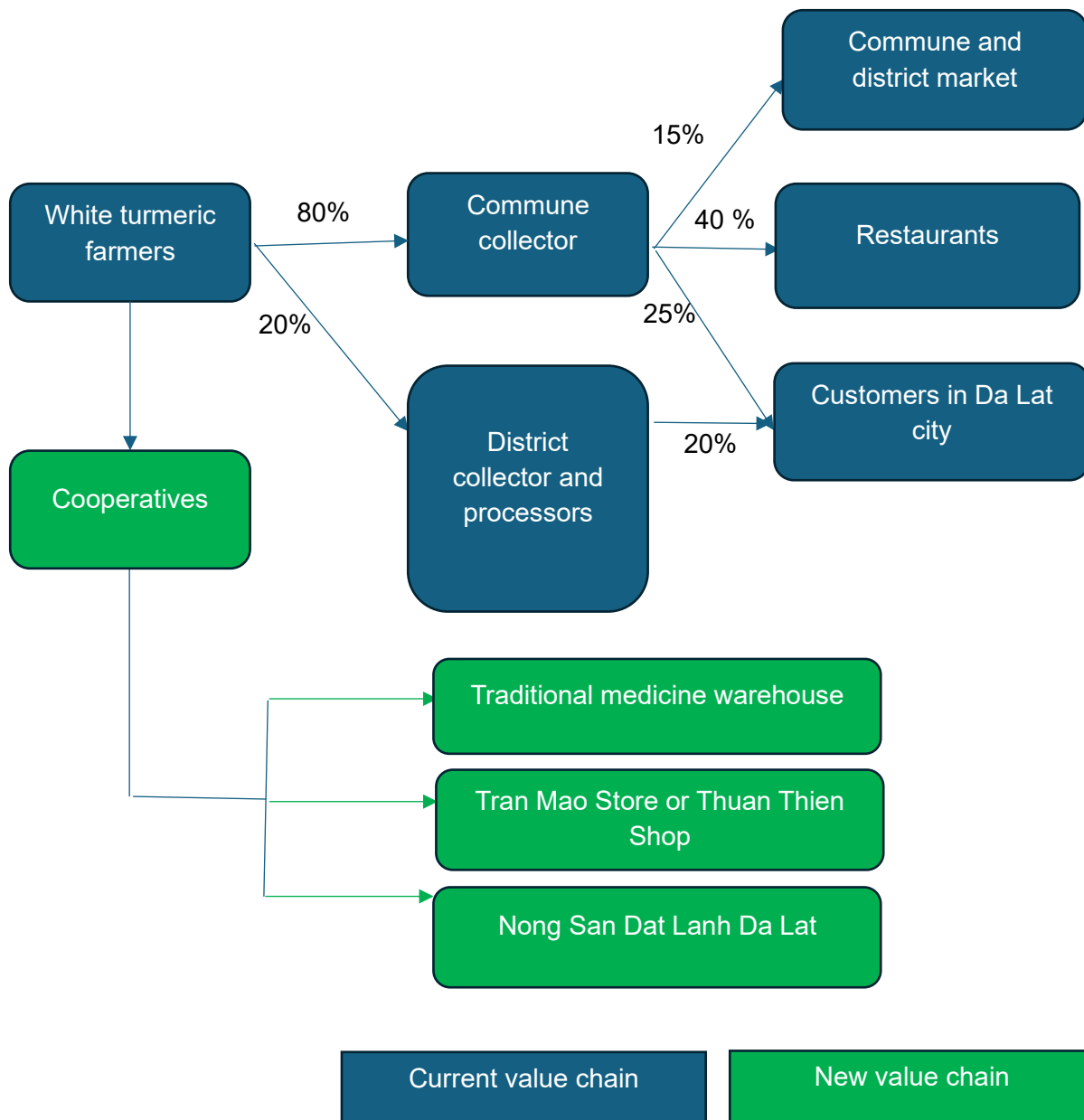


Figure 4: Current and new proposed value chain of white turmeric

The study also found that there are different market channels which might provide higher economic profits from the white turmeric business. However, local farmers have not comprehensively explored these opportunities. Firstly, the households themselves or cooperatives can collect white turmeric to process it into powder which then is directly supplied to customers or traditional medicine warehouse in the district at a price of 150,000 VND/kg. Moreover, cocoa farmers or cooperatives can supply fresh white turmeric to Tran Mao Store at ward No 8 in Da Lat city and Thuan Thien Company at ward No 2 in Bao Loc city. They buy more than 100 tons of fresh white turmeric to produce powder at a price of 40,000 VND/kg. Nong San Dat Lanh Da Lat Ltd. co in Da Lat city also collects white turmeric powder to process it into a mix of white turmeric powder and honey. These alternative market channels will increase the value of white turmeric and hence increase household incomes.

Lemon Grass

The current value chain of lemon grass is comparatively simple with farmers selling their products to retailers at local markets. Around 65% of the product then is sold to local customers, meanwhile the rest is sold to restaurants in Phuoc Cat town. *Cymbopogon flexuosus* or *cymbopogon citratus* are two common lemon grass types in Lam Dong generally and Cat Tien in particular. The time to grow lemon grass is relatively short. It only takes about four months to start cutting for the first time. After about 40-50 days, the tree grows again for the second cutting. Lemon grass plants are drought-resistant, use little water and need little fertiliser and labour. The average yield is 3 tons/ha/year with an average selling price of 5,000 VND/kg. If local farmers can link up with a cooperative for oil processing, the selling price can reach 6,000-7,000 VND/kg.

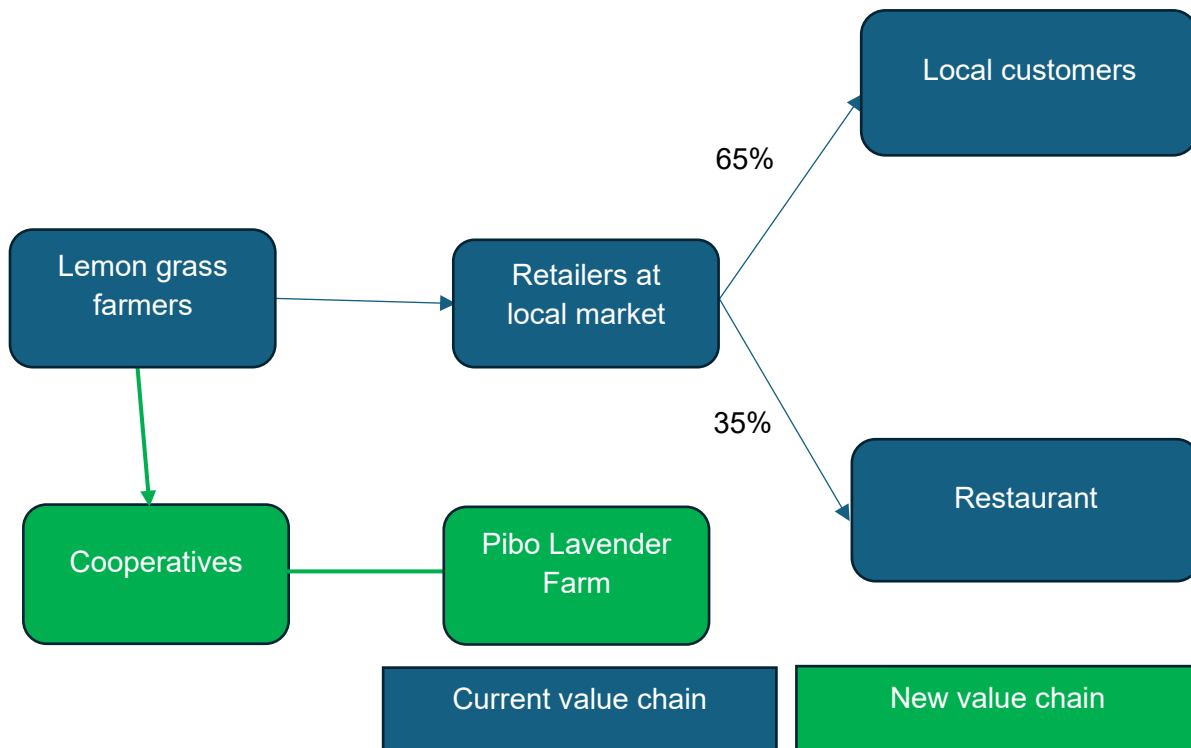


Figure 5: Current and new proposed value chain of lemon grass

3.3.3 Yellow Camellia and Fish Mint Value Chains in Da Teh District

Yellow Camellia

Phuong Nam Da Huoai Cooperative is the main market actor to collect yellow camellia from other cooperatives and farmers to produce yellow camellia tea.

Yellow camellia was first intercropped in coffee farms by Da Lat Farmers' Union in 2013 aiming to increase household income and improve soil fertility. Because this medicinal plant can be processed into instant tea, freeze-dried yellow camellia tea and matcha yellow camellia tea powder which have a high market demand, yellow camellia has been scaled up to other districts in Lam Dong province such as Da Huoai, Di Linh, Lac Duong and Da Teh. Despite the suitability of natural conditions for

yellow camellia development, the total planting area is still small with around 1,700 trees (approx. 2.5 ha) grown by 56 households. The reason is that it takes 4-5 years from growing to first harvest of the flower, meanwhile the market opportunities have not yet been explored. For this reason, farmers in the district have not been keen on this kind of production. Yellow camellia was successfully piloted to be intercropped in coffee farms in 2015 in Da Lat city and other pilot models in Da Huoai in 2023. This tree grows well in coffee farm and provides shading for young coffee and cocoa trees as well as improves the soil fertility. The total product volume in the Da Teh district is only about 1 ton of fresh yellow camellia. Currently, Lam Dong province has a plan to widely develop and process yellow camellia products as a specialty medicinal product, in which the area of yellow camellia is projected to increase by 33.2 ha in the whole province of which 16 ha in Da Teh and Da Huoai.

The value chain of yellow camellia in Da Teh district is quite diverse with farmers selling 50% of their total production volume to tea producers at a price of 300,000 VND/kg and the remaining 30% and 20% to traders in the district and tea processing companies respectively at a price of 250,000 VND/kg.

DARD has a master plan to improve the market access for yellow camellia farmers by strengthening the business linkage with Agriculture Service Da Huoai Cooperative to buy both fresh and dried yellow camellia. This cooperative will provide 14,000 yellow camellia seedlings to 12 participating households, expecting to reach 32 affiliated households with an area of 20 ha by 2025.

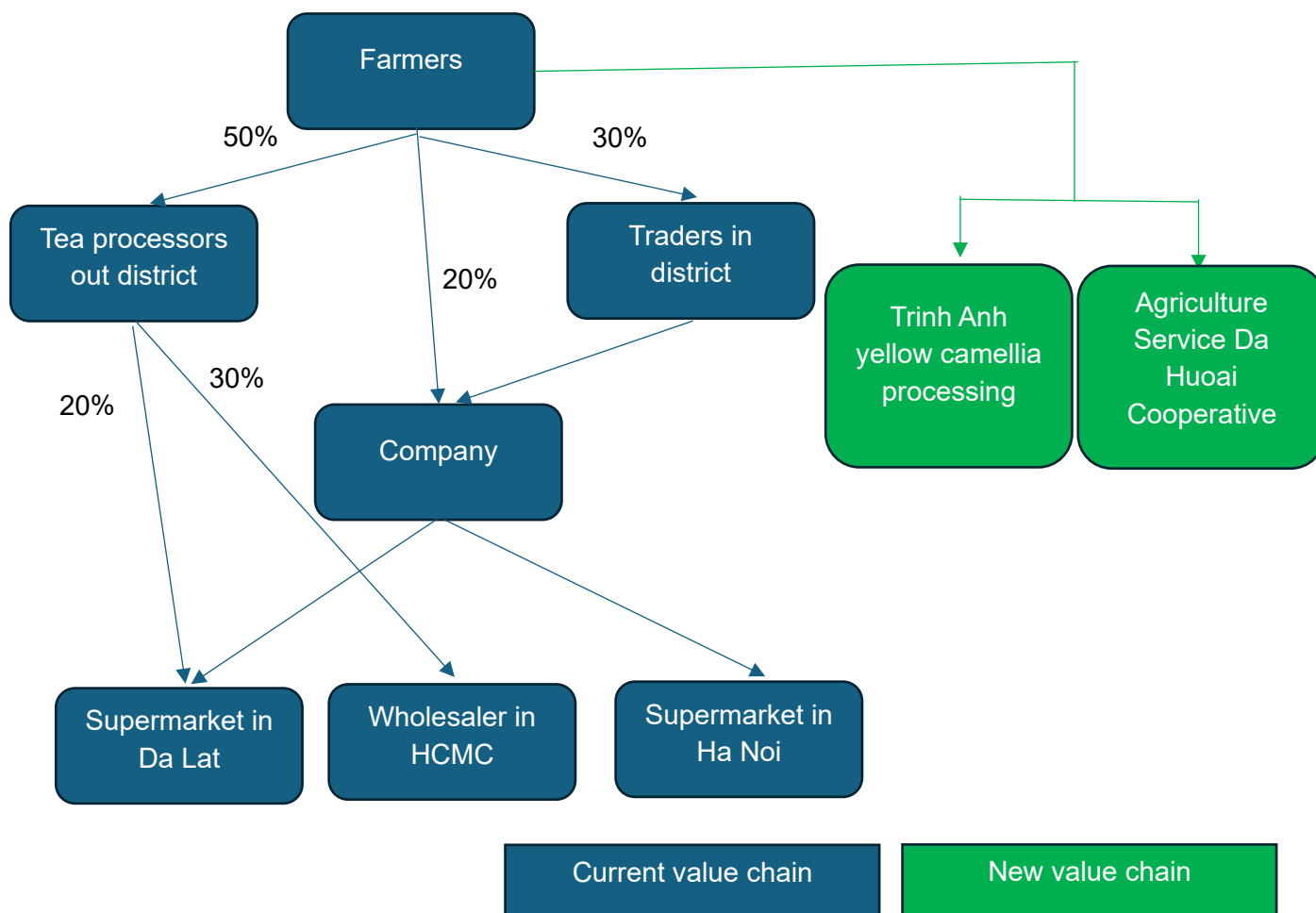


Figure 6: Current and new proposed value chain of yellow camellia

Fish Mint

Fish mint is suitable for many types of soil, preferably moist soil, rich in organic matter and mud. Fish mint is easy to grow and does not require much labour. In the dry season, it needs to be watered twice a day. In the rainy season, there is no need to water and the plant grows quickly and can be harvested early. Average yield in intercropping systems is 0.5-1 ton/ha. The output price of fish mint is quite stable, traders usually buy it at 10,000-17,000 VND/kg. Fish mint thrives with robust growth and can be harvested multiple times throughout the year due to its resilience against disease and quick recovery from cutting. It is a plant that saves roots, so the harvest cycle lasts for several years. Local traders collect fish mint from farmers and then supply wholesalers on markets in Da Lat city, while the rest is sold to local customers. In addition, three big companies, Dalat Nutrition Food (DLNF), Dalat Farm and Da Lat ICHIFOODS, purchase around 50 tons of fish mint per year at the price of about 30,000 VND/kg.

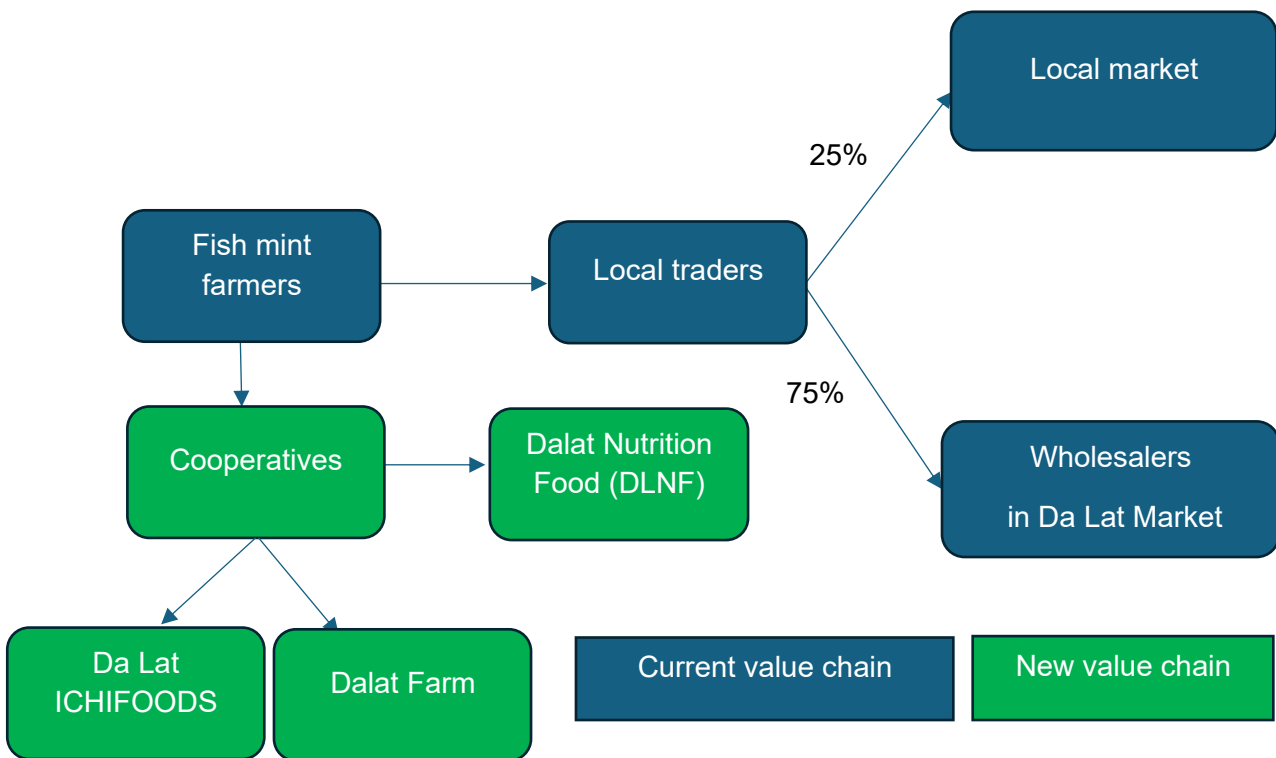


Figure 7: Current and new proposed value chain of fish mint

4. Market Access and Product Promotion Plans

4.1 Passion Fruit

4.1.1 Improving the Quality of Passion Fruit through Insect Management and Disease Prevention

The largest challenge to increase the area of passion fruit production is the risk of insects and diseases such as Bemisia tabacii, Alternaria passiflorae, Septoria passiflorae and Sclerotinia sp. Therefore, the following measures should be applied:

- Producing technical material on preventing diseases and insects in passion fruit production. Such material can be based on the Handbook for Disease Management issued by Southern Horticulture Research Institute.
- Sharing information on insect and disease management in meetings with cocoa farmers, organised by the ReCoPro project or in cooperative meetings

4.1.2 Establishing a Supply Chain for Passion Fruit and Diversifying Passion Fruit Products

As mentioned above (section 3.2), the passion fruit product can benefit from supplying new market actors such as the company of Chanh Vuong and the supermarket of Green Central Highland Specialty. For this, the following activities should be carried out:

- Conducting farm visits and meetings between cooperatives and the company Chanh Vuong and the supermarket of Green Central Highland Specialty to introduce the passion fruit products of Ea Kar. A sample of passion fruit should be sent to these companies for pilot processing and testing. Several meetings should be carried out later to discuss the price, the product volume, date and time for product collection and a purchasing agreement.
- Cooperatives need to develop a plan for collecting passion fruit from farmers, based on the schedule agreed.

Besides, cooperatives can process the products from passion fruit of which dried passion fruit is the best option since the product has a high market demand and is being promoted by the district authorities under the national OCOP programme. To do this, the project should conduct the following activities:

- Conducting trainings on passion fruit processing and quality management for cooperatives, with a focus on dried passion fruit
- Supporting cooperatives to apply for a sanitation and hygiene certificate at the district for dried passion fruit product
- Providing technical assistance such as supporting cooperatives in developing business plans and applying to register for an OCOP certificate at the district

4.1.3 Supporting Cooperatives with Marketing Events and E-Commerce

This activity is to introduce dried passion fruit products to supermarkets, souvenir shops and customers in Buon Me Thuot city and other districts nearby. To do this, cooperatives should participate in annual trade fairs such as regional specialty product festival, OCOP product trade fair and agriculture product trade fair in different localities to present their products.

Besides, e-commerce platforms may present a new opportunity to bring dried passion fruit products closer to consumers. The project can provide training on e-commerce, making use of national e-commerce platforms such as Postmart E-Commerce Platform (postmart.vn), established in 2019 with the mission of connecting consumers with agricultural products. Postmart specialises in offering high-quality OCOP and VietGAP compliant agricultural products as well as specialties from various regions in Vietnam. Additionally, TikTok Shop can be a viable e-commerce platform to sell dried passion fruit products. In recent years, Tik Tok Shop has cooperated with the Trade Promotion Center for Agriculture to support small businesses and cooperatives in their digital transformation of trade promotion under the OCOP programme. A three-day training on product promotion and selling on e-

commerce, focusing on the registration on e-commerce systems, the skills in promoting products in online shops and the management of the online business, is recommended for farmers and cooperatives.

4.2 Soursop

4.2.1 Improving Soursop Production

The total area of soursop production is about 2 ha in Ea Kar district. For this reason, it is necessary to increase either the soursop production area or productivity to meet the demands of processing soursop products and market. An agroforestry system with approximately 2,500 mature soursop trees planted across 25 hectares of land could potentially yield 100 tons of soursop. To do this, the Agricultural Extension Centre in the district should produce communication material on soursop production, its economic benefits and contribution to the cocoa agroforestry and share them with farmers in village meetings or Farmers' Union and or Women's Union meetings. It is also important to explore and update farmers about market opportunities of soursop and share experiences through success stories. Furthermore, technical assistance for example on seedling nursery techniques, farm design and fertilising as well as insect and disease prevention and management should be provided to households who are keen on intercropping soursop in cocoa farms to expand the area of soursop production. These kinds of assistance can be carried out by district staff from the Agriculture Extension Centre and financially supported by the project.

4.2.2 Establishing New Market Channels and Strengthening the Existing Supply Chain for Soursop Products

Establishing new market channels should simultaneously conducted with scaling up the area of soursop so that the farmers can sell their products timely at the first harvesting season. To do this, cooperatives such as Xuan Phu Agriculture Cooperative and Ea Kar Trade and Service Cooperative, and the company of Tuan Tam should work with wholesalers or soursop processors in other districts such as Dang Farm, Macca Eahleo Cooperative and ADV trader and Service Ltd., co to set up the plan for product purchasing.

Another strategy is organising farm visits for these actors to the soursop production area in Ea Kar district when soursop is ready for the first harvest season. These meetings and visits are opportunities for market actors to validate the quality of and ability to supply soursop from Ea Kar district. With this activity, the project can provide travel cost for Dang Farm, Macca Eahleo Cooperative and ADV trader and Service Ltd., co to visit the production area of soursop in Ea Kar district. Besides, the project can organise a study tour for Ea Kar cocoa farmers to visit these cooperatives and farms so that they understand better the processing of soursop and explore more opportunities for better soursop business.

4.2.3 Diversifying Products by Processing Fresh Harvest

Soursop tea is an herbal tea that is made from the leaves of the soursop fruit tree. The fruit and leaves contain antioxidants such as flavonoids, phytosterols and tannins. The market demand for soursop tea, also called Graviola tea, has increased over recent years, among other things because of its proclaimed health benefits. Therefore, cooperatives can produce this kind of product or supply the dried soursop leaves to those three market actors Dang Farm, Macca Eahleo Cooperative and ADV trader and Service Ltd., co. To process the dried leaves of soursop for tea processing, cooperatives

need to procure one machine for chopping leaves and one leave dryer which costs about 80 million VND. The machine supplier can provide one-day training on using and maintaining the machine and consultants from Tay Nguyen University can give another one-day training on processing dried soursop leaves. The project can provide financial support to cooperatives in Ea Kar district to procure the machines for processing products from soursop and organise customer meetings to introduce soursop products to market actors and customers.

4.3 White Turmeric

4.3.1 Increasing the White Turmeric Production Area

Although white turmeric requires little investment and only simple farming techniques while providing high economic value, the current white turmeric growing area in Cat Tien district is very small. To develop a market for the product, the project should provide financial support to expand the white turmeric area through the following activities:

- Setting up a pilot model of 500 m² of white turmeric production in cocoa farms in the first three years, when the trees have not yet closed canopy. The density of white turmeric should be 50 cm x 50 cm.
- Organising a farmer field school for other cocoa farmers when the white turmeric is in harvesting season after 9 to 10 months
- Developing a leaflet on white turmeric production techniques for cocoa farmers and other households
- Local project partners, including staff of DARD and Farmers' Union, should provide technical assistance such as guidance and training on watering, fertilising, pruning and solid care and share information on white turmeric production for cocoa farmers.

4.3.2 Developing New Market Channels and Diversifying Products from White Turmeric

As mentioned in section 3.2.3, there is an opportunity for farmers to supply white turmeric to traditional warehouses, shops and DaLavi, an online store for selling specialties from Da Lat through the Phu Gia and Phuoc Cat agriculture cooperatives in Cat Tien district. For this reason, it is recommended to hold several meetings between the cooperatives and farmers who grow white turmeric to discuss the business plan of white turmeric products. To do this, the project can provide training on market linkages for both cooperatives and farmers to increase business development capacity for white turmeric.

However, market actors such as traditional warehouses, shops and DaLavi buy white turmeric powder only at the price of 300,000 VND/kg. For this reason, the cooperatives should take over white turmeric powder processing by procuring the necessary processing devices and machines. The fixed and operational costs per kg of white turmeric powder is about 180,000 VND/kg, so the cooperative can gain 120,000 VND/kg of net profit. The project should provide financial support for Phu Gia or Phuoc Cat agriculture cooperatives to organise a customer meeting to introduce white turmeric in the district as well as a study tour for farmers to learn about white turmeric processing at Dalavi or traditional warehouses.

4.4 Lemon Grass

4.4.1 Increasing the Lemon Grass Production Area in the District

As mentioned above, *Cymbopogon flexuosus* or *Cymbopogon citratus* are the most suitable lemon grass varieties that can be used to produce oil, so other lemon grass varieties if currently cultivated in the district should be replaced by these two varieties. In doing so, the project should conduct the following activities:

- Introducing *Cymbopogon flexuosus* or *Cymbopogon citratus* varieties for cocoa farmers through a leaflet
- Providing a training course on lemon grass cultivation to farmers which focuses on cultivating *Cymbopogon flexuosus* or *Cymbopogon citratus* varieties
- Selecting households who already have *Cymbopogon flexuosus* or *Cymbopogon citratus* to become the nurseries to provide seedlings for other farmers
- Providing a training course on harvesting lemon grass and other preliminary techniques before selling to Phu Gia or Phuoc Cat agriculture cooperatives who will then supply Pibo Lavender Farm.

4.4.2 Developing Market Linkages for Lemon Grass

Because the oil processing from lemon grass requires high investment from production to packaging, the Phu Gia or Phuoc Cat Agriculture Cooperatives should supply the fresh lemon grass to Pibo Lavender Farm rather than processing oil at their facilities. The project should support these cooperatives by organising meetings with farmers to set up the plan for collecting lemon grass.

Besides, the project should invite representatives of Pibo Lavender Farm to visit the lemon grass farms so that they can evaluate the quality of lemon grass for producing oil. Moreover, it is recommended to hold several meetings between Phu Gia or Phuoc Cat Agriculture Cooperatives and Pibo Lavender Farms to discuss the plan for supplying fresh lemon grass and conclude an agreement about the price and quantity of products.

4.5 Yellow Camellia

The market plan for yellow camellia in Da Teh district should be consistent with the Master Plan on Yellow Camellia Market Linkages approved by DARD of Lam Dong by the Decision No 432/QD-SNN on 15th September 2023 to get the support from the province. This plan will provide financial support to design a business plan for yellow camellia at cooperative level, provide the equipment for yellow camellia processing, branding and packaging, build capacity of farmers and cooperatives in cultivation and processing and provide seedlings to farmers. Following this decision, 6 ha of yellow camellia in Da Teh district will be intercropped with industrial crops such as coffee, cocoa or fruit tree such as pomelo or tangerine until 2025. The total budget for capacity building, branding and packaging and providing seedlings is 1.2 billion VND of which 50% will be covered by the local government and the other 50% by cooperatives. Every year, cooperatives will plan their activities related to yellow camellia production and business, which are then submitted to the District People 's Committee for verification. When the plan is approved by the District People 's Committee, the money will be transferred directly to the cooperative 's account to implement the activities.

The market access planning for yellow camellia in Da Teh district should therefore comprise the following activities.

4.5.1 Capacity Building for Cooperative Staff and Farmers

Since processing companies which buy yellow camellia always ask for high quality products, it is necessary to provide advanced training courses on relevant regulation of VietGAP or organic cultivation standards as well as on food safety to cooperative staff and farmers. In response to this, the project can conduct a five-day training for around 25 cooperative staff members and farmers about yellow camellia cultivation, harvesting techniques, preliminary processing and storage.

4.5.2 Delivering Yellow Camellia Seedlings to Farmers

Phuong Nam Da Huoai Cooperative is the main market actor to collect yellow camellia from other cooperatives and farmers to produce yellow camellia tea. According to Decision No 432/QD-SNN dated 15th September 2023 of Lam Dong DARD to approve the project on developing production and market linkages for yellow camellia of Phuong Nam Cooperative, the provincial government will provide seedlings of yellow camellia to households who are members of this cooperative or having a contract to supply yellow camellia to this cooperative. The budget may not cover all households who have yellow camellia production so setting up a nursery for yellow camellia at cooperative or commune level is necessary to deliver the seedlings to all households.

4.5.3 Establishing Market Channels for Yellow Camellia

Phuong Nam Da Huoai Cooperative only collects yellow camellia which has undergone preliminary processing. For this reason, cooperatives in Da Teh district should procure freeze-drying machines to freeze-dry the fresh yellow camellia before supplying Phuong Nam Da Huoai Cooperative. The price of dried yellow camellia is around 1,000,000 VND/500g, meanwhile the total cost stands at 650,000/kg. This means that cooperatives in Da Teh district can obtain a considerable economic profit from processing.

4.6 Fish Mint

The production area of fish mint in Da The district is quite fragmented and low productivity. This means that the current production system of fish mint is unable to meet the requirements of Dalat Nutrition Food (DLNF), Dalat Farm and Da Lat ICHIFOODS who purchase fish mints for power processing. To achieve a better performance of fish mint business, the following activities are suggested to be implemented with the project supports:

4.6.1 Improving the Area of Fish Mint Production to Ensure a Stable Supply for Dalat Nutrition Food (DLNF), Dalat Farm and Da Lat ICHIFOODS

- **Capacity building for farmers**

Indeed, farmers are familiar with fish mint production techniques and the production does not require a highly skilled technical application. However, to improve the quality and productivity of fish mint, the project can support local farmers and Quyet Tam Agriculture Cooperative in Da Teh district with a two-day training course on fish mint cultivation. The training curriculum should focus on land preparation for fish mint production, seedling selection, organic fertilising and insect and disease prevention. Furthermore, a training on harvesting and preliminary processing is necessary to increase the quality of fish mint leaves.

- **Establishing nurseries to supply fish mint seedlings**

The quality of seedlings is very important to improve the quality of fish mint overall. For this reason, Quyet Tam Agriculture Cooperative or another group of farmers should set up a nursery to supply fish mint seedlings. There are 43 vegetable seed suppliers in Lam Dong province who have been certified by Lam Dong Crop Production and Plant Protection Sub-Department, of which the companies of Thang Kieu and Chinh Quyen in Lac Xuan commune in Don Duong district supply high quality fish mint seeds. Quyet Tam Cooperative or another farmer group should set up a 200-300 m² of fish mint nursery with 10 million VND of investment to supply the seedlings to other farmers in the district. The project can assist them by providing training courses on setting up nurseries, planting techniques (seedlings, plantation design, watering, and fertilisation etc.), farm care and maintenance techniques (pruning, mulching and weed control etc.).

4.6.2 Enhancing the Market Linkage for Fish Mint Products

Fish mint has a short business circle and can be harvested after 40 to 45 days, therefore the linkage between Quyet Tam Agriculture Cooperative and companies such as Dalat Nutrition Food (DLNF), Dalat Farm and Da Lat ICHIFOODS should be set up in advance. To do this, the project should facilitate exchange between the cooperative and those companies to introduce the potential fish mint production in Da Teh district. Besides, cooperative and farmer visits to Dalat Nutrition Food (DLNF), Dalat Farm and Da Lat ICHIFOODS should be conducted to provide more understanding on processing fish mint and the requirements of fish mint leaves as input. The project should also support the cooperative in developing a plan to collect fish mint leaves from farmers and to supply leaves to companies.

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