



Report

For

“NTFP Value Chain Analysis” Phase II - Value Chain Studies

**SUBMITTED TO
The World Bank Group**

**SUBMITTED BY
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Highlights of the Findings

- Most of products made from bamboo and rattan are handicrafts, comprising mainly furniture and small products for homeware.
- The current processing chain in Cambodia largely focuses on low and medium value bamboo products, including bamboo chopsticks, barbecue sticks and incense sticks; whereas, bamboo handicraft has been the main component in the bamboo industry. Key bamboo handicraft products include bamboo baskets and furniture.
- Domestic rattan processing involves handicraft works and comprises two main value chains including Pdao species handicraft and Lpeak species
- There are two types of cardamoms in Cambodia, namely Dangkor and Krervanh. However, the market for cardamoms has been bearish since 2017. Almost no trade activities have occurred. Meanwhile, cardamoms areas have been markedly decreased in recent years, albeit its iconic value for Pursat province.
- Five main enterprises processing bamboo were identified by the study, which have potential to be integrated into the project, including Cambamboo (bamboo sticks), Bopha Angkor (incense sticks), Sem Esa Babmoo Furniture (bamboo furniture), Bamboo Sea (premium bamboo homeware), and Bambuza (bamboo furniture and other diverse range of products).
- The project interventions should focus on both bamboo and rattan value chain, while constructing supply chain of cardamoms and connecting to export markets. Three main product categories are proposed for further consideration: different types of bamboo sticks, basket works and furniture made from bamboo or rattan.

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1. Introduction

The Cambodia Sustainable Landscape and Ecotourism (CSLE) project aims to improve management of protected forest areas, and to promote ecotourism opportunities and non-timber forest product (NTFP) value chains in the Cardamom Mountains and Tonle Sap landscape. To achieve these objectives, the project through this research study tries to determine strategic interventions for investments that help promote and strengthen the development of NTFP value chains, and to improve the participation of private sector including forest communities in the value chains.

The study comprised two phases. The first phase involved the prioritization of potential NTFPs to be further explored in the value chain analysis, which is the second phase of the study. The result of the first phase suggested three potential NTFP species including bamboo, rattan, and cardamoms. These NTFPs have highest potential for contribution to income generation and livelihood improvement of forest communities in the Central Cardamom Mountains (CCM) areas. Bamboo has the highest potential, given its diverse range of product derivatives and its large natural stock with a low risk of environmental degradation. Rattan has a comparable importance as bamboo, except that it has a smaller range of product derivatives and a higher risk of environmental degradation in comparison with bamboo. Cardamoms are geographical identification of the CCM areas, as its name implies, which pave ways for involvement from local communities if proper arrangement to revive the sector is implemented.

Considering the availability of natural stocks of these three NTFP species, in-depth studies on their value chain have been implemented with a focus on two main districts: Veal Veang district of Pursat province, and Srae Ambel district of Koh Kong province. These two districts have been identified to have both large number of NTFP species and large volume of the three NTFPs prioritized. Interventions from numerous development projects have been provided to bamboo and rattan sectors in different provinces across Cambodia. Yet, the competitiveness of these sectors have somewhat vanished after the projects ended, resulting in a stagnant growth of the sectors. Quite a similar story has been shared by cardamom sector. After enjoying high growth for a while in the past years, local trade of cardamoms has become almost inactive for undocumented reasons, particularly since 2017.

Employing a value chain approach, this phase of the study – which is the second phase – tries to identify investment opportunities to strengthen and promote the development of NTFP value chains, particularly NTFP processing industry, and to design mechanism favorable for NTFP communities to participate in the value chains. This phase comprises five activities: value chain mapping, value structure analysis, market analysis and identification, identification and profiling of potential investors, and design of a mechanism for engagement of local people and potential investors (Figure 9 of Annex 1). Qualitative interviews with industry stakeholders, who were composed of local people or NTFP communities, processors and traders, were conducted (Table 5 of Annex 1). Detailed methodology of this study phase has been presented in Annex 1. Findings in this report are mainly based on results of these interviews.

2. Value Chain Mapping

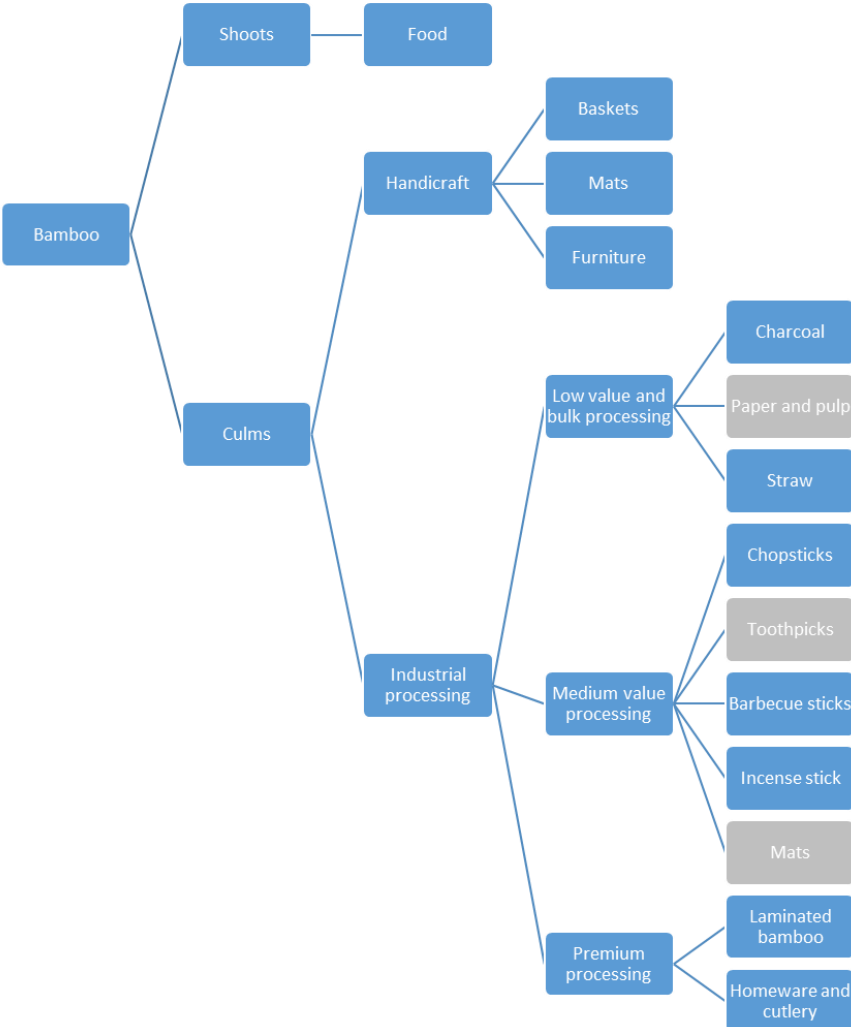
Most of products made from bamboo and rattan are handicrafts, comprising mainly furniture and small products for homeware. A limited number of industrial processing of low and medium value bamboo products were identified, particularly different types of bamboo sticks and bamboo charcoal pallet. Processing of premium products has also emerged, including bamboo water bottles, bamboo cutlery, premium bamboo bags, rattan bags, and bamboo and rattan premium homeware accessories. No processed cardamom products were found, however. This

section presents various product derivatives of the three NTFP species that the study identified between September and November 2019.

2.1. Bamboo value chain map

Bamboo has three main value chains including bamboo shoots, handicraft and industrial processing (Figure 1). The latter has high potential for stimulating growth of the sector and is favorable for local people involvement, particularly NTFP communities.¹ The value chain analysis of this study hence mainly focuses on the bamboo industrial processing chain.

Figure 1. Value chain map of Cambodia’s bamboo industry in 2019



Source: Nuppun interviews in 2019, based on concept of Marsh, John and Nigel Smith (2007) and Jessie Lin et al (2019).²
 Note: Grey color signifies that there is no such value chain, at least as of the reporting time.

The current processing chain in Cambodia largely focuses on low and medium value bamboo products, including bamboo chopsticks, barbecue sticks and incense sticks. Bamboo stick processing sector gained attraction from local investors during the Regional Economic Development Program (RED) project of around 2016-2018, but then experiencing a stagnant growth after project completion. There was bamboo charcoal processing during the project period, especially in Siem Reap province where the RED was first initiated. However, the processing stopped due to a lack of market. Bamboo charcoal could be targeted only local market at that time,

¹ Marsh, John and Nigel Smith (2007). New Bamboo Industries and Pro-Poor Impacts: Lessons from China and Potential for Mekong Countries. IFC-MPDF. Accessed from <http://www.fao.org/3/ag131e/ag131e25.htm> in June 2019.
² Jessie Lin et al. (2019). Opportunities and Challenges in the Ethiopian Bamboo Sector: A Market Analysis of the Bamboo-Based Value Web. MDPI.

yet its retail price was higher than that of conventional wooden charcoal.³ Currently there is only one company in Mondulkiri, Bambuza Global Ventures Co., Ltd., trying to process bamboo charcoal, pallet and torried. This processing activity has not reached a commercially viable stage yet, as of the time of writing this report. No bamboo toothpick processing was identified by the study. Toothpick processing requires a different set of machinery equipment which cannot be combined with bamboo sticks processing.⁴ Bamboo straw processing has emerged in recent periods, influenced by environmental protection momentum towards replacement of plastic straw. Premium processing of bamboo products was also identified. This processing includes advanced processing to make laminated bamboo boards, bamboo cutlery, premium bamboo water bottles and other customized homeware products.

Bamboo handicraft has been the main component in the bamboo industry. Key bamboo handicraft products include bamboo baskets and furniture. There is a tendency of combining bamboo with rattan when producing furniture, mainly due to rattan stock depletion which pushes up rattan material prices. Premium bamboo bags have been recently promoted as souvenirs for tourists, especially in Siem Reap town. One bamboo bag at retail store can cost up to around USD 25-30.

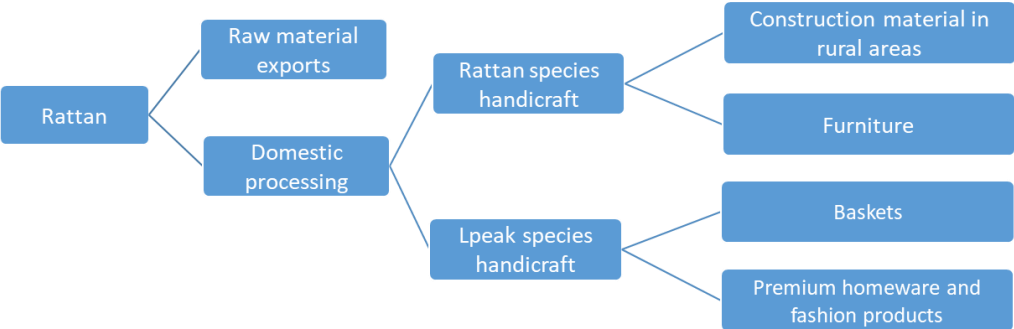


Premium bamboo bags at retail store in Siem Reap town. Photo taken in November 2019 by the study team.

2.2. Rattan value chain map

Domestic rattan processing involves handicraft works and comprises two main value chains including Pdao species handicraft and Lpeak species (*Calamus salicifolius*) handicraft (Figure 2). Pdao species is suitable for making various types of furniture, including sofa, closet, hammock, chair, bed, table, and cupboard. It is also used as construction material in rural areas. Lpeak species, on the other hand, is more suitable for making woven handicrafts such as baskets, bags, suitcases, or various types of homeware and fashion products. Unlike bamboo, rattan has a smaller range of product derivatives. Demands for rattan raw material for domestic processing were estimated at around 500 tons per year, according to industry experts.

Figure 2. Value chain map of Cambodia’s rattan industry in 2019



Source: Nuppun interviews in 2019.

³ Bamboo charcoal price was around 1,200 riels per kilogram, compared with 600 riels of conventional wood charcoal, based on interview with a former staff of the RED project.

⁴ Based interview with a former staff of the GIZ- Regional Economic Development Program (RED) project which aims to promote bamboo processing industry development in several districts of Siem Reap province. Officially, the RED program was started in Siem Reap province in 2007 and then extended to Banteay Meanchey and Oddar Meanchey provinces during the current third phase (09/2014 - 12/2017), according to the project factsheet accessed from http://giz-cambodia.com/wordpress/wp-content/uploads/1_FactSheet-of-Regional-Economic-Development-RED.pdf

There were two main sources of rattan products supplied to retailers, based on a market assessment in Phnom Penh in February 2019. The first source comes from NTFP communities. During their spare time in the dry season, where there are no farming activities, villagers harvest rattan to make furniture, baskets or other accessories. They then sell their products to middlemen who in turn supplied them to retailers in Phnom Penh. This creates a seasonality of rattan product supplies, which are high during March-June and low during July-February. To leverage this high supply, retailers tend to increase their inventory by purchasing in large quantity so that they can sell later in the rainy season, where the supply becomes low. Rattan products made by NTFP communities are generally perceived by retailers as of lower quality with irregular supply in comparison with those made by enterprises. This second source of supply produces rattan products in large quantity by themselves and directly supplies to retailers. Their products were said to have a better design and the supply is more regular.

Formal exports of Cambodian rattan furniture and baskets have been limited or minimal, mainly due to export document requirements and export tax of ten percent. Because of these challenges, most of these products are informally exported to neighboring countries, especially to Thailand. Based on the trade database of the World Trade Organization (WTO), export value of Cambodian rattan basket products was USD 136,000.00 in 2018; of which, exports to Thailand accounted for 49% and those to the USA and Japan were 30% and 21%, respectively. There are no records of rattan furniture exports, however.

Rattan raw materials have been largely exported through informal channels, pressuring on raw material supply for domestic processing and generating loss of value addition. Total export quantity of raw rattan could reach around 5,000 tons in 2018, according to an estimate of industry experts. This accounted for around 91% of total rattan harvested of around 5,500 tons, and it was five times larger than that recorded in the WTO database, which was only 1,017 tons in that year, in equivalent to USD 188,000.00 in export value. Key export destinations included Thailand and China (40% each), and Vietnam (20%). The exports were in coastal provinces and mainly transported through shipments, which is less favorable for exporting to Vietnam.

2.3. Cardamoms value chain map

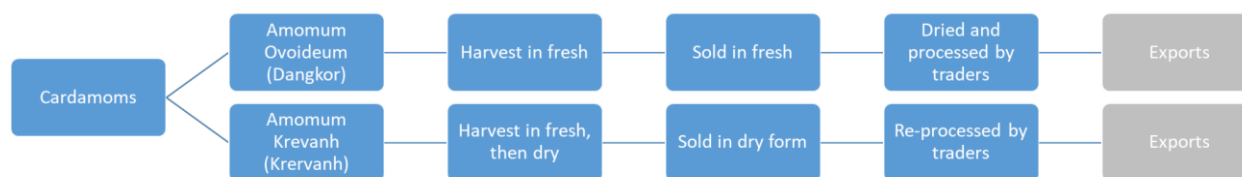
There are two types of cardamoms in Cambodia, namely Dangkor and Krervanh. Having dark green color after being dried, Dangkor is a local name in Khmer language and scientifically known as *Amomum Ovoideum*. Its shape is like a small rambutan fruit. Krervanh, on the other hand, has a white color and different shape from Dangkor. Dangkor and Krervanh were perceived as a very important species like some main crops such as paddy rice or corn by the local people in Pursat province.

They are generally used for medicinal purposes, food and spices. For Krervanh, villagers in Pursat use its seeds and leaves for medicinal purposes, and its trunk for food (as vegetable for frying, putting in soup, or eating fresh). For Dangkor, only its seed is used for medicinal purposes. However, local market demand in Cambodia is minimal, since most of Cambodian people do not consume cardamoms.



*Dangkor and Krervanh (right).
Photo taken by Nuppun team in April 2019.
Specimen taken from Pursat province.*

Figure 3. Value chain map of Cambodia's cardamoms industry in 2019



Source: Nuppun interviews in 2019.

Note: Grey color signifies that there is no such value chain, at least as of the reporting time.

Dangkor is highly concentrated in Pursat province and is actively traded in two communes of Veal Veang districts, namely Ou Saom and Pramaoy. Dangkor fruit is usually harvested from July to September, with peak season in August and September. Local people harvest their fruits and sell them fresh to middlemen who then dry and sell them to Vietnam and Thailand. Two forest communities, Tumpoar and Pchek Chrum forest communities, used to generate incomes from Dangkor prior to 2017. Trading volume in each community during the past periods was around 30-40 tons of dried fruit per season. During high demands, local households could earn from around USD 750 to USD 1,500 per year. A household could harvest, on average, 15-20 kilograms of fresh fruits and sold at 2,500-4,000 riels (USD 0.6-1.0) per kilogram to middlemen who then dried and sold at 40,000 riels (USD 10.0) per kilogram of dried fruits. If selling dried, local households could earn 12,000-13,000 riels (USD 3.0-3.25) per kilogram. To get a kilogram of dried fruits, it would require around three kilograms of fresh ones. And it would require three days to get them dried. Considering this conversion rate and time requirement, local people prefer selling fresh fruits to dried fruits of Dangkor, since they can generate more income. However, the market for cardamoms has been bearish since 2017.

Krervanh is rare and exists mainly in Pursat, the same district as Dangkor. It also has a quite similar harvesting period as Dangkor, i.e., around July-September, with a peak season in August and September. Unlike Dangkor, Krervanh grows in areas far from villages, in some cases the distance can be up to ten kilometers. Local people usually spend around ten days in the forest to harvest fresh Krervanh fruits then drying them there before bringing them back to their villages. Because of these conditions, only men can go into the forest to harvest the fruits. At the time of the study, no Krervanh cultivation or domestication activities were taking place in those communes. Each community in the two communes could harvest around 2,500 kilograms of dried fruits per year. It is that a household could harvest around 50-60 kilograms of dried Krervanh fruits per year. Only about 50 households of the total 186 households in Tumpoar went to harvest Krervanh.

Cardamoms areas have been markedly decreased in recent years, albeit its iconic value for Pursat province. Current cardamoms area is estimated at around 500 hectares, from 2,000 hectares in previous periods.⁵ This marked decrease was mainly caused by various investment projects developed in the areas.⁶ It has in turn reduced natural stock of cardamoms, which apparently makes it difficult to fulfil minimum ordered quantity of international markets. This factor could be a reason explaining the current bearish situation of local trading activities of cardamoms.

⁵ Based on estimated figure of the Ministry of Environment.

⁶ Based on interviews with NTFP communities in Veal Veang district.

3. Market Analysis and Identification

3.1. Bamboo markets

Given a large number of its product derivatives, bamboo already has a secured market. Local markets have a huge demand for bamboo products, especially for toothpicks, barbecue sticks, chopsticks, and incense sticks. A large proportion of demand for these products is fed by imports as domestic supply capacity cannot satisfy. Annual market demand for incense sticks was estimated at around 650 tons in Cambodia, while domestic supply was around 200 tons.⁷ This means that the other 70 percent of demand was supplied by imports. For bamboo chopsticks, it was estimated that the total demand in the country could be around 3.3 thousand tons per year or roughly ten tons per day (1.3 million pairs per day).⁸ Given a wholesale price of USD 0.01 per pairs, the total market value for chopsticks could be USD 4.2 million per year. However, a large majority of supply has been fed by imports, mainly from Vietnam and some from China and Thailand, which creates a fierce competition with local supply.

In Siem Reap province alone, for instance, annual market demand for bamboo chopsticks and barbecue sticks ranged between 150 and 180 tons, which were mainly supplied from Vietnam and; and only a very small quantity was from China.⁹ Current domestic supply of bamboo sticks in that province was estimated at around three tons per year, accounting for roughly two percent of the demand.¹⁰ Local demands would rise further, considering an increasing trend of restaurants and street-food places in urban areas in response to a high potential growth of tourism sector in particular. Local demand for bamboo furniture and other bamboo handicrafts, however, has decreased in recent years mainly due to changing preference of local buyers for wooden products.¹¹

There are eleven products of bamboo, according to Harmonized System (HS) code classifications in the database of the International Trade Center of the World Trade Organization (ITC database). These include, with 2007 HS code in parenthesis: bamboo raw materials (140110), bamboo mats or screens (460121), bamboo plaits and plaiting materials (460192), bamboo basketwork (460211), bamboo charcoal (440210), bamboo flooring (440921), chopsticks of bamboo (441912), bamboo plywood (441210), bamboo paper-based articles (482361), bamboo seats (940152), and bamboo furniture (940382).

Among these products, Cambodia exported five products during 2007-2018 with a total value of USD 0.6 million (Figure 4). Most of exports were on a sporadic basis, except for bamboo basketwork. This sporadic export pattern reflects a low penetration of export markets of Cambodian bamboo products. Bamboo basketwork was exported annually since 2007, with an average value of around USD 30,000. Key export destinations were the European Union¹² (39% of total exports during 2007-2018), Japan (32%), USA (12%), Australia (9%), and Thailand (6%).

In 2015, there was a fairly large export of bamboo mats or screen products of USD 107,000 to USA, but then disappeared afterwards. Sharing a similar fade, bamboo paper-based articles were

⁷ WWF (2016). Business Plan on Community-Based Bamboo Stick Production Workshop for Phnom Toap Cheang Community Forestry (2016-2017). Page 3.

⁸ Based on team calculation and interviews with industry experts. Key assumptions: (1) One in three people living in urban areas use a pairs of chopstick per day, and urban population accounts for 23.8% of Cambodian population of 16.6 million in 2019, based on UN data; (2) A pairs of chopstick weights 7 grams, averaging between imported chopsticks of 6 grams per pairs and local chopsticks of 8 grams per pairs; and (3) There are 365 days per year.

⁹ GIZ (2013). Bamboo Sticks Prospectus: Investment Opportunity. Regional Economic Development Program (RED): Green Belt Siem Reap project. Accessed from <http://www.aha-kh.com/wp-content/uploads/2017/01/6-bamboo-sticks-prospectus.pdf> on April 03, 2019. Page 7.

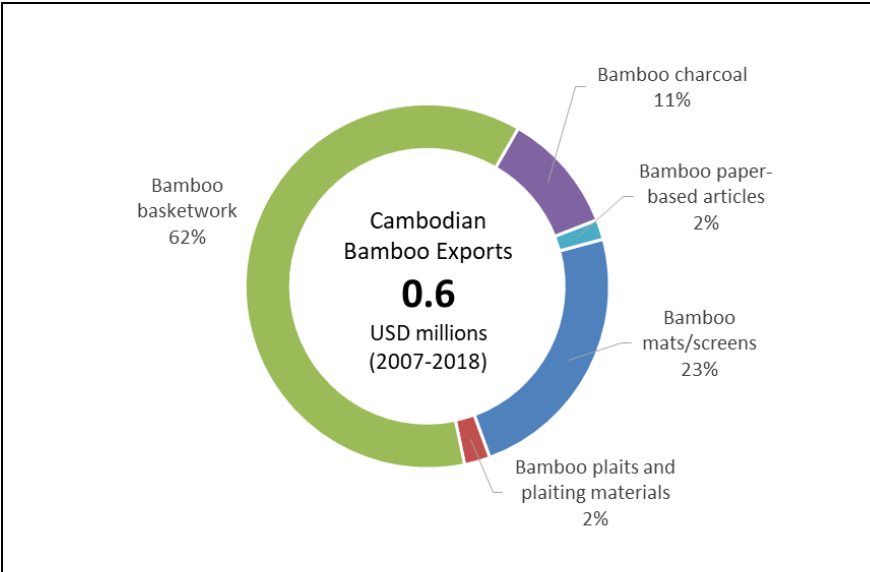
¹⁰ Based on the study team's interviews with owner of Cambamboo Enterprise in March 2019, daily production of bamboo sticks of this enterprise was 20 kilograms, while the total demand in Siem Reap province was 120 kilograms per day.

¹¹ Based on findings from quick market assessment that the study team conducted in Phnom Penh in February 2019.

¹² These countries included: United Kingdom, Germany, Spain, France, and Italy.

also exported in that year, with a total value of USD 9,000; and it was the only year since then. Also, bamboo charcoal was exported in 2014 and 2015, amounting to USD 55,000 and USD 6,000, respectively. There were no exports of this product during 2016-2018.

Figure 4. Cambodia’s exports of bamboo products during 2007-2018



Source: Nuppun, compiled from ITC Trade Map database in April 2019 (Mirror Data).

Many development project interventions have been provided to bamboo processing sector in Cambodia at least over the past two decades, yet, the growth of the sector appears to have faded away along with the completion of those projects. One of potential reasons behind this backward progress is the optimization of raw material use, resulting in a higher cost of production. Only 13% of bamboo raw materials can be processed into chopsticks and barbecue sticks, leaving 87% as unprocessed waste due to limitation of technology used by the enterprise. This waste can be processed into bamboo charcoal or pallets. An investment made to upgrade the technology of the processor would hence contribute to optimization of raw material use and cost reduction.

3.2. Rattan markets

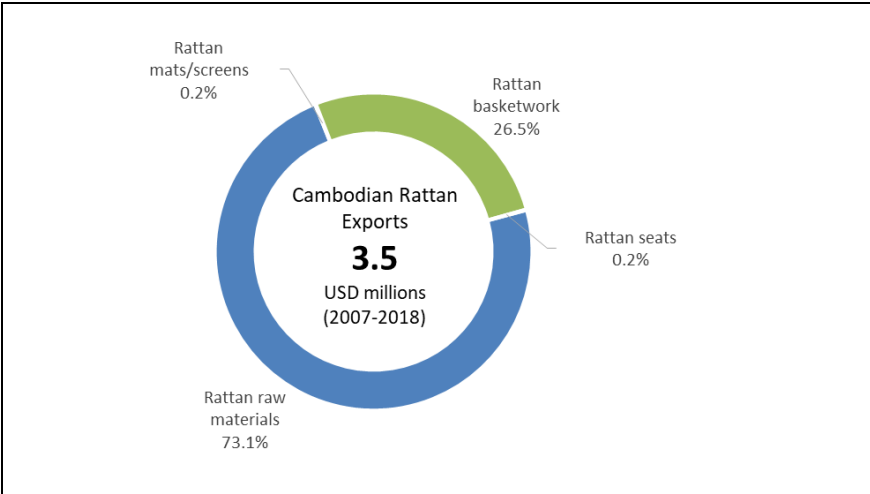
Local demand for rattan products, especially furniture, has experienced a marked decline in recent years. Local buyers changed their preference towards wooden furniture, which is perceived to be more luxurious, based on findings from the market assessment. Rattan products were popular only among lower middle income households or students, who were willing to pay at lower price and purchase in small quantity. Products with good sales include bookshelves and other accessories, since they have affordable prices. Retailer gross margins from rattan bookshelves and baskets were USD 1.0 and USD 0.3, respectively. Squeezing both from the sales volume and margin made some handicraft manufacturers least competitive and out of the business.

There are six lines of rattan products classified in the ITC database, reflecting a low diversity of product derivatives compared to bamboo. These product lines, with 2007 HS code in the parenthesis, include: rattan raw materials (140120), rattan mats or screens (460122), rattan plaiting materials (460193), rattan basketwork (460212), rattan seats (940153), and rattan furniture (940383).

For export markets, rattan raw materials have accounted for the majority, reflecting a primitive state of Cambodian rattan export activities. Over the past twelve years during 2007-2018, export value of Cambodian rattan products was USD 3.5 million; of which, exports of rattan raw materials accounted for 73.1% and were largely to Thailand. The total volume of rattan raw material exports was 14,542 tons, making an annual average of 1,200 tons during 2007-2018. This

suggests a low processing capacity or market penetration of the sector in comparison to that of Thailand in particular. The share of rattan basketwork exports was 26.5%. Its key export markets were USA (63%), Thailand (18%), Japan (9%), and EU (8%).

Figure 5. Cambodia’s exports of rattan products during 2007-2018



Source: Nuppun, compiled from ITC Trade Map database in April 2019 (Mirror Data).

Rattan seat is an emerging product. Its export started in 2017, amounting to USD 6,000 in value and 27 units in volume. Rattan mats or screens were, however, on the opposite site. There were no exports of these products since 2015, reflecting challenges in meeting market demand or no market. These two product lines, rattan seats and rattan mats or screens, represented less than 1% of the total exports accrued during 2007-2018 (Figure 5).

3.3. Cardamom markets

The classification in the International Trade Statistics database captures three product lines of cardamoms, with 2007 HS code in the parenthesis: cardamoms (090830); cardamoms, neither crushed nor ground (090831); and cardamoms, crushed or ground (090832).

Cardamom trade in the country is largely influenced by export demand, given minimal local demand. ITC database¹³ showed that Cambodia used to export dry cardamoms (neither crushed nor ground form) to Taiwan in 2014 and 2016, with a total quantity of ten and six tons, respectively. The export value was USD 13,000 and USD 8,000, correspondingly for 2014 and 2016. Probably because of this export demand, local trade of cardamoms in the country was active but then has become bearish since 2017. There were no official records in other years, including up to 2018. These statistics suggests a primitive state of cardamom sector in Cambodia, where no processing technologies have been used.

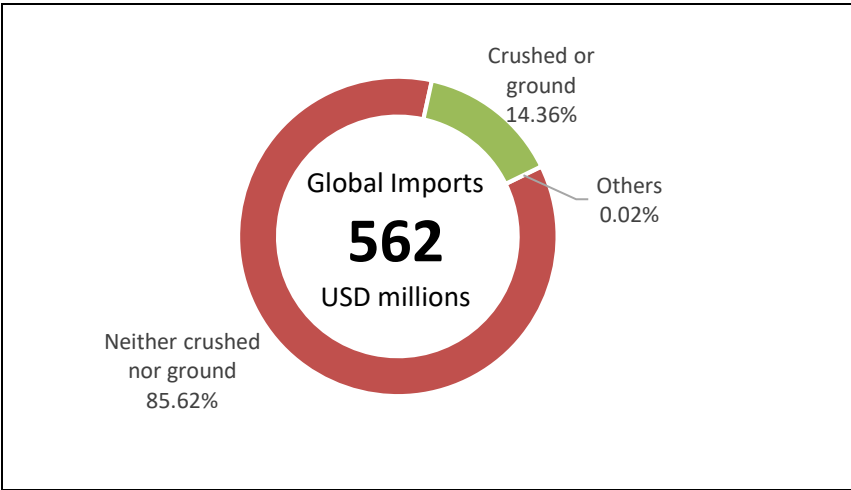
However, there remains potential international market demand for cardamom products. Global imports of cardamom products¹⁴ in 2017 was USD 562 million (Figure 6), of which around 86 percent were dry cardamoms (neither crushed nor ground) and the remaining 14 percent was basically processed cardamoms (crushed or ground). Dry cardamoms were of high demand in the Middle East and Asian countries. Global imports of dry cardamoms in 2017 were 46 thousand tons (USD 481) with key importers including Saudi Arabia, United Arab Emirates, Kuwait (Middle East); India, Bangladesh, Pakistan, and Singapore (Asia). For processed cardamoms, the market is more diverse, reaching further to Europe and America in addition to the Middle East and Asia.

¹³ Website: <https://www.trademap.org/Index.aspx> accessed in April 2019.

¹⁴ These cardamom products are composed of three items, based on Harmonized System code of 2012 version: cardamoms (HS 090830); cardamoms, neither crushed nor ground (090831); and cardamoms, crushed or ground (090832).

Global imports of processed cardamoms were 6.6 thousand tons (USD 81 million) in 2017. Key importers included Saudi Arabia, United Arab Emirates, Kuwait, Qatar (Middle East); Germany, Norway, Sweden (European Union); USA; India, Nepal (Asia).

Figure 6. Global imports of cardamom products in 2017



Source: Nuppun, compiled from ITC Trade Map database in April 2019.

4. Identification and Profiling of Potential Investors

Five main enterprises processing bamboo were identified by the study, which have potential to be integrated into the project. These enterprises include: Cambamboo, producing bamboo sticks in Siem Reap province; Bopha Angkor, specializing in incense sticks in Tboung Khmum province; Sem Esa Babmoo Furniture, focusing on production of bamboo furniture in Kampong Chhnang province; Bamboo Sea, processing premium bamboo water bottles and homeware in Phnom Penh; and Bambuza, specializing in processing of bamboo in a diverse range of products in Mondulokiri province.

For rattan products, the Rattan Association of Cambodia can be a good partner to access to many rattan processors across the country. Member enterprises of this association have sourced Pdao species from Koh Kong, Kampot, Preah Sihanouk, Kampong Speu, Banteay Meanchey, and Preah Vihear; and Lpeak species from Siem Reap and Kampong Thom. Key rattan products include: rattan furniture, basket, premium homeware, and fashion products.

Cardamoms market has been inactive since 2017, with no trading activities taken place in key cardamom areas. In this situation, profiles of cardamoms traders could not be provided in this report.

Table 1. Summary of bamboo and rattan enterprises

Enterprise	Product	Remarks on the project
Cambamboo	Bamboo barbeque sticks, chopsticks	Suitable for the project but located far from Pursat
Sem Esa	Bamboo furniture and structure	No bamboo stick processing experience but located near Pursat
Bopha Angkor	Incense stick	Potential for integrating into the project
Bamboo Sea Co., Ltd.	Bamboo water bottles and other premium homeware	Emerging advanced processing with potential to integrate into the project
Bambuza Global Ventures Co., Ltd.	Various types of bamboo derivatives, except sticks	Suitable for complement with stick processing
Rattan Association of Cambodia	Various types of rattan furniture, homeware and fashion products	Comprising eight rattan processors, focusing mainly on rattan and some bamboo integration

4.1. Cambamboo enterprise

It is among few companies that process bamboo chopsticks and barbecue sticks in the country. Receiving seed funding from GIZ-RED project, this enterprise started its operation in April 2017 in Varin district of Siem Reap province to process chopsticks and barbecue sticks from forest bamboo, known as Bambusa Bambos or locally known as Reussey Prey. It initially employed technology from Vietnam but later switched to using that from Thailand to fit the characteristics of Bambusa Bambos which has hard nodes. The technology from Vietnam can process bamboo into long sticks without a need to remove bamboo nodes, in turns resulting in a higher processing efficiency compared to that from Thailand. Only bamboo species with softer nodes, however, are best fit with this technology. These species include, but not limited to, a local bamboo species known as Reussey Srok or a species in Vietnam known as Dendrocalamus Barbatulus. The enterprise has yet made any profits so far, mainly due to a low utilization rate and low production efficiency. Bamboo supply is limited and unstable at the processing site, hindering the enterprise from operating in its full processing capacity. Moreover, the enterprise presently lacks technology to process bamboo waste which accounts for some 87% of the bamboo raw material used. Aiming to improve its sourcing situation and technology expansion, the enterprise has made further investment to re-locate its production site to a new place which is more spacious but in the same district. However, the processing activity remained low, at least during the time of the study.¹⁵



Bamboo chopstick (left) and barbecue stick (right) produced by Cambamboo enterprise

4.2. Bopha Angkor

Located in Tboung Khmum province, Bopha Angkor focuses mainly on incense stick production. It sources semi-finished bamboo sticks from Toap Cheang community in Koh Kong; of which, half allocated for its processing into incense sticks and the other half for supplies to other incense sticks producers in Phnom Penh, Kampong Cham and Battambang provinces. It purchased 200 tons of semi-finished bamboo sticks manually made by 50 households in that community in 2016 and planned to increase to 300 tons in 2017.¹⁶ The involvement of local people also brings a challenge. The quality of hand-made bamboo sticks supplied by the community decreased over time and was of poorer quality compared to those produced by machine. This poor-quality issue negatively affected sales of incense sticks produced by the enterprise.

4.3. Sem Esa Bamboo Furniture

The enterprise specializes in producing bamboo furniture, ranging from bamboo chairs, sofas to kiosques. It also provides services to construct various types of bamboo structures. Located in Kampong Trolach district of Kampong Chhnang province, the enterprise uses two domestic bamboo species grown in the village, including, in local name, Reussey Srok and Reussey Pingpung which are sourced from around 70 kilometers radius around the production site. This bamboo raw material can cost from 700 riels per cane to 5,000 riels per tree,



Bamboo sofa produced by Sem Esa enterprise

¹⁵ Additional interview and site visit by the study team were conducted on November 06, 2019.

¹⁶ WWF (2016). Business Plan on Community-Based Bamboo Stick Production Workshop for Phnom Toap Cheang Community Forestry (2016-2017). Page 6.

depending on species and quality. With a diverse range of furniture products, the price range also largely varies, from USD 2.00 to USD 100.00 per unit.



Bamboo structure built by Sem Esa enterprise

4.4. Bamboo Sea

Established in 2017, the company focuses its business activity on premium processing of bamboo products, including water bottle and other homeware. As a result of growing business, the company legally registered in 2019. Its processing site is located in Phnom Penh city. The company mainly sources bamboo materials from its bamboo plantation which grows different bamboo species. These species are mainly imported from various countries, including Thailand (Saingmon species and *Dendrocalamus asper*¹⁷ species) and Myanmar. The company produces a relatively wide range of products and can be customized upon buyers' preference, but mainly focuses on homeware. These products include water bottles, tooth brush holders, other customized homeware, bamboo straws, bamboo soaps, laminated bamboo flooring, and bamboo pellets.¹⁸



Water bottle and cups (left), toothbrush holder (middle), customized homeware (right)

The company has brought quite modern technology, which can be tapped into the project for NTFP community. A further discussion would be needed, given that the company has a sharp focus on sourcing raw materials from its plantation. Supplying bamboo poles is also part of the company business revenue model.

4.5. Bambuza Global Ventures Co., Ltd.

The company has the most diverse bamboo products among bamboo processing enterprises in Cambodia. Registered as a private limited company in 2012, the company produces three main products: various types of bamboo furniture and homeware, bamboo fertilizers (Bamboo SuperSoil and bamboo biochar), and bamboo charcoals (bamboo chip pellets, briquettes, charcoals and terrified bamboo).¹⁹ The company also provides décor and customized services for producing bamboo products and bamboo structures. It does not produce bamboo sticks, however, mainly due

¹⁷ Based on information provided by Bamboo Sea's Facebook page, *Dendrocalamus asper* poles can be used as a building material and structural timber for heavy construction including houses and bridges; whereas, the culm internodes can be used as containers for water and other fluids, as well as cooking pots. This species can also be used for making laminated boards, furniture, musical instruments, chopsticks, household utensils and handicrafts. Young shoots are sweet and considered a delicious vegetable. Accessed from <https://www.facebook.com/bamboosealinna/>.

¹⁸ Based on Bamboo Sea's Facebook page: <https://www.facebook.com/bamboosealinna/>.

¹⁹ Based on information provided on the company's website: <http://www.bambuzaglobalventures.com/products/>.

to low profitability. The company has its office in Phnom Penh and processing site in Koh Nhaek district of Mondulkiri province. It is a large company in the bamboo sector in Cambodia, with official business registration, management capacity, equipment, and large capital investment. The company has so far received several orders from abroad, including its first shipment of bamboo chairs and other furniture to Israel in May 2018.²⁰



Coil stool chair (left) and loading activity (right)



*Bamboo pellets (left); bamboo briquettes (middle); and bamboo charcoal and torrified (right).
Photos downloaded from the company's website.*

The company owner expressed interest in joining the project to support NTFP community in Pursat in the development of bamboo industry. Further discussion on the arrangement would be needed, however. Based on the company expertise, key potential contributions for the project would be in the area of bamboo furniture and structure design and production and processing of bamboo by-products which can include bamboo fertilizer (biochar) and bamboo charcoals. These areas are needed to complement bamboo sticks production as in the case of Cambamboo, which in turn could further improve the processing efficiency.

4.6. Rattan Association of Cambodia

Established in 2009, the Rattan Association of Cambodia (RAC) aims to promote the development of rattan processors by closely working with forest communities, government, and other stakeholders. The association currently has eight rattan processor members. These enterprises produce: rattan furniture (sofa, closet, hammock, chair, bed, table, and cupboard), basket, premium homeware, and fashion products. Pdao species is mainly sourced from six provinces including Koh Kong, Kampot, Preah Sihanouk, Kampong Speu, Banteay Meanchey, and Preah Vihear provinces; whereas, Lpeak species is sourced from Siem Reap and Kampong Thom provinces. Among the eight processors, only two targets international markets, including Khmer Rajana Rattan Handicraft and Manava. The others sell their products to local markets such as hotels, guesthouses, restaurants, supermarkets, and furniture stores. RAC also works with twelve NTFP communities across three provinces including Koh Kong, Preah Sihanouk and Kampot provinces.



Premium homeware and fashion products

²⁰ Based on information provided on the company's Facebook page:
<https://www.facebook.com/pg/BambusaGlobalVentures/about/>

Table 2. Summary of RAC members

Enterprise	Product	Rattan species	Sourcing province	Sourcing quantity	Market
Angkor Rattan Handicraft	Rattan furniture	C.rudentum, C.palustris, Daemonorops, Jenkinsiana	Banteay Meanchey, Preah Vihear, Koh Kong	56,500 canes/year	Local
Khmer Rajana Rattan Handicraft	Rattan furniture and semi-finished products	C.palustris, D.jenkinsiana, K.bejaudii	Kampong Speu, Kampot, Koh Kong	16,000 canes/year	Local, exports
Khun Bunlaing Rattan Handicraft	Rattan furniture and semi-finished products	C.palustris, D.jenkinsiana, K.bejaudii, C.rudentum	Preah Sihanouk and other provinces	10-15 tons/year	Local
Kong Chamnan Rattan Handicraft	Rattan furniture	C.palustris, D.jenkinsiana, K.bejaudii, C.rudentum	Preah Sihanouk, Kampot, Preah Vihear	30 tons/year	Local
Kuy Meng Rattan Handicraft	Rattan furniture and semi-finished products	C.palustris, D.jenkinsiana, K.bejaudii, C.rudentum, Myrialepis sp., C.viminalis, Plectocomia sp.	Kampong Speu	60,000 canes/year	Local
Siem Reap Natural Fiber Association	Basket and homeware	Lpeak	Siem Reap, Kampong Thom	(N/A)	(N/A)
Veng Hout Rattan Handicraft	Rattan furniture and semi-finished products	C.palustris, D.jenkinsiana, K.bejaudii, C.rudentum, C.guruba	Siem Reap, Kampot, Preah Sihanouk, Preah Vihear	40,000 canes/year	Local
MANAVA	Premium homeware and fashion products	Lpeak	Siem Reap	(N/A)	Online

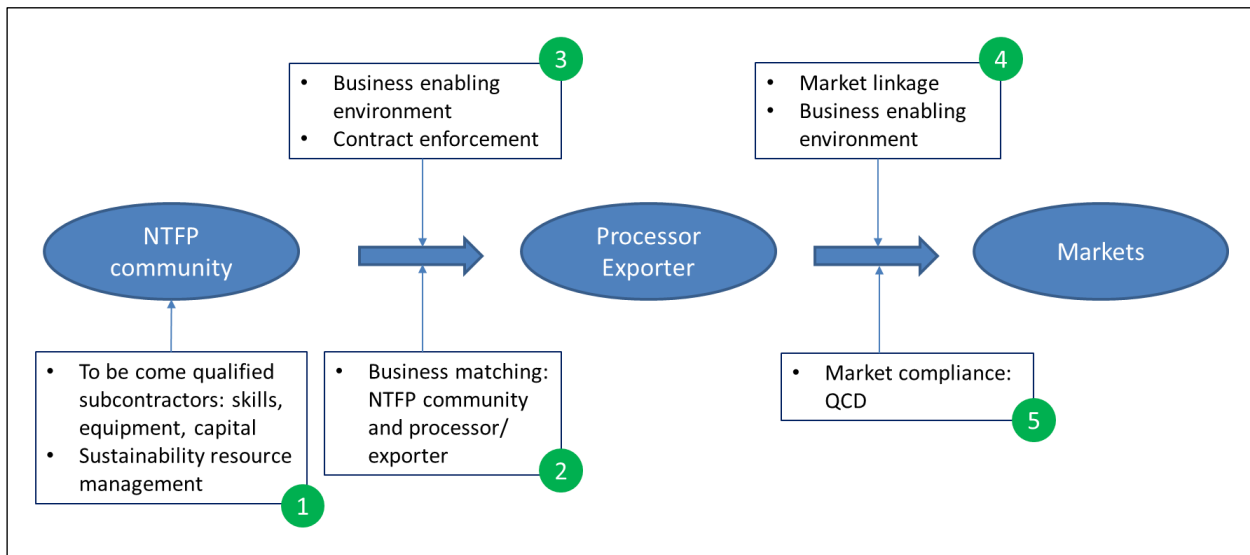
Source: authors, compiled from RAC's website as of November 2019.

5. Mechanism for Engagement of Local People and Potential Investors

The project interventions should focus on both bamboo and rattan value chain, while constructing supply chain of cardamoms and connecting to export markets. Considering the availability of bamboo and rattan natural stocks in Koh Kong and Pursat provinces, which are the target areas of the CSLE project, the following mechanism is proposed for engagement of local people and potential investors, as illustrated in Figure 7. This mechanism comprises five potential intervention components. However, only the first three components are directly related to the project scope.

Three main product categories are proposed for further consideration: different types of bamboo sticks, basket works and furniture made from bamboo or rattan. Bamboo sticks may include bamboo chopsticks, barbecue sticks, incense sticks, or other forms of sticks needed to make furniture or basket works. Both bamboo and rattan materials can be combine to make furniture. To gain economy of scale, especially to reduce transportation cost and to improve competitiveness if compared to imported products, these products should be produced in bulk quantity. In the medium to longer term, the processing chain should be diversified toward premium products, especially premium homeware, suitable for high-end markets of both local and exports.

Figure 7. Mechanism for engagement of local people and potential investors



5.1. Component 1: Capacity Building for NTFP communities

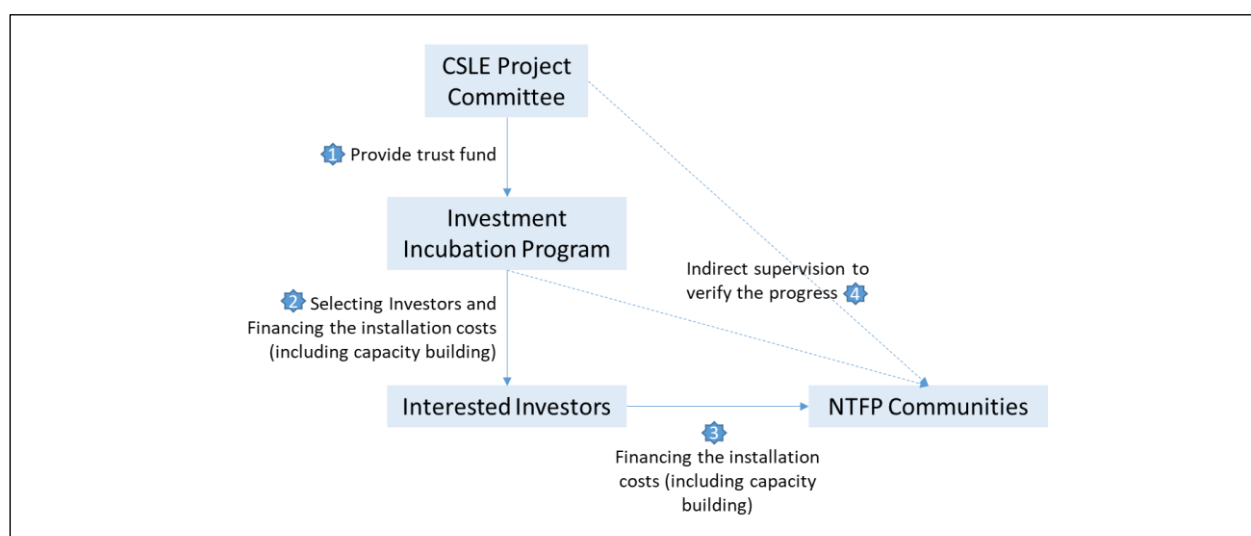
This component aims to equip NTFP communities with skills, processing equipment and capital, so that they can be qualified as subcontractors of processors. The implementation of this component could capitalize on previous projects initiated by development partners, especially WWF and GIZ. Moreover, to ensure a sustainable use of natural stocks of bamboo and rattan, a mechanism should be put in place, through lesson learnt from previous intervention projects.

Both technical and business skills should be included in the capacity building activities. Technical skills are composed of harvesting techniques of bamboo and rattan; primary processing (treatment techniques, cutting and slicing, etc.); and semi-final processing (splitting into different types of sticks and drying). Specific technical skills could be determined only after the selection of products to be processed and processing stages, which are contingent upon market situation and requirements from buyers. On the other hand, business coaching should be provided to the NTFP communities, especially leaders who will be responsible for the business operation. Coaching topics may include basic accounting, production programming and quality control, and management. These topics are needed to orient operation activities toward business approach and to avoid any conflicts of interest arisen from the project implementation.

Certain level of machinery equipment is needed in order that NTFP communities be able to semi-process bamboo, depending on production line choices. Basic machines that are needed may include bamboo sawing, bamboo strip splitting or bamboo sticks pressing machine, and stick length cutting machine. Other types of machines – e.g. stick head sharpener, polishing machine, packing machine, blade sharpener, etc. – can also be installed at later stage if upgrading to a complete processing line. These basic machines could cost between US\$5,000 and US\$10,000, depending on processing line.

An annual harvesting plan should be used to sustainably extract bamboo and rattan natural stock. A baseline study to estimate total inventory of bamboo and rattan resources should be implemented. Result from this study will then be used to develop the harvesting plan which needs to be submitted to relevant local authorities, namely village chief, commune chief, or other relevant authority, for approval. This application of harvesting plan can be done on an annual basis, by following a process initiated by WWF.

Figure 8. Indicative Business Matching Framework



Experience of similar investment incubation program can be drawn from Feed the Future Cambodia Harvest II project – known as Investment Accelerator Program²¹ – to which the USAID provides funding. This project that is managed by an implementing agency, which initiates an investment incubation program through announcements seeking for interest from existing businesses in the target field. By setting conditions to promote investment in the target field, this agency then finances business proposals submitted by interested businesses.

5.3. Component 3: Building Favorable Business Enabling Environment

Favorable business enabling environment for the development of NTFP value chains lies on three main factors: business contract enforcement, legal document processes, and physical infrastructure. Business contracts between NTFP communities and processing enterprises should be enforced. The enforcement process should be jointly handled by three parties: the implementing agency of the investment incubation program, tentatively proposed for WWF and RAC, plays a direct role in the contract enforcement given its financing decision power delegated by the CSLE project committee (Figure 8); a representative from the NTFP community local authority (e.g. commune chief); and a representative from the CSLE project committee (e.g. MoE official).

Legal document processes mainly include those related to the NTFP harvesting plan and permits for inter-provincial transports of NTFP materials. Different permits from each provincial authority through which the NTFP materials are transported are required, making it a cumbersome process and should be simplified. Given that the permit is issued by the Forestry Administration of the Ministry of Agriculture, Forestry and Fisheries (MAFF), MoE should play a coordinating role in simplifying the process, particularly for rattan and bamboo if not all NTFPs.

Physical infrastructures, especially road accessing to the NTFP communities should be constructed. The construction of rural roads is under the responsibility of the Ministry of Rural Development which is also part of the CSLE project implementation. Specifically, road accessing to Pramaoy commune of Veal Vaeng district in Pursat province, which can be a potential target area for the project, is of difficult conditions, making it difficult to transport products to markets.

5.4. Component 4: Promoting Enabling Environment for Exports

Rattan and bamboo products should be removed from the customs restricted list, whereas export tax levied on processed products should be exempted to promote the sector growth. During the project period, key implementing partners – especially the Ministry of Environment – should work closely with the General Directorate of Customs and Excise (GDCE) of the Ministry

²¹ Further details can be found through <https://www.facebook.com/CambodiaHarvestII/>.

of Economy and Finance (MEF) along with the Ministry of Commerce (MoC) and the Ministry of Agriculture, Forestry and Fisheries (MAFF): (i) to seek for possibility to remove rattan and bamboo products, especially in processed forms, from the restricted list; (ii) to simplify the export document processing; and (iii) to seek for possibility to provide export tax exemption, especially on processed products.

Almost all of rattan and bamboo products belong to the current list of prohibited and restricted goods for international trade, requiring more documents and stricter process of customs clearance. This situation contributes high export costs, in turns lowering the competitiveness of rattan and bamboo industries which are currently at primitive stage. This list comprises twelve product lines, from bamboo raw materials to finished products (Table 3).

Five product lines in the current list of prohibited and restricted goods are subject to export taxes of 5% or 10%. The export tax rate of 5% has been levied on two products, including laminated bamboo and rattan/bamboo furniture other than seats; and the rate of 10% on three products comprising bamboo raw materials for plaiting, bamboo charcoal, and bamboo flooring products. The export tax does not apply to other seven products, including bamboo chopsticks and basketworks.

Table 3. Summary of list of prohibited and restricted goods from bamboo and rattan

Nº	HS-Code	Description	Description of Goods	Treatments			Import Duty (%)			Export Tax (%)
				MOC	MAFF	MOE	CD	ST	VAT	ET
1	1401.10.00	- Bamboos	Bamboo raw materials	(2) (3)	(2) (3)		0	0	10	10
2	4402.10.00	- Of bamboo	Bamboo charcoal	(2)			7	0	10	10
3	4409.21.00	-- Of bamboo	Bamboo flooring	(3)			7	0	10	10
4	4412.10.00	-- Of bamboo	Laminated bamboo	(3)			7	0	10	5
5	4419.00.00	Tableware and kitchenware, of wood.	(may include bamboo chopsticks HS 441912)*	(3)			15	0	10	0
6	4601.21.00	-- Of bamboo	Bamboo mats/screens	(3)			35	0	10	0
7	4601.22.00	-- Of rattan	Rattan mats/screens	(3)			35	0	10	0
8	4602.11.00	-- Of bamboo	Bamboo basketwork	(3)			35	0	10	0
9	4602.12.00	-- Of rattan	Rattan basketwork	(3)			35	0	10	0
10	4706.30.00	- Other, of bamboo	Bamboo pulp			(3) (4)	7	0	10	0
11	9401.51.00	-- Of bamboo or rattan	Bamboo or rattan seats	(3)	(3)		35	0	10	0
12	9403.81.00	-- Of bamboo or rattan	Other furniture of bamboo or rattan	(3)	(3)		35	0	10	5

Source: Annex to Letter No. 3784 MEF.GDCE Dated 19 June 2012, Anukret No.209 ANK.BK Dated 31 December 2007 on the Implementation of the List of Prohibited and Restricted Goods; Customs Tariff of Cambodia 2012

Note:

(2) : License, import permission, or other legal documents in similar forms are required on import from competent ministries or agencies.

(3) : License, export permission, or other legal documents in similar forms are required on export from competent ministries or agencies.

(4) : Import is absolutely prohibited.

CD: Customs duty; ST: Special tax; VAT: Value added tax; ET: Export tax

* Tariff line for bamboo chopsticks was not explicitly displayed in the Customs Tariff of Cambodia 2012, but may included in HS 4419. Based on international HS code, bamboo chopsticks are coded as 441912.

5.5. Component 5: Market Compliance

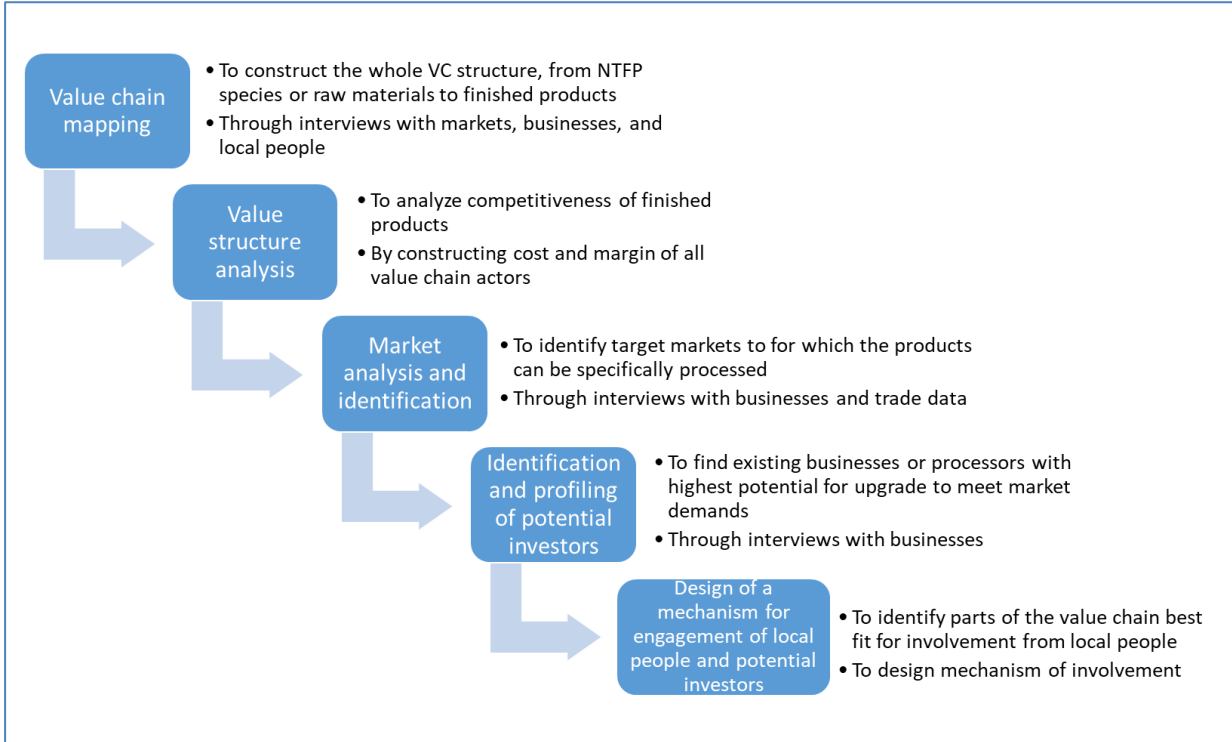
The quality, cost and delivery (QCD) of rattan and bamboo products should be improved to better respond to export market requirements, by upgrading technologies used in processing lines. This can only be done at the medium or longer terms after the project has started. The Rattan Association of Cambodia (RAC) should take a leading role in: (i) market studies and linkage; and (ii) conducting research and development (R&D), especially on processing technologies and innovation. The RAC should also work with the Institute of Standard of Cambodia (ISC) of the Ministry of Industry and Handicraft (MIH) to develop national standards for rattan and bamboo processed products, by focusing on export market requirements.

Annex. Detail Methodology for the Value Chain Studies

1. Study methodology

The Cambodia Sustainable Landscape and Ecotourism (CSLE) project can play a crucial role as either a business incubator or investment accelerator that contributes to the development and growth of the NTFP value chain with active involvement of local people. Taking this role into account, the value chain analysis of the three prioritized NTFP species – including bamboo, rattan and cardamoms that have been selected as result of the study in “Phase 1 - Prioritization of NTFPs” – covers five activities: value chain mapping, value structure analysis, market analysis and identification, identification and profiling of potential investors, and design of a mechanism for engagement of local people and potential investors (Figure 9).

Figure 9. Key activities in implementing value chain analysis



▪ **Value chain mapping**

This step sets floor for the analysis through identification of NTFP product derivatives which can be formed as a value chain map. The mapping process was first based on existing literatures that capture as many products as possible, including in other countries, deriving from the three NTFP species; and was then fine-tuned to reflect the current situation in Cambodia through primary data collected from interviews with industry stakeholders who were composed of local people or NTFP communities, processors and traders (Table 5).

▪ **Value structure analysis**

Analysis of values generated along the chain and by various actors will be conducted. The reviews of existing literatures as proposed in Subsection 2.1 above should enable us to identify types of products that are demanded by high-end markets, including both national and international markets. Value structure analysis will be performed only on priority products that have potential for high value addition activities. The value analysis will be focused on costs and margins of the relevant value chain actors (as indicated in Table 4**Error! Reference source not found.**).

Table 4. Indicative value structure analytical framework

Product 1	Input supplier		Processor		Local Trader		Exporter	
	Cost	Margin	Cost	Margin	Cost	Margin	Cost	Margin
Product 2	Input supplier		Processor		Local Trader		Exporter	
	Cost	Margin	Cost	Margin	Cost	Margin	Cost	Margin
Product 3	Input supplier		Processor		Local Trader		Exporter	
	Cost	Margin	Cost	Margin	Cost	Margin	Cost	Margin

Looking from the quality-cost-delivery (QCD) perspectives, issues or bottlenecks related to product specific and industry specific will be identified in the matrix form, with proposed recommendations. A simulation of new cost structure will be conducted, based on assumptions of the proposed recommendations to see the intervention effect. This allows us to assess the competitiveness of products.

▪ **Market analysis and identification**

Market demands largely influence the value chain map. These markets include both domestic and international ones. To better understand domestic market demands, interviews with retailers and local processors will be conducted. For international markets, trade data will be extracted from the Trade Map database of the International Trade Center of the World Trade Organization. These data could explain type of products had been exported and their export destination; and they also allow us to identify new products and their potential markets. Companies that used to exports will be identified, through the ASYCUDA system of the customs where export documents been processed and through the Ministry of Commerce by which the certificate of origin (CO) was issued. Tracing these companies would help to better understand success and challenges with regards to processing and markets of the NTFP commodities.

▪ **Identification and profiling of potential investors**

This step aims to seek for businesses that are interested to partner with CSLE project in development of the NTFP sectors, particularly the three commodities. These businesses would be mainly existing processors with high growth potential when having additional investment from the project so that their processing capacity become more competitive or be able to meet the QCD conditions in the market. In addition to high growth potential, these businesses should have a business model that allow engagement from NTFP communities.

Considering the ongoing momentum of promotion of inclusive business model of the Ministry of Industry and Handicraft, these businesses can also benefit from various incentive schemes – including certification as an inclusive business, tax incentives, etc. – that allow them to improve branding of their products. To be an inclusive business, the main revenue model of a business should contribute to the needs of the poor. This can include the engagement of NTFP communities in their value chain.

▪ **Design of a mechanism for engagement of local people and potential investors**

A proper assessment with both the NTFP communities and processors is a key factor for a successful involvement of local people. To handle this, lessons learnt from previous development projects will be collected through specific interviews with development communities, including but not limited to WWF (focusing on its rattan and bamboo project supports). Discussion with processors will be conducted to initially sketch potential engagement mechanism with local people, especially on minimum requirements of engagement. Consultation with NTFP communities will be conducted to collect interest and feedback on the mechanism proposed by the processors.

- **Data collection**

Primary data collection has been conducted for all the three NTFP value chains, using semi-structured questionnaires. Key value chain actors were interviewed, including local people, traders, processors, and buyers. Based on prioritization result in the first phase of the study, two districts, including Veal Veang district of Pursat province and Srae Ambel district of Koh Kong province, were mainly covered.

Table 5. The number of respondents interviewed by location

Province	Processor	NTFP Community	Stakeholder	Local Trader	Total
Phnom Penh	1		3	3	7
Siem Reap	3				3
Sihanouk Ville	2				2
Pursat		2			2
Koh Kong		2			2
Kampong Cham	1				1
Steung Treng/Monduliri			1		1
Total	7	4	4	3	18

2. Limitation

This study phase has faced a few challenges that made data collection limited. The first challenge was related to low participation of NTFP processors, amid small number of such processing enterprises. One of the interviewed stakeholders mentioned that it was one of the main challenges in implementing their development project in finding processors. In addition, all processors in Phnom Penh identified during the first phase of the study rejected to take part in this phase. This was not the case for processors in other provinces.

The second challenge was related to identifying stakeholders of cardamoms value chain which has been somewhat inactive since 2017. The study team could not identify, find, and interview value chain actors, besides communities, to obtain adequate information on cardamom. Most of the information in this report was generated from literature review related to cardamoms.

The third challenge was that information related to value chain cost structure was deemed very sensitive by interviewees; thus, most of interviewees refused to reveal the information or stated unable to identify costs and margins for their products.