



# **Report**

**For**

## **“NTFP Value Chain Analysis” Phase I - Prioritization of NTFPs**

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The World Bank Group**

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## 1. Introduction

**A tropical country, Cambodia contains a great biodiversity resource, and thus livelihood of rural people largely depends on agriculture, and forest and non-timber forest products (NTFPs).** The annual economic value generated from NTFPs in 2006 ranged between USD 280 and USD 345 per household, accounting for some 30 percent and 42 percent of their incomes of low and medium income category households, respectively.<sup>1</sup> This reflects an important role of NTFPs in rural livelihoods in the country. The Cardamom Mountains and Tonle Sap areas, which includes one of the world's most productive freshwater fisheries in Indochina, supports millions of people with income, food and water. Cambodia's forests – including those in the Cardamom Mountains – serve as carbon sinks, protect watersheds, reduce soil erosion and loss of soil fertility, and prevent flooding and sedimentation. Ensuring the long-term sustainability of these natural assets is particularly important given that many households in this area rely on farming and fishing for their incomes and are extremely vulnerable to shocks that could easily push them back below the poverty line.

**To support the Royal Government of Cambodia (RGC) in addressing these challenges through its national strategies and plans, the World Bank has included a focus on natural capital development as part of its country assistance strategy with the RGC.** Accordingly, the Bank is developing a program of technical assistance to: strengthen the planning and cross-sectoral coordination capacities of the RGC for developing sustainable natural resources-based livelihoods; enhance the climate-resilience of practices and investments; enhance the value of-, and promote the sustainable use of forest resources across the Tonle Sap and Cardamoms Mountains landscapes. Specifically, the government is preparing a project to be financed with a World Bank IDA loan entitled Cambodia Sustainable Landscape and Ecotourism (CSLE) project. The objective of the project is to improve protected areas management, and to promote ecotourism opportunities and non-timber forest product (NTFP) value chains in the Cardamom Mountains-Tonle Sap landscape. An NTFP value chain study expected to support the project through determining strategic interventions for investments in NTFPs that help to strengthen and increase the value of the NTFP chain, and improve the participation of private sector including forest communities in the value chains.

Nuppun has been engaged by the World Bank to under the value chain study. **The study intends to achieve two main objectives:** (1) To identify potential NTFP species, which are marketable for linkage between local community and market, in the Cardamom Mountains area; (2) To conduct the value chain analysis on the selected NTFPs. **The study comprises two phases:** Phase I is to identify the potential NTFPs, and Phase II focuses on the value chain analysis of the selected NTFPs. Phase I of the study is to address the first objective of the study, identifying the potential NTFPs in Koh Kong, Pursat and Kampong Speu provinces (Central Cardamom Mountains). This report presents the results of Phase 1 of the study.

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<sup>1</sup> HEOV Kim Sreng et al. (2006). The Value of Forest Resources to Rural Livelihoods in Cambodia. CDRI Policy Brief series March 2006, Issue 02. CDRI. Accessed from <https://www.cdri.org.kh/publication-page-old/pub/policybrief/nre/nrepBE02.pdf> in May 2019.

## 2. Overview of NTFPs

### 2.1. The importance of NTFPs for livelihood

**This section builds on the recent stocktaking work undertaken by CI which included examination of NTFPs in Cambodia.**

**NTFPs have been an essential contribution to local economic and the livelihood of rural people.** People in many rural locations particularly where they living close to forests have partly relied on, if not solely, NTFPs for their subsistence needs through collecting food, medicine, materials and cash income (Suleiman et al. 2017). For rural households, informal trading NTFPs helps to reduce the vulnerability and offer a partway out of poverty (Shackleton et al. 2007). The dependency on NTFPs also magnifies as safety net of local people to cope with shocks when there was a shortfall of agricultural productions and a need to pay off the expense associated with death of family's member (Kendra 2005). A study by Ahenkan and Boon (2011) indicates that NTFPs contribute to not only poverty reduction, but also nutrition and health care needs of forest-dependent communities. Hence, it is clear that NTFPs provide substantial livelihood and economic benefit.

**The relying on forest products is also an economic strategy of rural Cambodians, especially households in the plateau/mountain area.** According to the Cambodia Socio-Economic Survey in 2017 (CSES 2017)<sup>2</sup>, at least 370,000 households, equivalent to 81 percent of the total households in plateau/mountain, engaged in forestry and hunting activities (Ministry of Planning 2018). Even though NTFPs are not the only strategy to generate household income of rural Cambodian, trading forest product such as resin, wild honey, orchids, and bamboo is significant to prevent forest dependent households from falling into poverty and vulnerability (Chou 2018).

**Despites of recognizing the value of NTFPs on livelihood and local economics, there is currently very little known about the prioritization NTFPs species that have high economic value for local people in Cambodia, and its market demand of such species production.** The knowledge on potential NTFPs that could produce high economic return to local people is necessary for commercialize development and natural resource management (Saha and Sundria 2010). This study attempts to identify the potential NTFPs for commercialize, and provide the analyses on the value chain of identified potential NTFPs.

**So far few studies discussed about NTFPs in Cambodia, most of which focus on areas outside Cardamom Mountains.** The International and Tropical Timber Organization and Forestry Administration conducted a study on NTFP prioritization for trading in Cambodia in Kampong Chhnang, Kampong Thom, Mondulkiri and Ratanakiri provinces. The study indicates potential NTFPs including resin, rattan, bamboo, orchidaceae, and medicinal plants (FA and ITTO 2010). The Forestry Outlook Study 2020 by the Forestry Administration identifies bamboo and rattan as the most popular NTFP species that were harvested and traded in Cambodia by local people (Forestry Administration 2010). Boissiere et al (2013) also identified three main NTFPs comprising rattan, bamboo and resin. The studies above, however, have not covered the Cardamom areas.

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<sup>2</sup> A nationally representative survey regularly conducted by the National Institute of Statistics (NIS) of the Ministry of Planning.

## 2.2. Legal framework on NTFPs collecting and trading

**The Law on Forestry (2002) and Sub-degree (2003) on “Community Forestry Management” recognize the traditional user rights of local communities living within or near the permanent forest reserves to collect dead wood, picking wild fruit, collecting honeys, taking resin and collecting other forest by-products.** The article 40 of the law on forestry indicates that local communities have the right to barter or sell forest products if the activities do not affect the sustainability of the forest. Nevertheless, the third party or customers, who have collected the forest by-products from local communities with the purpose of trade, shall pay the royalty and premium payment to gain the permit for products transportation.

The Article 2 of the Sub-degree (2006) on “Forest and Non Timber Forest Products Allow for Export and Import” states that exporting non-timber forest products that were extracted from legal source of natural forest are permitted. The number of processed and non-processed forest and non-timber forest products including but not limited to furniture, assembled bamboo sticks, rattan, vine, all kinds of wood, resin, wild mushroom, flower, leaves, fruits of wild plants are allowed to export. However, the exports of forest and non-forest products are subjected to pay taxes, excepted for the export of the processed products following traditional styles at family or tourist scales (Article 6).

**National legal framework provides the opportunities for local communities living nearby the forest to access forest by-products or non-timber forest products for their community uses, and selling the products.** It is aligned with an objective of the National Forest Programme 2010-2029 that is expected to create employment and improved the livelihood of local people through developing value added to the NTFP and promoting of viable rural small and medium enterprises (RGC 2010). For potential enterprises that will work with local communities in processing products from NTFPs for commercialization have to pay attention on the premium and royalties fees for transportation the NTFPs.

**Regulations related to NTFP royalties have been found conflicting, resulting in ambiguity in enforcement and in turns creating rooms for informal fees and negatively affecting trade flows.**<sup>3</sup> The Article 53 of the Forestry Law (2002) stipulates that local communities who collect and sell NTFPs from State Forests under customary user rights are not required to pay royalties or premiums for commercial or subsistence use. The Clause 12 of the sub-decree on Community Forestry Management, however, provides an ambiguous statement by referencing the Article 55 of the Forestry Law which states that the royalties and premiums, in terms of the right to harvest, process, transport and sales of NTFPs, are payable. Because of this ambiguity and informal fees, coupled with costs and difficulty in obtaining transport permits, NTFP traders and collectors tend to avoid regular routes and instead transport their products through informal channels.

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<sup>3</sup> Mulcahy, G and Boissière, M (2014). No Forest, No NTFPs for Rural Communities in Cambodia. CIFOR Policy Brief series, Issue 67. Center for International Forestry Research (CIFOR). Accessed from [https://www.cifor.org/publications/pdf\\_files/infobrief/4407-infobrief.pdf](https://www.cifor.org/publications/pdf_files/infobrief/4407-infobrief.pdf) in May 2019.

### 3. Potential NTFP Species in Central Cardamom Mountains

Located in the South-western part of Cambodia, the Central Cardamom Mountains (CCM) have a total surface of 401,313 hectares and cover seven districts of three provinces including Koh Kong, Pursat and Kampong Speu. Of these districts, four are located in Koh Kong (Srae Ambel, Kaoh Kong, Thma Bang, and Mondol Seima districts); two in Pursat (Veal Veang and Phnum Kravanh districts); and one in Kampong Speu (Aoral district), as illustrated in Figure 1. There are 36 communes under the coverage of these districts.

Sixteen commercial NTFP species have been identified in the CCM, scattering across 20 communes, based on indicative listing conducted by the study. Commercial NTFP species refer to those having already been traded or generated income for villagers. The identification process was done through interviews with key stakeholders – including officials of the Ministry of Environment, Forestry Administration of the Ministry of Agriculture, Forestry and Fisheries, NGOs, and NTFP communities – and focused more on the existence of NTFP species rather than their volume or quantity by geography. Among these NTFPs, seven species are most widely present in these locations, including wild honey, rattan, gedraphol, bamboo, malva nut, and cardamoms (Dangkor and Krervanh).

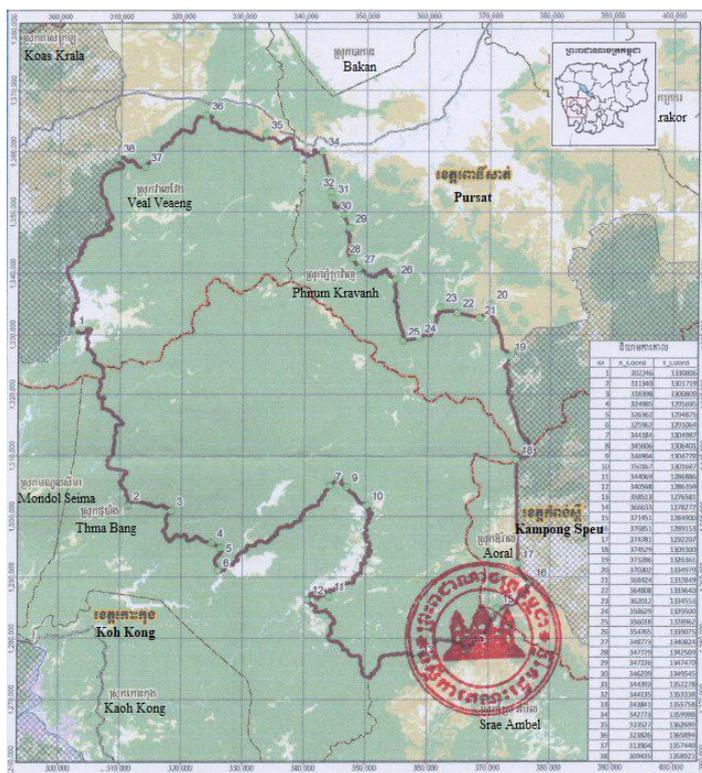
Medicinal mushroom (Linh Chi) is also an important NTFP species, although it exists in fewer communes. It was of high demand and value.

In terms of geographical concentration, top five communes with highest number of NTFP species included: Pramaoy and Ou Saom communes of Veal Veang district (Pursat), Dang Peaeng commune of Srea Ambel district (Koh Kong), and Ta Sal and Trapeang Chour communes of Aoral district (Kampong Speu). These communes have at least nine commercial NTFP species as indicated in Table 5.

#### 3.1. Wild honey

Wild honeybee population is highly concentrated in two districts of Koh Kong, including Srae Ambel (especially in Dang Peaeng commune) and Botum Sakor (Andong Tuek commune). Bee honey in Koh Kong is said to possess a special feature for medicinal purposes and unique from that in other provinces. This special feature can be recognized through a darker color of honey and somewhat bitter than the normal one. There were roughly 15 tons – in equivalent of some 10,000 liters – of wild bee honey collected annually from Srae Ambel and Botum Sakor districts, estimated by an NTFP-EP official who has been working with honeybee communities in Koh Kong province. Other locations of the CCM have been identified to have low or medium population of honeybee.

Figure 1. Map of Central Cardamom Mountains



Source: Sub-decree 81 dated May 09, 2016.

Koh Kong province is located in key biodiversity sanctuaries and corridors of the Cardamom Mountains, including the Phnom Aural Wildlife Sanctuary, according to a study conducted by USAID in 2009.<sup>4</sup> The same source estimated that there were around 2,000 honeybee colonies within the 5,000 hectare harvesting area in the two districts of Srae Ambel and Botum Sakor where the study was conducted. This area was composed of three sites: Toab Cheang Community Protected Area (3,046 hectares); Prang-Chamkar Kroam Community Forest (859 hectares); and Ta Meak Community Fishery Area (1,400 hectares). A bee hive could consist of 40,000-60,000 bees and produced between one and five liters per month (20-30 days).<sup>5</sup>

**Five bee species were found in Srae Ambel and Botum Sakor districts**, according to the USAID study. These bee species included: the *Apis dorsata* or giant honeybee (Khmum Thom in Khmer language), the *Apis florea* or the dwarf Asian honeybee (Khmum Phlit in Khmer language), the Asian hive-bee or *Apis cerana* (Pruot in Khmer language), the stingless bees of the genus *Trigona* (Mraum in Khmer language), and the *Apis andreniformis* (Khmum Bokor in Khmer language). The giant honeybee was the most populous, followed by the dwarf Asian honeybee.<sup>7</sup> There has been no domestication of the giant honeybee yet, based on consultative meeting with stakeholders. Instead of domestication, villagers built rafters in the forests to attract wild bees. Bees migrated elsewhere during the dry season and return to these districts in the rainy season.

**Giant bee honey is usually available to collect during May-September, with a peak season in June-August.** Households go to harvest bee honey on a part-time basis, with an average volume of around five liters of honey along with one kilogram of wax per season in 2008. With this volume, a household could earn around USD 37, given an average price of USD 6.12. Both honey and wax were commonly used for medicinal purposes and as food supplement.<sup>8</sup>

Figure 2. Giant honeybee (*Apis dorsata*)



Source: [www.growtherainbow.com](http://www.growtherainbow.com)<sup>6</sup>

**Currently, there are two channels of honey trade: honey head and honey.** Villagers sold honey head to bee committees, which received technical supports from various NGOs. The honey head was then weighted and sold at a price of 20,000-30,000 riels (USD 5.0-7.5) per kilogram. Bee honey, on the other hand, was sold at 50,000-80,000 riels (USD 12.5-20.0) per liter after being processed and packed into bottles. Processing and packaging techniques have remained a challenge among villagers but are needed to improve honey quality, standard and hygiene.

### 3.2. Rattan

**Rattan are generally present in many natural forests across Cambodia.** At least 18 rattan species<sup>9</sup> have been identified and documented; and it was estimated that there would be more than 20 species across the country. Of which, 12 species<sup>10</sup> were identified to be used for commercial

<sup>4</sup> USAID (2009). Cambodia MSME 2/Bee Project: Wild Honeybee Baseline Survey.

<sup>5</sup> Ibid.

<sup>6</sup> Photo courtesy of [zoochat.com](http://zoochat.com) & [indnaturewatch.com](http://indnaturewatch.com) taken from the website

<https://growtherainbow.com/blogs/news/a-look-at-cambodias-honey-harvest-traditions-in-action>

<sup>7</sup> USAID (2009). Cambodia MSME 2/Bee Project: Wild Honeybee Baseline Survey.

<sup>8</sup> Ibid.

<sup>9</sup> Please refer to Annex 1.

<sup>10</sup> Ibid.

purposes in making furniture, baskets and other rattan products. Rattan can be processed into different kinds of furniture and handicraft products including bed, bookshelf, sofa, chair, basket and other decorating accessories. In addition to shelter and furniture products, rattan – especially its shoots and roots – is used for food and medicinal purposes by NTFP communities. Income from rattan industries contributed to local people was estimated at around USD 1.5 million.<sup>11</sup> Five provinces where villagers mainly relied on rattan as their income source include: Koh Kong, Kampong Thom, Kampot, Preah Vihear, and Preah Sihanouk provinces.<sup>12</sup>

Specifically for the CCM area, three types of rattan – among others – were mentioned in literatures. These include *Calamus kampucheaensis* (Phdao banla dang penh in Khmer language)<sup>13</sup>, *Calamus mellitus* (Phdao Toek Khmun)<sup>14</sup>, and *Plectocomia elongata* (Phdao Reussey Yeak or Phdao Dambang)<sup>15</sup>. The latter two species are suitable for furniture, while the usage of the former species could not be identified.

**Natural stocks of rattan in Cambodia along with other countries in the Lower Mekong Region (including Vietnam and Laos) has decreased, mainly due to forest loss and over-exploitation.**<sup>16</sup> This has raised concerns over environmental sustainability of rattan species. An interview with the owner of a handicraft enterprise in Veal Rinh district of Koh Kong province suggests a decrease in rattan supply. Daily material purchase of the enterprise plunged to only 200 canes in 2019, from some 10,000 canes in previous years, mainly due to continual exploitation over the past periods and deforestation for farm land. Rattan can be replanted, and it would take approximately four or five years to be ready for harvest and needs tall trees to support growth.

### 3.3. Malva nut

**Locally known as Sam Rong, Malva nut has been identified in 15 communes of Koh Kong and Pursat provinces.** The local name was provided after the name of the tree that bears the fruit, called Sam Rong tree in Khmer language. This tree is tall, which can be up to 20-30 meters height, and bears fruit only once a year.

**Malva nut was commonly collected in Koh Kong province during March and April.** It has also been processed into soft drink and desserts, for domestic markets. Since Sam Rong tree is tall making it hard for harvest, people tend to cut down trees in order to harvest fruits. This eventually leads to a continual decrease of its population, posing a challenge of ensuring a sustainable supply of the input.

### 3.4. Bamboo

**Bamboo has been identified in 14 communes across the CCM area.** *Bambusa procera* species, locally known as Tha Ngor bamboo, is a type of wild bamboo commonly found in these communes. This wild bamboo has long culm, which is suitable for processing into different products, including incense sticks, chopsticks, barbecue sticks, toothpicks, or furniture products.

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<sup>11</sup> Khoulang Chey et al. (2015). Sustainable cottage industries and the Rattan Association of Cambodia. ETFRN News 57. Page 118.

<sup>12</sup> Naven Hon et al. (2019). Sustainable Landscapes and Ecotourism in Cambodia. Conservation International. Page 12.

<sup>13</sup> Charles M. Peters et al. (2014). Systematics, Ecology and Management of Rattans in Cambodia, Laos and Vietnam: The Biological Bases of Sustainable Use. WWF/IKEA/NYBG.

<sup>14</sup> Ibid.

<sup>15</sup> Khou Eang Hourt (2008). A Field Guide of the Rattans of Cambodia. WWF Cambodia.

<sup>16</sup> Charles M. Peters et al. (2014). Systematics, Ecology and Management of Rattans in Cambodia, Laos and Vietnam: The Biological Bases of Sustainable Use. WWF/IKEA/NYBG. Page 17. Accessed in April 2019 from

Some studies, however, suggested that the other type of wild bamboo, locally known as Reussey Prey and scientifically called *Bambusa bambos*, is suitable for stick production.<sup>17</sup> Based on some sources, there are 17 species<sup>18</sup> of bamboo in Cambodia. These species possess different characteristics best fit for various purposes.

**Tha Ngor bamboo has been said to be highly concentrated in two communes, including Dang Peaeng of Srae Ambel district (Koh Kong) and Pramaoy commune of Veal Veang district (Pursat).** In Dang Peaeng, the natural bamboo stock was estimated at 3,000 hectares, which can secure a regular supply of raw material of one million bamboo poles per year for incense stick production of around 4,000 tons.<sup>19</sup> A proper management of resource extraction, however, would be required to ensure a sustainability of this natural stock.

**Bamboo natural stock in Cambodia has markedly declined compared to that in the past,** based on assessment of the Forest Administration using Landsat satellite imagery.<sup>20</sup> During 2002-2003, total bamboo coverage in the country was 28,000 hectares, a sharp drop of 90 percent from some 387,000 hectares in 1960. Bamboo exports were estimated at 12,157 tons during 2000-2006, mostly through informal trade and in unprocessed form to Vietnam and Thailand, according to the Forestry Administration data.<sup>21</sup>

Figure 3. *Bambusa procera* (young)



*Photo taken by Nuppun team in March 2019. Specimen taken from Siem Reap province.*

It is worth to note that bamboo possesses a latent potential favorable for environment protection. Its extensive root network allow bamboo to prevent soil erosion, assimilate carbon and preserve water table.<sup>22</sup> Bamboo can grow fast, especially in tropical countries. This fast growth makes bamboo an option for reforestation, which in turns improves ground water level and soil through the nutrients generated by plant debris.<sup>23</sup>

### 3.5. Cardamoms

**Two types of cardamoms that were identified by the study, namely Dangkor and Krervanh.** Having dark green color after being dried, Dangkor is a local name in Khmer language and

<sup>17</sup> 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 13.

<sup>18</sup> Website Chouk Khmer: <https://choukhmer.wordpress.com/agriculture/classification-of-forestrys-by-products/> accessed on April 03, 2019. Seventeen species of bamboo include, in local names: (1) Reussey Khlai, (2) Reussey Khlich, (3) Reussey Tha Ngor, (4) Reussey Tronum Moin, (5) Reussey Tronum Moin Phnom, (6) Reussey Ping Pung Thnau, (7) Reussey Ping Pung Snor, (8) Reussey Pok Thom, (9) Reussey Pok Touch, (10) Reussey Prey, (11) Reussey Prich Chanluonh, (12) Reussey Prich Sbart, (13) Reussey Roleak Thom, (14) Reussey Saanh, (15) Reussey Roleak Touch, (16) Reussey Loor, and (17) Reussey Atinh.

<sup>19</sup> WWF (2016). Business Plan on Community-Based Bamboo Stick Production Workshop for Phnom Toap Cheang Community Forestry (2016-2017).

<sup>20</sup> Enterprise Opportunity Ltd. (2006). Mekong Bamboo Sector Feasibility Study. IFC-MPDF/Oxfam Hong Kong. Page 90.

<sup>21</sup> Naven Hon et al. (2019). Sustainable Landscapes and Ecotourism in Cambodia. Conservation International. Page 10 & 16.

<sup>22</sup> Lugt P. et al. (2009). Bamboo, a Sustainable Solution for Western Europe Design Cases, LCAs and Land Use. International Network for Bamboo and Rattan. Page 11. Accessed from <http://www.aha-kh.com/wp-content/uploads/2017/01/4-inbar-bamboo-a-sustainable-solution-for-western-europe-design-cases-lcas-and-land-use.pdf> on April 03, 2019.

<sup>23</sup> Ibid.

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 (**Error! Reference source not found.**). *Amomum Krevanh* is its scientific name. 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 seed and leaf for medicinal purposes, and its tree 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 is highly concentrated in Pursat and less in Koh Kong.** It is present in 14 communes of the CCM but actively traded in only 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 sell their harvested fruit in fresh to middlemen who then dry it and sell to Vietnam and Thailand.

**Two forest communities, Tumpoar and Phek 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 an average of 15-20 kilograms of fresh fruit 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 fruit. 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 fruit, it would require around three kilograms of fresh one. And it would require three days to get it dried. Considering this conversion rate and time requirement, local people prefer selling Dangkor in fresh fruit to drying it before selling, since they can generate more income. However, the market for cardamoms has been bearish since 2017 until present, due to some unknown reasons.

Figure 4. Dangkor and Krervanh (right)



Photo taken by Nuppun team in April 2019.  
Specimen taken from Pursat province.

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 an average of 15-20 kilograms of fresh fruit 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 fruit. 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 fruit, it would require around three kilograms of fresh one. And it would require three days to get it dried. Considering this conversion rate and time requirement, local people prefer selling Dangkor in fresh fruit to drying it before selling, since they can generate more income. However, the market for cardamoms has been bearish since 2017 until present, due to some unknown reasons.

**Krervanh is rare and exists mainly in Pursat and some in Koh Kong.** It has also been identified in 14 communes of the CCM, especially in Ou Saom and Pramaoy communes of Veal Veang district. Krervanh has a quite similar harvesting period of around July until 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 fruit then drying it there before bringing back into the village. Because of these conditions, only men can go into the forest to harvest it. At the time of the study, there was no Krervanh cultivation or domestication activities were taken place in those communes yet. Each community in the two communes could harvest around 2,500 kilograms per year in dried fruit. It has been estimated that a household could harvest around 50-60 dried Krervanh per year. And only a few households – some 50 households out of the total 186 households in Tumpoar – went for the harvest.

### 3.6. Lingzhi mushroom

**Locally known as Phsit Reach Kol, Lingzhi mushroom was commonly found in Pramaoy commune, Pursat province.** It was named after the name of a tree on which this mushroom grows, especially during the rainy season. This tree is locally known as Reach Kol, grown in that area. Local people in Tumpoar forest community collected Lingzhi mushroom from May to November.

Similar to other mushroom types, Lingzhi growth is largely influenced by the precipitation of rains, since it needs moisture on log to grow.

Through interviews with local people, Lingzhi mushroom could provide income for many households in the community. A family member could collect around ten kilograms per year, and a household could collect approximately 30 to 40 kilograms in total. Collectors sold fresh mushroom at 25,000-45,000 riels (USD 6.25-11.25) per kilogram to middlemen who then exported to China. Local people in Tumpoar community affirmed the mushroom generally has a good market. Middlemen always come to buy the mushroom from the village.

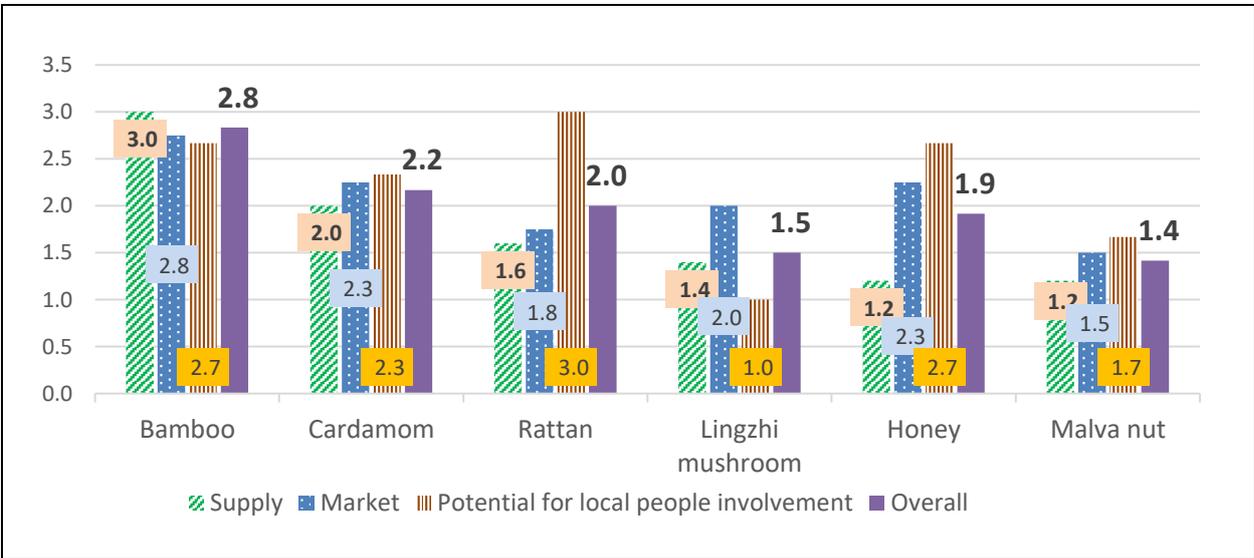
Lingzhi mushroom has yet been domesticated, although it has been an important income generation for local people in Tumpoar forest community. A common threat to this mushroom is the degradation of Reach Kol tree and its logs. The long-term investment might look at the possibility to domesticate or cultivate the mushroom.

#### 4. NTFP Prioritization

**To prioritize potential NTFPs identified in the study, three factors are taken into account:** of three main factors: supply, market and potential for local people involvement. Each factor is composed of different indicators. Factor and indicator weights have been proposed by the study team, to allow for a quantification using a scoring system between one and three that respectively signifies the lowest and highest scores. Reasons have been provided to support the scoring, which are mainly based on result of qualitative interviews and focus group discussions with NTFP communities in the CMM. Details of the scoring method have been presented in the Annex 2 – Study Methodology of this report.

**Prioritization of the NTFPs is still subjective, albeit employing a quantitative approach.** This subjectivity is partly influenced by the project priority which aims to improve the livelihood of NTFP communities in its target areas of the CMM. Scoring each indicator has been performed among the study team, by synthesizing findings from meetings with key stakeholders and local people. Only six out of the seven potential NTFP species identified above were selected for scoring. Gedraphol was excluded from scoring because it is usually sold as fresh fruit for local markets. Result of the prioritization is illustrated in Figure 5, whereas details are presented in Table 2 of the Annex section.

Figure 5. Result of NTFP prioritization



**Top three NTFP species with highest scores include bamboo, cardamom and rattan, considering the project implementation target.** A quite strong supply factor, mainly contributed by perceived large natural stocks of these NTFPs, markedly influenced the scoring. In this sense, Lingzhi mushroom and Malva nut, which were perceived to have limited natural stock and low potential for domestication, received low scores. Meanwhile, honey scored fairly well compared to rattan, but a concern on sustainable natural supply availability has dragged down its priority. The following sections, hence, discussed only the top two NTFP species which passed the prioritization process.

#### 4.1. Bamboo: the first priority

**Bamboo should be given the highest priority compared to other NTFP species, based on the scoring method proposed above.** It received 2.8 scores out of the total three scores. Natural bamboo stock is perceived to be large enough to secure a regular supply for processing, while bamboo has both high possibilities for cultivation and natural regeneration. These possibilities minimize the risk of environmental degradation resulting from natural bamboo stock depletion.

**Bamboo can be processed into a large arrays of products, depending on technologies used for processing.** These technologies can be classified into three categories: manual, low and high. Through manual method, bamboo can be processed into different types of furniture, bamboo handicrafts (baskets and other articles thereof), and other semi-finished products including in the form of different types of sticks. When using low technology, bamboo can be processed or re-processed into many products such as toothpick, barbecue stick, chopstick, incense stick, and bamboo mate.<sup>24</sup> If using high technology, bamboo can be processed into many industrial products: bamboo pellet or charcoal from bamboo waste, bamboo floor, bamboo plywood, bamboo pulp, and bamboo paper-based articles.<sup>25</sup> Combing these technologies can maximize the use of bamboo up its maximum potential.

**On the demand side, given a large number of its product derivatives, bamboo has already secured the market.** For local markets, there is a huge potential for bamboo products, especially for toothpick, barbecue stick, chopstick, and incense stick. A large proportion of demands 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.<sup>26</sup> This means that the other 70 percent of demand was supplied by imports. In Siem Reap province alone, annual market demand for bamboo chopsticks and barbecue sticks ranged between 15 and 18 tons, which were mainly supplied from Vietnam and few from China.<sup>27</sup> 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.<sup>28</sup> 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 demands for bamboo furniture and other bamboo

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<sup>24</sup> 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.

<sup>25</sup> INBAR (2014). International Trade of Bamboo and Rattan 2012. Accessed from <http://www.aha-kh.com/wp-content/uploads/2017/01/5-inbar-international-trade-of-bamboo-and-rattan-2012.pdf> on April 03, 2019.

<sup>26</sup> WWF (2016). Business Plan on Community-Based Bamboo Stick Production Workshop for Phnom Toap Cheang Community Forestry (2016-2017). Page 3.

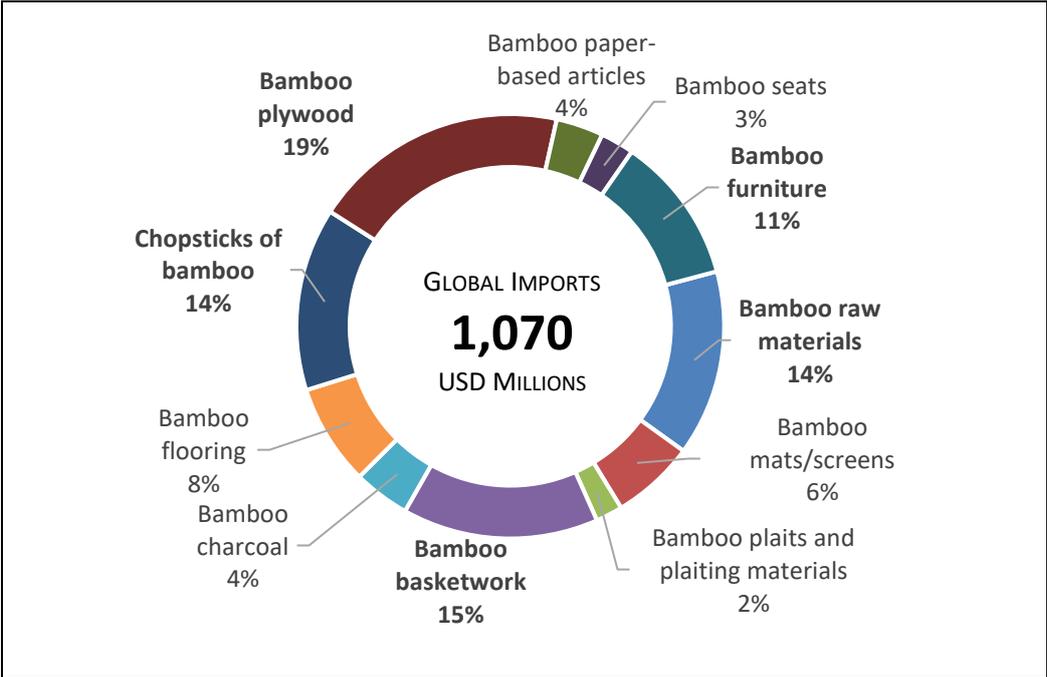
<sup>27</sup> GIZ (2013). Bamboo Sticks Prospectus: Investment Opportunity. Regional Economic Development Program (RED): Green Belt Siem Reap project. Accessed from <http://www.aha-kh.com/wp-content/uploads/2017/01/6-bamboo-sticks-prospectus.pdf> on April 03, 2019. Page 7.

<sup>28</sup> 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.

handicrafts, however, have decreased in recent years mainly due to changes in local buyers' preference which has now concentrated on wooden products.<sup>29</sup>

For international markets, main buyers of bamboo products are major advanced economies including the EU<sup>30</sup>, USA and Japan. Global imports<sup>31</sup> of bamboo products in 2017 were USD 1,070 million. Of which, EU share was one third, while that of USA and Japan accounted for 21 percent and 12 percent, respectively. Five main imported products included bamboo plywood, accounting 19 percent; bamboo basket work, 15 percent; bamboo chopsticks, 14 percent; bamboo raw materials, 14 percent; and bamboo furniture, 11 percent. Bamboo flooring and charcoal represented eight percent and four percent of the global imports, correspondingly (Figure 6).

**Figure 6. Global imports of bamboo products in 2017**



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

Chopsticks are commonly used in many Asian countries. In 2017, based on international trade statistics<sup>32</sup>, six major importing countries included: Japan (52 percent of USD 149 million), USA (12 percent), Taiwan (five percent), Netherlands and Thailand (four percent, each), and South Korea (three percent). China has been the main consumer and exporter of chopsticks. In 2011, China produced 60-80 billion pairs of bamboo chopsticks; of which, 40 percent was for domestic consumption and the other 60 percent for exports, mainly to Japan and South Korea.<sup>33</sup> Japan used between 23 and 25 billion pairs of chopsticks per year, making it the second largest consumer of

<sup>29</sup> Based on findings from quick market assessment that the study team conducted in Phnom Penh in February 2019.  
<sup>30</sup> This includes 27 countries of European Union (EU27).  
<sup>31</sup> Global imports of bamboo products include eleven items, based on Harmonized System (HS) code of 2007 version. These items include: bamboo raw materials (140110), bamboo mats/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), bamboo furniture (940382).  
<sup>32</sup> Based on ITC Trade Map database, accessed in April 2019.  
<sup>33</sup> 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 6. Based on original source “Chinese Bamboo Chopsticks Industry from 2009 to 2012”.

disposable chopsticks.<sup>34</sup> Bamboo chopsticks have become more attractive for Japanese importers, given the government tax imposed on wooden chopsticks.

**Several bamboo processing enterprises have sourced intermediate inputs from NTFP communities, paving ways for local people involvement.** Two enterprises were identified by the study, including Bopha Angkor enterprise in Thbong Khmum province and Cambambo enterprise in Siem Reap province. Sourcing semi-finished bamboo sticks from Toap Cheang community in Koh Kong, Bopha Angkor allocated half for its production of incense sticks and the other half for supplies to other incense 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.<sup>35</sup> 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.

Cambambo enterprise, on the other hand, started its operation in April 2018 and initially received seeding fund from a GIZ project, based the study team's interview with enterprise owner. It produced bamboo chopsticks and barbecue sticks by sourcing semi-finished bamboo sticks from several families that were its subcontractors in the province. To be subcontracted, local families need to invest several thousands of US dollars for machinery equipment. This can be challenge for NTFP communities. Only 13 percent of intermediate input can be used for bamboo chopsticks and barbecue sticks production, mainly due to bamboo characteristics which were hard, too thick, or not straight. It was suggested that the remaining 87 percent of bamboo waste can be processed into bamboo charcoal or pellets, if using higher technology which the enterprise is currently lacking.

In Pursat province, Tumpoar forest community has already had some experience in participating in bamboo value chain. This community is located in Pramaoy commune of Veal Veang district, where there is a large natural stock of Tha Ngor bamboo and Talipot palm, locally known as Traing or Samlarnh tree. Tha Ngor bamboo has a long culm and is suitable for processing different types of sticks; while, Samlarnh tree has a comparable quality with palm tree when processed into premium chopsticks. If processing chopsticks, these two NTFP species can be used. Given this favourable condition, a non-governmental organization called COCD chose this community as its target and provided trainings to local people to make bamboo baskets. The market for baskets was good at that time, making this handicraft work attractive for villagers. For some time later, the market became bearish and people could not generate as much income as before from this handicraft work. Hence, they decided to stop their production.

## 4.2. Cardamoms: the second priority

**Receiving 2.2 scores, cardamom should be placed in the second priority, after bamboo.** As its name specifies, cardamom can be a geographic identity of the CCM, especially Pursat province where Chourng and Poar ethnic groups have a tradition of harvesting cardamoms. This tradition is expressed by their iconic traditional dance performance.<sup>36</sup> Local people have already been involving in the supply chain. The natural stock of cardamoms is large but has a higher risk of degradation than bamboo due to its selective conditions, e.g. growing well in cold weather in the

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<sup>34</sup> 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 6. Based on original source "Chinese Bamboo Chopsticks Industry from 2009 to 2012".

<sup>35</sup> WWF (2016). Business Plan on Community-Based Bamboo Stick Production Workshop for Phnom Toap Cheang Community Forestry (2016-2017). Page 6.

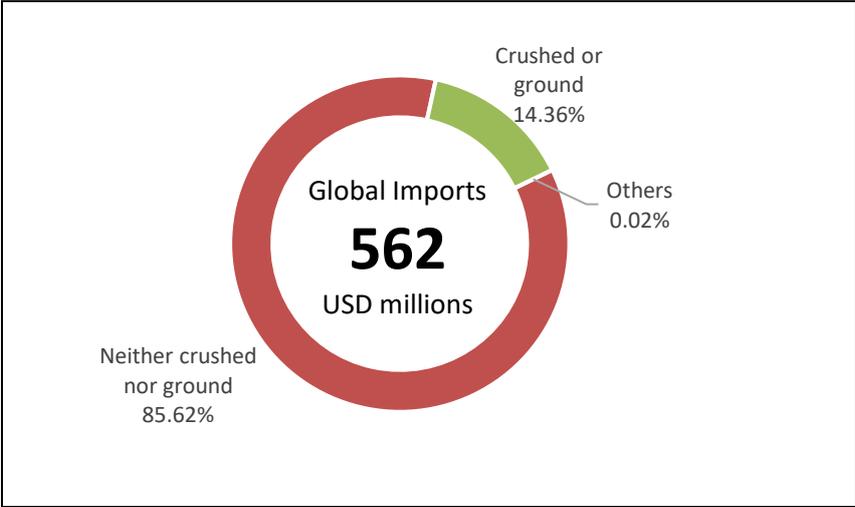
<sup>36</sup> According to the website <http://www.chanbokeo.com/index.php?gcm=1411&grid=127612&gtop=5233>

forest and on mountains. These conditions make domestication of cardamoms somewhat more difficult than bamboo. Based on field interviews, some villagers already tried to domesticate cardamoms nearby their houses but received little success as cardamoms did not grow well.

**Cardamom trade in the country is largely influenced by export demands, given minimal local demands.** International Trade Statistics<sup>37</sup> showed that Cambodia used to export dry cardamoms (neither crushed nor ground form) to Taiwan in 2014 and 2016, with total quantity of ten and six tons, respectively. The export value was USD13,000 and USD 8,000, correspondingly for 2014 and 2016. Probably because of these export demands, local trade of cardamoms in the country was active but then has become bearish since 2017.

**However, there remains potential international market demands for cardamom products.** Global imports of cardamom products<sup>38</sup> in 2017 was USD 562 million, 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 demands 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 (Asian). For processed cardamoms, the market is more diverse, reaching further to Europe and America in addition to the Middle East and Asia. 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 7. Global imports of cardamom products in 2017



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

### 4.3. Rattan: the third priority

**Rattan received a lower score of 2.0, compared to cardamoms and bamboo and should be placed in the third priority.** Supply factor was the main factor dragging down the scoring. Rattan has a high risk of natural stock depletion which can affect environment sustainability, although it currently has a large natural stock. For domestic cultivation, it would require between four and five years to be ready for harvest and need tall trees to support growth.

<sup>37</sup> Website: <https://www.trademap.org/Index.aspx> accessed in April 2019.

<sup>38</sup> 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).

**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 were no farming activities, villagers used rattan to make furniture, baskets or other accessories. They then sold to middlemen who in turn supplied to retailers in Phnom Penh. This situation has created 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 could sell later in the rainy season, where the supply becomes low. Rattan products made by NTFP communities were generally perceived by retailers as of lower quality and irregular supply in comparison with those made by enterprises. This second source of supply produced rattan products in large quantity by themselves and directly supplied to retailers. Their products were said to have a better design and more regularity.

**The study identified two main rattan processing enterprises currently in operation and supplying rattan furniture and baskets in the country: Veal Rinh Enterprise and Rattan Association of Cambodia (RAC).** Located in Preah Sihanouk province, Veal Rinh Enterprise produced furniture from rattan and bamboo. About 80 percent of its products were sold to depots in Phnom Penh and the rest to provinces, according to the enterprise owner. According to the owner of this enterprise, Veal Rinh enterprise supplied about 80 percent of rattan products in Phnom Penh, and it also sold to other retailing stores in other provinces. RAC had its own processing enterprise and worked with different forest communities in Cambodia. RAC bought rattan furniture from the local communities as well as raw rattans to supply its furniture enterprise.

**Local demand of 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 less quantity. Products with good sales included bookshelf and other accessories, since they have affordable prices. Retailer gross margin from rattan bookshelf and basket were USD 1.0 and USD 0.3, respectively. Squeezing both from the sales volume and margin made some handicraft manufacturers no longer competitive and out of the sector.

**Cambodian rattan has been traded both locally and for exports,** with a total traded volume of around 304 tons during 2000-2006.<sup>39</sup> Export procedures for NTFP products, including rattan, are more demanding than those of other products. Specifically for rattan, in addition to certificate of origin (CO) and other required documents, an export permit from the Ministry of Agriculture, Forestry and Fisheries (MAFF) is needed for exports of rattan items exceeding five kilograms per unit, according to the sub-degree 208 dated September 08, 2011.<sup>40</sup> Procedures for applying the export and transportation permits from MAFF involve five steps, as summarized in Figure 8.<sup>41</sup>

**Figure 8. Application procedures for export and transportation permits from MAFF**



<sup>39</sup> Based statistics of the Forestry Administration in 2006, cited from Naven Hon et al. (2019). Sustainable Landscapes and Ecotourism in Cambodia. Conservation International. Page 11.

<sup>40</sup> WWF and RAC (undated). Guidance for Export Procedure: Practical Guide for Rattan Handicrafts in Cambodia. World Wild Fund for Nature (WWF-Cambodia) and Rattan Association Cambodia. Page 37

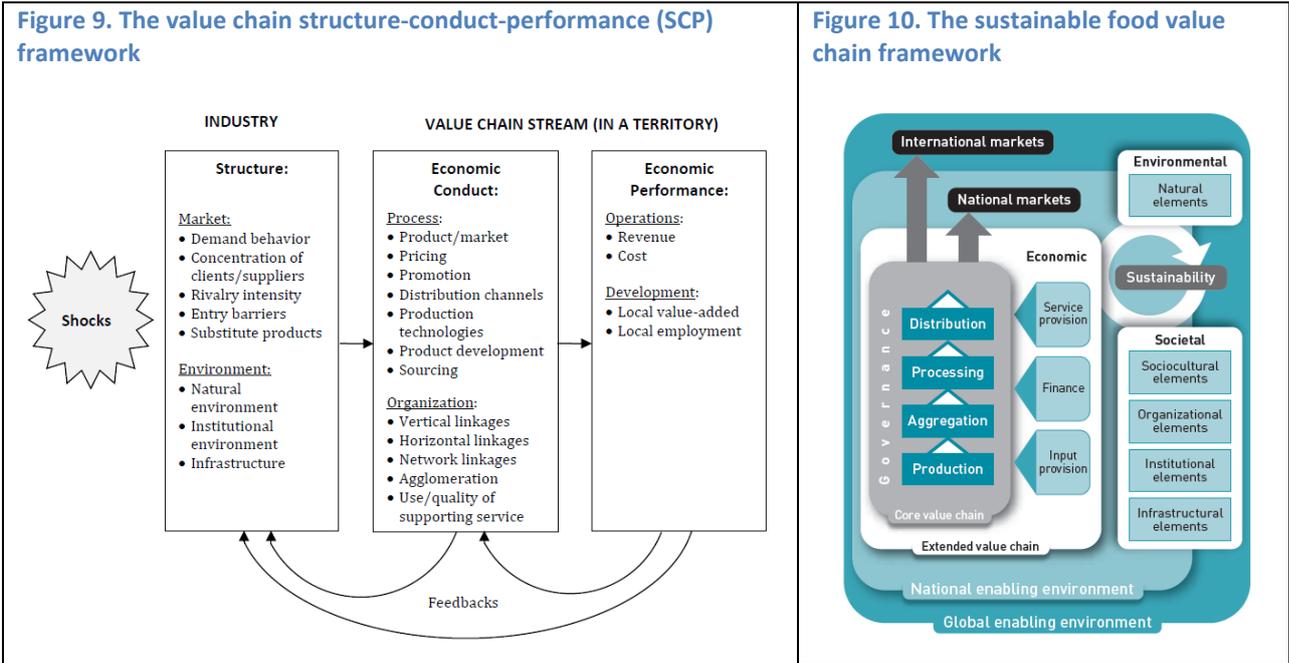
<sup>41</sup> Ibid. Page 35.

## 5. Concluding Remarks

The result of the prioritization exercise suggests three main NTFP species – including, in order of priority, bamboo, cardamoms and rattan – that 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. 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. 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.

Considering the availability of natural stocks of these three NTFP species, the study team suggest that in-depth studies on their value chain should be implemented with a focus on two main districts: Veal Veang district of Pursat province, and Srae Ambel district of Koh Kong province. As indicated in Table 5 of Annex 2, 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 unknown reasons, particularly since 2017.

In this regards, the value chain studies should stress on the identification of challenges faced by key value chain actors, capturing both failure and success stories of different enterprises. Doing this allows us to properly diagnose issues hampering growth of the three sectors and in turns propose solutions. Two value chain frameworks will be taken into account for the studies (Figure 9 and Figure 10).



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<sup>42</sup> Accessed from <https://www.ifama.org/resources/Documents/v19i3/1120150046.pdf> on 12 November 2018.

<sup>43</sup> Accessed from <http://www.fao.org/3/a-i3953e.pdf> on 12 November 2018.

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## Annex 1. Additional Notes on Rattan Species in Cambodia

### ▪ Names of 18 rattan species

Based on Khou Eang Hourt (2008), there were 18 rattan species including (local name in bracket): *Calamus lateralis* (unknown local name); *Calamus salicifolius* (Lpeak, or rice field rattan in English); *Calamus erinaceus* (Phdao Aeng/Phdao Toek Prai), *Calamus palustris* (Phdao Chhveang or Kbang, Kantrang, Ta-uonh); *Calamus tetradactylus* (Sae Soeung or Phdao Changret, Phdao Lpeak, Hapeak); *Calamus viminalis* (Phdao Krek or Phdao Kok, Phdao Lving, Tresh Sor, Phdao Kantel); *Calamus bousigonii* (Phdao Arech); *Calamus rudentum* (Phdao Dambang); *Calamus* sp (Phdao Toeuk Khmom); *Calamus guruba* (Phdao Achmoan or Phdao Tresh, Tresh Anchmoan); *Calamus siamensis* (Phdao Toeuk); *Calamus godefroyi* (Phdao Toeuk); *Daemonorops jenkinsiana* (Phdao Soam or Phdao Em); *Korthalsia laciniosa* (Preah Phdao or Phdao Krahorm); *Myrialepis paradoxa* (Phdao Reussey or Tresh Chheu); *Plectocomia elongata* (Phdao Reussey Yeak, also called Phdao Dambang in the south and southwest); *Plectocomia pierreana* (Chang O or Tresh Amboh, Phdao Reussey Msao); *Plectocomiopsis geminiflora* (Phdao Teang Oa, Phdao Thngae).

*Calamus* sp is also known as *Calamus mellitus*, based on Charles M. Peters et al. (2014). One more species that additionally identified by Charles (2014) was *Calamus kampucheaensis* (Phdao banla dang penh). There are in total 19 rattan species, if adding this newly identified.

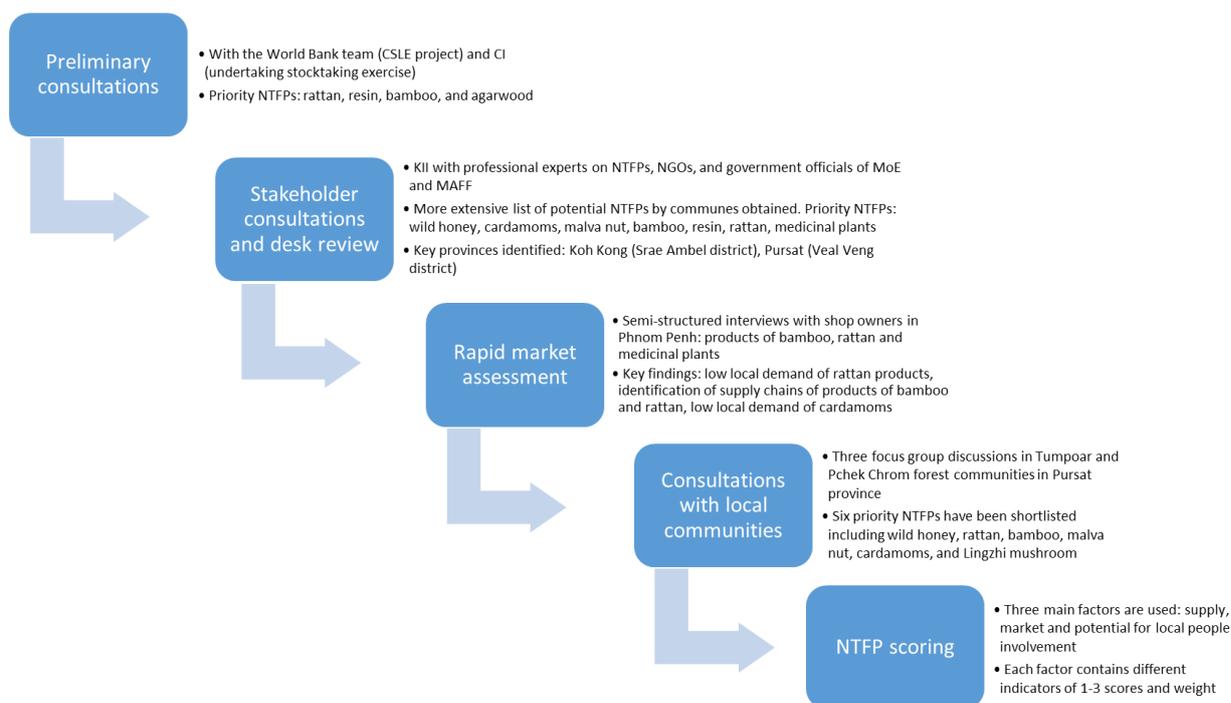
### ▪ Names of 12 commercial rattan species

Based on Khou Eang Hourt (2008), there were twelve rattan species that were used in making furniture and other rattan products. They included (local names in bracket): *Calamus salicifolius* (Lpeak); *Calamus erinaceus* (Phdao Aeng or Phdao Toek Prai); *Calamus palustris* (Phdao Chhveang or Kbang, Kantrang, Ta-uonh); *Calamus tetradactylus* (Sae Soeung or Phdao Changret, Phdao Lpeak, Hapeak); *Calamus viminalis* (Phdao Krek or Phdao Kok, Phdao Lving, Tresh Sor, Phdao Kantel); *Calamus rudentum* (Phdao Dambang); *Calamus* sp (Phdao Toeuk Khmom); *Calamus guruba* (Phdao Achmoan or Phdao Tresh, Tresh Anchmoan); *Calamus siamensis* (Phdao Toeuk); *Calamus godefroyi* (Phdao Toeuk); *Korthalsia laciniosa* (Preah Phdao or Phdao Krahorm); and *Myrialepis paradoxa* (Phdao Reussey or Tresh Chheu)

## Annex 2. Study Methodology

The overall methodology for the study comprised five steps: preliminary consultations, stakeholder consultations and desk review, rapid market assessment, consultations with local communities, and NTFP scoring. Quantitative approach has been used to construct a scoring system, which allows for NTFP prioritization.

Figure 11. Summary of the study methodology



1. **Preliminary consultations** with the World Bank team working with the Cambodian government on preparation of the CSLE project, and with Conservation International that undertook a recent stocktaking exercise, also in support of the CSLE project preparation.<sup>44</sup> The outcomes of the consultation were the identification of priority NTFPs for examination. These included rattan, resin, bamboo, and agarwood.
2. **Stakeholder consultations and desk review** of previous studies and publications and legal documents on NTFPs were undertaken. The consultations with relevant stakeholders and local communities were undertaken to prioritize NTFPs that have potential for commercialization as well as income generation of local households. The common questions for consultations included: (i) What are potential NTFPs? (ii) Is there high prevalence of the species? (iii) And whether the species is marketable (see Annex 4 for guiding questions). The participants were asked to prioritize identified NTFPs species from the top priority to lowest. In addition, the prevalence of NTFPs was accessed based on the observation of participants in the target project area. Following consultations were conducted in the study.

Key informant interviews with professional experts on NTFPs and non-governmental organizations (e.g. GIZ, Conservation International, World Wildlife Fund, UNDP, Rattan Association Cambodia, NTFP-EP, and Wildlife Alliance) were made to obtain the information

<sup>44</sup> Naven Hon et al. (2019). Sustainable Landscapes and Ecotourism in Cambodia. Conservation International. (Stocktaking Report for preparation of CSLE project).

on current prioritization of NTFPs in the areas, processing activities in local communities and market of NTFPs. Further, the consultation allowed the study to establish a general understanding on a shortfall of previous efforts on NTFPs and challenges faced by local people in processing the NTFPs for the market.

The concerned officials of the Department of Community Livelihood (DCL) and Provincial Departments of Environment (DoE) of the Ministry of Environment (MoE); and the Forestry Administration (FA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF) were consulted for information and feedback on listing of the potential NTFPs in their respective provinces. It is important to gather the insight information from the officials, who were directly working in the NTFPs sector, as a cross-check to the consultation with non-governmental organizations. The main consultation objectives were focused on the potential NTFPs in their provinces, natural availability of NTFPs species, and existing processing enterprises in the provinces. We consulted with one official from DCL; six officials of DoE from six provinces (Koh Kong, Kampong Speu, Pursat, Kampong Thom, Kampong Thom and Kampong Chhang provinces); and three officials of FA based in Kampong Speu and Koh Kong provinces.

Meanwhile, desk review was also conducted to get a better understanding of the NTFPs sectors; whereas secondary data, especially international trade data, were collected mainly from the International Trade Center of the World Trade Organization. Key existing research reports included: those published by the World Wildlife Fund (WWF), mainly for rattan and bamboos; German International Development Agency (GIZ), specifically focus on bamboos; International Network for Bamboo and Rattan (INBAR). List of these reports is presented in the Reference section above.

Findings from this step allowed the study team to construct a more comprehensive list of NTFPs at commune level (Table 5). This list also helped to identify key locations of NTFPs in the study area, which included two provinces: Koh Kong (Srae Ambel district) and Pursat (Veal Veang district).

3. **A rapid market assessment** was made to identify the opportunities and challenges of the NTFPs trading in the current market, mainly to capture the current situation of the demand. The indicative list of NTFPs obtained from the first and second steps of the study activities suggests several NTFP products that are currently sold in local market, especially products of bamboo, rattan, and medicinal plants. Similar to other products in Cambodia, Phnom Penh is known for a distribution center of products to provinces.

In this regards, the assessment focused on the demand of the furniture products made of bamboo and rattan, and the demand of medicinal plants, which are available in retailing shops in Phnom Penh. The approach of market assessment is to conduct the interview with NTFPs retailers. The result of this assessment allows us to understand the gap between demand and supply of products from NTFPs from retailers' perspective, how well the supply matches with the demand, and what the challenges facing by retailers as well as producers. The market assessment covers areas of Tonle Bassac, Psar Deum Tkov and Borei Keila, where the main retailing stores selling products of bamboo and rattan were located. We conducted semi-structure interviews with four furniture retailing stores in total. These stores sourced final products of bamboo and rattan from manufacturers and communities from different places including: Koh Kong, Preah Sihanouk, Kampong Speu, Siem Reap, Battambang, Kandal, Prey Veng, and Takeo provinces. These stores also sold furniture made from woods. One store amongst the four used to have its own handicraft manufacturing, which produced materials and furniture from rattan and bamboo. However, the manufacturing was closed because of the high operation cost and low demand of handicraft products. On the other hand, the medicinal

plants retail stores were available in O'Reussey market, which is also included in this assessment. It is impossible for the assessment to cover all NTFPs products, particularly resin, because it is directly traded to foreign markets after collecting from forests, which is unable to trace the intermediate and final products in Cambodian market. The study team could not identify resin processing firm or business in the country, at the time writing this report. Forest communities collect resin and then sold it in raw to middlemen who then informally exported to Vietnam and further to China.<sup>45</sup>

This assessment helped the study team to better understand supply chains of bamboo and rattan products, and to confirm that current local demand of rattan products became low in recent years. It also helped to confirm that local demand of cardamoms is low.

4. **Consultations with local communities** were undertaken in Tumpoar and Pchek Chrom forest communities in Pursat province. The list of NTFPs obtained from consultations suggested two provinces of Koh Kong and Pursat, where large number of NTFP species are located. For the first phase of this study, only Pursat was selected for the consultation which comprised three mini-group discussions: two with male participants and one with female participants. The groups' participants composed of village head, head of forest communities, and members of forest communities, who were the NTFPs collectors. The consultations were expected to corroborate on the potential NTFPs from local people's perspective, and to understand on how local people harvested, processed, and traded NTFPs. The consultation also sought to have local people's perception on the natural availability and sustainability of NTFPs in the forests, willingness to process NTFPs, and potential economic benefit from NTFPs on their livelihood.

These consultations helped to expand the list of NTFP species, including Lingzhi mushroom, Talipot palm and Saum fruit; and to provide additional information needed for prioritizing NTFPs. They also helped to distinguish two types of cardamoms: Dangokor and Krervanh in Khmer language. Up to this stage, six priority NTFPs have been shortlisted including wild honey, rattan, bamboo, malva nut, cardamoms, and Lingzhi mushroom.

5. **NTFP scoring** was conducted, by analyzing information collected from stakeholder consultations and literature review to prioritize top three NTFPs – as targeted by the project – that would be recommended for further value chain analysis. The scoring system was developed and composed of three main factors: supply, market and potential for local people involvement. Each factor is composed of different indicators. Factor and indicator weights have been proposed by the study team, to allow for a quantification using a scoring system between one and three that respectively signifies the lowest and highest scores. Reasons have been provided to support the scoring, which are mainly based on result of qualitative interviews and focus group discussions with NTFP communities in the CMM.

As summarized in Table 1, the supply factor has been set in the first priority with a total weight of 50 points, considering the nature of NTFPs which largely relies on the natural availability. The market factor is in the second priority and has a total weight of 40 points, followed by the potential for local people involvement as the third priority with a total weight of 30 points. The idea is to make sure that available NTFPs have either existing or potential markets; and once the market exists, the possibility of engaging local people into the supply chain has then been assessed.

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<sup>45</sup> Bruce McKenney et al. (2004). Focusing on Cambodia's High Value Forests: Livelihoods and Management. Cambodia Development Resource Institute, and Wildlife Conservation Society.

**Table 1. Scoring methodology**

Key Factors	Factor Weight	Indicators	Indicator Weight	Score
Supply	50	Available quantity perceived by local people	10	1-3
		Available period	10	1-3
		Potential for cultivation	10	1-3
		Potential for natural regeneration	20	1-3
Market	40	Suitable product derivatives	10	1-3
		Market demand	20	1-3
		Income generation perceived by local people	10	1-3
Potential for local people involvement	30	Potential for involvement of local people in processing	10	1-3
		Existing processing enterprises and upgrading potential	20	1-3
<b>Overall factor</b>	<b>120</b>	<b>Overall indicator = weighted average score</b>		<b>1-3</b>

Source: Nuppun study team.

The supply factor depicts mainly the availability of NTFPs, including the sustainability aspect. It therefore consists of four indicators, namely available quantity perceived by local people who have been living in the NTFP areas, available period or harvesting period of NTFPs, potential for cultivation or domestication, and potential for natural regeneration. The latter two indicators capture the sustainability aspect; whereas, the former two indicates the current availability of supplies. To stress on the sustainability of natural supply, the fourth indicator – potential for natural regeneration – has been provided more weight than others of 20 points.

The market factor portrays the demand side of NTFPs, in terms of product arrays and their current and potential demands. This comprises three indicators including suitable product derivatives, market demand and income generation perceived by local people. Product derivatives refer to the number of products that can be derived or processed from NTFP species. They are composed of existing products and those considered as potentially suitable for alignment with existing processing chains, so that value addition or efficiency of the processing industries can be increased. Meanwhile, market demand indicator is considered as a key indicator, having more weight than others of 20 points. The income indicator represents the role of income sources generated from NTFP related activities; and based on their perception, local people categorized these sources into two types, including the long term and regular income source from NTFPs and the additional one for which a lower score is provided.

The factor related to potential involvement of local people qualitatively assesses the possibility to engage NTFP communities in the value chain, so that their livelihood can be improved. This factor consists of two indicators that identify the involvement of local people in the value chains through different business models of existing processing enterprises. The existence of processing enterprises is crucial for the involvement of local people, hence having been provided with a higher weight compared to others of 20 points.

## Annex 3. Supporting Tables

Table 2. Summary assessment result of potential NTFP species

NTFP	Key Factors		Indicators	Weight	Score	Explanation
Bamboo	Supply	3.00	Available quantity perceived by local people	10	3	Large quantity in Koh Kong and medium in Pursat
			Available period	10	3	All year round
			Potential for cultivation	10	3	High possibility for cultivation
			Potential for natural regeneration	20	3	High possibility for natural regeneration
	Market	2.75	Suitable product derivatives	10	3	Chopsticks, barbecue stick, furniture, floor, charcola (potential), paper (potential)
			Market demand	20	3	Local market, import substitutions, exports
			Income generation perceived by local people	10	2	Long term and regular income source, but not the main source
	Potential for local people involvement	2.67	Potential for involvement of local people in processing	10	2	Existing business model in Siem Reap; local people used to be trained to make bamboo products; but requiring some additional training and capital
			Existing processing enterprises and upgrading potential	20	3	Processing industry already exists
	<b>Overall score</b>				<b>120</b>	<b>2.8</b>
Cardamom	Supply	2.00	Available quantity perceived by local people	10	3	Large quantity in Pursat and low in Koh Kong
			Available period	10	2	July - September
			Potential for cultivation	10	1	Low, after unsuccessful trial by local people
			Potential for natural regeneration	20	2	Medium
	Market	2.25	Suitable product derivatives	10	2	Medicinal ingredients, spices
			Market demand	20	2	Used to have high demands during periods prior to 2017. Bearish markets until now, for unknown reasons
			Income generation perceived by local people	10	3	Additional income source, but providing high income comparable to paddy rice which is a main crop
	Potential for local people involvement	2.33	Potential for involvement of local people in processing	10	3	For Takor, local people selling fresh; for Krervanh, selling in dry but requiring long period to stay in forest
			Existing processing enterprises and upgrading potential	20	2	Limited and basic drying facilities by middlemen
	<b>Overall score</b>				<b>120</b>	<b>2.2</b>
Rattan	Supply	1.60	Available quantity perceived by local people	10	2	Large quantity in Koh Kong and low in Pursat
			Available period	10	3	All year round
			Potential for cultivation	10	1	Low
			Potential for natural regeneration	20	1	Low, requiring long time and high risk of natural stock depletion
	Market	1.75	Suitable product derivatives	10	2	Furniture
			Market demand	20	2	Local market, but currently less popular; complicated export procedures
			Income generation perceived by local people	10	1	Long term and regular income source
	Potential for local people involvement	3.00	Potential for involvement of local people in processing	10	3	Business model already exists, but facing steep challenges from market and natural stock depletion
			Existing processing enterprises and upgrading potential	20	3	Processing industry already exists
	<b>Overall score</b>				<b>120</b>	<b>2.0</b>
Lingzhi mushroom	Supply	1.40	Available quantity perceived by local people	10	2	Medium quantity in Pursat and low in Kampong Speu
			Available period	10	2	May - November
			Potential for cultivation	10	1	Low
			Potential for natural regeneration	20	1	Low, largely dependent on existing of Reachkol trees
	Market	2.00	Suitable product derivatives	10	1	Medicinal ingredients
			Market demand	20	3	High demands in China, exported through Thailand and Vietnam
			Income generation perceived by local people	10	1	Additional income source
	Potential for local people involvement	1.00	Potential for involvement of local people in processing	10	1	Low, since local people just dry it
			Existing processing enterprises and upgrading potential	20	1	No processing, only collectors
	<b>Overall score</b>				<b>120</b>	<b>1.5</b>
Giant honeybee	Supply	1.20	Available quantity perceived by local people	10	1	High availability in Koh Kong
			Available period	10	2	March - May
			Potential for cultivation	10	1	Low
			Potential for natural regeneration	20	1	Currently at decreasing population
	Market	2.25	Suitable product derivatives	10	1	Natural honey
			Market demand	20	3	Both local and export markets
			Income generation perceived by local people	10	2	Additional income source
	Potential for local people involvement	2.67	Potential for involvement of local people in processing	10	2	Medium, as it requires some trainings for both harvest and processing
			Existing processing enterprises and upgrading potential	20	3	Few processing companies exist
	<b>Overall score</b>				<b>120</b>	<b>1.9</b>
Malva nut	Supply	1.20	Available quantity perceived by local people	10	1	High availability in Koh Kong
			Available period	10	2	March - April
			Potential for cultivation	10	1	Low
			Potential for natural regeneration	20	1	Suceptible to decreasing population of Malva tree, due to inappropriate harvest technique
	Market	1.50	Suitable product derivatives	10	1	Soft drinks and desserts
			Market demand	20	2	Local market
			Income generation perceived by local people	10	1	Additional income source
	Potential for local people involvement	1.67	Potential for involvement of local people in processing	10	1	Medium, as it requires climbing up tall trees
			Existing processing enterprises and upgrading potential	20	2	One processing company identified
	<b>Overall score</b>				<b>120</b>	<b>1.4</b>

**Table 3. List of existing bamboo processing enterprises identified in the Phase 1 of the study**

Enterprise	Products	Location	Contact
Cambamboo	Chopsticks and barbeque sticks	Varin district, Siem Reap province	Mr. Soun Chanimonimol 012 2 45 45
Bopha Angkor	Incense stick	Thbong Khmum province	Mr. Say Touch 017 65 19 89
Veal Rinh Enterprise	Furniture from bamboo and rattan	Preah Sihanouk province	Mrs. Choung Vanny 012 97 22 54
Rattan Association Cambodia	Furniture from bamboo and rattan	Phnom Penh	

**Table 4. List of consultative meetings**

Institution	Meeting schedule
1) WWF	January 22, 2019
2) UNDP	January 25, 2019
3) NTFP-EP	January 31, 2019
4) NTFP researcher (individual)	January 30, 2019
5) Conservatives International	February 18, 2018
6) GIZ	February 18, 2018
7) Ministry of Environment Department of Community Livelihood	February 20, 2019
8) Rattan Association of Cambodia	February 20, 2019
9) Wildlife Alliance	February 22, 2019
10) Veal Rinh Furniture Enterprise	February 29, 2019
11) Tumpoar Forest Community	March 09, 2019
12) Pchoek Chrum Forest Community	March 10, 2019
13) Cambamboo Enterprise	March 11, 2019
14) Department of Environment in Koh Kong	March 1, 2019
15) Department of Environment in Battambang	March 1, 2019
16) Department of Environment in Kampong Thom	March 1, 2019
17) Department of Environment in Kampong Speu	February 28, 2019
18) Department of Environment in Pursat	February 28, 2019
19) Forest Administration in Kampong Speu	March 4, 2019
20) Forest Administration in Koh Kong	March 4, 2019
21) Forest Administration in Kampong Speu	March 6, 2019
22) (Malva nut processing company)	(Rejected)

Table 5. Indicative listing of commercial NTFP species in the CCM

CommGis	Province	District	Commune	Commercial NTFP Species by Local Name																Total NTFPs
				Phsit Paak	Phsit Chheu/ Phsit Chamras/ Phsit Ro Ngea	Phsit Pcheuk	Phsit Linh Chi	Choi Chong	Teuk Khmum	Tom Paing	Reussey	Sam Roring	Kuy	Dangkor	Krervanh	Pdao	Phsit Smach	Plae Saum	Samlarnh	
				Commercial NTFP Species by English Name																
				False earthstar	Chheu mushroom	Peheuk mushroom	Lingzhi mushroom	Resin	Honey	Bamboo shoot	Bamboo	Malva nut	Gedraphol	Cardamom (Ovoideum)	Cardamom (Kervanh)	Rattan	Smach mushroom	Saum fruit	Talipot palm	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
050403	Kampong Speu	Aoral	Trapeang Chour		1	1	1	1	1	1	1	1	1				9			
050405	Kampong Speu	Aoral	Ta Sal		1	1	1	1	1	1	1	1	1				9			
090303	Koh Kong	Kaoh Kong	Ta Tai Kraom					1		1	1	1	1	1	1		8			
090304	Koh Kong	Kaoh Kong	Trapeang Rung					1		1	1	1	1	1	1		8			
090503	Koh Kong	Mondol Seima	Tuol Kokir					1		1	1	1	1	1	1		7			
090602	Koh Kong	Srae Ambel	Chi Kha Kraom					1		1	1	1	1	1	1		8			
090603	Koh Kong	Srae Ambel	Chi kha Leu					1		1	1	1	1	1	1		8			
090604	Koh Kong	Srae Ambel	Chrouy Svay					1									1			
090605	Koh Kong	Srae Ambel	Dang Peaeng					1	1	1	1	1	1	1	1		9			
090701	Koh Kong	Thma Bang	Ta Tey Leu					1		1	1	1	1	1	1		8			
090702	Koh Kong	Thma Bang	Pralay					1		1	1	1	1	1	1		8			
090703	Koh Kong	Thma Bang	Chumnoab					1		1	1	1	1	1	1		8			
090704	Koh Kong	Thma Bang	Ruessei Chrum					1		1	1	1	1	1	1		8			
090706	Koh Kong	Thma Bang	Thma Doun Pov					1		1	1	1	1	1	1		7			
150406	Pursat	Phnum Kravanh	Santreae	1	1			1			1			1			5			
150601	Pursat	Veal Veang	Ou Saom	1	1			1	1	1	1	1	1	1			10			
150602	Pursat	Veal Veang	Krapeu Pir	1	1			1	1	1	1			1			7			
150603	Pursat	Veal Veang	Anlong Reab	1	1			1	1	1	1			1			8			
150604	Pursat	Veal Veang	Pramaoy	1	1		1	1	1			1	1			1	11			
150605	Pursat	Veal Veang	Thma Da	1	1			1	1	1	1	1	1				8			
<b>Total location</b>				<b>6</b>	<b>8</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>20</b>	<b>7</b>	<b>15</b>	<b>15</b>	<b>17</b>	<b>14</b>	<b>14</b>	<b>19</b>	<b>11</b>	<b>1</b>	<b>1</b>	

Note: (i) Location names are based on Commune Database 2016 version; (ii) Names of NTFP commodities are local names (Khmer language). Commercial NTFP commodities are those having already generated income for villagers; (iii) The identification process was done based on the existence of NTFP commodities, but not on their volume or quantity; (iv) bold-style commune names mark those having commercial NTFPs of at least 10 commodities.

**Table 6. List of commercial NTFP species identified in Central Cardamom Mountains**

N <sup>o</sup>	Khmer Name	Local Name	English Name	Scientific Name	Picture	Present (Number of Communes)
1.	ផ្សិតប៉ក់	Phsit Paak	Hygroscopic earthstar/ Barometer earthstar/ False earthstar	Astraeus hygrometricus		6
2.	ផ្សិតឃើ/ផ្សិតបាវ/ផ្សិតដា	Phsit Chheu/Phsit Chamras/Phsit Ro Ngea	Chheu mushroom	(Not available)		8
3.	ផ្សិតផ្ទឹក	Phsit Pcheuk	Pcheuk mushroom	(Not available)	(Not available)	2
4.	ផ្សិតលីញដី	Phsit Linh Chi	Lingzhi mushroom / Reishi mushroom	Ganoderma lucidum		3

N°	Khmer Name	Local Name	English Name	Scientific Name	Picture	Present (Number of Communes)
5.	ជ័រចុង	Choi Chong	Resin	(Not available)		2
6.	ទឹកឃ្មុំ (ឃ្មុំធំ)	Teuk Khmum (Khmum Thom)	Honey	Apis dorsata species		20
7.	ទំពាំង	Tom Paing	Bamboo shoot	(Not available)		6

N <sup>o</sup>	Khmer Name	Local Name	English Name	Scientific Name	Picture	Present (Number of Communes)
8.	ប្រស្នីថ្លែវ	Reussey Tha Ngor	Bamboo	Bambusa procera		14
9.	ស្រែស្រង	Sam Rorong	Malva nut	Scaphium affine		15
10.	ផ្លែក្លាយ	Kuy	Gedraphol	Willughbeia edulis		18
11.	ដង្កោ	Dangkor	Cardamom (Ovoideum)	Amomum ovoideum		14

N <sup>o</sup>	Khmer Name	Local Name	English Name	Scientific Name	Picture	Present (Number of Communes)
12.	ក្រវ៉ាញ	Krevanh	Cardamom (Krevanh)	Amomum krevanh		14
13.	ជ្រៃ	Pdao	Rattan	Calamoideae		19
14.	ជ្រូកស្នាច់	Phsit Smach	Smach mushroom	(Not available)	(Not available)	11
15.	ផ្លែសោម	Plae Saum	Saum fruit	(Not available)		1

N°	Khmer Name	Local Name	English Name	Scientific Name	Picture	Present (Number of Communes)
16.	ដើមត្រាង/សំឡាញ	Deum Traing/Samlarnh	Talipot palm	Corypha umbraculifera		1

## Annex 4. List of consultative guidelines

### Box 1. Key stakeholder consultative guideline

<p>NTFP Value Chain Analysis <b>Key Stakeholder Consultative Guideline</b></p>
<p><b>a. Background</b></p> <ol style="list-style-type: none"><li>1) What are the types of NTFP that your institution has supported/ worked on in Cambodia?</li><li>2) What are areas of NTFP projects?</li></ol>
<p><b>b. Potential NTFPs</b></p> <ol style="list-style-type: none"><li>3) Could you identify the current potential NTFPs? Why? Prompts: Is there a large market demand for products in Cambodia? Could the raw materials be supplied all year around? What do you think about the product quality? Producer's skills?"</li><li>4) How do the forest communities/families make the products from collected NTFPs? Prompts: do they have the machines for processing?</li><li>5) What do you perceive as the potential challenges for NTFPs to access the market? Prompts: does producers have adequate skills? Is there technology available for processing or making the final products? Is there a market? Law/regulations?</li></ol>
<p><b>c. Further study</b></p> <ol style="list-style-type: none"><li>6) Any suggestion for the study on NTFPs?</li><li>7) Could you recommend any potential institutions that our team should meet for this study (NGOs, community, private company)?</li></ol>

### Box 2. Quick market assessment guide

<p>NTFP Value Chain Analysis <b>Quick Market Assessment Guideline</b></p>
<ol style="list-style-type: none"><li>1. What are the products that your store selling?</li><li>2. Who are the suppliers of these products? Where they came from?</li><li>3. Are there any products that have a market demand but there is supply? Prompt: are there products that customer could find in your stores? Are there any products that you have in your store but no one looks for them?</li><li>4. Is the price competitive? Why?</li><li>5. How regular is supply of these material/ or medicinal plants to your store? Prompt: Could you have the supply anytime you need? Is there any particular season that the supply of the products available?</li><li>6. What could you perceive as main challenges for market demand and supply of NTFPs product in your store?</li></ol>