### Introduction

*Garcinia cowa* Roxb. (Guttiferaeae), commonly known as *cowa*, is a lesser-known species that originates from southeast Asia and is found throughout Thailand, where it is known as cha muang. It is one of the 22 *Garcinia* species reported in Thailand, of which mangosteen (*G. mangostana*) is the most well-known (Smitinand, 1980). Cowa is a small- to medium-sized tree whose young leaves...
and berries are both edible (Yapwattanaphun et al., 2002). It usually grows wild along the margins of forests in various parts of Thailand. This tree grows especially well in coastal areas such as in Chanthaburi, Trat and Rayong Provinces along the east coast of Thailand where the soil is mainly alluvial. Traditionally, it has been used in folk medicine for various purposes (Lim, 2012). For instance, its bark and latex have been used as an antipyretic (anti-fever) and antimicrobial agent (Na Pattalung et al., 1994; Panthong et al., 2006; Ritthiwigrom et al., 2013). The tree produces small, edible fruits that contain hydroxycitric acid (Jena et al., 2002) and are believed to help against fever, stomach ache and constipation. *G. cowa* trees were domesticated in home gardens after farmers discovered their medicinal properties and the potential of their use as a spice or food ingredient in local cuisine at least a hundred years ago. Correspondingly, using the *G. cowa* tree leaves in traditional food recipes has been in practice for about the same length of time. *G. cowa* is now commonly grown in home gardens and orchards by the farmers in Chanthaburi Province. The geography of the region is characterized by short mountain ranges alternating with short river basins that drain into the Gulf of Thailand. The soils in this area are moderately to highly fertile and the climate is characterized by high humidity (72–80 per cent) and warm temperatures (21–35°C). The rainy season begins in May and continues intermittently until the end of October with an average annual rainfall of 2,565 mm (2010–2012). These conditions favour fruit tree production as well as other marketable crops.

Farmers’ livelihoods in Chanthaburi province are generally dependent on commercial tropical fruit tree production with occasional additional income derived from non-farm labour. The most popular crops grown commercially are durian (*Durio zibethinus* Murr.) and mangosteen (*Garcinia mangostana* L.), next to less dominant species like rambutan (*Nephelium lappaceum*), salak (*Salacca zalacca*), longan (*Dimocarpus longan*) and langsat (*Lansium domesticum*). During the last three to four decades, Chanthaburi Province has developed from being a region with a traditional farming system with orchards and home gardens combining a wide range of tree species into the major production regions of durian and mangosteen in Thailand. Though monocropping commercial orchards and the number of durian and mangosteen trees have increased sharply, the number of rambutan and mango trees has dwindled. Populations of *G. cowa* have been less affected as their populations have always been small, reflecting its main use as home consumption only. The average farm income in Chanthaburi is about US$300 per month.

**Identification of good practice for diversity**

The women’s group led by Mrs Yupa Niyomvanich was identified as one of the key stakeholders of the UNEP/GEF funded project, ‘Conservation and Sustainable Use of Cultivated and Wild Tropical Fruit Diversity: Promoting Sustainable Livelihoods, Food Security and Ecosystem Services’ during the initial proposal development phase and baseline survey in 2009. Focus group
discussions making use of participatory research tools such as Venn diagrams, Four Cell Analysis (FCA) and Timeline were used to collect information. FCA was used to understand the richness, abundance and trends of local fruit tree diversity. Venn diagrams were used to identify key stakeholders involved in fruit tree production and related value chains. The Timeline was used to document the overview of historical developments that have affected the level of diversity in the area. Mrs Yupa Niyomvanich’s process group is participating in the OTOP\textsuperscript{1} (One Tambon One Product) programme of the Thai government and is locally well-known for her innovative product Moo Chamuang, a traditional Thai dish famous from this region, which she has managed to commercialize and promote among group members.\textsuperscript{2} As well as this, the group produces candies or paste made from mangosteen and flakes or chips from durian among several other products made from fruit trees. Several key informant interviews were conducted with her and the group members to document in more detail the process and major driving forces that facilitated the commercialization of Moo Chamuang among several other products.

**Description of good practice for diversity**

The women’s processing group was established in 1983 after a major storm damaged the community’s durian and mangosteen trees and caused the fruits to fall (Kruijssen et al., 2008). The quality of these fallen or bruised fruits was considered too low to be marketed fresh and therefore some of the women members of the community decided to process the fruits in their homes. In the following years, the women began to counter the low prices of the oversupply in the glut season by using fallen or excess fruits to make paste, candies, flakes and other products to fetch a higher price or to be able to lengthen their shelf life. Assisted by the district-level government, the women established a cooperative, learned to process several kinds of fruits and later acquired a building with processing facilities and a small market outlet (Kruijssen et al., 2008).

In 2004, the Khlong Narai women’s group started producing a local food dish named Moo Chamuang, a spicy pork curry blended with young leaves of the \textit{G. cowa} tree for sale in local markets. Young leaves of \textit{G. cowa} are traditionally used as a souring spice in Thai cuisine. The Khlong Narai women’s group was the first to market this popular dish for which the Chanthaburi region is famous. Mrs Yupa Niyomvanich used her own recipe, which has exquisite taste and quality according to her peers. Plate 70 illustrates the processing steps of this GPD. The spicy pork curry is seasoned with a paste of grilled shallots, galangal rhizomes, dried chillies and crushed \textit{G. cowa} leaves. The leaves add a distinct sourish taste to Moo Chamuang, which greatly improves the pork taste, according to local villagers.

Initially the group sold the spicy pork dish directly to consumers at a stand at the local market. Seeing the success, the group decided in 2004 to produce Moo Chamuang in a sealed plastic pack to reach out to multiple market outlets,
improve shelf life and enable long-distance distribution to a wider group of customers. Seven years later, the women’s group began to produce canned *Moo Chamuang* for sale in local and external markets. In the first years they made use of the canning facilities of another processing group, but since 2011 they have used their own canning facility (see Table 25.1). They managed to obtain food quality certification for the product by the Food and Drug Administration of Thailand to guarantee food safety and to attract and strengthen consumer interest.

The value-added products were initially sold to diverse market outlets such as village markets and shop stalls at various exhibitions, fairs and festivals. Lately, the women’s group has also been collaborating with the Thailand Post Company to deliver products domestically and globally, thus improving their ability to penetrate more distant markets. Currently, the women’s group is able to sell more than 1,200 cans of *Moo Chamuang* per month. In the near future they plan to increase their sales by exploring new market channels, such as exporting products to foreign markets, and expanding production capacity.

*Moo Chamuang* can be regarded as the most successful product of the Khlong Narai women group. However, before venturing into *Moo Chamuang*, the women’s group had explored many other products made from a wide range of fruit trees species as found in their gardens (see Table 25.2). Of this long list of products, at present *Moo Chamuang* generates the most income, followed by mangosteen preserve (paste). Mrs Yupa Niyomvanich explained that they

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**Table 25.1** Historical timeline of key events of ‘Khlong Narai’ women’s cooperative

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity or event</th>
<th>Sales turnover of Moo Chamuang</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>Group established with the help of the local Extension Department and started producing mangosteen paste, durian sweets and jackfruit flakes among many other products</td>
<td>Establishment phase</td>
</tr>
<tr>
<td>1996</td>
<td>Began processing <em>Moo Chamuang</em> in sealed plastic bags that were sold in the local market</td>
<td>100–200 packs per month</td>
</tr>
<tr>
<td>1997</td>
<td>Entered new market channel by displaying products in city fairs organized by government in Chanthaburi and Bangkok</td>
<td>300–400 packs per month</td>
</tr>
<tr>
<td>2003</td>
<td>Obtained equipment to process <em>Moo Chamuang</em> in cans with help of professor from Mahidol University in Bangkok and investment grants from government</td>
<td>Started with 600 cans a month</td>
</tr>
<tr>
<td>2011</td>
<td>Obtained food safety certification for own canning facility from government</td>
<td>800–1000 cans a month</td>
</tr>
<tr>
<td>2014</td>
<td>Started sales through Post Order company. Other women’s groups are taking up <em>Moo Chamuang</em> as a viable commercial product</td>
<td>1200–1400 cans a month</td>
</tr>
</tbody>
</table>
had learned through trial and error. Initially, they focused on mangosteen and durian products, which were easier to make but which receive higher competition, as many other women’s groups make these products. By marketing the spicy pork curry, they managed to create a novel product for which little competition existed and which received good demand as it is a well-known dish and recipe that traditionally originates from this region. Now they want to enlarge the market for Moo Chamuang by increasing the sales of the spicy pork product to Bangkok. Simultaneously, Mrs Niyomvanich wants to improve some of the other products and explore more novel products such as juice made from a lesser-known Citrus species named som jeed or kumquat (C. madurensis Lour) in order to find more products with a good profit margin that can broaden their income base.

Impact on diversity

*G. cowa* Roxb is a deciduous species and has both male and female trees, which normally results in a genetically diverse population. However, most *G. cowa* trees found in Chanthaburi are female, whose seeds are apomictic, producing plants that are clones of the female parent, in turn limiting the intraspecific genetic diversity of the tree population. However, the creation of a commercial value for *G. cowa* does seem to contribute to interspecific diversity by avoiding and even reversing the loss of this lesser-known semi-wild species. For instance,

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**Table 25.2** Portfolio of products made from fruit tree species by women’s groups

<table>
<thead>
<tr>
<th>Fruit species</th>
<th>Plant parts</th>
<th>Market strategy (Ansoff)³</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Garcinia cowa</em> (Chamuang)</td>
<td>Young leaves</td>
<td>Diversification</td>
<td>Moo cha muang (pork curry) in cans and in aseptic plastic bag</td>
</tr>
<tr>
<td><em>Durio zibethinus</em> (Durian)</td>
<td>Fruits</td>
<td>Market penetration</td>
<td>Chips, preserves (paste)</td>
</tr>
<tr>
<td><em>Garcinia mangostana</em> (Mangosteen)</td>
<td>Fruits, Peel</td>
<td>Market penetration/product development</td>
<td>Preserves (paste), candy, juice, cream for skin (lotion), soap</td>
</tr>
<tr>
<td><em>Musa spp.</em> (Banana)</td>
<td>Fruits</td>
<td>Market penetration</td>
<td>Chips, dried whole fruit</td>
</tr>
<tr>
<td><em>Syzygium aqueum</em> (Rose apple)</td>
<td>Fruits</td>
<td>Product development</td>
<td>Sweetmeat (preserve)</td>
</tr>
<tr>
<td><em>Nephelium lappaceum</em> (Rambutan)</td>
<td>Fruits</td>
<td>Market penetration</td>
<td>Candy</td>
</tr>
<tr>
<td><em>Citrus madurensis</em> (Som jeed or Som Mapit)</td>
<td>Fruits</td>
<td>Diversification/product development</td>
<td>Juice</td>
</tr>
</tbody>
</table>
FCA analysis between 2010 and 2014 revealed that the number of *G. cowa* increased from 25 to 81 trees in Trok Nong and from 50 to 150 trees in Khlong Narai village. *G. cowa* trees, though initially only found in the wild, are now grown in almost every home garden and orchard in Chanthaburi. The activities by the women’s group increased the value of *G. cowa*, resulting in on-farm conservation of this species and increasing the richness in home gardens and orchards by adding another species to the list of their crops. Besides, the start-up of processing activities has enabled the women to explore products for a range of species such as durian, mangosteen, banana, rose apple and rambutan. This helps to trigger interest in maintaining the traditional multispecies orchards and home gardens that did not previously fetch significant income through the sale of fresh fruits and thus were dwindling because of the stronger commercial orientation of farming households on durian and mangosteen only and the growing numbers of monocropping orchards in the province.

**Impact on livelihoods**

In terms of contribution to livelihood strategies, this practice has created income security for households through the creation of value-added products from traditional food recipes and dishes that were used before only for home consumption. In general, the average income of farmers in this area is around US$300 per month, while the women’s group producing *Moo Chamuang* can earn additional income of around US$1,500 per month with the sales of canned (1,200 cans) and packed (600 packs) *Moo Chamuang*. Additionally, they earn about US$260 per month with the sales of mangosteen preserve (300 packs) and US$250 through the sales of mangosteen soap (100 soaps), mangosteen skin cream (50 bottles) and the other products from other fruit species. Around 26 women started to work together to develop the processing activity, which has now been practised for almost 12 years. At present, 30–40 households from Khlong Narai subdistrict are involved and two or three neighbouring women’s groups are also in the process of adopting the production of *Moo Chamuang* or similar types of products for the market.

Member households earn additional income through the sale of fresh leaves or fruits to the cooperative and receive salary income for those members who work in the production facility of the women’s group. Likewise, local teenagers seeking an employment opportunity collect the fresh leaves or fruits and earn a small wage when free after school. Moreover, local merchants benefit by handling and coordinating the sales of these products. Income generated from canned *Moo Chamuang* or other processed products is more stable and evenly distributed than the sales of fresh fruits. *Moo Chamuang* can be processed all year round, whereas the mangosteen preserve is only processed during June, July and August. This enables community members to diversify and secure their income over the course of the entire year, avoiding sole dependency on fruit sales during the glut season that often brings low and volatile prices.
This practice has also led to the empowerment of the women’s group and its members, as the members have been able to make their own decisions as to which products and activities to pursue, have managed to obtain support from government agencies and were able to earn their own income and invest in improved processing facilities such as for canning. In addition, they are proud of their products and activities that have received a lot of attention and won them prizes as best OTOP product. Other women’s groups or individuals frequently visit Khlong Narai to learn about the products and operations of the processing group.

Assessment of GPD effect on livelihoods

Effect on livelihood assets

By initiating this local good practice, the women’s group members acquired specific skills in the processing and production of canned products such as Moo Chamuang and also engaged in other products. They gained insight into the institutional framework of a cooperative, their role as members and shareholders thereof, and the successful management of an enterprising cooperative. It has empowered them to make self-directed decisions regarding their livelihood activities and the use of their own natural, social and financial resources. It has strengthened their linkages and networks with other value chain actors like bankers, traders, retailers, exporters and government departments. Profits made by the cooperative have enabled the women’s group to invest in better facilities and improve equipment for canning. The women’s group and its members have been able to earn regular income throughout the year with the profits generated from this activity, which has thus provided them with cash outside of the fruit harvest season, when local incomes typically drop. By adding G. cowa as a beneficial species to their home gardens and orchards and expanding pre-existing populations, this species will be maintained and secured for future use. This practice provides income to the cooperative through the sales of Moo Chamuang, which in the long run contributes to the financial capital of the women in the processing groups, as all group members receive a yearly payout based on their share in the cooperative and the profits made.

Driving forces for the success of the GPD

The driving forces for the successful establishment of this activity could be attributed to a push by the Department of Agricultural Extension to establish the women’s cooperative to produce mangosteen paste and other products for sale in the first year (Table 25.3). Second, the real driving forces resulted from initiation of the women’s cooperative in launching their product of Moo Chamuang curry in a simple package that was very well received and accepted in the local market. The increase in demand from the local market drove the women’s cooperative to push forward a product development programme.
Finally, Dr Visith Chavisit, an associate professor from Mahidol University, guided the women’s cooperative to produce the *Moo Chamuang* dish in a can. Importantly, the women’s group is supported by technological help and funding from government offices. First, it established financial capital with the purchase of shares by the members for US$1200. In 2003 the women’s cooperative obtained an award of US$73,750 from the central government to buy machinery, build the processing plant and purchase processing equipment.
for the production of several products. They are highly motivated because of their recognition within the OTOP programme of the Thai government, the establishment of their own cooperative, the creation of jobs for local women and income for shareholders from the profits.

**Factors favouring or hindering successful functioning of GPD**

Although the local women had the traditional knowledge about how to make this particularly tasty recipe, it was not easy for the founding members to devise a strategy to market Moo Chamuang in a form catering to a wide consumer base. The training that was given to them by government programmes such as OTOP helped them to organize themselves. The training on food safety regulations and requirements, simple household-level canning technology and advice regarding the establishment of a cooperative helped the women’s group to set up this economically viable enterprise. Later on, financial support from the government together with the successful accumulation of financial capital through profits enabled the cooperative to invest in hardware and an improved production facility. The members stressed that another factor important to their success was the selection of a capable, trustworthy and inspiring manager of the cooperative, Mrs Yupa Niyomvanich, who invented, developed and implemented several product ideas.

**Concluding remarks and an action plan for scaling up and dissemination**

The principles of this GPD, creating a commercial product from a local popular food dish or product that is made from native fruit species or varieties, can be easily replicated elsewhere. However, mainstreaming this practice may be a challenge, as starting a canning factory, however small, involves substantial initial capital investments that rural communities often lack in part or in whole. Nevertheless, there are other canning techniques that require lower investment costs and may serve as an alternative method for those communities unable to attain initial financial backing.

An action plan for the dissemination of this approach outside the community and beyond Thailand has great potential. Communities from other countries that want to take up this activity can be exposed to this kind of processing activity through exchange visits to the women’s cooperative in Khlong Narai. That said, it is essential to first conduct a participatory market chain assessment to evaluate the interest of consumers in other districts and provinces to be able to select which local or traditional fruit species or variety is best suited for manufacturing and what kind of products have the most market potential (see Chapter 22 of this book). The evaluation and selection of the most potentially profitable products and fruit varieties or species should be carried out in conjunction with value chain stakeholders such as traders, exporters and
retailers to ensure that market demand is directly taken into account in the value chain analysis process. Stakeholders can also identify which training needs are required from support institutions like the local and national government. As a first step towards establishing this practice, potential and interested communities should develop a business plan to begin raising funds and capital for its implementation.

References


Smitinand, T. (1980) Thai Plant Names (Botanical names-vernacular name), Royal Forest Dept., Bangkok (in Thai)


Notes

1 OTOP stands for ‘One Tambon (meaning village) One Product’. It is a rural development and local entrepreneurship stimulus program of the Thai government that aims to create improved rural livelihoods and supports the development and marketing of locally made, unique or traditional products in villages across Thailand.

2 *Kaeng Moo Chamuang* is a Thai curry with a unique sweet and sour taste made from pork belly and a herb called Garcinia leaves or ‘Bai Chamuang’. The pork belly is cut into chunks then simmered with curry paste in low heat until it becomes tender. It has an intense but not too spicy flavour, great to eat with warm white rice. http://amazingthaifood.tourismthailand.org/thai-food/thai-regional-foods-eastern.html.

3 The Ansoff matrix is a marketing tool that identifies four alternative types of growth strategy for an enterprise based on new or existing products and for new or existing markets (customers); i.e. market penetration, market development, product development and diversification. See Chapter 22 for a fuller explanation.