20 Management of *Garcinia fusca* for sustainable use

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GPD 'passport'

GPD code:	20
Focus area:	(a) Propagation and planting material (b) Production and crop management (c) Collective action and social networking
Character:	Process, method, technique and institutional arrangement for the management of *Garcinia fusca*
Species and varieties involved:	*Garcinia fusca*
Name of location:	Ise subdistrict, Pho Si Suwan district; Huai Thap Than subdistrict, Huai Thap Than district, Sisaket province
GIS reference of location(s):	Ise subdistrict: N 15°26′64″; E 104°01′91″ Huai Thap Than subdistrict: N 15°05′21″; E 104°03′08″ Altitude of both sites: 120-150 masl
Name of farmer (data resource):	Mr Peerachai Vonglert, Mrs Prayong Chaisawang

Introduction

Wild madan (*Garcinia fusca* Pierre) is one of the wild relatives of the more popular fruit mangosteen (*G. mangostana* L., family Clusiaceae). The tree, locally known as wild madan, is a medium-sized tree or shrub which grows abundantly and naturally along the Thap Than River and other riverbanks (Plate 45a–45c),

streams and swamps (Shu *et al.*, 2007; Subhadrabandhu, 2001). The young leaves are traditionally used as an ingredient in soup, giving it a sour taste, and the fruit is used in chilli paste. While *Garcinia* generally is used as a spice in India and as a flavouring agent in soup in Malaysia, the Thai people from Sisaket have discovered a unique way of using the madan stem. The villagers in Huai Thap Than subdistrict in Sisaket use the branches of the wild madan tree as a skewer for a grilled chicken recipe called 'Kai Yang Mai Madan' (Siriyan *et al.*, 2015b). When chicken meat is impaled on a madan skewer and grilled over a fire, gum secreted from the green stick blends with the meat, giving it a distinctive flavour and aroma that is found nowhere else and making it a favourite among local consumers (Hom *et al.*, 2010). Huai Thap Than subdistrict is well-known in Thailand for this unique product (Plate 45f). This recipe has been popularly known for more than 50 years.

This particular traditional dish has now grown into a large-scale business. The grilled chicken produced in the area totals approximately 2,000 chickens per day. About 10,000 individual wild madan skewers a year are used in the several roadside stalls and restaurants in Sisaket Province. One labourer can earn about 600 Baht per day (US$20/day) by cutting these wild madan skewers. The grilled chicken is priced at 35 Baht/portion package (US$1.17/portion package). There are about 53 chicken grill stalls in Huai Thap Than, hence the combined sales turnover amounts to about 350,000 Baht/day (US$11,660/day). The production and management of madan is illustrated in Plate 45.

With the great demand for these wild madan skewers, the plant species is now vulnerable to overexploitation if proper conservation efforts are not made. During the last few years, the population of wild madan bushes in its habitat along the river has been severely damaged and its population has started to dwindle. Hence efforts are being made by the community to sustainably manage and use *G. fusca*. In order to conserve this plant species, community members have started efforts that can constitute the domestication process of *G. fusca*. A complete cultivation system covering propagation and pruning techniques, nursery management, replanting, sustainable harvesting practices and commercially viable practices of *G. fusca* has been developed, demonstrated and mainstreamed. This domestication process contributes to the conservation of *G. fusca* in the wild by taking pressure off it. The efforts have been implemented and managed by the community itself, with support from local government and the Sisaket Horticultural Research Centre.

This chapter describes the combined efforts and activities of the Huai Thap Than and Ise communities to avoid the overexploitation of this unique native wild species that has become victim of its own commercial success. The chapter focuses on propagation techniques for *G. fusca* to explore the multiplication and domestication of this wild species. It also describes the participatory research activities conducted with the environmental group of the Ise community to explore additional products and cultivation techniques for wild madan.

Methodology used for data collection

The area of the study covers Ise, Pho Sri Suwan and Huai Thap Than districts, Sisaket Province, located in the lower part of northeast Thailand. Data were collected through survey questionnaires, interviews and community group meetings. Transect walks were carried out by a team of experts to observe various home gardens, plantation boundaries and riverbanks in order to understand local management practices. Four Cell Analysis was used to assess the amount and distribution of wild madan diversity in the community and get a deeper socio-economic and biological understanding of this distribution. Community nurseries were established, in which evaluation trials were conducted to compare different propagation techniques and cultivation regimes. In addition, research was conducted to explore potential by-products from *G. fusca* through the development of prototype products from its fruit, bark and leaves.

Description of GPD

A complete cultivation system, covering propagation, nursery management, replanting, sustainable harvesting practices and commercially viable practices of *G. fusca* has been developed, demonstrated and mainstreamed in the Huai Thap Than watershed. In order to protect the local grilled chicken industry and conserve the madan plants, the community has made an effort to manage madan for long-term, sustainable use. This good practice developed gradually as a concerted effort that involves many stakeholders in the village. The first step was the establishment of a community forest of around 350 hectares in 1995 to protect the leftover area of fertile wild madan natural habitat. Since then, the community has developed its own propagation techniques whereby seeds and seedlings are collected from the river forest, grown in nurseries and then replanted in the forest and also in home gardens. Regulations for community forestry have been agreed in the community, such as zoning the area and assigning each harvest zone to a group. The community facilitates management and ensures that individuals have an invested responsibility. Up to now, seed collection from riverbanks is still the proper technique for wild madan propagation. This technique produces regular and numerous saplings and a vigorous rooting system and it is convenient for transportation. The Ise and Huai Thap Than communities established two nurseries in 2012, one located at Ban Ise Kururadwitthaya School and one located at Huai Thap Than Witthayakom School. The nurseries were trained and encouraged by Sisaket Horticultural Research Centre, the schools themselves and local government. The nurseries are managed by Mr Peerachai Vonglert and Mrs Prayong Chaisawang. Local conservation groups, the schools and the community engage in activities such as public awareness, collection of seed and propagation, restoration of wild madan along fences and degraded lands, and domestication of wild madan. The nurseries have so far produced at least 4,000 saplings of wild madan (Plate 45g–h).

The relatively low value of the madan skewers limits the potential of commercial cultivation, thus to increase its market value, additional products have been explored from the waste materials. For example, the bark of wild madan sticks was used to extract natural dyes that have been used to dye clothes for increased income. New products have also been developed from the wild madan fruit and leaves (Plate 46).

Impact on diversity

Until recently there has been indiscriminate exploitation of *G. fusca* in the wild. Such exploitation had become a serious threat to the diversity of madan species. However, wild madan is now being domesticated from forests into home gardens. The sustained adoption of seed propagation techniques has helped to reduce the human pressure on the wild madan population along the Thap Than River and facilitate the restoration of degraded land areas. The propagation techniques from seeds have also taken up the multiplication of other species such as a domesticated madan (*G. schomburgkiana*) and Cha muang (*G. cowa*). Similar efforts are being made to explore their potential market value and the most appropriate propagation and cultivation techniques. The replanting and restoration efforts of the conservation group are supporting the richness of species found along the riverbanks and could lead to the diversification of home gardens and farmers' fields. This case illustrates how delaying the rate of genetic erosion of genetic resources also maintains agricultural biodiversity (refer to Chapter 24).

Impact on livelihoods

So far the conservation efforts have not generated direct income; the saplings from the nursery are handed out for free to community members. However, the number of requests for saplings has increased and the saplings may soon have a monetary value attached. At present, the majority of the saplings are replanted as part of the restoration efforts, supported by local government, of the Non Yai community forest conservation group in the Ise community. To internalize the costs of conservation of wild madan, the hope is that the restaurant and grill stand owners will support the initiative taken by Ise community and financially support the nursery and replanting efforts. Moreover, the Ise community hopes to sell the newly developed products such as the naturally dyed clothing and wild madan juice to the same grill stand owners and tourists (Siriyan *et al.*, 2015b; Hom *et al.*, 2010). These multifaceted benefits and income opportunities connected to wild madan have encouraged the local Ise community and rural institutions to protect the natural habitat, the environment, *G. fusca* and its genetic diversity.

Additional benefits and ecosystem services

This good practice could also protect the Thap Than River banks from soil erosion phenomena. Wild madan saplings have been replanted along the river. Conserving biodiversity along the riverbanks could help shield waterways against nitrogen pollution, such as that released from agricultural fertilizers and waste, human sewage and fossil fuel burning. Recent research reported by Cardinale (2011) showed how streams with more species are better at removing excess nutrients from water. The findings imply that developing countries that keep rivers and lakes species-rich could save money on water treatment and provide benefits to downstream communities. This could be a case of how biodiversity provides ecosystem services and functions. The communities' participation through knowledge exchange and sharing within and between communities could strengthen the communities' unity towards a common goal of conserving the *G. fusca* species and its ecosystem.

Contribution to social and human capital, strategies and impact

In 1995, Ise community established a conservation group that initially had 60 members consisting of teachers and students. The group is connected and led by the local biology teacher and also 'agent of change', Mr Peerachai Vonglert, who was concerned about the degradation of the Thap Than River area. He learned that the overcollection of wild madan sticks was one of the major causes for this degradation. The group's first activity was to conserve wild madan in its habitat by monitoring the cutting of wild madan branches and collaborating to create the forest community rules. Another activity was to control the adoption of creepers for handicrafts and replanting in the forest.

The conservation group currently has a total of about 230 members. They have been empowered through training on wild madan seedling propagation organized by the Ise subdistrict authority. Training followed by public awareness activities on watershed management enhanced the community's awareness and participation in the sustainable use and management of wild madan sticks. The community has in this way been empowered for self-directed decision making on the management of the *G. fusca* resource for the benefit of people. The formation of *G. fusca* Conservation Groups and the establishment of community nurseries for the propagation of *G. fusca* species has enhanced the social capital to conserve the ecosystem and unique diversity of the *G. fusca* species.

The community group conducted trials into how to use wild madan more beneficially. They learned to make use of various parts of the wild madan tree besides the sticks, and finally they found that the bark can be used as a natural dye for many type of clothes (Siriyan *et al.*, 2015a). Based on these research results, four on-site training courses on dyeing cotton cloth with wild madan dyes were set up for the people in Ise subdistrict, Sisaket Province (Plate 46c–h). The idea for this research was stimulated by visits by the site coordinator and

farmers to Kiriwong community in Thailand, where similar techniques are used with locally available materials.

Driving forces for the success of the GPD

The increasing demand for wild madan skewers for grilled chicken has resulted in overuse of *G. fusca*, which hence has become vulnerable to destruction and local extinction. Moreover, wild madan's natural habitats are now also being encroached upon by the cultivation of new economic crops. However, the strong commitments of the community and local leaders to conserve the *G. fusca* species and to protect the Thap Than watershed are the major driving forces ensuring the success of the good practice. The local leadership of Mr Peerachai Vonglert has been instrumental in convincing the community to take part in collective actions to start up the nursery and to explore the identification of diverse products. The project played a key role in bringing together all key actors to build social capital and consolidate combined efforts.

Constraints for scaling up or dissemination of GPD

Initially, many activities for conserving wild madan were started in Huai Thap Than community, but responses from community people have been muted. Instead, it was observed that Ise community was much more receptive to this idea. This was mostly because Ise community has strong leadership of the conservation group. The group has created awareness for the conservation of wild madan to both adults and children in the community. Activities for conserving wild madan are part of the study course in the school, which increases the knowledge of how to manage it among the children. To educate students and adults, the teacher used brainstorming, experimenting, conducting special projects, practising in the real field and other activities. This way of tackling the problems represents a group creativity technique designed to generate a large number of ideas for its solution.

Free and easy access to wild madan sticks from riverbanks has resulted in a general phenomenon of 'the tragedy of the commons'. There are still some members of the community who hold negative attitudes towards conservation. Lack of awareness and limits to promotion campaigns are constraints to successful implementation. Transitions in local governance could be a threat to continued policies as well.

Action plan for scaling up and dissemination

One of the action plans for scaling out the good practice is to make extra income from using the by-products from making madan skewers to dye cotton cloths with dyes made from wild madan bark. The bark yields a pleasant brown/brownish-yellow colour depending on the mordant used. Experiments to check the colour fastness to washing and rubbing of these dyed cotton clothes

have found it mostly good. Dyeing cotton cloth with dyes extracted from wild madan bark is a new finding and has sparked new interest. Training and setting up of women's groups as small business enterprises selling these clothes might generate income and stimulate the community to conserve their wild madan trees, as has happened in the village of Kiriwong. The success in the scaling up and dissemination of the good practice needs strong commitment from the community groups and local government to propagate and multiply *G. fusca* to sustain the supply of raw materials for grilled chicken. Also, the community's understanding and enhanced awareness of the risks to the *G. fusca* population, and strong policy support from the local government, contribute to the successful scaling up and dissemination of this good practice.

References

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