
Executive summary

Survey on Natural Resource Availability of Maktao Wild Sugar Palm around Hin Nam No NPA, 28 May- 5 June 2014

What is Maktao?

Maktao is the Lao Name for a type of wild sugar palm (*Arenga Westerhoutii*) which produces fruits that are a popular ingredient in sweets and deserts throughout Southeast-Asia. Lao PDR exports over 1,000 tons per year of this wild product to Thailand. It is a large palm tree, with large pinnate leaves and fibrous spines reaching up to 12 m. high. It prefers to grow around streams and in wet places on the slopes of mountains of the northern and middle part of Lao PDR. It can take up to 16 years of age before the plant starts flowering. Once the tree starts bearing fruits, it dies within 1-2 years. Sustainable production can be achieved by maintaining wild populations with plenty of younger trees that constantly replace the older trees.



Figure 1: Mature Maktao Palm tree with fruits



Figure 2: Each fruit contains three endosperms



Figure 3: Endosperms, the sellable product.

Why we are working on Maktao

A German-supported Project supports the co-management of the Hin Nam No National Protected Area (NPA) in Bualapha district, Khamouane Province. One of its key activities is to support the NPA authorities in developing revenue for local communities from sustainable use of Non-Timber Forest Products (NTFPs). Such an income would give a strong incentive for local communities to engage in nature conservation.

In Bualapha district, large amounts of Maktao trees can be found in the mountains bordering on the Hin Nam No NPA. None of these trees are harvested commercially, due to the remoteness of the area. Maktao was selected by local villagers as one of the most promising products for income generation during a rapid rural survey conducted by Agriculture and Forestry Consultants (AFC) in 2013.

How the survey was done

A Maktao resource survey was implemented with the help of 7 villagers from Bolikhamxay province, who are experts in Maktao production and management. The other members of the survey team consisted of 5 district staff 2 consultants from AFC and the national livelihoods adviser from GIZ/IP Consult. The survey was implemented in 9 days from 28 May to 5 June 2014.

They surveyed two locations: (a) the northern slope of Phou Louang, used by the villages of Ban Thaplao, and Ban Nyavet and (b) the northern slope of a small mountain north of Ban Nam Chala. In the Phou Louang area, the first step was to hold a meeting with villagers and have them create a sketch map of the location of the Maktao resource. The villagers were also asked to rank each area as in high/medium/low in Maktao resources. Out of 27 streams identified, 6 were selected for the survey: 2 high yielding areas, 2 medium and 2 low yielding. Along each stream, a sample plot was laid out of 25 by 250 m (6,250 m²). In total there were 6 plots (3.75 ha). In Nam Chala, the area is much smaller so it was measured by GPS device. Three plots of 50 by 50 m. (2500 m²) were sampled (total 7,500m²).

In each plot all mak tao trees were counted and divided into 6 age classes: 1-3 years, 4-6 years, 7-9 years, 10-12 years 13-15 years and older than 16 years. Within the last category, all fruiting trees were counted. The average yield per tree was estimated to be 120kg, based on experience and observation of the local experts from Bolikhamxay. A demonstration of harvesting, pressing and boiling the fruits was done. It showed that 30 kg of fresh fruits can produce 10 kg of endosperms, the sellable product. Thus, an average tree is estimated to yield 40 kg of sellable product.

Main Results of the Survey

The results of the survey showed that on Phou Louang mountain, Maktao occurs around 27 streams. The area where Maktao occurs was found to be roughly 25 m. on each side of each stream. All streams were mapped in a QGIS, where Maktao was found to cover a total of 526 ha (see figure 4). In Nam Chala, the total Maktao area covers 3.6 ha only. The total production area can be estimated to be 530 ha.

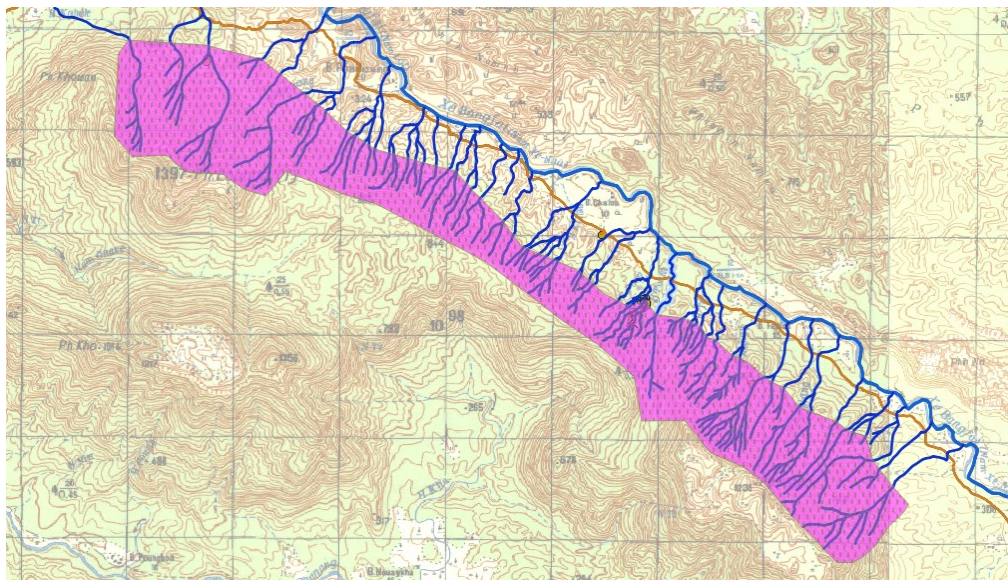


Figure 4: Map of Maktao Production area along 27 streams on the Northern Slope of Phou Louang (2,649ha)

In the case of Phou Louang, for sustainable management of Maktao it is vital to stop shifting cultivation in all the land between the streams as well. This additional land covers 2,123 ha. The total Maktao production area to be protected on the northern slopes of Phou Louang would thus cover 2,649 ha. As there was little difference between the plots, average values over all 9 sample plots are presented in the table below. On average, the total density of Maktao trees was 552 trees per hectare (see table 1).

Table 1: Density and age distribution of Maktao palm trees around Phou Louang and Nam Chala, June 2014 (N=9 sample plot, total sample plot size 4.375 ha)

Age Class	No trees/ha	% of all
1-3 years	111	20%
4-6 years	130	23%
7-9 years	73	13%
10-12 year	79	14%
13-15 years	51	9%
>16 years (mature)	108	20%
Total	552	100%

On average 108 trees per ha were mature trees (20%). Among these, 24 trees per hectare were bearing fruit at the moment of the survey (23% of all mature trees, 4% of all trees). Observations were also made on the number of trees that had fruited last year 2013 (26 trees/ha), the number of trees flowering (38 trees/ha) that will fruit next year (2015) and the number of trees that will flower in 2016 (see table 2).

Table 2: Density of fruiting and flowering trees

Mature trees	No trees/ha	% of all trees	% of mature
fruited 2013	26	5%	24%
fruiting 2014	24	4%	22%
will fruit 2015	38	7%	35%
will fruit 2016	20	4%	18%
Total	108	20%	100%

Conclusion on production potential and sustainability

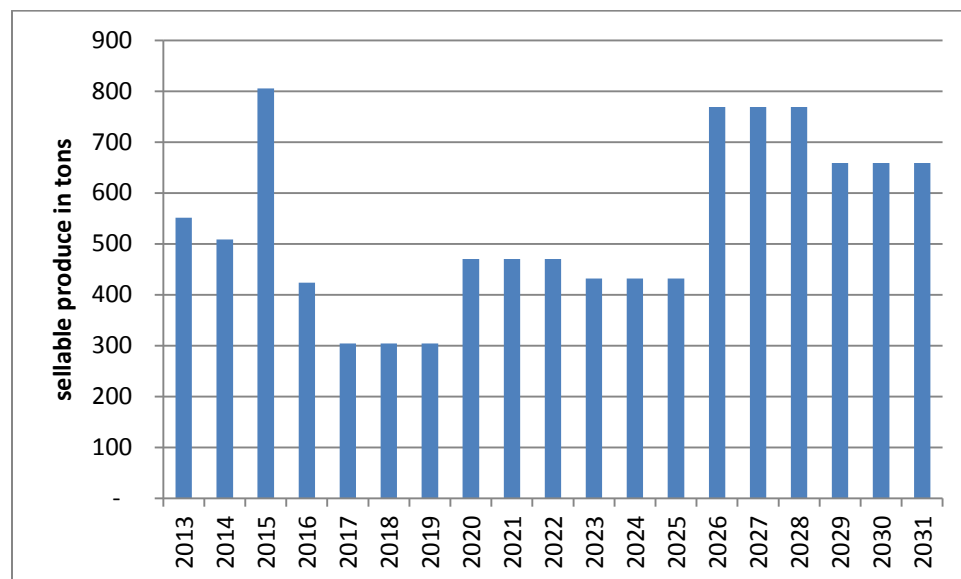
Based on an average yield of 40 kg endosperm per tree, a total production area of 530 ha and a density fruiting trees of 24 trees per ha, the production potential of the trees now fruiting can be estimated to be 508 tons for 2015. In similar way, the potential production can be projected for each year between 2013 and 2031 (see table 3).

Conclusions on sustainability

The distribution over the age classes is fairly equal, indicating a robust population where the mature trees that die every year will be replaced by an equal number of younger trees. So the prospect for sustainable harvesting looks good. In general, the densities of trees estimated to be aged between 7-15 years old are lower than those of the very young and very old trees. This means that over the next three

years (2015-2017) there is likely to be a decline in the number of harvestable trees, but that number will recover within 10 years (as of 2027) when the trees that are now 10-12 years old will start to bear fruit.

Table 3: Projections of Maktao resource in Phou Louang and Nam Chala between 2013-2031 in tons of endosperms (sellable product) per year.



Conclusions on income potential

Maktao is in high demand in domestic market and in Thailand and Vietnam. Over the last few years, producers in Bolikhamxay could receive more than 3,000 kip per kg for the endosperms at farm-gate level. It would seem realistic to expect the same price for producers in Khammouan. With such a price the value of the available resource in the Hin Nam No area can be estimated to be 913–2,417 million kip (91,000-242,000 EURO) per year.

Table 4: Projected value of Maktao resource at a price of 3,000 kip/kg

Years	Fruiting trees No/ha	Yield/ha kg/ha/yr	Production Tons/year	Value at 3,000 kip/kg	Value EURO
2029-2031	31	1,243	659	1,976,402,746	197,640
2026-2028	36	1,451	769	2,306,482,380	230,648
2023-2025	20	815	432	1,295,868,192	129,587
2020-2022	22	887	470	1,409,969,794	140,997
2017-2019	14	574	304	912,812,815	91,281
2016	20	800	424	1,272,000,000	127,200
2015	38	1,520	806	2,416,800,000	241,680
2014	24	960	509	1,526,400,000	152,640
2013	26	1,040	551	1,653,600,000	165,360

The actual production will depend on the numbers of households that will be available to do the harvesting. A rough estimate was made for the available labor in the three villages (see table 5). The total expected value of the production would be around 807 million kip (80,730 Euro).

Table 5: Projected labor force and income from Maktao in 2015

Villages	No Households	Expected	Income for year 2015		
		No households	Harvesting Capacity (ton)	Value (kip) At 3,000 kip/kg	Value (Euro)
Thaplao	70	70	144.9	434,700,000	43,470
Nyavet	52	30	62.1	186,300,000	18,630
Namchala	71	30	62.1	186,300,000	18,630
Total	193	130	269.1	807,300,000	80,730

An average household with three labor forces available could produce up to 30 kg of Maktao per day. They would expect to work 23 days per month. The total harvesting season for Maktao is three months (January-March). So one household could work 69 days and harvest around 2070 kg of Maktao, giving them an income of 6.1 million kip (610 EURO). This compares quite favorably to the baseline cash income in the three villages of 2013, which ranges from 0.34 million in Nam Chala to 10 million kip/household per year in Nyavet. An additional income of 6.1 million kip would increase household cash income in Nam Chala with 1733% and in Nyavet with 60%.

Table 6: Rough calculation of Maktao production and income raising capacity for an average household

No workers per household	3
Kg Maktao/person/day	10
No days worked per month	23
No months	3
Total production per household	2,070
Price in kip/kg	3,000
Household Income in kip	6,210,000

Next steps proposed

The main challenges remaining to realize the income potential established during this survey are to get agreement from the District Authorities to issue a quota allowing trade in Maktao and for the villagers to find a trader who will be willing to invest in organizing transport and buying the product.

The German-supported project will assist the Hin Nam No Management Authorities to organize a district workshop around the quota policies as well as value-chain survey to identify potential traders and for villagers to come to agreement with them. At the same time, the three communities will be assisted into forming producer groups and in further training on sustainable Maktao harvesting and resource management.