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**Wild Sago Replanting Project and Sago Processing Research in  
Long Si'ang  
Date: 19<sup>th</sup> February 2017 – 26<sup>th</sup> February 2017**

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**March 2017**

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### Sago Replanting Project and Sago Processing Research

WWF-Malaysia in collaboration with the Craun Research has implemented a wild sago replanting project and sago processing research at Long Si'ang. The objectives of the sago replanting project and sago processing research were:

1. To study the planted and wild sago palm (*Eugeissona utilis* and *Metroxylon sago*) in Long Si'ang and Long Belok.
2. To establish research plot of wild sago with active local involvement and make use of expert and indigenous knowledge.
3. To identify key local person in maintaining and monitoring of sago research plot.
4. To determine the efficiency of sago processing using traditional technique versus grinding technique in starch yield and to collect sago sample from sago processing for lab analysis.

### Attendees

Table 1: Name and organization of attendees

No.	Name	Organization	Role
1.	Peter Stanley Howell	Craun Research	Technical advisor
2.	Razi Kodin	Craun Research	Technical advisor
3.	Alfred Keleman	WWF	Facilitator
4.	Emmy Goh	WWF	Facilitator

The first and second day of the activity was to study the planted and wild sago around Long Si'ang area. It was found that the planted sago stages around Long Si'ang area was at the early growth stages for hill sago where starch could not be extracted yet. The sago palm has been planted for about 3-4 year. Diameter of the sago palm was measured using a measuring tape and the height of a palm was estimated (Figure 1). Meanwhile, in the forest near to the logging road (coordinate: N03°48'05.2", E115°01'00.8"), other 3 different stages of sago palm, namely *Sepelit pa'ong*, *Bu'an dalem* and *Uvut iko baya* was found (coordinate: N03°48'04.3", E115°00'57.2"). This sago palm which was planted for more than 10 years was ready for starch collection. Based on the interviews with locals and observations made by Mr Peter on ground, the description of features of different growth stages of the sago palm is summarized in Table A, Appendix 1.

In this trip, some sago seedlings which were temporary kept at Ba Selulong for this sago replanting project were moved to the identified research plot at Long Si'ang for replanting. The project team working together with locals to prepare the identified research plot, where

bushes were cleared using machete and sago palm planting points were measured and marked using a long stick at a distance of 5m from each other (Figure 3).

On the 3<sup>rd</sup> day of this activity, with the consent from the headman of Ba Selulong, sago seedlings planted in the nursery plot was moved from Ba Selulong to Long Si'ang. A total of 128 sago seedlings were found survived with 9 non-germinated and 3 germinated but dead seeds. Mr Peter has chosen a total of 27 sago seedlings to be planted at the sago research plot with 2 different treatments of putting and no putting fertilizer. On top of that, a total of 10 sago seedlings were also chosen and kept at the nursery plot as backup, to replace the dead seedlings found at the research plot if this happen in the future. Before doing the planting of sago seedlings, parameters such as height and diameter of palm, length of petiole and rachis, length and diameter of leaf, and number of fronds were counted (Figure 2). For maintenance and monitoring purpose, a local focal person was identified to assist with the necessary works at the research plot.

On the 4<sup>th</sup> day of the activity, the team travelled to Long Belok to study on the thorny species of *Metroxylon sagu* (locally known as *balau*). According to the headman of the village, the palm was originally taken from Long Bemang in year 1978 and planted in the village. For one section of the palm of about 2.5 feet length, one could get about 20kg of starch. For planting purpose, the headman will collect germinated seeds from the mother palm and planted in the village. Till now, villagers have planted about a total of 60 sago palm seeds. With the kindness of the headman of Long Belok, 2 *balau* seedlings were collected from the mother palm to be brought back for planting at Long Si'ang. On the same day also, locals collected hill sago (*Buah bala*; coordinate: N03°48'32.8", E114°57'47.8") nearby Long Kawa area. The sago trunk was cut into four sections which were brought back later to the Long Si'ang. It was kept till further processing to extract starch from the trunks.

On the 5<sup>th</sup> day of the activity, the project team members interviewed locals in Long Si'ang, discussed and organized information gathered on the hill sago. On the following day, locals demonstrated the common way of locals processing the sago. First, locals removed the thorns of the sago trunk which has been cut earlier on into four sections. Then for the research purpose, the trunk was weighed with trunk length and diameter, and thickness of the bark was measured (Figure 4). Two different methods were used in the extraction of sago starch: i) the traditional beating method, where the pith is rasped by means of a small hoe made from tree stems; and ii) the grinding method, where the pith is rasped using a board with nails in it (Figure 5).

Due to the limitation in processing design, it was found that one cannot extract the starch completely by using the grinding method. One can grind the sago trunk halve while the other halve has to use the small hoe in beating the pith. During the sago processing, water was added to the rasped mixture of fibre and it was kneaded by foot on a platform (*tikan*) (Figure 7). The sago starch filtered through the rattan mat (*ja'an*) was accumulated on the *tabau* below. Samples of sago palm fibre, bark, wet starch and sieved water were collected to bring back for further analysis (Figure 8).

On the 7<sup>th</sup> day of the activity, all data on hill sago collected was compiled and discussed among the team members. During the discussion with locals, matters regarding allowances that will be given to the focal person (Mr Wong Berat) were discussed with the knowledge of Long Si'ang's headman, Mr Asai Berat. Mr Peter also briefed Mr Wong on the things that should be done for monitoring and maintenance the research plot. A record list was passed to Mr Wong for recording purpose.

## **Appendix 1**

Table A: Growth stages of hill sago palm, *Eugeissona utilis*.

<b>Name of stages (Penan)</b>	<b>Growth stages</b>	<b>Descriptions/Observations</b>
<i>Anak uvut</i>	Rosette stage	Sago seedling
<i>Sipak uvut</i>		No visible trunk seen. Bigger and longer stems and fronds.
<i>Sin uvut</i>	Trunking stage	Visible trunk seen. Trunk formation (i.e. elongation, enlargement) stages.
<i>Sepelit Pa'ong</i>		Maximum trunk length and diameter.
<i>Bu'an Dalem</i>	Inflorescence stage	Development of inflorescence stage. No frond produced. Might have maximum starch accumulation.
<i>Uvut Iko Baya</i>		Florescence axis formation.
<i>Buah Nyeragap</i>	Flowering stage	Early formation of flowering bud.
<i>Buah Bala</i>		Development flowering bud.
<i>Buah Ngemurah</i>		Maximum flowering bud size.
<i>Buah Pegak</i>		Flower blossom.
<i>Nevangah (Ulun Piket)</i>	Fruiting stage	Early development of fruit.
<i>Nevangah (Ulun Daran)</i>		Development of fruit.
<i>Nevangah</i>		Fruit maturity.
<i>Ngugau</i>	Declining stage	Old and dead palm.

Source: Based on interviews with Penan communities from Long Si'ang and Ba Marong which include Mr Asai Berat (headman of Lg Si'ang) and Mr Sagung Raja (headman of Ba marong).

## Appendix 2



Figure 1: Mr Peter was measuring the diameter of planted hill sago palm at Long Si'ang (left); Mr Peter talked with headman of Long Belok at the *balau* plantation area in the village (centre); A group photo of Mr Peter with the headman of Long Belok and a local from Long Si'ang with the 2 *balau* seedlings that were brought back for planting at Long Si'ang (right).



Figure 2: Mr Alfred Keleman measured the length and diameter of hill sago palm.



Figure 3: A local assisted in digging the hole for planting the sago seedling (left); Mr Wong planted the sago seedling (centre); Mr Peter assisted by Mr Alfred measuring the distance of each sago palm planting point (right).



Figure 4: Mr Peter and Mr Razi measured and recorded the weight, length and diameter of sago trunk, and thickness of sago bark.



Figure 5: Mr Asai (headman of Lg Si'ang) and a local used a small hoe made from tree stems in rasping the pith (top); Mr Peter and Mr Razi with the locals tried the new rasping instrument using a board with nails in it, on the sago trunk which has been removed its bark (bottom).



Figure 6: The mixture of fibre and pith collected by means of traditional beating method with mostly largest fibre pieces (left), and grinding method with fibrous pulp observed (right).



Figure 7: A Penan lady added water to the mixture of fibre and it is kneaded by foot on a platform (*tikan*). Sago starch filtered through the rattan mat (*ja'an*) is accumulated on the *tabau* below.



Figure 8: Mr Razi collected the fibrous mash into a plastic bag for weighing (left); Mr Razi weighed on the sago bark (centre); Mr Razi collected sieved water as sample to bring back for further analysis (right).