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Sago Production

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Introduction

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INTRODUCTION

Sago palms have long been cultivated for their starch in various parts of the humid tropics, particularly in Southeast Asia and Melanesia. In Sarawak, for example, crude and refined sago from plantations of cultivated *Metroxylon* spp. palms has been exported since the nineteenth century. Similarly, in many parts of New Guinea *Metroxylon* palms are clearly treated as cultivated plants; and the palm gardens are carefully cultivated, particularly when the palms are young [RUDDLE *et al.* 1978]. But even there people mostly depend on the wild sago palms from the hinterland to extract sago for subsistence purposes. Among the Galela, sago palms are regarded as wild plants: They are neither cultivated nor specifically propagated.

As noted above (see Ishige and Yoshida, this volume pp. 12–13, 109–117), the swampy area (*pece*), south of Limau, supports a vast and dense forest of bamboo and wild sago palms (Photo. 1). Although varying little in yield, the variety known locally as *kuweso* is said to produce the best-quality starch.

The quantity of starch in the trunk reaches a maximum just prior to flowering. Villagers state that 8 years are required before sago palms bear flowers (but it should be noted that local time estimation is rather vague and their claim should not be accepted at face value). Just prior to blooming the palm has attained a height of 7–10 m and a trunk diameter of some 30 cm. To ascertain the appropriate time for felling sago palms, the Galela make a hole in the trunk and remove some pith. This is inspected to judge the quantity of starch clinging to the fibers.

I. SAGO PROCESSING

During the 1940s a Japanese entrepreneur ran a mechanized sago factory on the Kau river. This factory, based on wild palms, ceased operations as war conditions



Photo. 1. Sago palms (*Metroxylon* spp.).

began to worsen. There are no other records of mechanized sago processing in Halmahera and today all sago processing is done manually, using traditional technology. The sago processing techniques used by the Galela are the same as those employed by all ethnic groups on the island, including the Austronesians.

1. Felling and Chopping of Sago Palms

Men alone undertake all the tasks necessary for the extraction of palm starch. These tasks include felling the palm, chopping the pith, precipitating the starch, and transporting the crude sago. All the work takes place in the forest and the palms are never processed in the village, as is usual among some of the ethnic groups of Malaysia and New Guinea.

The first step in sago processing is the felling of a palm. A palm is felled at about



Photo. 2. Chopping the pith with an adze.

waist height, with an iron axe (*basu*). About 30 percent of the so-called bark is removed along the entire length of the trunk to expose the pinkish pith. The man who fells the palm then sits astride the trunk and chops the pith with a wooden adze (*ngangalo*) to loosen the starch-bearing fibers (Photo. 2). An iron ring is attached to the adze head, which is purchased from a man who works as the village carpenter. The head is attached to a wooden handle (Fig. 1). The complete adze weighs 1.7 kg. When thoroughly beaten the fibers are reduced to fine chips (*kuweso*, this term is also used for naming a variety of sago palm.), which are then packed into a carrying box (*palaudi*). Formerly this box was made of sago palm leaf sheath, but now this has been replaced by a jute sack. The process of beating and packing continues for several days until the pith of one sago palm trunk has been completely reduced.

2. Extraction of Crude Starch

A trough (*poko lamo*) for washing is installed at a spring or a pond close to the chopping place. In practice, the Galela select for felling a suitable palm growing within a radius of 30–40 m of an already constructed trough.

According to an informant, the *poko lamo* or *poko ma lamo* (lit. “a big belly”) is so named because of its resemblance a big stomach that can contain, at any given moment, a large quantity of starch. The trough (Fig. 2) is 9.8 m long. The main

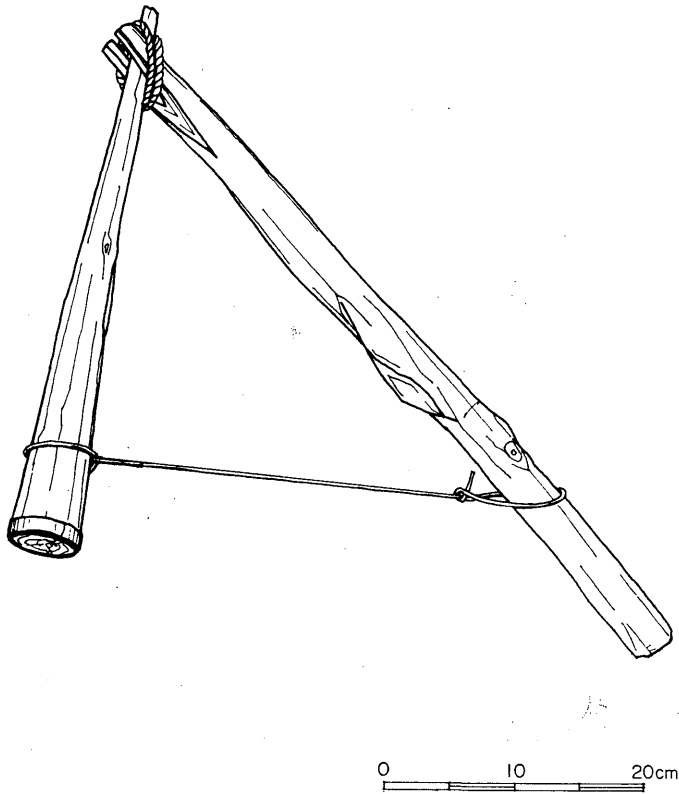


Fig. 1. Adze for beating sago.

body (*kirigu*) is made from the hollow palm trunk that remains after all the pith has been removed in the first stage of sago production. The cross section is U-shaped because supporting sticks keep the upper end open (Fig. 2-2-A). In order to erect the *kirigu*, two long sticks (*sosode*) are placed on a horizontal crossbar and is set on the ground. The bottom end of the *kirigu* is then placed on these *sosode* and is supported by vertical stakes (*golingaso*) that stabilize the *kirigu* (Photo. 3). A small trough (*rihosa*) made of the leaf sheath of the sago palm is next attached to each end of the *kirigu*. It is placed on a short stake, also made of the leaf sheath of the palm.

The *poko lamo* is constructed so that one end protrudes over the water surface. This part is used for washing the crude sago, and consists of a *seri* and *paga*. It is again made from a leaf sheath of the sago palm. A sieve (*gumutu*) of coconut bark fibers is then fixed in place at the junction of the two parts of the *paga*. Today, *gumutu* is mostly made of jute sack cloth. For stability, the bottom of the *gumutu* is inserted between the partially overlapping ends of the *paga* and the top is tied to a bent wooden stick (*bau*), which maintains the tautness of the vertical *gumutu*. One end of the *paga* is placed in a forked stake erected in the water. A wooden platform made from

beaten sago palm “bark” is placed on the water directly under the *paga* so that a man can stand on it when kneading *kuweso*.

A container full of *kuweso* is placed on the platform or on the ground close to the *paga*. *Kuweso* is scooped with both hands from the container and placed in part ‘B’ (Fig. 2-1-B). With a well bucket (*sia-sia*), water is then poured onto the *kuweso*. The traditional sago washing bucket is made by forming the leaf sheaths of the sago palm into the shape of a pail, with a handle made of a sago palm leaf stalk. Today Galelans use a bucket made of bound *woka* leaves (*Livistona rotundifolia* [Lamk] Mart.) with a rope attached to it (Photo. 4). A similar bucket is also used for obtaining well water. After two bucketsful of water (about 3 liters) have been poured onto it, the *kuweso* becomes waterlogged, and is then kneaded and washed with two both hands to release the starch (Photo. 5). Gradually the starch clinging to the fibers is loosened and washed from the pith and the water turns white. This starch-emulsified water flows through the sieve until the *kuweso* loses its water, whereupon two more buckets of water are poured onto it, and kneading and washing are repeated. The process is repeated 5–10 times until all the starch is

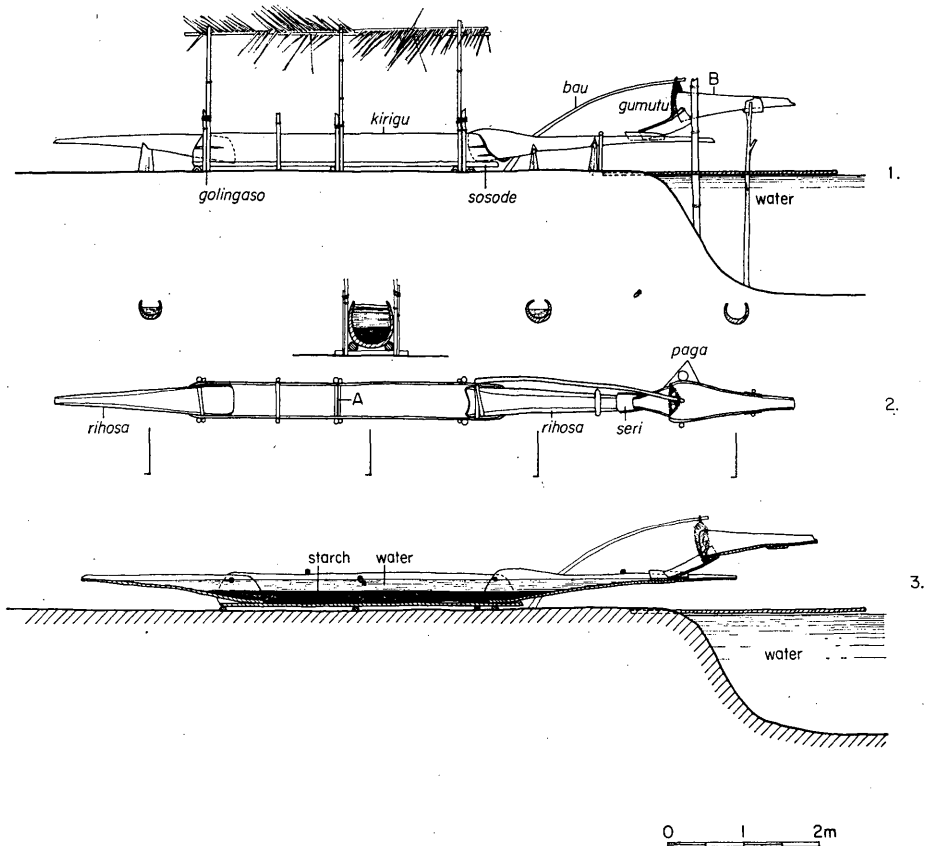


Fig. 2. Trough for extracting sago.



Photo. 3. Trough for extracting sago.

released from the fibers and the water no longer turns white. The *kuweso* in the *paga* is then discarded and another load of *kuweso* is placed in the apparatus and the process repeated.

The starch solution flows through the sieve into the *kirigu*. Waterflow is adjusted by placing a rock control plug in the *kirigu*, the extra water being forced to flow over the left end (Fig. 2-3), thereby maintaining a constant water level in the *kirigu*. The water should flow in a gentle trickle lest the starch not settle, and the solution overflow. After being guided into the *kirigu*, the emulsified water separates into pure water and starch, the latter settling to the bottom as a sediment (Fig. 2-3). When the left *rihosa* support (Fig. 2-1) is slid over and the *rihosa* becomes slightly tilted, the water above the starch runs down, leaving behind the waterlogged crude sago (*peda*), which is then removed with both hands and packed into the *ruru*.

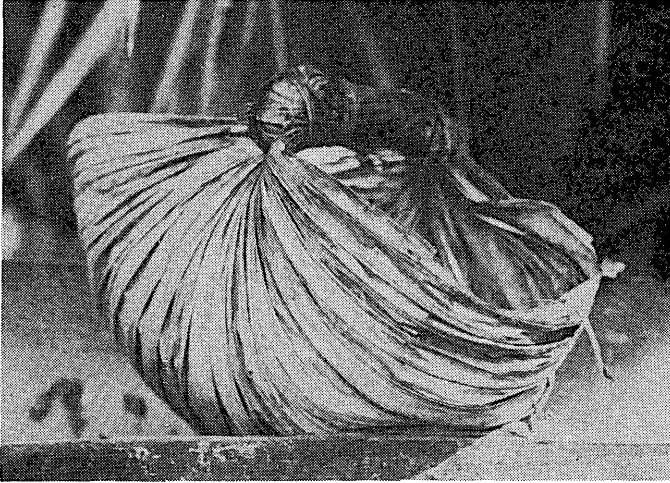


Photo. 4. *Woka* leaf bucket.



Photo. 5. Pouring water onto the *kuweso*.

3. Packing the Crude Sago

The starch sediment is packed into a container (*ruru*) and taken to the village for storage. The carrying container (*ruru*) is made from leaves of the sago palm. A similar kind of *ruru*-like container is also used throughout the Maluku Islands and also by several sago-producing ethnic groups of the Vogelkop Peninsula and Geelvink Bay in Irian Jaya. The container is called *tumang* in Indonesian (or Malay), a *lingua franca* in these areas.

A *ruru* is made in the following manner (Photo. 16-12). First using a bushknife (*taito* or *suambel*), the leaflets are removed from the midrib of the multi-foolate sago palm leaf. Each leaflet is then trimmed at both ends to approximately the same length and is folded back at about an arm's length from its tip (this unit, the length from the fingertip to the shoulder, is called 1 *dapa*). Ten of these folded leaflets are placed side-by-side and partially overlapping, and are stitched together with a narrow-pointed strip made from the skin of the sago leaf midrib. Both top and bottom of the leaflets are stitched together and form a cylindrical vessel. A circular band, also made of the skin of the midrib, is centrally placed inside the cylinder to form a support. The cylinder is then set on the ground, and the folded leaflets are placed on its top. Three hoops made from the palm midrib are placed around the outside of the vessel. The cylinder then is upended, the "top" serving as the bottom of a *ruru*. A small amount of *kuweso* is put in the bottom to fill the cracks between the bottom leaflets.



Photo. 6. Removing the leaflets; the first step in making a *ruru*.



Photo. 7. Then the leaflets are stitched together.



Photo. 8. Next the circular band is made.



Photo. 9. The completed *ruru*.



Photo. 10. Packing the *ruru* with crude sago.

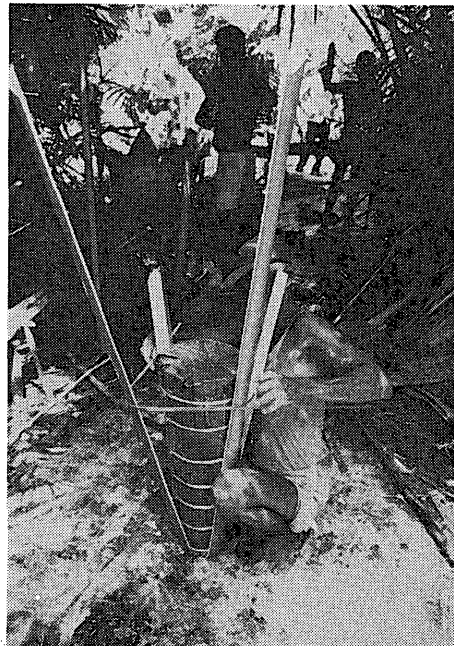
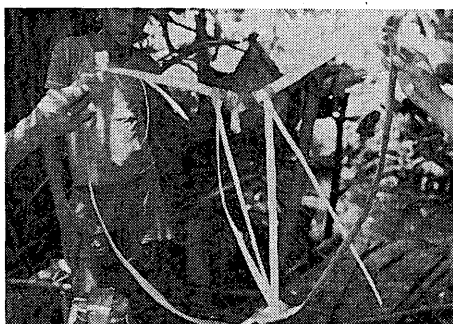


Photo. 11. The lid and reinforcing are attached to the filled *ruru*.



↑ **Photo. 12.**
The strap for carrying the *ruru* is made.



Photo. 13. Carrying the *ruru*. →

This main body of the *ruru* is completed by the addition of a lid and shoulder straps. It is approximately 55 cm long and has a maximum diameter of about 25 cm. A lid is then made for the *ruru* from sago palm leaflets in much the same way as the bottom was made. Two reinforcing frames made from the leaf midribs are placed on the outside of the *ruru*. Finally, shoulder straps made from the midrib rind are attached. The man then carries the *ruru* on his back to the village (Photo. 13).

II. EXTRACTION LABOR AND CONSUMPTION OF STARCH

The Galelan verb "to beat the sago pith" is *hahalo*; hence *nyawa hahalo* means "the one who beats sago pith". And the verb for "knead (and wash)" is *raramo*; hence *nyawa raramo* means "the one who kneads (and washes) sago." Our informant claims that sago processing is done most effectively when a pair of men, one *nyawa hahalo* and one *nyawa raramo*, work together, the former making the *kuweso* and the latter doing the washing. But in many cases both tasks are performed by one man working alone.

Villagers usually go in the morning to the forest for sago processing. Work for the day is over before lunch time, when they all return to Limau. It takes about 3.5 hours for one man doing both *hahalo* and *raramo* to produce one full *ruru* of crude sago *peda*. He usually goes to the forest every morning on several consecutive days to extract all the starch of one palm.

As mentioned above, there is a tacit agreement among the Galela to adjust the

leaflets for *ruru*-making to one's arm length, and diameter of the *ruru* is also fairly constant. Thus the capacity of a *ruru* is approximately standard throughout North Halmahera, and crude sago is measured by the *ruru*. At the time of our fieldwork 1 *ruru* of sago cost Rp. 500 in Limau, and was sold in the Soasio market for Rp. 700.

The weight one *ruru* of sago varies according to the moisture content. The stored crude sago is occasionally watered, and 1 *ruru* of sago has an average weight of 22 kg, the amount obtainable from 2 jute sacks of *kuweso*, or the equivalent of 70–80 kg of unwashed *kuweso*.

A section of sago trunk with a length of two outstretched arms and with a diameter of 35 cm yields enough *kuweso* to produce 1 *ruru* of *peda*. Hence, if a 8 m trunk 35 cm in diameter is felled, 5 *ruru* of *peda* can be obtained with 17.5 hours of labor. Naturally, the yield varies according to the dimensions and starch content of the trunk and the thoroughness with which the starch is extracted. *Peda* yields per palm were found to range between 3–10 *ruru*.

Were all staple foods prepared with *peda* a family of 5 persons would consume 1 *ruru* in 3 days. But since other staples such as banana, manioc, sweet potato and rice are also eaten, a family of 5 usually consumes 1 *ruru* of *peda* per week. The *peda* obtained from a single relatively large palm usually lasts a family for about one month.

Since there are extensive sago palm forests south of Limau, young palms outnumber those felled for starch. This natural resource, among others, has been instrumental in attracting in-migrants to the village, and sale in the Soasio market of *peda* to those villagers who do not have access to the palm forest has become a source of cash income for the Limau villagers. We estimate that more than 30 percent of the *peda* produced in Limau is sold outside the village.

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