Chapter 3

Life and Livelihood in Sago-Growing Areas

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Abstract This chapter describes how people in sago-growing areas are involved with sago, especially in those areas where local people consume sago starch as their staple food, and also describes the cultural and social aspects of sago usage in these areas. Sago is claimed to be one of the oldest crops, and it was the staple foods in large areas of Southeast Asia and Oceania, together with taro and yam, before rice largely replaced these crops. In some areas in Southeast Asia and Oceania, sago is still the staple food, and the sago palm is used not only as a food source but also for various purposes, such as thatching materials. In these areas, sago plays various kinds of social roles as well as being a food. In other areas, such as some places in Malaysia and Indonesia, commercialization of sago starch is practiced, and the starch is processed industrially in factories. Since sago is one of the older crops, it is related to many aspects of people's lives in the sago-growing areas. Having a large number of folk varieties in these areas indicates that sago has a close relationship with people's interests and that it is deeply involved with people's lives. These are shown in mythology, rituals, feasts, and many other human activities.

3.1 Diversity of Sago Usage

The distribution of sago palm species is shown in Fig. 3.1. Sago grows mostly in the islands of Southeast Asia and also in Melanesia. It includes most of Indonesia, Malaysia, southern Philippines, southern Thailand, Papua New Guinea (PNG), Solomon Islands, Vanuatu, Fiji, and Samoa. It is argued that in Southeast Asia, including islands and mainland areas, taro, yam, and sago formerly were the staple foods before rice largely replaced these crops, and it is claimed that sago is one of the oldest food plants (Spencer 1963).

The way the people use sago varies depending on the area. Using sago as a starch source often refers to the palms being under a system of semi-cultivation, and the

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Fig. 3.1 Distribution of *Metroxylon* spp. in the Asia-Pacific region (Source: Ruddle et al. 1978)

distinction whether the people cultivate sago intentionally or use naturally occurring sago is unclear. The degree of cultivation varies from one area to another.

There are several ways that the local people are involved with sago. First, in some areas sago starch is the staple food for local people. In these areas, the people get starch from sago as a way of subsistence. Second, in some areas, commercialization of sago starch is practiced. Sago is collected, and the starch is processed industrially in factories. Here, the sago starch is exploited as a means of earning cash. Third, in other areas, although they have sago forests or sago palms near their living areas, sago is not used very much. It is only supplementary to other food, only consumed as emergency food, or it is no longer consumed, although it was formerly eaten.

In some areas, sago is the staple food for local people, and these areas include lowlands in Indonesia, Malaysia, and PNG, with some parts of highlands also included. In Indonesia, Papua Province has huge sago forests, more than 1 million ha in total (Ehara 2015), and the people heavily depend on sago as staple food. Also in other areas, such as the Moluccas, northern Sulawesi, and northern Kalimantan, the people utilize sago as a staple food. In Malaysia, Sarawak and Sabah, there are areas where the local people utilize sago as one of their staple foods. Papua New Guinea has a large area where sago is the staple food. Figure 3.2 shows the distribution of land usage of PNG, and it indicates the areas where sago is the staple food. This includes lowland areas in the northern and southern parts of New Guinea Island, and also some areas in smaller islands, including Manus and northern New Ireland. The total area of sago-growing area in PNG is estimated to be around 1 million ha (Power 2002). In some parts of Bougainville, especially in Eivo and Siwai, which are not shown in Fig. 3.2, sago is produced regularly as food (Connell and Hamnett 1978).

Fig. 3.2 Distribution of the areas where sago is the staple food in Papua New Guinea (Source: Vasey 1982)

As for the commercialization of sago, there are examples only in Malaysia and Indonesia. In Malaysia, there are small-scale sago factories in Sarawak and Sabah. In Indonesia, sago plantations are found in Riau, Sumatra, and Papua Province, as well as small-scale factories (see Chaps. 6, 7, and 8).

In other areas, sago is not used very much. In the current countries of Fiji and Vanuatu, it is believed that sago was once used as a food (Barrau 1959), but at present there is little evidence of its use as food with the exception of Espiritu Santo Island, Vanuatu, and Rotuma Island, Fiji (Connell and Hamnett 1978). In the Solomon Islands, there are some records of its use as a food crop. For example, in the islands of Anuta and Tikopia, sago remains an alternative food to taro, after a cyclone, and in Kwaio and Baegu of northern Malaita, sago was used in times of great scarcity (*ibid*). There are some areas where it is recorded that the people formerly but no longer consume sago. In many areas where sago grows, sago starch is not eaten, but the palm parts are used for other purposes, such as thatching material.

3.2 Sago Use as Food

When sago is considered as staple food, it has some advantages, compared with the other crops in tropical areas. First, when considered as a food resource, no forward planning is required for getting starch. When the harvest work begins, starch can be consumed after one-half a day or after a day at the most. If sago palms are found just before flowering, starch can be obtained at any time. In the case of root crops, the harvest time depends on the time of planting, and it is possible to adjust the time of harvesting by shifting the time of planting. But in the case of sago, starch is available all the year around, and the flexibility of harvest time in sago is greater than in any of the other crops. In this sense, it can be said that sago has no seasonality. Second, sago palm is constant in that it grows where the other crops cannot grow. Sago palms are able to grow in both mineral and peat soils that have little nutrition, even with high groundwater levels all year around and flooding during the wet season. Also, few diseases and harmful insects damage sago palms, compared with the other crops, such as sweet potatoes, bananas, taro, and cassava (Sasaoka 2006), partly because in the case of insects, the trunk of the sago palm is hard and strong. Third, when extracting starch from sago as one of the land uses, the amount of labor input to obtain calories is less than other crops and shorter than shifting cultivation (Sasaoka 2006; Yamamoto 2015). When a sago palm is felled for starch, 100–800 kg of starch can be taken (in the case of naturally growing palms, it is mostly 100–200 kg), depending on the size and variation of the palm. In this sense, it is efficient for local people to acquire the staple food. Fourth, the starch of sago may be stored for a long time. After making starch, it may be stored for a couple of months in woven bags made of natural fiber, or plastic bags, or ceramic pots (Greenhill 2006)¹, or even for one-half a year if kept in water in an example from Seram, Indonesia (Sasaoka 2006). In the case of tropical areas, where cereal crops are not available, this characteristic is important, in that sago starch can be stored for the near future.

But on the other hand, sago has some disadvantages as a staple food. First, in sago, the nutritional value, other than carbohydrates, is poor, and the other nutritional requirements, especially protein, must be taken at meals together with sago starch. Second, it takes time to get the first harvest when beginning to grow sago in new locations, since it requires more than 10 years to get starch after the first planting.

There has been discussion as to whether harvesting starch from sago is an easy task for the local people or not. It is said that it requires little managerial work when naturally grown palms are used. But some have argued that it is not easy to manage the sago palm forests for the sake of getting a high quantity of starch, although the man-hours to produce 1 million calories is less than the other crops. It must be acknowledged that it requires collective work for processing starch, since the palms

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¹Greenhill (2006) mentioned the possibility of spreading sago disease (sago hemolytic disease: SHD), if the starch is kept for a long period.

are quite large and heavy compared with the other crops (Osozawa 2016). Ellen (2004) also argued that getting sago starch is an adaptive strategy based on complicated technology and refuted the assertion that sago extraction is an intuitively and technically simple solution to food provision for those reluctant to adopt *proper* agriculture.

As for the starch production potential of sago, once again this subject has been debated. It is reported that the carrying capacity of sago is not very high in PNG (Ohtsuka 1994) and that sago cannot support the human population, especially if population pressures increase significantly. On the contrary, it is argued that sago palm has a very high starch production potential, and higher than the other crops, such as cassava, sweet potatoes, and potatoes. It is acknowledged that making a comparison with other crops in terms of starch production is difficult because it is not easy to find appropriate conditions for sago research to be carried out (Yamamoto 2015).

3.3 Starch Processing

Although the method for extracting sago starch is similar throughout the tropics, there is some variation in techniques and implements when examined in detail (Townsend 1974; Ellen 2004). The process of obtaining starch from the palm stems is as follows. First, the people select the appropriate palms for starch harvest, sometimes testing the palms with an axe cut in the trunk to determine that the starch content is adequate. Those testing positive are felled. Felling palms requires hard work, and usually it is done by men. When the palms grow far from home, the trunks are sometimes transported, typically rafted by water, to a processing area near the home. The trunks are quite often cut into log sections, since the entire trunks are too long and heavy to handle. Next, the logs are debarked and the pith chopped out of the trunk interior. Usually wooden pounders are used for this purpose, sometimes with a metal tip. In some areas in Malaysia and Indonesia, this process is done mechanically by using rasps. The next step is to wash the starch from the prepared pith and to settle out the starch. The strainer for filtering is most frequently a fibrous coconut leaf sheath, but recently artificial materials, such as a cloth or nylon netting, are used. For processing, both the hand kneading and trampling method are widely used.

The processing of sago requires collective work, and mostly it is performed by married couples or by consanguineous groups. The gender roles of processing have variations, depending on the area. The general tendency is that the first one-half of processing, including felling the palms and debarking, are performed by men and the latter half by women. In many areas of New Guinea Island, the man is in charge of palm selection, felling palms, debarking, and pith crushing and the woman transporting and storing starch in general. However, the division is different from one area to another, and women perform pith crushing in some locations (Toyoda 2015).

3.4 Cooking Practices and Dietary Habits

The methods of cooking sago also exhibit diversity, such as making sago jelly (also called as sago pudding, sago porridge, or sago dumpling), and also it is eaten baked (as a pancake). Among the Toradja people of Sulawesi, Indonesia, and in the Sepik River area in PNG, wet sago is cooked in bamboo tubes or sandwiched between tree barks. In many areas where sago is consumed as staple food, other foods are eaten with sago, usually in the form of meat, fish, or vegetables, and sometimes with coconut soup (Ruddle et al. 1978).

Table 3.1 shows an example of the dietary habits of the village of Sowom, Arapesh, PNG, where sago is the staple food. Out of 283 meals, 275 included sago; other starches were bananas, root crops, and rice. This shows that the people are heavily dependent on sago as a staple food.

3.5 Other Usages of Sago

In sago-growing areas, the palm is used not only as a food source but also for various purposes. Mostly the palms are used for construction materials. For example, the leaves are used as thatching. Thatching with sago leaves is the main usage of sago other than food.

In those locations where sago grows nearby, people utilize every part of sago palm for various purposes. In the case of Nuaulu, Seram, nonfood uses of sago palms are reported in detail by Ellen (2004). Leaves are used to make brushes, baskets, torches, and so on, as well as thatching. Petioles and rachises are used to make fences and toys, as well as for wall construction. In the case of the Melanau people of Sarawak, Malaysia, various kinds of usage of foliage are reported (Goto and Nitta 2015). Dried leaf sheath skins are used to make various kinds of vessels, and the skins of leaf sheath bases are used to make water containers. The vascular bundle at the base of the leaf sheath is made into blowpipe darts. The leaf midribs are used to

Table 3.1 Frequencies of food kinds consumed in Arapesh, Papua New Guinea^a (daily basis)

	No. of days	Percent
No. of valid data	283	
Sago	275	97.2
Bananas	191	67.5
Root crops ^b	84	29.7
Rice ^c	119	42.0

^aMultiple responses
^bRoot crops include taro, sweet potato, yam, and cassava
^cRice is imported from Australia and sold at shops. Source: Toyoda et al. 2005

make brooms (ibid.). Dried petioles are also used to make walls and ceilings in many areas (Greenhill 2006; Sasaoka 2006). The bark is sometimes used as flooring materials. Long sections of bark are necessary for flooring, and in this case, the trunks are not cut into sections before crushing the pith. Barks and fronds are also used as fuel, to make fences, and so on.

On the residue of sago pith which is left after processing, certain kinds of mushrooms grow, and they are eaten as supplementary food. Also, when the residue is left for a certain period, larvae of grubs (mostly *Rhynchophorus ferrugineus*) appear, and the larvae are eaten by local people as a sort of delicacy (Mitsuhashi 2015). Sometimes the residue is left with the intention of collecting these larvae. The residue of sago pith is used as pig feed in some areas (Connell and Hamnett 1978).

3.6 Social and Cultural Aspects of Sago

Agricultural crops often play social roles in various societies, and sago is no exception to this point. In sago-growing areas, sago plays various kinds of social roles as well as being a food.

3.6.1 Folk Classification of Sago

Sago is considered a single species (*Metroxylon sagu* Rottb.), but it is classified into several varieties in folk classification in many areas. Ellen (2006) reports that Seram have 11 named folk varieties², and Shimoda and Power (1992) recorded 15 in the lower Sepik River area. Toyoda et al. (2005) report seven among the Arapesh and nine among the Kwanga (Toyoda 2003) in the Sepik River area, both in PNG. The main attributes people use to distinguish folk varieties vary depending on the areas, but mostly they are morphological characteristics, such as spinescence, height, and thickness of trunk, and sometimes characteristics of starch, such as wateriness, solubility, and taste as food (Toyoda 2003; Ellen 2006). The number of folk varieties varies depending on the language group, and it is socially important in that it shows the degree of local peoples' interest in sago and the degree of their dependence on it. The Papua Province of Indonesia has a large number of folk varieties in general, sometimes more than ten. It is reported that there are 35 folk varieties near Sentani Lake of Papua Province (Yamamoto 2015), but it might be possible that these

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²The term *folk variety* indicates a local category for grouping in each vernacular language. Ellen uses the term *landrace* for that (Ellen 2006: 269), but the term folk variety has been used in the field of sago studies. It has been used to distinguish local peoples' names from cultivar in the strict agronomic sense, and to indicate the results of folk classification, and to reflect local peoples' recognition. *Ethnovariety* is a synonym.

varieties include local names in multiple language groups, and the number might be less within a single language group.

3.6.2 *Mythology of Sago*

Although most societies have no myths related to sago, a few have such myths, explaining the origin of sago and the involvement of sago with humans (Ruddle et al. 1978). Among the Toradja in Sulawesi, a series of myths explain the origin of sago. According to these myths, a woman used to provide sago porridge for her husband, but he could not find out where she got this dish. The husband spied on her and noticed that she made the porridge from the white flow from her vagina (others say from the dirt she scraped from her body). When this became known, people killed her. The sago grew out of her corpse. When they chopped into the trunk, blood spurted out, and from these blood spatters sago trees grew anew (Adriani and Krut 1951).

The theme of the origin of sago from the corpse of a slain culture hero or heroine can be related to *Hainuwele mythologeme*, which explains the origin of root crops (Jensen 1939). These myths of the Toradja can be understood as one of them. The Gogodala people, from the middle Fly region of the Western Province, PNG, have a belief that there is a close relationship between humans and sago, and they believe that the first sago palm arose from a man who defecated a seed that grew into a sago palm (Dundon 2002). It can be said that this is also related with the Hainuwele type of myths.

The myths explaining the origin of sago are not found in many areas, and the myths in other areas explain the involvement of sago with humans. In the Sepik River area of PNG, where sago is the staple food, myths related to sago have been reported. Most of these myths say that the local people came to know the ways of washing sago and the customs of cooking it from godlike beings, and then they began to eat sago (Kamimura 2015).

3.6.3 *Sago and Ritual*

Most societies have no rituals for sago, but a few societies have rituals related to sago in that it represents the fertility of crops and humans (Ruddle et al. 1978). Among the Tor people, Papua Province, Indonesia, sago pounding songs are said to have magical efficacy (Oosterwal 1961). The Toradja make small offerings of sago on the way leading to the sago washing place to keep spirits away from their work (Adriani and Krut 1951). The Kiwai people of the Fly River, PNG, carry out a *life-giving ceremony*, called *moguru*, to promote human fertility and longevity and to

enhance the starch production of sago palms. They make life-giving medicine from sago along with a large number of medicinal plants, and they distribute the medicine to each man, who smears it on the trunk of sago palm to encourage the palm to grow large and to yield plenty of starch. They also have a myth suggesting a relationship with the Hainuwele type of myth, in that the dead body of a cultural hero is cut into pieces and buried in the garden (Landtman 1927).

Generally, sago is not related to any kind of taboo. But in Kwoma, Sepik River area of PNG, there is a rule that a man must not eat sago which his wife, or any other woman, has leached, but only that which he himself or another man has leached (Williamson 1979). This is related to the fact that women are considered to be impure, and therefore dangerous, especially when menstruating, in most PNG societies. In Kwoma, sago is considered to be related to women, and it must be purified by leaching by men themselves, before men eat it (ibid.).

3.7 Sago and Feasts

As mentioned, one of the advantages of sago as a food resource is that no forward planning is required. Consequently it is useful at times of feasts and famine when ready availability is more important than productivity (Connell and Hamnett 1978). In sago-growing areas, therefore, it is customary to serve sago to invited guests at special occasions such as weddings. In Arapesh, PNG, sago jellies are offered to visitors from other villages at funerals. At the end of the 3-week mourning period, as an expression of gratitude to the relatives, a lavish feast is held, and sago is the main food on this occasion (Toyoda 2015). In Eivo, Bougainville Island, PNG, sago starch is eaten only at feasts (Connell and Hamnett 1978).

Sago is treated as goods for giving and receiving gifts. In many places in Melanesia, the groom's family offers some goods (bride price) to the bride's family for matrimony. While pigs are typically presented as the bride price, bags of sago starch are given as a gift at the same time in areas where sago is the staple food (Toyoda 2015).

3.7.1 *Sago and Trade*

As mentioned above, sago starch, unlike almost all the other food crops in tropical area, may be stored for as much as a few months. This has made sago a significant trade item. The Motu people on the southern coast of PNG have traditionally engaged in what is known as *Hiri trade* with people in the Gulf of Papua area to the

west to obtain sago. The Motu make unique earthenware pots as their local specialty goods and trade them for sago from the Gulf on a type of sailboat called a *lakatoi* or *lagatoi*. As the Motu people cannot obtain sago in their neighborhood, they resorted to this form of trade which involves a 2–3 month-long journey (Toyoda 2015).

3.8 Conclusion

Sago is claimed to be one of the oldest crops, and it was the staple food in large areas of Southeast Asia and Oceania together with taro and yam, before rice largely replaced these crops. In some areas in Southeast Asia and Oceania, it is still the staple food, and the sago palm is used not only as a food source but also for various purposes, such as thatching materials. In these areas, sago plays various kinds of social roles as well as being a food. In other areas, such as some places in Malaysia and Indonesia, commercialization of sago starch is practiced, and sago is collected, and the starch is processed industrially in factories.

It has been claimed that getting starch from sago needs little managerial work, and that it is an easy work to get staple food. But recent discussion indicates that it is based on complicated technology and that it needs elaborate management in order to get high-quality products. Whether getting starch from sago is an effective way or not for the local people to get food needs further discussion.

Since sago is one of the oldest crops, it is related to many aspects of livelihood in sago-growing areas. Having a large number of folk varieties in these areas indicates that sago has a close relationship with people's interest and that it is deeply involved with their lives. These are shown in mythology, rituals, feast, and many other human activities.

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