

## **SAGO IN MALUKU: PAST, PRESENT, AND FUTURE PROSPECTS**

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### **Introduction**

Sago flour, produced from the sago palm (*Metroxylon* spp.), is the staple food of the people of Maluku. The sago palm grows naturally throughout the islands of Maluku, occupying 30,048 hectares of land in 1982 (Bureau of Statistics 1982).

For centuries, sago has been processed in order to obtain starch by using a traditional method that is still in use. The starch is then processed into sago flour, which is further processed to make various food items. More recently, the role of sago flour in the economy of Maluku has been challenged by the availability of rice, which has been subsidized by the Indonesian government as the staple of most Indonesians. There are various indications that during the past five years, many or most of Maluku's inhabitants have switched to staples other than the sago.

This brief paper reviews the technology used in processing sago, present consumption patterns, and future prospects for sago as a staple for the people of Maluku and possibly other Indonesians.

### **Sago Processing Technology**

There are four principal stages in the harvesting of sago.

1. Determining the maturity stage of the sago palm;
2. Cutting the trunk and collecting the pith;
3. Extracting the starch; and
4. Packaging and storage.

Let us review each of the four stages in more detail.

### 1. Stage of Maturity

The first step in the harvest process is to determine the proper time for the sago palm to be harvested, because the maturity is related to the starch content in the pith. Maturity depends on the particular species or variety of the sago palm and on its habitat (Rumalatu 1984). Four varieties are economically important: *Metroxylon rumphii* Mart., *Metroxylon sagus* Rottb., *Metroxylon sylvestris* Mart., and *Metroxylon longispinum* Mart. The harvesters (especially in western Seram) normally distinguish between four stages of development (Rumalatu 1984):

A. *Wela (putus duri)*. No thorns appear on the leaves. Starch in this stage of development is only found along the main trunk, so harvesting is not yet recommended.

B. *Maputi*. The leaf stalks are yellow, thorns no longer develop, and the young leaves that develop are smaller than normal. This is the optimal stage for harvesting *M. rumphii* Mart.

C. *Maputi masa*. All leaf stalks are white to yellow in color, and flowers start to develop. This is the ideal time to harvest *M. sylvestris* Mart., because its trunk is then rich in starch.

D. *Siri buah*. Flowers are fully developed. This is the best time to harvest *M. longispinum* Mart. In other varieties, the starch during this stage of development is converted into energy for the development of the flowers.

### 2. Cutting and Pith Collecting

Traditional sago processing in Maluku involves cutting the trunk with a large ax and chopping the pith with a tool called *nani*. In some places, for example Seram and Ambon, a chainsaw is now used for cutting the trunk, and a simple machine called *parudan* is used for chopping the pith. (Using a *parudan* rather than a *nani* helps reduce the loss of pith, and therefore starch, during the chopping.) The chopped pith is then collected into a plastic bag, and carried manually to the starch extraction site.

### 3. Starch Extraction

Starch is extracted from the pith by pouring water over it and kneading it in a trough, or *sahani*, made of the large sheath base of the sago leaves (see Wallace 1869). The mixture of pith and water is then forced through the *runut* (the coarse fibrous covering of the coconut leaf stalks) which serves as a filter. The suspended starch that passes through this *runut*

filter is collected into a larger trough, the *goti*, made from the outer part of the sago palm trunk. At some locations in Ambon and western Seram, a piece of textile is used instead. Water is an important component in starch extraction. In some locations, clean water is available from sources such as rivers and wells. However, where freshwater is not available, people must use water from stagnant sources, which may impart a distinctive color or smell to the sedimented starch.

### 4. Storage

Fresh sago flour is moist, and contains about 15% water. The flour is collected in baskets made from sago leaves, called *tumang*, which have a capacity of from 10 to 30 kilograms. Sago flour can be stored in the *tumang* as long as the water content is maintained at a constant level, by periodically adding water. In western Seram, fresh sago flour is stored inside hollow bamboo stalks which are kept in water, usually in the sago swamp itself. The flour may then be stored this way for months or even years.

As mentioned above, there are two ways to harvest the sago palm: the traditional method (using a *nani*), and the semimechanized method (using a *parudan*). Using the first method, it would take three workers three days to harvest one sago palm, while the second method would require the same three workers only one day.

Large commercial sago mills exist in Waihatu, western Seram, and Kao, Halmahera. The Waihatu sago mill produces 1–1.5 tons of sago flour per month. At the time of writing, sago trunks were bought from the farmers for Rp 6,000 (about \$3.00) each. However, each trunk can produce about 30–40 *tumang* of fresh sago flour worth at about Rp 4,000–5,000 (about \$2.00–\$2.50) per *tumang*. Therefore most farmers prefer not to sell their sago palms to the mill, which consequently cannot maintain its production level.

### Sago Flour as a Foodstuff

Fresh (moist) and dried sago flour are each used to prepare different kind of foods. The most popular food made from fresh flour is *papeda*. Another kind of food made from fresh flour is *sinoli*. Both *papeda* and *sinoli* are eaten as staple foods. Dried flour is used for making *sagu lempeng* (baked sago loaves) and many kinds of snacks such as *sagu*

*tumbu*, *sarut*, *bagea* and *makron*. *Sagu lempeng* is the staple of most people in the Maluku islands.

**Table 1. Number of sago sellers and volume of sago flour consumption in Ambon City, 1961–1992**

YEAR	NUMBER OF SELLERS	VOLUME CONSUMED (KG/DAY)	POPULATION OF AMBON CITY
1961	20	12,000	55,547
1966	27	16,000	61,588
1971	11	5,000	79,280
1976	9	2,000	95,630
1981	5	900	115,914
1987	3	225	120,457
1992	6	750	275,888

SOURCE: Bureau of Statistics.

Table 1 shows that, despite the fact that sago may be used in a wide variety of foods, including noodles, beverages, and ice cream, sago consumption in Ambon City declined dramatically between 1966 and 1987. The nutritive value of some traditional sago-based foods of Maluku is shown in Table 2.

**Table 2. The chemical composition of some traditional sago-based foods of Maluku**

FOOD ITEM	WATER (%)	ASH (%)	FAT (%)	FIBER (%)	PRO- TEIN (%)	CARBO- HYDR. (%)	CALORIES
<i>Bagea Ternate</i>	8.80	2.42	20.33	3.33	2.24	63.78	447.05
<i>Bagea Saparua</i>	4.95	2.43	22.47	2.93	2.63	64.61	568.03
<i>Sagu lempeng</i>	11.75	0.70	0.20	0.33	0.37	86.65	349.88
<i>Sinoli</i>	21.73	1.72	7.35	3.25	2.13	63.75	329.40
<i>Bangkit sagu</i>	6.32	1.60	31.25	2.64	1.98	56.21	514.40

SOURCE: Department of Industry, Maluku Regional Office (1989).

Table 2 shows that *sinoli* (a mixture of sago and fresh coconut) is very suitable as a staple because of its high protein and carbohydrate

content. Other foods like *bagea Ternate*, *bagea Saparua*, and *bangket sagu*, also contain considerable amounts of protein and carbohydrates. *Bagea* is prepared from sago flour, almonds, and eggs, while *bangket sagu* is made from sago flour, eggs, margarine, and some other minor ingredients. These foods are therefore high in protein, which comes from the eggs, margarine, and almonds.

### Future Prospects for Sago as a Staple

Because of the high nutritive value of sago-based foods, the people of Maluku and other Indonesians could benefit if those foods were more popularly used as staples. However, in order to increase consumption, sago harvesting and processing methods first need to be improved. The quality of sago flour should be standardized like other types of flour. The starch extraction technique must be improved, and so must storage methods. For example, modern storage and packaging materials such as plastics and cardboard could be used instead of sago leaves.

Some factors that could facilitate the adoption of sago as a staple by more Indonesians are: the abundance of sago palms throughout Indonesia; the fact that sago harvesting is not seasonal, and may be carried out whenever the palm is mature; the long shelf-life of sago flour; and sago's high carbohydrate content.

### Summary

The development of sago as a staple food in Maluku and other parts of Indonesia is dependent on various factors: harvesting and processing technologies, national economic conditions, and consumption levels. The application of improved harvesting and processing technologies will improve the quality of sago flour and subsequently the quality of the various foods prepared from it. One economic factor that has hindered the development of sago as a staple has been the government-subsidized price of rice. Removal of these subsidies will make the price of sago flour competitive with that of rice. However, the most important factor in increasing the consumption of sago is the consumer preference: consumers must learn about the diversity and high nutritive value of sago, so that they might switch to it as their staple. Only through drastic changes in technology, economic conditions, and consumer preferences, will sago regain its important role as a staple in Maluku, and achieve its deserved position in the economy of Indonesia as a whole.

## NOTE

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## THE ARCHAEOLOGY OF SAGO ECONOMIES IN CENTRAL MALUKU: AN INITIAL SKETCH

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## Introduction

Early accounts of the spice trade and other contact dynamics between Europeans and indigenous peoples of Maluku Province in Eastern Indonesia, or the Spice Islands, have long dominated Maluku research. A brief perusal of the literature suggests why this is the case. Maluku Province has a rich and varied cultural and linguistic history that is well documented in a variety of sources (see Abdurachman 1978; Collins 1982; Ellen 1979; Van Leur 1955). However, there exists to date very little information on the prehistory of Maluku, apart from a few preliminary studies (see Bellwood 1992, Ellen and Glover 1974, Miller and Spriggs 1976, Solheim 1989, 1990). Maluku is often referred to as part of a greater sphere of cultural and linguistic diffusion involving the movement of Austronesian speaking populations into the Pacific (see Bellwood 1985, 1987, Blust 1976, 1985). Although the elucidation of common cultural traits between adjacent areas represents a very important line of culture historic research, we feel that it is also worthwhile to focus on some unique aspects of Maluku's prehistory.

In this paper we provide a preliminary sketch of the range of variation found in the sago-based foraging economies of early Maluku society. We begin with an outline of the main features of early Maluku subsistence before European contact and how they, in many respects, do not fit into current, popular classifications of traditional economies (see Griffin 1984, Kent 1992). This is followed by a brief description of previous archaeological research in the region. We then present a brief sketch of preliminary archaeological survey work carried out during the summer of 1992 on the islands of Ambon, Seram, and Buru in central Maluku. Finally, we discuss the significance of our survey results and provide suggestions for future research in Maluku.



### The Research Problem: "Scarce" Carbohydrates and Variation in Maluku Foraging Economies

Recent studies in anthropology (Bailey et al. 1989, Hart and Hart 1986, Headland 1987, Headland and Reid 1989) have challenged the view that tropical rain forests are food-rich habitats for human foragers and that prehistoric hunter gatherers once lived independently of cultivated foods in such environments. These works represent the extreme view of an earlier suggestion by Griffin (1984) that problems do exist concerning the paucity of wild carbohydrate resources in Asian jungles, and that animal fats and proteins are both abundant and important to support a foraging economy. The resulting hypothesis states that wild starch foods such as yams were so scarce and difficult to extract that human foragers could not have lived in such environments without recourse to cultivated foods (Bailey et al. 1989, Bailey and Headland 1991, Headland 1987, Headland and Reid 1989). By extension, these authors propose that the symbiotic relationship found between hunter-gatherers and farmers in tropical forest regions, such as Maluku, is not a recent phenomenon, but evolved long ago as an adaptive strategy for successfully exploiting this ecosystem.

We present an alternative model that suggests that foragers in humid tropical areas like Maluku were and are still capable of self-sufficient subsistence and do not need farmers in order to exist. Earlier accounts of the region suggest that Maluku rain forests would have been prime habitats for broad-based foraging economies (Forbes 1885, Forrest 1779; see Merrill 1917, Wallace 1869) Maluku rain forests contain a wide range of plant and bird species as well as mammals, some of which were likely introduced by humans, among them the pig, cuscus, and deer (Ellen 1979, 1990, Groves 1981, 1985, Merrill 1917, Van Slooten 1959, Wallace 1869). The rain forests of Maluku are unlikely to have been short of wild carbohydrate sources due to the wide distribution of sago palm (*Metroxylon sagu*), which makes up a large portion of the local diet in the region (Ellen 1977, 1988, 1990, Ruddle et al. 1978). Botanical studies suggest that central Maluku was very rich in natural sago stands that would have been highly adaptable to renewal under foraging (Ellen 1978, see also Rhoads 1982, Merrill 1917, Townsend 1971, Yen 1990:265). Scarce carbohydrates are unlikely to have been a major problem for early inhabitants of the Maluku rain forest environment.

Ethnographic descriptions of Maluku indicate that many contemporary groups rely on a predominantly sago-based economy coupled with a wide range of supplementary resources and concomitant procurement strategies. Recent studies by Ellen on the Nuaulu of Seram (1978, 1979, 1988, 1990), and Dwyer (1985) and Dwyer and Minnegal (1991) on the Etolo of New Guinea suggest that hunting and sago production are very compatible in terms of resource scheduling and overall contribution to the diet. (See also Brosius 1991 for a similar account of the Penan of Sarawak.) Dwyer notes that since relatively short bouts of sago processing yield surplus starch, people who rely on sago have more time to hunt than those who cultivate or tend gardens (Dwyer 1985:68). This model, which emphasizes the compatibility between foraging, hunting and sago production, provides an example of a viable alternative economy in the tropical rainforest that does not need agriculture to reproduce itself.

Another potential buffer against resource scarcity in Maluku would have been the widely documented exchange and interaction networks in place during the early historic period throughout much of the region (see Ellen 1979, Ellen and Glover 1974, Elmberg 1968, Van Leur 1955, Meilink-Roelofs 1962). Ellen notes that sago has likely been traded from the earliest times of its production in Maluku. Despite its widespread occurrence, the distribution of sago is uneven and does not neatly fit the pattern of human settlement. The smaller volcanic islands are less suited to sago swamp forest, while inhabited atolls and sand banks support little vegetable matter at all (Ellen 1979:53). Such localities imported sago and other foodstuffs by exchanging fish, shell, stone and other forest products. Ellen notes that this kind of local trade involving sago must certainly predate organized trade with outsiders (Ellen 1979:53). Any shortage of resources within a given area could have been buffered through exchange of sago and other items between foraging groups from different environmental zones.

Ellen and Glover (1974:366) note that, as early as A.D. 1400, Muslim and Hindu Javanese traders dominated shipping with Timor and Maluku. The Javanese primarily sought the cloves and nutmeg of Maluku in exchange for a variety of manufactured goods at important trading centers in Ternate, Tidore, Hitu, and other areas (Ellen and Glover 1974). It was through this large-scale spice trade network that localized tribal economies were gradually altered and replaced in certain coastal areas in Banda, Ambon-Lease, parts of Seram and Buru, Ternate, Tidore, and

adjacent islands off the coast of Halmahera (Ellen and Glover 1974:367, Ellen 1979). The people of Maluku paid increasingly more attention to commercial crops, while relying heavily on a wide variety of manufactured products and even some foodstuffs, such as rice, that were imported from western parts of the archipelago (Cooley 1971:185). This also led to exchange with indigenous groups in the interior areas of larger islands such as Seram and Buru, in which manufactured goods were traded for forest products (Ellen 1979). A highly diversified economy characterized by sago foragers, cultivators, and traders involved in various levels of exchange and interaction seems to have been present very early in Maluku history.

We argue that an equally complex range of economic activities and interactions began far back into the prehistoric record of Maluku, and furthermore that this need not have involved agricultural economies. Large-scale trade and interaction networks, involving movement of obsidian and pottery that date back several thousand years have been documented for the nearby Bismarck Archipelago and other areas of Oceania (Green 1987, Kirch 1988, Wickler 1990). Talesea obsidian from New Britain is present in sites on New Ireland as early as 19,000 years ago (Allen, Gosden and White 1989). This long-distance transport of materials intensified during the later Lapita cultural complex period from roughly 1500 B.C. to A.D. 100 (Kirch 1988, Kirch and Hunt 1988). Long-distance exchange is one of the most distinctive features of this complex, which consisted of the transport of obsidian, chert, meta-volcanic rock, pottery, and other materials (Green 1987, Kirch 1988, Wickler 1990). This network may have extended over 6500 km from Sabah, in Malaysia, as far as the island of Fiji in western Polynesia around 300 B.C. (Bellwood and Koon 1989). Although there is as yet no well-dated archaeological evidence, the presence of such wide exchange networks involving the movement of many different materials as early as the Pleistocene period in adjacent regions could suggest a similar pattern for Maluku.

Using the ethnographic and historical evidence, we suggest that an early prehistoric Maluku economy would have consisted of an arboreal-based structural component consisting of sago palm, fruit tree, and nut tree exploitation (see Yen 1990). This component would have been linked to a series of highly variable hunting and foraging strategies that shifted in emphasis, depending on seasonal availability of key resources

(see Ellen 1975, 1988). Additional resources provided by the extraction of marine and riverine species and exchange of materials would have provided a highly variable economy of shifting alternatives that would not fit the more common "farmer" and "forager" dichotomy. The main goal of the preliminary survey is to locate sites from a wide range of environments to help elucidate the variation among early foraging and other economic strategies that were present in the region. The survey was also conducted to build on previous work in central Maluku which is summarized briefly below.

### Previous Archaeological Research in Maluku

As noted by Spriggs (1989), archaeological research to date in Maluku is minimal. Most work has involved coastal surveys in search of ceramic middens and survey of raised limestone areas to locate cave and rock-shelter sites. Another area of concern has been to locate contemporary pottery-making villages and understand the range of ceramic variation within the region (Spriggs 1990).

Ellen and Glover (1974) describe the contemporary manufacture and trade of pottery in central Maluku through the use of historical and limited archaeological evidence. Much of the information was collected by Ellen while doing ethnographic survey work on Seram, Ambon, and Saparua islands between 1969 and 1971. The authors note the importance of contact by Maluku peoples with trading voyages from western Indonesia and the subsequent influence of that contact on historic and contemporary pottery manufacture in central Maluku. Ellen and Glover argue that archaeological research in Maluku would certainly reveal prehistoric pottery traditions several millennia older than the first historically documented wares.

Ellen and Glover's study was followed by archaeological survey in central Maluku conducted by Miller and Spriggs in 1976. Miller and Spriggs (1976, Spriggs 1990; see also Spriggs and Miller 1979) cover a wide range of data, including descriptions of contemporary pottery-making villages similar to those in Ellen and Glover's article, the location of coastal ceramic middens, historic fortifications and several rock-shelter sites on the islands of Ambon, Seram, Haruku, and Saparua. This important report further documents the range of ceramic variation in surface midden sites and in contemporary pottery-making villages throughout much of central Maluku. Miller and Spriggs (1976) and



Spriggs (1990) also located several rockshelter and cave sites with abundant surface artifacts which they collected. More important, since some of these sites contained fairly deep deposits, they had potential for subsurface excavation. Excavation could provide evidence of prehistoric occupation in Maluku, which up until that point would remain conjectural at best.

Since these preliminary surveys, limited excavation has occurred recently in northern Maluku. Solheim (1989, 1990) has carried out test-excavations in Irian Jaya, Halmahera, and Ternate to find evidence of the early movement of Austronesian-speaking peoples from Southeast Asia into Melanesia and the Pacific. Solheim's work has focused on the examination of ceramic traditions, with a research design that seeks to elucidate cultural relationships over a wide area. Solheim's limited excavations have yielded a wide range of artifacts, including a large number of ceramic sherds. Preliminary analysis has not led to the discovery of materials ancestral to the pottery or cultures of Melanesia and the Pacific ("Lapita"). However, Solheim notes that the earthenware sherds, while retaining some affinity with those of Southeast Asian cultural traditions, are distinct and sophisticated. The decorative patterns are similar to those common today and in the recent past over all of New Guinea and Melanesia.

Bellwood (1992) has carried out survey and excavation work in the Halmahera island group of northern Maluku to investigate Lapita Culture origins and insular Southeast Asian connections with Melanesia. Bellwood test-excavated five sites, one from Kayoa Island, three from southern Morotai Island, and one from Halmahera. These excavations yielded a wide range of materials that overlap in time with Lapita (1500 B.C. to A.D. 100) and further show affinities with Lapita in terms of pottery, shell ornaments, and stone adzes (Bellwood 1992:9). Bellwood's excavations have yielded an important series of radiocarbon dates for the Halmahera group that places initial occupation of the area somewhere between 8,000 and 5,000 years ago. (There is also a 37,000 B.P. date for the Tanjong Pinang rockshelter in southern Morotai. However, this date is problematic and Bellwood expresses uncertainty over its reliability.) These dates represent the first secure evidence of prehistoric occupation in Maluku. Bellwood notes that, like New Guinea, the prehistory of Halmahera can be expected to be unusually complex. We would expect

the rest of Maluku to contain an equally complex prehistory, which we have only just begun to understand.

As shown in the previous discussion, the archaeology of Maluku remains relatively unknown. Preliminary survey work has located several open air, cave, and rockshelter sites with excavation potential. Contemporary pottery-making villages and historic fortifications have been located and described in detail. Limited test excavation in northern Maluku has recently unearthed a wide range of materials, in particular ceramics, which show some affinities to those from prehistoric cultures in adjacent areas. Finally, a series of radiocarbon dates provided by Bellwood (1992) for the Halmahera group establish a prehistoric occupation date for the region of somewhere between 8,000 and 5,000 years ago. Although these dates will no doubt change with further research. These studies provide a base for further work to which we hope to contribute by elucidating the variation in early foraging and alternative economic strategies in Maluku. Work toward this goal began during the 1992 summer field season with preliminary survey in central Maluku.

### Archaeological Survey in Central Maluku

Preliminary archaeological survey work in Ambon, Seram, and Buru was undertaken through July and August, 1992. One purpose of the survey was to further develop relations with the Indonesian National Research Center of Archaeology, Division of Prehistory, in Jakarta, and the Maluku Studies Center at Pattimura University in Ambon to facilitate future cooperative research and academic exchange. Specific research goals were to gain some understanding of the environmental variation present in the survey areas, to document variation in the range of site types present, to locate suitable prehistoric sites for excavation, and to add to the site inventories already begun by Miller and Spriggs in their 1976 survey. There were two major phases to each island survey which consisted of: (1) a coastal flat survey to locate surface ceramic middens, and (2) a limestone karst survey of interior locales to find cave and rockshelter sites. By necessity, these became the primary focus of research due to their high visibility and their well-documented (see Straus 1991) preservation of perishable remains necessary for the reconstruction of prehistoric economies. The survey will be described in the order in which it took place, beginning on Ambon, shifting to Seram, and finishing on Buru.

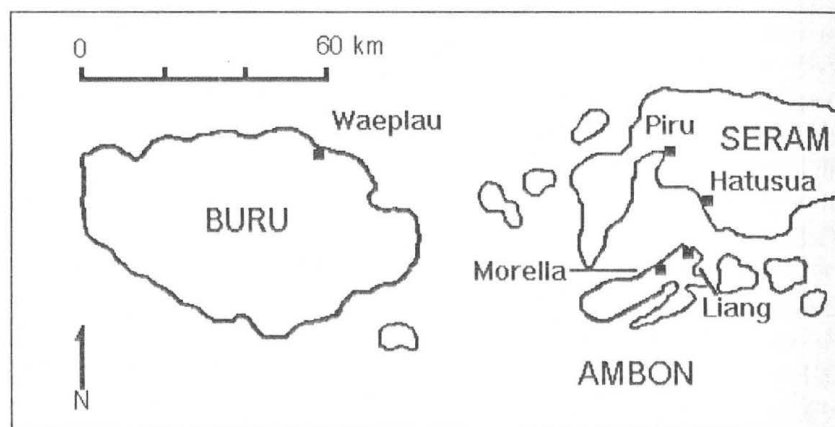
### Initial Preparations upon Arrival in Ambon

Upon arriving in Ambon, we met with officials at Pattimura University to establish our itinerary. We explained our research intentions and obtained proper permission and letters, and acquired a variety of useful maps of the area from the university library. We were also introduced to a guide who would help us with our survey, and then spent a few days in Ambon City, which was to become our main base of operations.

### Ambon Island: Coastal Flat Survey

The coastal flat survey on Ambon took place on the north and northwestern coasts of the northern Leihitu portion of the island. The team surveyed westward from Liang village as far as Wakal village and located six widely dispersed ceramic midden sites (nos. 1–4 and 6–7) shown in Figure 2. Overall, the coastal middens, apparently of recent origin, either sat directly on recent dune deposits or were associated with recent coastal limestone terraces situated near present-day sea level.

Figure 1. Survey localities during the 1992 field season on Ambon, Seram, and Buru

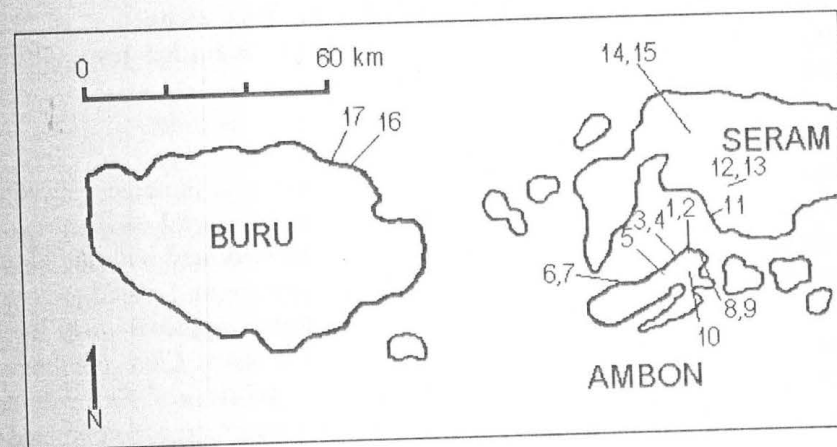


A wide range of ceramic rim and body sherds were collected from these sites. They included plainware, painted and incised sherds, recent glazed sherds, and irregular-shaped ceramic pieces such as loophandles. Much of the ceramics appear to be fairly recent material from Saparua or Haruku (Spriggs, pers. comm.). Several pieces also appear to be from bowls for mixing *papeda* (*sempe*) or molds used to bake sago cakes (see

Ellen and Glover 1974). Various lithic materials were associated with the ceramic middens, including stone adzes, netsinkers, and chert and basalt flakes. Overall, the artifacts collected appear to be of recent origin. They consisted of many glazed sherds of European or Chinese origin mixed with older earthenware sherds.

Figure 2. Major archaeological sites located during the 1992 field season on Ambon, Seram, and Buru

**Ambon Sites:** (1) Warputi site, (2) Huhu site, (3) Lalama site, (4) Wela site, (5) Kapahaha rockshelter, (6) Palaka site, (7) Wahatu site, (8) Ganimua site, (9) Liang cave, (10) Liang summit rockshelter  
**Seram Sites:** (11) Hatuhuran caves, (12) Serapi caves, (13) Serapi site, (14) Batu Mete rockshelter, (15) Batu Mete fort  
**Buru Sites:** (16) Tanjunliang rockshelter, (17) Waeplau cave



### Ambon Island: Karst Survey

This phase of the survey took place primarily in localities associated with raised limestone cliffs above Morella and Mamalla villages, shown in Figure 1, on the north coast of Hitu and a raised limestone terrace formation stretching from Liang village south to Waa village along the northeast coast of Ambon. A large limestone rockshelter was located at Kapahaha, the top of a steep slope approximately one kilometer northeast and inland of Morella village. The Kapahaha site, shown as Site 5 in Figure 2, consists of a large limestone overhang alongside a dry stream bed that cuts through the back of a cave alongside the rockshelter. The



rockshelter contains very thick silt deposits with scattered ceramics on the surface. Three other cave sites were located in the raised limestone terraces behind the Liang ferry terminal. These contained surface scatters of lithic and ceramic materials, as well as bone and fire-cracked rock. Small surface collections were made of the ceramic and lithic materials, while the bone was left in the caves.

As noted by Miller and Spriggs (1976), the island of Ambon is not short of archaeological materials. We located a wide range of sites, from ceramic middens to caves and rockshelters that contained abundant surface scatters of ceramic and lithic materials. It is difficult to estimate the age of much of the artifactual material without controlled excavation. However, here too, much of what was collected appears to be of relatively recent origin. A notable exception could be material from the inland Kapahaha rockshelter, which is distinctly different from that we encountered in the coastal surface middens. Test excavation of the Kapahaha rockshelter should be a high priority for further research on Ambon.

### **Seram Island: Coastal Survey**

The coastal survey on Seram took place primarily in the area between Kairatu and Waesamu villages. A large network of coastal caves, previously visited by Miller and Spriggs (1976), were relocated with the help of guides from the village of Hatusua. The cave system, labeled as Site 11 in Figure 2, is built into a raised limestone terrace approximately five meters above sea level and 20 meters from the coast. Cave openings were at the bottom of small slopes, were full of debris, and their floors were wet from run-off. Since the cave interiors were damp and contained wide networks of small passages and fissures, they were likely for specialized uses, such as burials, rather than for long-term living shelters, where a variety of day to day activities would have been performed.

This view was confirmed by the array of artifacts and other materials that were found in each cave. A wide variety of plain and decorated ceramics were found associated with abundant human bone. Many ceramics had incised decoration with a variety of geometric patterns as well as red-slip ware. For the most part, these were probably funerary urns used as burial goods with individuals in the interior portion of the caves. Other signs of long-term habitation, such as stone tools, hearths, or fire-cracked rock were not found. This confirmed our assumptions

about the specialized function of this series of burial caves in Hatuhuran. We collected a small number of ceramics to be taken back to Pattimura University in Ambon.

### **Seram Island: Interior Karst Survey**

The interior karst portion of the Seram survey took place in the upland forest area near Lumoli village about four kilometers east of Piru village, shown in Figure 1, on the northeast corner of Piru Bay. Two sites were located in Batu Mete, which is a dense forested area at the top of a mountain about six kilometers east of Lumoli village. The first site, shown as Site 15 in Figure 2, is a historic fortification at the top of a raised limestone ridge. The site is built into the side of the ridge and consists of angular limestone blocks that have been stacked into a wall, about 50 meters across, overlooking a very steep slope. Our guides told us that the fortification was used by the local inhabitants to repel the Portuguese about 400 years ago. Since it is located within very dense vegetation at the top of a steep slope and is built into the hillside, it would have provided an excellent ambush site to repel enemies.

Site number 14, shown in Figure 2, is a raised limestone rockshelter located on a steep slope at the top of a mountain eight kilometers east of Lumoli village at the end of an inland mountain trail. The shelter, located about 1000 meters above sea level, provided an impressive view of the entire surrounding countryside. However, its rather precarious location made it quite difficult to reach. The rockshelter contained scatters of ceramic sherds, bone, and lithics, as well as historic pottery on its floor area and a recent wooden sleeping platform. Our guides told us that there were several more large caves on the other side of the ridge, but we were unable to reach them due to lack of time.

The Seram survey provided us with important information. First, it provided us with a good sample of the rich burial caves, previously visited by Miller and Spriggs (1976), along the Hatuhuran coastal area between Kairatu and Waesamu. The caves contain a wide array of ceramics and other artifactual materials. There are many more caves in this coastal region that we did not investigate. Thus, further research in this area would be fruitful especially for studies of ceramic diversity. The interior upland survey barely began to uncover the large number of cave and rockshelter sites in this region. These sites would be of key importance since they are in areas of relatively undisturbed rainforest and would

almost certainly be sites of the ancestors of indigenous groups from the interior mountainous regions of Seram. Although the areas would pose some logistic difficulties for excavation, further research in the area should be a major priority in assessing the diversity of prehistoric economies in central Maluku.

### **Buru Island: Karst Survey**

Since a very short amount of time was spent on the island of Buru, we decided to look only for karst landscapes with potential cave and rockshelter sites. We were very fortunate, considering our tight schedule, to locate two such areas along the northeast corner of the island. The first area consisted of a series of raised limestone wave-cut rockshelters in the Tanjungliang locality two kilometers west of Waiperang village. These wave-cut shelters, shown as Site 16 in Figure 2, are about two meters above sea level and 40 meters from the coast. Due to their geomorphic situation we estimate that the wave cuts probably date to within the last four to five thousand years (Spriggs, pers. comm.). Several ceramic sherds, as well as bone and fire-cracked rock, were located on the ground surface under the wave-cut overhangs, which would have provided excellent shelter for its occupants. Matthew Spriggs thinks that some sherds contain the same incised decorative pattern, temper, and dark gray slip as material that he collected from a rockshelter on Haruku island. This raises interesting possibilities for research on ancient ceramic exchange networks in Maluku that predate European contact. Overall this area has potential for the excavation of sites from the recent Holocene (from 10,000 B.P.) on the island of Buru.

The second survey area was a large raised limestone cliff formation located one half kilometer behind Waeplau village on the northeast coast of Buru. We located several rockshelter sites in this karst formation as well as a very large cave site, shown as Site 17 in Figure 2, known as Waeplau cave. The cave sits atop a gentle slope, leading up to the cliff formation, with an impressive view of the surrounding coastal flat below. The cave ceiling is about seven meters high, while the cave mouth is about 25 meters wide. The cave contains a large living-floor with very thick, dry silt deposits covered by extensive shell and ceramic middens. The cave is obviously still in use today for nut cracking. There is a large anvil stone in the center of the cave, and depressions that may have been dug to collect megapode eggs.

Based on the available evidence, we think that Waeplau cave has potential for yielding some very early occupation dates. The cave is part of a much older limestone cliff formation than the previous wave-cut sites (Spriggs, pers. comm.). Its very large, well-lit, and well-ventilated floor area presents ideal living conditions for early inhabitants in the area. So does its location near Waeplau stream and the north coast. Finally, several surface artifacts were collected, consisting of very thick earthenware ceramics and large stone cobbles and flakes. The main research objective of the University of Hawai'i archaeology team will be to return to Waeplau cave on Buru for test excavation to determine the date of occupation as well as the range of material indicative of prehistoric economies in the area.

### **Discussion**

The results of our initial survey in central Maluku have proved quite fruitful. First, we have recorded additional sites to add to the lists of Maluku sites compiled by Miller and Spriggs (1976), Spriggs (1990), and by Bellwood (1992) in Halmahera, further documenting the rich array of archaeological materials present throughout the islands. Second, we have located a series of cave and rockshelter sites with excellent potential for further test excavation to recover data allowing us to answer questions concerning variability in prehistoric economies in Maluku. Finally, our work has provided food for thought concerning several other questions related to Maluku prehistory. Similarities in ceramic material collected on Ambon, Buru, and Seram suggest possible links through prehistoric exchange networks that predate the historic spice trade, throughout central Maluku. The rockshelter near Batu Mete on Seram may provide information on past lifeways of Seram's indigenous inhabitants. This data may also shed light on the question of independent rain forest foraging economies in prehistory, with research in Maluku leading the way. Finally, Waeplau cave on northern Buru should provide data concerning a whole range of questions including possible Pleistocene occupation of central Maluku. This is a distinct possibility when one considers that occupation dates of 40,000 years or older have been found in nearby Australia and New Guinea (see Allen 1989, Allen, Gosden, and White 1989, Groube et al. 1986). Questions such as these still remain unanswered at this point in time for Maluku. However, further archaeological research in the area will begin to provide us with a

glimpse of what life was like for the early inhabitants of the region. Our work will hopefully demonstrate that Maluku's prehistory is as rich and varied as its historic period.

### Summary

In this paper, we have provided an initial sketch of archaeological survey work carried out on the islands of Ambon, Seram, and Buru in central Maluku and indicated how this research pertains to the current debate in anthropology on the nature of foraging economies in the humid tropics. We suggest that early economies in Maluku were highly variable entities not likely to fit into the popular "farmer" vs. "forager" dichotomy used by many researchers today. We also provided an overview of previous archaeological research in Maluku followed by a brief account of the survey work conducted by the authors during the summer of 1992. We conclude that our survey work adds to the previous researchers in the area, and provides a solid base to begin further research concerning the nature of early economies in Maluku.

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## RESEARCH REPORT

### TRANSMIGRATION IN MALUKU: NOTES ON PRESENT CONDITION AND FUTURE PROSPECTS

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With the presence of the transmigrants, eventually some of the indigenous population in neighboring villages have been able to change their way of life, which previously depended upon nature. Now they can also prepare *sawah* and plant rice and several other types of vegetables (*Sekretaris Desa*, Waihatu, Kecamatan Kairatu, West Seram).

#### The Transmigration Program

Transmigration is the government-sponsored movement of agricultural, and in some cases urban, populations from the relatively overpopulated islands of Java, Bali, and Lombok, to planned settlements in the more sparsely populated Outer Islands of Indonesia. The government develops infrastructure, acquires and clears land, constructs irrigation facilities, and builds rudimentary homes for settlers. They are provided with agricultural inputs and subsistence supplies for a year or so, after which the community is expected to become self-sufficient.

Indonesia's transmigration program is today the biggest and longest-running government-sponsored land resettlement or colonization scheme in the world. It was initiated by the Dutch in 1905 with resettlement of Javanese peasants in Lampung, Sumatra, as a means to redistribute population and ostensibly to improve the welfare of the native population. Java was then, as now, characterized by extreme rural population densities and small farm holdings, with extensive landlessness and poverty. At the same time transmigration was motivated by the concerns of