

TRADITIONAL AGRICULTURE OF THE MARQUESAS ISLANDS (FRENCH POLYNESIA)

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ABSTRACT

*Agriculture was an important component of the subsistence strategy of the ancient Marquesans. The present understanding of traditional Marquesan agriculture is based more on ethnographic and historical than archaeological sources. Breadfruit (*Artocarpus altilis*) has been portrayed as the dominant crop, while other cultigens have been assigned less important roles. Recent field-work suggests that the current model conceals the great variability of traditional Marquesan agriculture and that irrigated taro (*Colocasia esculenta*) cultivation was important in the wetter valleys facing the north and east coasts.*

The Marquesas Islands are located in the eastern Pacific Ocean and comprise six inhabited islands of volcanic origin with a highly weathered, eroded landscape. Tectonic activity has left the islands devoid of coastal plains, and the shore is composed mostly of high cliffs. As in all Polynesian societies, agriculture was an important component of the traditional subsistence strategy of the ancient Marquesans. The fertile valleys that run from the interior to the coasts were heavily populated before European contact and these valleys provided the agricultural base of ancient Marquesan society.

TRADITIONAL MARQUESAN AGRICULTURE AS DESCRIBED IN THE ETHNOHISTORIC AND ETHNOGRAPHIC LITERATURE

Archaeologists' understanding of traditional Marquesan agriculture is based largely on ethnohistoric and ethnographic sources. These sources (e.g. Gracia 1843; Handy 1923; Linton 1925; Porter 1986; Robarts 1974; von

Krusenstern 1813) indicate that, at the time of European contact, Marquesan agriculture was heavily dependent on the cultivation and storage of breadfruit (*Artocarpus altilis*). Also mentioned as important food crops are taro (*Colocasia esculenta*) and banana (*Musa* sp.). Land was extensively cultivated in both small domestic gardens and larger plots farther away. Early European visitors to the Marquesas were struck by the extent and quality of agriculture that they observed. One of these visitors refers to several adjacent valleys on Nuku Hiva as being highly cultivated. His description of the Valley of Taipivai may be representative of the general state of Marquesan agriculture at the time of European contact. He wrote:

Villages were scattered here and there, the breadfruit and coconut trees flourished luxuriantly and in abundance; plantations, laid out in good order, enclosed with stone walls, were in a high state of cultivation, and everything bespoke industry, abundance, and happiness. (Porter 1986:97).

Forster, a botanist travelling with the explorer James Cook, walked far into another Marquesan valley. He wrote that "excellent plantations and groves of various fruit trees" were seen all along the way (Forster 1777:26). He also implies that all arable land was devoted to food production (*ibid.* 34). Still another early European visitor referred to the plantings in one valley as "a magnificent forest of breadfruit and coconut" (von Krusenstern cited in Ottino 1990:84). He also noted that large fields of taro were located near the houses (*ibid.*). Bananas were also grown in enclosures near houses or in more distant plots.

Most ethnohistoric accounts stress the importance of breadfruit in the Marquesas. One early visitor noted extensive groves of breadfruit in every valley that he visited

(Porter 1986). A longtime European resident writing in the mid 1800s stated that breadfruit formed the basis of the diet of the Marquesans (Gracia 1843:21). Another early European resident indicates breadfruit's role in the diet when he wrote of the scarcity of food during a particular drought. He says simply that there was no breadfruit, with the implication that this meant there was no food (Robarts 1974:5). E.S.C. Handy's (1923) ethnographic work reinforces this idea, since it gives the impression that Marquesans conceptualised breadfruit as their staple food.

As well as being eaten fresh, breadfruit was stored in pits for long periods of time. Known in Marquesan as *ma*, this fermented paste has been reported to remain edible for at least 100 years (Handy 1923:188). *Ma* formed an important part of the Marquesan subsistence strategy since it allowed surplus food to be stored for an almost indefinite period of time. Two kinds of *ma* pits were used. Large communally-filled pits were maintained by chiefs. The amount of care devoted to their construction is indicated by the remains of ornamental-finish adzing which can still be seen on the walls of some of the larger *ma* pits. Smaller pits, reserved for daily family use were located near each household.

While the ethnohistoric and ethnographic sources emphasise the importance of breadfruit cultivation, some also indicate that taro, grown either with, or without irrigation, was a regular food source. One visitor noted that "much pains were taken" in its cultivation (Porter 1986:149). The ethnographer Handy observed irrigated terraces on three different islands. He concluded that, in prehistory, the practice was generally utilised throughout the archipelago (Handy 1923:185-186). Archaeologists as well have reported both irrigated and non-irrigated terraces for several islands in the Marquesas (Bellwood 1972; Kellum 1968; Kellum-Ottino 1971; Ottino 1985). A variety of irrigation methods were employed. These included terraces watered by *in situ* springs, those irrigated by diverting water from a stream with canals, and also the use of barrage terraces built in the beds of intermittent streams.

There are problems inherent in basing our understanding of traditional Marquesan agriculture on ethnohistoric and ethnographic accounts. Information in these sources is limiting both temporally and spatially. Temporally, only the endpoint in a developmental sequence is represented. Change through time that led to the system described for the ethnographic present is not represented in these accounts. Spatially, variation between different environmental contexts becomes blurred as fragments of information from various localities are blended. There

may be wide gaps between what was recorded for the archipelago generally and what was actually practiced in any one place. For example, as mentioned above, there is only sporadic reference to irrigated taro cultivation in this literature, and its importance is not stressed. This view can be contrasted with the widespread remains of irrigated terrace complexes that one finds on the ground in the Marquesas.

It is possible that this discrepancy between the ethnohistoric literature and the archaeological evidence is due to the limited areas visited by the writers. Two bays on two different islands were the preferred anchorages for visiting ships, and were later the seats of French administration in the Marquesas. These two port settlements received most of the early visitors and it is clear that most of the ethnohistoric accounts relate to these places. Both are leeward, amphitheatre shaped valleys that are drier than valleys located in windward areas. This relative dryness is important, since rainfall may be an crucial factor influencing the abundance of irrigated taro terraces in any particular valley. On the Island of Nuku Hiva I have observed that in well-watered valleys irrigated terrace complexes are both more common and more extensive than in valleys with less precipitation. In short, the ethnohistoric and ethnographic sources may be obscuring variability in agricultural production in the Marquesas. There may have been much more variability in contact period agriculture than is documented in these sources. Although the ethnohistoric and ethnographic literature has given a limited picture of traditional Marquesan agriculture there are abundant remains of agricultural infrastructure in the Marquesas that beg archaeological investigation. There is good potential for developing an archaeologically based understanding of spatial variability in cultivation techniques in the Marquesas.

WET WINDWARD VALLEYS AND IRRIGATED TARO CULTIVATION

Initial survey results from Nuku Hiva Island indicate that there are more irrigated terrace complexes in the wetter valleys and further research may show that they sustained a different pattern of agricultural exploitation. Valleys on the north and east coasts of the island receive abundant rainfall and contain evidence of extensive irrigation. It is probable that irrigated taro production was quite a significant component of the agricultural output. For example, at Ha'atuatua Valley, located on the east coast, the southernmost stream has associated terraces for much of its length. This area of terrace sets run for over a kilometre from high up in the valley to near the sea. This degree of irrigation is not unique to this valley. At A'akapa

Valley on the north coast there are equally extensive terrace sets. Some of these were built very massively using large boulders. One flood control wall on the stream side of one terrace set incorporates stones nearly a meter in diameter. Internal walls, parallel to the slope within the terrace system, were built of equally large stones.

Hakau'i Valley on the south coast of Nuku Hiva has a large flat valley floor. Although it is in a leeward location, because of the position of a range of mountains to the west and a plateau in the interior, it receives a high amount of rainfall. At Hakau'i remains of large terraces indicate extensive shallow terracing on the valley floor, and it appears that recent sedimentation has covered much more extensive terracing. That these terraces were irrigated is indicated by a large, stone-edged canal that must have fed numerous terraces in this valley. Remaining portions of the canal are about two meters wide. The original depth is hard to determine since the bottom has been thickly covered in sediment. The great volume of water that could have been carried by such a canal may be an indication of just how many terraces there are in this valley lying hidden just below the ground surface. Irrigated terraces must have covered much of the flat valley bottom in former times.

In valleys with less rainfall, irrigated taro may not have been as important. These valleys may better fit the ethnohistoric portrayal of Marquesan agriculture as dominated by breadfruit cultivation. There may have been distinctly different systems of agricultural exploitation in different places in the Marquesas. Environmental factors, especially the amount of rainfall may have been important in determining the strategy used in any particular valley.

DRY LEEWARD NUKU HIVA

Most of the Marquesan landscape is divided into valleys by steep mountain ridges. It was in these valleys that most of the population was concentrated. However, the western side of Nuku Hiva Island is an exception. This whole part of the island is much drier than the rest of Nuku Hiva due to a range of mountains which blocks the rain carried on the trade winds from the east. Here, the rainfall is highly correlated with elevation. The higher elevations receive more rain and are consequently more highly dissected than the lower elevations which receive less rain and are more gently sloping. On this side of the island there are several valleys that run from the coast, through this gently sloping terrain, back to the mountains.

Fieldwork done in the 1950s in this area suggested that people had lived on this part of Nuku Hiva from

around AD 1100-1200 (Suggs 1961). This work further suggested that the valleys were the areas of habitation. Considering the concentration of populations in valleys on the rest of the island this is not surprising. Yet, unlike valleys on the other side of Nuku Hiva, these valleys have very steep sides. Any cultivable land in the narrow and flat valley bottoms is periodically swept by strong, erosive floods. A question left unanswered by Suggs' research was how the people of leeward Nuku Hiva obtained food. Given the lack of suitable agricultural land in the valleys, the starchy staple crops that supported this area's inhabitants must have come from somewhere else.

In summer 1993 I did some reconnaissance survey in this area. Preliminary results seem to indicate that the tablelands adjacent to the valleys were farmed. There is also evidence of agriculture high in the mountains. In the tablelands, at around 500 meters elevation, there is an area of severe erosion. Visible in the profiles left by the erosion is evidence of a buried agricultural soil, which can be seen as a charcoal-enriched darker band. It is capped by a layer which is probably sediment deposited by erosion caused by European introduced animals. The agricultural layer is thickest and darkest higher up in the tablelands and becomes less distinct at lower elevations until it disappears at around 400 meters elevation. Near this agricultural area in a shallow gully is a small set of irrigated terraces associated with a spring of fresh water. This indicates that at least some irrigation was formerly used even in this arid environment.

About 100 meters from the spring, on the edge of a bluff overlooking the 'Uea Valley, is a series of house foundations. Because we had only limited time while doing this survey and the vegetation reduced ground visibility, no other habitation features were found in this area. Future work should uncover more house foundations at around this elevation. With the evidence that we have now, I am inclined to think that there was only relatively minor habitation in the valley proper and that most of the population was concentrated up near the agriculturally-productive area. The only evidence of habitations from the valley proper are rockshelters. It is possible that they were only temporary shelters used while on fishing trips, or that perhaps they were inhabited by a few people who fished more or less continuously. In any case, despite a search of the valley floor, we found no evidence of large numbers of people living in the valley itself.

The evidence from this dry side of Nuku Hiva suggests to me a third pattern of land use. This pattern has people living inland at intermediate elevations. This would have allowed easy access to both marine resources

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and agriculturally-productive areas. The area around the habitations was probably extensively used for dryland cultivation with limited irrigated terrace cultivation. In addition, the constantly moist highlands are accessible from this area. Several Polynesian cultigens were noted in these highlands. These included taro, banana, *ti* (*Cordyline fruticosa*), candlenut (*Aleurites moluccana*) and yam (*Dioscorea* sp.). It is probable that a band of agriculture stretched from 400 or 500 m elevation up into the cloud zone.

CONCLUSION

Traditional Marquesan agriculture was more varied than a model based on the ethnohistoric and ethnographic literature would indicate. This variation is probably largely due to environmental conditions such as rainfall and landforms. On just one island I have noted three patterns of agricultural production. First, on the dry western side of Nuku Hiva there was extensive dryland cultivation, perhaps based on sweet potato (*Ipomoea batatas*) and yam, both of which can tolerate dry conditions. There was also minor irrigation and the highlands were agriculturally exploited. Second, in the very wet windward valleys irrigated taro cultivation was well developed, and other crops played an as-yet unspecified role. Third, in the less well-watered valleys we see the pattern documented in the ethnohistoric sources; there was little irrigation and breadfruit was probably of prime importance. As well as this variability on one island there may have been differences between islands in the Marquesas.

It is fortuitous that these ideas about Marquesan agriculture need not remain in the realm of speculation but are highly amenable to empirical research. The remains of agricultural infrastructure are there and await detailed examination. Archaeological investigation of these remains can lead to an understanding of the spatial relationships in Marquesan agriculture in addition to documenting the development over time of the agricultural systems that were in use at European contact.

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