

## COMMENTS ON SOME FEATURES OF HORTICULTURAL LAND USE ON POHNPEI ISLAND

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### Introduction

On Pohnpei Island, although the inhabitants purchase a large amount of imported food-stuffs, the quantitative importance of food production by means of subsistence agriculture or horticulture is still maintained considerably (RAYNOR, 1991). The land use of subsistence agriculture or horticulture there has been already described in brief or in detail by a number of researchers, such as MORISITA (1944), NAKANO *et al.* (1986), and RAYNOR (1991).

On the other hand, the term and concept of agroforestry became widely known since the 1970s (THAMAN & CLARKE, 1993), though a general consensus of opinion on the exact definition of this term has not yet been reached by the experts who are actually concerned with such a type of agriculture or forestry (BEETS, 1989). Since the 1980s, another optimistic term —sustainable development in agriculture— seems to have been, despite the vagueness of its concept, much in fashion amongst academic, journalistic, policy making, and other various circles all over the world. In recent years, agroforestry systems have become classified into traditional or non-institutionalized and institutionalized systems (THAMAN & CLARKE, 1993). RAYNOR (1991) applied the former notion to the agricultural or horticultural land use for subsistence food production on Pohnpei Island and emphasized the sustainability of such a land use.

To the preceding background, I add the following comments, which are based on actual observations in November 1994, on some features of the horticultural land use on Pohnpei Island.

### Description and Discussion

As noted in MORISITA (1944) and NAKANO *et al.* (1986), the harvest seasonality of the two main crops for subsistence consumption, namely, breadfruits and yams, is obvious. RAYNOR (1991) confirmed quantitatively this fact. At a garden close to a village house, yam vines (*Dioscorea* spp.; herbaceous) grow, in many cases, tangling with breadfruit trees (*Artocarpus communis* FORST.; arboreal). Because the flourishing season of yam leaves above the breadfruit trees is not all the year around, the growth of those leaves does not much hamper the photosynthetic activities of the tree leaves when a span of one year is taken into account. Therefore the two main crops can continually and sustainably co-exist in a garden. Besides these two main crops, many other herbaceous and perennial tree crops including coconut trees (*Cocos nucifera* L.) are grown in a garden close to a house (RAYNOR & FOWNES, 1991a). This seems to be a typical example that fulfills the original idea of agroforestry in which a stress is laid on the co-existence of herbaceous crops and useful trees on one field at the same time even though the herbaceous are grown only at the initial stage of silvicultural processes (SAMAPUDDHI, 1974/75).

Some writers gave comprehensive definitions of agroforestry. According to these definitions, swidden agriculture can be included in its concept (BEETS, 1989; MACDICKEN & VERGARA, 1990). Although I recognize that such definitions have some reasonable aspects, I, a researcher on the ecology of swidden agriculture, am very reluctant to accept them unconditionally, because, with the fallow period being reduced, the frequency of land denudation increases on the land for swiddens. I have a view that the core concept of agroforestry consists in the aspect of the minimum frequency of denudation of the land during the processes of agricultural production. In this sense, the traditional system of agroforestry on Pohnpei Island is idealistic. The longevity of some gardens there is more than 100 years (RAYNOR & FOWNES, 1991b), during which, except for anomalous cases, the land is never entirely denuded after their establishment.

In principle, cropland cannot be established without the transformation of natural vegetation. SAUER (1952) states that people everywhere "prospered by disturbing the natural order, (p. 22 of the Japanese revised edition)." In most cases, the processes for crop production include a stage of denudation, that is, a process of transforming land covered by original and natural vegetation into completely or nearly bare land. An exceptional case can be brought forward. On the hills in continental Southeast Asia, some tea gardens are established not by planting the seedlings of tea trees on the bare land, but by felling or girdling the tall trees around naturally or semi-naturally growing tea trees (VAN ROY, 1971). In this case, the land for a tea garden does not have a stage of nearly bare land, although the original vegetation is much changed.

According to RAYNOR (1991), at the initial stage for the establishment of an agroforest garden on Pohnpei Island, the degree of denudation is usually kept minimal, although, finally, the original vegetation is completely changed. All the larger and taller trees composing the original vegetation are not felled and/or girdled at one time, but are replaced gradually by the perennial tree crops. The traditional system of agroforestry on Pohnpei Island is another example of exceptional cases in the meaning mentioned above.

As described in NAKANO *et al.* (1986), HUNTER-ANDERSON (1991) and RAYNOR (1991), a great number of gardens which undergo the process of nearly complete denudation can be also found in a secondary forest not very near to a house. In such a garden, in most cases, only a small number of crops are grown in contrast to an agroforest garden close to a house. Not a few gardens of those are specialized for yam production. As has been already pointed out by NAKANO *et al.* (1986) and HUNTER-ANDERSON (1991), this type of gardening is in line with swiddening.

As well as on Pohnpei Island, one of the traditionally main crops in the Yap Islands, the high islands of Micronesia which are also subject to a climate with much precipitation throughout the year, is yam which is, there, produced in swiddens (HUNTER-ANDERSON, 1991). In the quantitative comparison of the spread of grasslands and fernlands amongst the Micronesian high islands, the Yap Islands and Babelthuap Island in Belau appear to be covered most pronouncedly by such types of vegetation (NAKANO *et al.*, 1987; HUNTER-ANDERSON, 1991). The issue of causation with regard to this is still far from settled (HUNTER-ANDERSON, 1991). Although much area is covered mostly by grass and/or fern on Pohnpei Island, too, the difference in the relative value of the area of grasslands and fernlands to the total area of the respective islands as between Pohnpei Island and the Yap Islands seems to be outstanding (MACLEAN *et al.*, 1986; FALANRUW *et al.*, 1987). The

relationship between this fact and the respective features of the systems of horticultural land use ought to be further investigated in detail. FALANRUW's (1990) paper includes such an aspect of investigation. It reports that swiddening on the Yap Islands today causes the retreat of forest and an exhaustion of soils because of careless and too frequent burning and very short fallow periods. In those studies, chronological investigations in cooperation with archaeologists are indispensable, as observable from the discussions in NAKANO *et al.* (1987) and HUNTER-ANDERSON (1991).

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