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AGRODEFORRESTATION AND  
THE NEGLECT OF TREES:  
THREAT TO THE WELL-BEING OF  
PACIFIC SOCIETIES.

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## AGRODEFORSTATION AND THE NEGLECT OF TREES: THREAT TO THE WELLBEING OF PACIFIC SOCIETIES

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### 1. INTRODUCTION

The purpose of this paper is to suggest that, if true polycultural agroforestry systems and the planting of trees, are not incorporated as an integral components of current and future agricultural and forestry development strategies, there may be little future for sustainable development in the Pacific Islands in the 1990s and beyond. It is suggested that modern monocultural and export-oriented agricultural and forestry development has been a major contributor to deforestation, and that agrodeforestation, the the destruction of, and failure to replant trees within the context of existing agricultural systems, is a threat to the wellbeing of Pacific societies, and, perhaps, a more serious economic and ecological problem than classical deforestation for many Pacific island societies whose primary indigenous forest resources are almost non-existent.

### 2. AGROFORESTRY AND AGRICULTURAL DEVELOPMENT

Agroforestry has always been central to "agricultural development" and the economic, social, and ecological wellbeing of Pacific peoples, with diverse, species- and cultivar-rich and adaptable agroforestry systems existing in all island groups. Current institutionalized agricultural, agroforestry and forestry activities, however, have, as their main objectives, and allocate almost all of their scarce financial and manpower resources to the planting of cash crops and timber species or the production of livestock for export or import substitution. This has led to the destruction of traditional agroforestry systems and to widespread agrodeforestation.

It is argued here, that the protection and promotion of traditional agroforestry practices and tree planting, along with appropriate cash-cropping systems, may be one of the most cost-effective, practicable, and socially and geographically equitable means of sustainable long-term agricultural

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development in the isolated, fragmented, resource-poor, and ecologically fragile islands of the Pacific. Not only should the institutional promotion of such traditional or modified agroforestry activities satisfy most of the goals of current national development plans, it may also be more practicable, because it is based on existing and ecologically and culturally time-tested technologies, and may also be the only means of protecting the cultural integrity and sustainability of the agricultural and agroforestry systems of semi-subsistence rural peoples. Finally, such a policy, by definition, would address the serious and accelerating problem of "agrodeforestation" on many islands where few, if any areas of indigenous lowland forest remain.

The balance of the paper will focus, first, on: 1) a definition of terms used in the paper; 2) deforestation and "agrodeforestation" as major global and Pacific island agricultural development issues; 3) the nature of "traditional" Pacific island agroforestry systems; 4) the nature of more narrowly focussed modern institutionalized agricultural development activities and how they may, in fact, be a major factor in leading to agrodeforestation; and, finally 5) a plea for a more balanced approach to institutionalized agricultural and agroforestry development using traditional agroforestry systems as bases for forestry, agroforestry, and agricultural development, rather than as obstacles to modernization and monetization.

## 2. DEFINITION OF TERMS

There are numerous definitions of "agroforestry". One of the most functionally comprehensive, and in agreement with agroforestry focus of this paper, is that of King and Chandler (1978):

Agroforestry is a sustainable land-management system which increases the overall yield of the land, combines the production of crops (including tree crops) and forest plants and/or animals, simultaneously or sequentially, on the same unit of land, and applies management practices that are compatible with the cultural practices of the local population (my underlining).

Along similar lines, for the purposes of this report, "agroforestry" is defined as:

The deliberate incorporation of trees into, or protection of trees within an agroecosystem in order to ensure its short- and long-term productivity, cultural utility and ecological stability.

In this context, an "agroforestry system" is thus defined as:

Any agricultural system (agroecosystem) in which planted or protected trees are seen as economically, socially, or ecologically integral to the system.

Finally, a new term, agrodeforestation (Thaman, 1988a) is introduced and is defined as:

the removal of trees or the de-emphasis on the planting and/or protection of trees in agroecosystems.

These rather unrestrictive and functional definitions have been selected to cater for the great diversity and functional utility of existing Pacific Island agroforestry/agricultural systems (as seen through the eyes of Pacific peoples), which range from dooryard or houseyard and squatter-garden agroforestry in both urban and rural areas to deliberate intercropping and or protection of trees and tree-like perennials in active garden areas and the planting of woodlots and protection of village forest stands (which are seen as part of integrated agroecosystems) in sparsely populated rural areas.

### 3. DEFORESTATION AND AGRODEFORESTATION AS DEVELOPMENT ISSUES

#### 3.1 Deforestation as a Global Issue

History is riddled with examples of deforestation, from tiny Easter Island in the Pacific to the continental areas of America, Europe, Africa and Asia, where the thoughtless elimination of trees has led to the collapse of civilizations and to abject poverty and serious conflict over scarce resources. Most of "modern humankind" seems to have been quite content to create political systems and agricultural development strategies which have little or no concern for how they fit into the larger pattern of our global ecosystem.

Numerous writers, including Plato, have described the vicious circle between deforestation, erosion, declining soil fertility, fuelwood shortage, and poverty. Of particular relevance to the Pacific Island situation is Plato's observation (1952:110C-111D in Glacken, 1967:121) that:

And just as it happens on small islands, what now remains compared with what then existed is like the skeleton of a sick man, all the fat and soft earth having wasted away, and only the bare framework of the land being left.

Similar vicious circles involving deforestation, poverty and conflict are to be found throughout the world. Eckholm (1976:167-69), for example, argues that the total destruction of El Salvador's tropical deciduous forests that once covered 90 percent of the country, by centuries of clearance for grazing, plantations, mining, charcoal manufacturing, and especially within the last century, the spread of subsistence cultivation, has made it one of the "most environmentally devastated countries of the New World". An organization of American states study concluded that 77 percent of El Salvador's land area suffers from accelerated erosion, and that reduced fertility was reportedly a major cause of heavy emigration of El Salvadorians into neighbouring Honduras, which helped precipitate a war between the two countries in 1969.

Similarly, Haiti, one of the few countries to surpass El Salvador in "nationwide environmental destruction", is now less than nine per cent wooded.

Its steep slopes have been cleared by the land-hungry, soil erosion has reached the point where it is now a major cause of poverty, and Haiti, which means "Green Island" in the indigenous language, is currently one of the poorest and internally conflict-ridden countries on earth. Nevertheless, "wealthy farmers and North American sugar corporations own the best valley lands, crowding peasants onto slopes where cultivation is a fertile temporary proposition" (Eckholm, 1976:169), which only leads to a tightening of the vicious circle of poverty, deforestation, environmental destruction, inequality, and inevitable conflict.

Eckholm (1976:170-171) cites numerous other examples from Asia, Africa, and Latin America where steep slopes have been deforested by the land hungry, and traditional fallow periods have been violated" and where oversized estates in the hands of a small minority, force the poor and landless into environmentally destructive and deforesting practices in order to survive. He argues (1976:171-172) that perhaps the most rigidly institutionalized examples are Zimbabwe (formerly Rhodesia) and South Africa, "where the small European minorities have reserved the best lands for their own use, crowding Africans onto an inadequate land area." Conflict as we know, has recently become the hallmark of South Africa.

Even the "Green Revolution", held to be the agricultural panacea for expanding world food production, seems to have severe ecological as well as social flaws, and has contributed to accelerating deforestation and increasing social polarization (Sachs, 1976:52). Recent studies of the remarkable strides China has made in solving its food production problems, for example, indicate that China's modern agricultural policies, particularly those aimed at bringing marginal lands into production, have been environmentally disastrous and have led to deforestation throughout the country. On Hainan Island, for example, indiscriminate destruction of trees since the 1950s, mainly due to the policy of grain growing as the key to agricultural development, the use of primitive slash-and-burn methods, the expansion of estate farms, and the lack of coal, has led to a decrease of the natural forest of Hainan and its rich diversity of plant and tree species and timber and medicinal plants, from 863,000 to 245,000 hectares between 1954 and 1980 (Vermeer, 1984:10).

### 3.2 Deforestation as an Issue in the Pacific Islands

In the Pacific Islands, large stands of economically and ecologically precious tropical forest remain on some of the islands, and small areas of mangrove and ubiquitous coastal strand forest have been preserved on others, but deforestation in the Pacific is proceeding at a frightening rate. Forests, both primary and secondary, continue to be transformed into degraded savannas and fern-grasslands, mangroves into housing and industrial estates or other lifeless land-sea interfaces, and polycultural tree-studded traditional gardens into monocultural plantations and grazing areas. The trends are the same from the high continental islands of Melanesia Pacific to the smallest low-lying atoll islets of Micronesia and Polynesia (Thaman, 1986; Thaman and Clarke, 1987).

Deforestation, often the result of repeated burning, has been endemic in the post-human contact Pacific and is responsible for the evolution of

secondary forests, grassland savannas, and a degraded fern and scrubland. It has, for example, undoubtedly been the main cause of the extensive anthropogenic grasslands of highland New Guinea, the xerophytic niaouli (Melaleuca lewucadedron) savanna lands of New Caledonia, and the highly degraded "sunburnt lands" or talasiga found throughout Fiji. Deforestation has similarly led to severe crisis in the Cook Islands, French Polynesia and Hawaii where most of the indigenous forest has been removed. Flenley and King (1984) go as far as suggesting that deforestation was responsible for the puzzling collapse of the pre-European contact Polynesian megalithic culture on Easter Island.

### 3.3 Agroforestation as a Issue

Although deforestation, as such, has received most attention globally, probably of tantamount importance is "agroforestation" in the forms of both declining tree planting and the elimination of trees from agricultural and urban landscapes. Trees that have, for generations, provided food, timber, firewood, medicines and served other important cultural and ecological functions, as integral components of polycultural agricultural systems, are increasingly not being replaced or protected by the present generation (Thaman, 1988a, 1989).

Although some countries have increasingly effective systems of forestry reserves, conservation areas, or national parks, and institutionalized programmes of reforestation and agroforestry, few, if any, have legislation or programmes prohibiting the cutting, or promoting the replanting of important or endangered tree species as part of agricultural or other, modern-sector development. Thus, agroforestation continues, with little or no official recognition or resistance to it.

The situation is not yet beyond hope as it appears to be in some areas of the world because most traditional agroforestry strategies of the Pacific Islands have been preserved, if only in relict form. Nonetheless, increasing agroforestation and the gradual disappearance of time-tested agroforestry systems in the face of monocultural expansion of agriculture and forestry, commercial livestock production, rapid population growth, demands for fuel, continued urbanization, and the "commercial imperative" (Tudge, 1977) are the dominant trends that will only be reversed by deliberate planning and action, which might hopefully include the institutional promotion, protection, and improvement of existing Pacific island agroforestry systems (Thaman, 1989).

## 4. TRADITIONAL AGROFORESTRY IN THE PACIFIC ISLANDS

In traditional Pacific Island "development", forestry, agriculture, housing, medicine, and the production of a wide range of material goods were not compartmentalized into "sectors"; rather they were generally part of integrated agroforestry systems or strategies tailored to the environmental and societal needs of each island ecosystem. Trees, of course, were major components of such sustainable agroforestry systems (Thaman and Clarke, 1987).

In terms of composition and spatial organisation, all traditional agroforestry systems, from the highlands of Papua New Guinea to the smallest atoll countries, exhibited a high degree of interspecies diversity, incorporating a wide range of cultivated and protected indigenous and exotic tree or tree-like species, ranging from some 75 species commonly encountered on atolls, which have among the poorest floras on earth, to over 300 widespread species in the larger-island agroforestry systems of Fiji, Vanuatu, Solomon Islands, and Papua New Guinea. Species include not only traditional staple tree crops such as coconuts, breadfruit, and bananas or plantains intercropped with ground staples and supplementary ground crops, but also a wide range of fruit and nut trees and other useful trees and plants which are either deliberately planted, encouraged and protected in the regeneration of fallow regrowth, or spared when clearing new garden plots.

Moreover, for most traditional tree cultigens and non-tree understory cultigens, for many recently-introduced cultigens, and for a lesser number of indigenous species found in Pacific island agroforestry systems, there is also a high degree of intraspecies diversity, with a wide range of named, locally differentiable cultivars or varieties. Within a given species, these cultivars have variable yield characteristics and seasonality, thus spreading yield distribution and seasonal surpluses more evenly. Similarly, as has been found true in other parts of the world, different cultivars have differential resistance to pests and diseases and to tropical cyclone damage, saltwater incursion and salt spray and drought; differential ecological tolerance ranges in terms of adaptability to different soil types, shade and hydrological regimes; and differential utility (for example some coconut cultivars are used purely as drinking nuts, some for the flesh, and some for the large shells or the coir which can be used for vessels or for rope respectively).

Also seen as integral components of the broader village agroforestry systems are: 1) indigenous stands of tropical rainforest, and mangrove or coastal strand forest which border or fall within the matrix of active garden or fallow areas; 2) secondary or fallow forest areas, 3) permanent, often sacred, tree groves of primarily planted useful trees in garden areas or surrounding villages; and 4) trees planted in home gardens in nucleated villages or around isolated dwellings (Thaman, 1988a). Together these diverse arboreal resources present an image of agroforestry far different and far more polycultural and utilitarian than the predominant view of "modern" agroforesters which commonly sees "agroforestry" as constituting the intercropping of export cash crops such as cocoa, coconuts, coffee or bananas with selected ground or shade crops; cattle under coconuts; the promotion of fuelwood plantations or wood lots; or the intercropping of exotic forest species with export or subsistence ground crops, with virtually no mention of the hundreds of other useful plants and wild animals that are integral to the traditional systems that they often irreversibly replace.

In terms of the more specific utilitarian attributes of individual Pacific agroforestry systems, Table 1 is an attempt to show the multi-functional nature of these systems as well as the value of the individual

Table 1. Ecological and cultural functions and uses of trees in agroforestry systems in the Pacific islands, based on fieldwork in Papua New Guinea, Solomon Islands, Fiji, Tonga, Western Samoa, Kiribati, and Nauru.

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ECOLOGICAL

Shade	Soil Improvement	Animal/Plant Habitats
Erosion Control	Frost Protection	Flood/Runoff Control
Wind Protection	Wild Animal Food	Weed/Disease Control

CULTURAL/ECONOMIC

Timber(commercial)	Broom	Prop or Nurse Plants
Timber(subsistence)	Parcelisation/Wrapping	Staple foods
Fuelwood	Abrasive	Supplementary Foods
Boatbuilding(canoes)	Illumination/Torches	Wild/Snack/Emergency Foods
Sails	Insulation	Spices/Sauces
Tools	Decoration	Teas/Coffee
Weapons/Hunting	Body Ornamentation	Non-alcoholic Beverages
Containers	Cordage/Lashing	Alcoholic Beverages
Woodcraving	Glues/Adhesives	Stimulants
Handicrafts	Caulking	Narcotics
Fishing Equipment	Fibre/Fabric	Masticants
Floats	Dyes	Meat Tenderizer
Toys	Plaited Ware	Preservatives
Switch for Children/ Discipline	Hats	Medicines
Brush/Paint Brush	Mats	Aphrodisiacs
Musical Instruments	Baskets	Fertility Control
Cages/Roosts	Commercial/Export Products	Abortifacants
Tannin	Ritual Exchange	Scents/Perfumes
Rubber	Poisons	Recreation
Oils	Insect Repellents	Magico-religious
Toothbrush	Deodorants	Totems
Toilet Paper	Embalming Corpses	Subjects of Mythology
Fire Making	Dancing Grounds	Secret Meeting Sites

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Source: Adapted from Thaman and Clarke, 1987.

arboreal components. Although modern agroforesters and horticulturalists may see native forests; silvicultural tree plantings; coconut, oil palm, cocoa, coffee, or banana plantations; or orange, avocado or macadamia orchards in terms of their economic value, or, possibly, even in terms of their ecological, recreational, or nutritional values, it is clear the Pacific island agroforesters perceived arboreal resources to be far more multi-purposeful.

In terms of the ecological value of trees, shade, for example, is critically important to humans, plants, and animals, especially in open savanna lands, in highly reflective low-lying coral island and lagoonal environments,



and in villages and urban areas; damage from wind, erosion, and flood are increased when forests are removed; and mangrove and coastal strand forests stabilize tidal-zone soils and reduce the impact of storm surge. Soil improvement is another area where trees are of critical importance, especially given the high cost of fossil-fuel-dependent inorganic fertilizers and recent concern as to the detrimental impact on soil of long-term use of such fertilizers. The value of forests and trees as habitats for plants and animals, many of which are of considerable subsistence and commercial value, cannot be overstated. Deforestation can also severely limit the potential for implementing integrated pest management (IPM) programmes designed to minimize reliance on dangerous herbicides and pesticides, through destruction of the habitats of beneficial insect, bird, and other vertebrate predators.

There is no need to examine the importance of timber, except to note that commercial timber operations supply timber for local construction throughout the Pacific as well as being among the top generators of foreign exchange in Papua New Guinea, the Solomon Islands, Fiji, and Western Samoa. Trees are also of critical importance in the informal sector in most countries for house construction, fencing, boatbuilding, toolmaking, weaponry, making containers, fishing gear, cooking equipment, and handicrafts (Table 1).

Foods from trees are of immense value, whether as staples, supplementary sources, or occasional snacks and famine foods. The nutritional importance of dominant staple tree crops, such as coconut, breadfruit, bananas and plantains, sago palm, and Pandanus spp. and the wide range of fruit and nut trees found throughout the Pacific have been widely stressed elsewhere and need no further mention (Parkinson, 1982; Coyne, 1984; Thaman, 1979, 1982ab, 1983, 1985, 1988b; Yen, 1980ab). Supplementary foods and snacks are described by Thaman (1976, 1976/77, 1982ab) for Tonga and Fiji and other Pacific Islands and by Clarke (1965, 1971) for a highland Papua New Guinean community. Powell (1976) provides a comprehensive coverage of wild-food use and other important aspects of ethnobotany for the entire island of New Guinea.

It is important to stress, however, that although many tree foods are energy-rich in carbohydrates and/or vegetable fats, it is in other nutritional essentials such as vitamins and minerals and fibre that they often excel in comparison with the ubiquitous root-crop staples and other annual non-arboreal plants. For example mango, papaya, and some Pandanus spp. are excellent sources of provitamin A; Canarium spp., Inocarpus fagifer, and avocado (Persia americana) of B-complex vitamins; guava, mango, papaya, and Citrus spp. of vitamin C; and most seeds or green leaves (for instance, from Ficus spp., Gnetum gnemon, which also provides edible seeds, and Moringa oleifera) are good sources of plant protein and a range of other micronutrients necessary for optimum health (Thaman and Clarke, 1987; Thaman, 1983). Spices and sauces from tree products can also be of great nutritional importance.

Wild food and other valuable products are also lost to subsistence communities when the diversity of plants and animals that supplied them disappear along with the forest that served as their habitats (Clarke, 1965; 1977; Thaman 1982a). Deforestation has severely restricted the habitats for wallabies and the valued cassowary bird of Papua New Guinea, and a great

number of vertebrate and non-vertebrate wild animal foods and an even greater range of wild plant foods that contribute significantly to the dietary well-being of many Pacific islanders, particularly in the interior of large continental islands. The destruction of mangrove forests is of particular concern because of their importance in marine and estuarine food chains as well as being favoured habitats or nurseries for a wide range of fin-fish, molluscs, and crustaceans (Thaman, 1982a).

Trees are also important sources of food and fodder for domesticated animals. Pisonia grandis leaves for example, are used as pig feed in Tonga; Leucaena leucocephala leaves and pods are used widely for goats, pigs, and cattle; and coconuts and papaya are abundant and important animal foods throughout most of the Pacific.

In terms of other uses, the arboreal pharmacopoeia is widely known and valued by modern science and industry as well as by local inhabitants, with all parts of the Pacific possessing medicine-producing trees and associated plants. Wrapping materials includes coconut leaves, leaves of Artocarpus altilis, Musa cultivars, Hibiscus tiliaceus and Macaranga spp. Other leaves, notably Ficus spp., serve as effective abrasives. Dyes are derived from many sources, e.g., Bischofia javanica (a major red-brown dye for tapa), Bruguiera spp. and Aleurites moluccana (black), Morinda citrifolia (yellow), and Bixa orellana (red).

Perfumes or scents such as sandalwood are well known outside of the Pacific, while less cosmopolitan fragrances are derived from Cananga odorata and other scenting agents that are put into coconut oil from trees such as Pimenta, Plumeria, Pandanus and Gardenia spp., Parinari glaberrima, Aglaia saltatorum, Fagraea berteriana, and Calophyllum inophyllum (Thaman and Clarke, 1987). In Tonga, for example, there are over 50 species of sacred or fragrant plants, many of them indigenous, known as 'akau kakala, which are central to the spiritual and economic fabric of Tongan society and which are planted or protected as integral components of Tongan agroforestry (Thaman, 1986b, 1987).

These few examples from the list in Table 1, show the utilitarian diversity and the economic and cultural value derived from trees and agroforestry in the Pacific, values that are rarely acknowledged in planning or project documents, but that would be extremely difficult or impossible to replace with imported substitutes. The elimination of such utilitarian and cultural diversity, through increasing agrodforestation, can only serve to lock Pacific societies more tightly into the vicious circle of economic and cultural dependency.

## 5. INSTITUTIONALISED AGRICULTURAL AND AGROFORESTRY DEVELOPMENT IN THE PACIFIC ISLANDS

Institutionalised agricultural and agroforestry development activities in the Pacific islands (i.e., those activities which are actively and officially promoted by governments, quasi-government organisations, private agencies, and aid

donors in terms of funding, training, research, and extension activities) fall into four basic categories: 1) the promotion of cashcropping for export or import replacement; 2) intercropping of tree crops or woody perennials with commercial or subsistence ground or tree crops; 2) planting of primarily exotic timber and/or fuelwood and multipurpose species within existing agricultural systems, as intercrops, rotational crops, or as small-scale monocultures or woodlots; and 3) commercial grazing or intensive small-animal livestock development for export or import substitution (Thaman, 1989).

Such activities were first promoted by colonial governments to provide primary products needed by the metropolitan countries, to finance costly colonial governments, and to provide sources of cash income or to monetise the local population. More recently, emphasis has been basically for the same reasons, to provide tax revenue, employment, and export earnings to the increasingly centralised newly independent, indebted, and resource-poor small-island states of the Pacific Ocean.

In all cases, the emphasis has been essentially monocultural, with very little recognition given to, or promotion of the existing polycultural agroforestry systems and their constituent tree species, many of which modern agriculturalists and foresters would not be able to identify, let alone know their diverse cultural and ecological utility to Pacific peoples.

Watt (1980:302), in his analysis of the forestry sector, as part of the South Pacific Agricultural Survey of 1970, similarly, stressed, as mentioned above, that most plantation forestry activity is in the form of large-scale plantations in degraded areas or in restocking commercially logged areas, rather than in more agroforestry-oriented small-scale community or social forestry. He attributes this, to a number of institutional factors including lack of government resources and staff, as well as the "separation of agriculture and forestry extension services (which) encourages the impression that agriculture and forestry are mutually exclusive alternatives rather than complementary landuse".

Even the more focussed Fiji-German Forestry Project, with its specific objective of "providing ecologically sound advisory assistance in the fields of forestry and agroforestry in line with the social, cultural and economic requirements of target groups" (von Tull, 1988:3), seems to be overly biased towards export cash cropping, with the terms of reference of a Project Investigator/consultant in Fiji for three weeks being to: "Identify suitable sites for demonstration plots in the following areas:

- A. Cash crops (ginger-root crops) on the wet side of the island.
- B. Sugarcane areas on the dry side.
- C. Shifting cultivation areas.
- D. Livestock/pasture areas.
- E. Cocoa plantations" (telex to consultant from Fiji-German Forestry Project, July 1988).

Similar recommendations as to the farming systems and locations where agroforestry should have priority have been suggested by other Fiji-German Forestry Project consultants, who clearly stressed the potential benefits of: 1)

tree planting in ginger-root crop and sugarcane areas in terms of erosion control and home garden establishment; 2) of leaving some fire resistant trees unfelled and planting trees as improved fallow to reduce soil erosion and soil deterioration and improve productivity in shifting agricultural areas in the rainforest zones; 3) preservation of remaining forest areas, planting of small tree groves, living fencing and fodder trees in combination with improved pasture in stabilizing and improving productivity in the extensive areas of highly eroded and degraded *talasiga* grassland; 4) intercropping of cocoa with appropriate shade trees, with coconuts or the planting of new cocoa plantations in forest areas by clearing the undergrowth and leaving selected tall trees, and the resultant additional output of fuelwood, fruits and timber; 5) cattle grazing in pine plantations, root cropping around pine stands, mushroom cultivation on dying trees, and enrichment of existing monocultural pine plantings with other appropriate species; 6) planting trees along unprotected rural roads; and 7) the promotion and improvement of home garden and small holder agroforestry (de Haen, 1988:17-21; von Maydell, 1987).

Nevertheless, despite these seemingly holistic and wideranging recommendations, which are certainly an improvement on existing agricultural and forestry development policies, there is still a very strong bias towards cash cropping and the introduction and experimentation with exotic trees and plants, rather than focusing more on the preservation of existing agroforestry systems and maintaining a balance between commercial agroforestry activities and activities which could insure that the existing subsistence base is protected. Although the somewhat contradictory recommendation to the Project, that: "Agroforestry and forestry extension should not attempt to remain with or return to pure forms of subsistence economy but focus on including profitable cash crops at low risks" (von Maydell, 1987:35), does on one hand indicate a sensitivity to the need to minimise risk, it could very well be interpreted as stressing a move away from maintaining a viable subsistence base, because the need to do so is not stressed explicitly in any of the consultants' reports. Similarly, the consultant selected to "identify suitable sites for demonstration plots" (although having considerable sympathy for such a balanced approach) felt very strongly that neither the Fiji government nor the funding German agency would support an approach which placed such emphasis on the subsistence aspects of agroforestry and the analysis of existing agroforestry systems as "demonstration plots" into which selected improvements could be introduced (Beer, 1988: pers. com.).

In summary export and cash crops, timber trees, and grazing and livestock improvement schemes have been the continuing focus of almost all official agricultural, agroforestry and forestry activities for almost a century. Regardless of whether it has been the colonial or post-colonial government agricultural and forestry departments themselves or international aid agencies, with the exception of experimental activities, the focus has been almost exclusively on the monocultural, often large-scale promotion of these species for either export or, in the case of timber and fuelwood production, for import substitution. Even the intercrops are usually cash crops for export or local sale. Consequently most indigenous wild species and the wide range of traditional cultivars have received little official promotion, have been the focus of only limited research, and have had few if any technical experts or development entrepreneurs who have enough knowledge about the traditional

mixed agricultural systems and their species to promote them. More often than not, "agrodeforestation" continues unabated, with traditional agroforestry systems having been degraded, displaced or eliminated in the name of institutionalized "modern" agricultural, forestry, or, more recently, "agroforestry" development (Thaman, 1989).

## 6. A PLEA FOR A BALANCED APPROACH TO AGROFORSTRY

The tendency to replace long-lived trees with shorter-lived trees or other types of plants or totally artificial landscapes, although yielding undeniable short-term benefits to mankind, may in fact be undermining the long term stability of agricultural systems throughout the world. Oedekoven (1962:55) in his article "Saving our Vanishing Forests" stresses:

In the course of history, civilizations have flourished and disappeared with a resultant depletion of trees and plants, leaving only steppe and desert behind. Only in recent centuries has man begun to realize that he was cutting off the branch that he was sitting on.

In short, mankind's continuing deforestation throughout history and prehistory may ultimately prove to be a more harmful change in the ecosphere than changes brought by warfare, nuclear disasters, starvation, degenerative diseases, and social and economic instability. Although a symbol of ecological and cultural stability in many cultures - the physical antithesis of desertification and the cultural antithesis of deprivation and neglect - forests and trees are rapidly disappearing from the earthscape. This global trend is in stark contrast to the teachings of Buddhism, wherein trees are seen as a symbol of peace, stability, and spiritual and material well being, as well as a non-violent means to achieve the needs of human kind. This realization is clearly echoed by Schumacher (1973) and Eckholm (1976) who argue that reforestation and tree planting may be the most direct and economically beneficial means of improving the lives of the poorest of the poor in the Third World. Planting trees could have greater benefit in terms of improving the quality of life than the Green Revolution or costly miracle drugs. Nor is there need for the expenditure of billions of dollars on research.

Regardless of the difficulties in achieving a balance between monocropping of commercial export crops and subsistence crops and between modern institutionalised agroforestry and the preservation or improvement of existing polycultural agroforestry systems in the Pacific islands, evidence seems to indicate that a more traditional, less capital-intensive and less monocultural approach to institutionalised agricultural and agroforestry would be in the long-term interest of most Pacific island communities.

As Yen (1980b) cautions in his study of "Pacific Production Systems", although the possibility of multistory cropping under coconuts and other trees and other forms of agroforestry are increasingly promoted in official circles:

In fact native systems have always involved such techniques in village gardens and with descending storeys of palms, trees, productive vines, shrubs, herbaceous root crops, and vegetable plants and ornamentals. Similarly, in swiddens, mixed species and variety plantings are themselves multi-storey. In this case such plantings also take on a successional aspect, for following the root crops, some cultigens such as banana and longer-term plants such as breadfruit and other fruit and nut trees, industrial shrubs, and vines, prolong the production of these gardens.

Perhaps the time is ripe, for the technocratic and managerial elite of the Pacific islands and their benefactor countries, to take a more balanced approach to agricultural, forestry, and agroforestry development, by institutionally and financially supporting multipurpose agroforestry which sees the "native" systems as bases for development, and which includes the planting, promotion, and protection of both indigenous and exotic species in both monocultural and polycultural modes, in both commercial and subsistence systems, and in both non-agricultural and agricultural areas. By taking such an approach, which Clarke (1978) has termed "progressing with the past", it should be possible to further most of the current goals of most of today's institutionalized agricultural and national development programmes.

Such an approach would, furthermore, protect the fragile subsistence economies of Pacific societies against economic uncertainties related to "endemic" deterioration in terms of trade, natural disasters, and other factors which increase the vulnerability of Pacific societies to factors beyond their control. This can probably be done most cost-effectively and most practicably through a balanced approach to agricultural development, which on one hand promotes the adoption of appropriate technologies to address the need for increased cash incomes, import substitution, and the generation of foreign exchange, while on the other addressing the issues of deforestation and "agrodeforestation" by fostering the protection, promotion, and improvement of existing Pacific island agroforestry systems as bases for both ecological and cultural stability, as well as for the protection of the indigenous and exotic tree species that have served the needs of Pacific peoples for millennia. Such an approach, may, as Oedekoven, (1962) suggests, save Pacific societies (and the experts that aid them) from "cutting off the branches they are sitting on" and insure that there will be agricultural development rather than agricultural underdevelopment in the 1990s!

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