Reg Environ Change
DOI 10.1007/s10113-014-0696-7

ORIGINAL ARTICLE

Food security in the island Pacific: Is Micronesia as far away as ever?

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Received: 31 March 2014 / Accepted: 13 September 2014

Abstract Food security in the Pacific, especially in Micronesia, has worsened in the past half century. Agriculture, fishing and local food production have declined, except in the most remote islands, especially in peri-urban environments. Diets have incorporated more processed and imported foods, because of prestige, accessibility, cost and convenience, at financial, social, environmental and nutritional cost to countries and households. Non-communicable diseases have grown rapidly throughout Micronesia. Household expenditure is dominated by imported foods, especially rice. Food security requires more adequate market access, but national resource bases are limited, and government intervention and policy formation are both weak and exhibit urban bias in unusually fragmented states. Climate change is likely to further hamper local food production. Household has negotiated multiple livelihoods across international boundaries with national and household incomes boosted by remittances, which may become a distinctive key to achieving improved health and nutritional status.

Keywords Food · Nutrition · Pacific · Micronesia · Islands · Incomes · Livelihoods

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> When we get sick we go to see the doctor and are told we need to eat cabbages and other greens to help us control our diabetes but the problem is where do we get the money to buy the cabbage and other greens? And where can we find space to plant on Majuro? Sometimes traditional foods may be found in the stores but we do not possess the financial means to purchase them. Money, or the lack of it, is the root of all our social problems. If people had enough money they would not have to worry so much and would be able to buy all the healthy and nutritious food their bodies require (Marshallese women, quoted in McMurray and Smith 2001: 152–155).

Introduction

Food security has worsened in Pacific islands in the past 50 years despite numerous regional and international organisations, and national development plans, promoting policies and programmes designed to encourage greater self-sufficiency in food production and consumption, and more adequate food security, mainly by encouraging improved local production (Thaman 1982) but with few positive outcomes. Early advocates of greater food security were concerned over a number of related issues: firstly, the high national cost of food imports (as a proportion of all imports), and a negative balance of payments, sometimes extending to concerns over household expenditure; secondly, the potential for undernutrition (with the loss of local diversity, high and volatile prices of imported goods and inadequate incomes); thirdly, a related health/epidemiological transition towards non-communicable diseases (NCDs), (e.g. diabetes) with the shift in diets; and fourthly, the social costs of some transitions (e.g. alcohol), and concerns over cultural dependency (e.g. in the

Published online: 28 September 2014

shift from coconuts to coca-cola), as local foods are not 'instant', and more conducive to conviviality and attuned to traditions of sharing and reciprocity. Particular problems were attached to food security in atolls (especially urbanised atolls), where traditional diets were limited, and in the growing urban centres (where the poor were disadvantaged).

Inadequate food security stems from, firstly, a decline in the local availability and production of subsistence foods—whether from land or sea—ironic in a 'sea of islands' where food and its sharing symbolise social relations. Secondly, it follows the lack of income (and infrastructure) to secure adequate alternative foods. A number of now well-known factors have posed problems for development in small island states, with a narrow resource base contributing to limited diversity of production and exports that in turn create problems for food security (Connell 2013). Yet such problems have been bound up in a series of food regimes that have constantly favoured export crops above domestic food production (Plahe et al. 2013). Consequently, food security has worsened in the Pacific in recent decades because of falling food production per capita, low or absent growth in agricultural production, and increased and costly dependence on food imports (SPC 2011). This paper seeks to provide an overview of contemporary trends in smaller Pacific islands, but with particular reference to the three largest Micronesian states—the Marshall Islands (RMI), Kiribati and the Federated States of Micronesia (FSM)—where achieving economic growth has been unusually difficult, aid dependence is considerable, food security has long been a problem, and nutrition assistance programs were established as early as the 1960s (Connell 1991; Denman and Dewey 1989). It seeks to examine the extent to which social, economic and environmental issues interact to worsen food security in a particularly challenging context. The three states have a combined population of 267,000 and are primarily composed of coral atolls, although FSM has four central high islands; hence, reference is also made to atolls and small islands elsewhere, especially in the adjoining atoll state of Tuvalu.

'Food dependency'

What has been termed 'food dependency', 'dietary colonialism' or, for Kiribati, 'gustatory subversion' (Lewis 1988) emerged in colonial times with the diffusion of 'European' foods that symbolised a degree of welcome modernity. Imported foods, especially rice and tinned foods, became staple diets on plantations and growing towns, gradually diffusing into rural and remote areas, to be incorporated in local diets. Government workers, with salaries and prestigious jobs, were the earliest consumers of imported foods (Lewis 1988). Colonial governments had little interest in food production, as they sought to expand cash crop production, where feasible. As local people engaged in cash crops, land was gradually transferred from food crops. Food gardens were displaced further away from villages, and less effort was expended there. In Kiribati, to pay for food imports, coconut production was expanded by cutting down pandanus and breadfruit trees, labour was shifted from taro pits to copra production, so reducing an already limited choice of local foods, while sale of coconuts that had previously been stored as 'drought foods' increased vulnerability (Lewis 1988; Feinberg 1986). Changing tastes influenced these trends, with some local species no longer regarded as appropriate nutrition. Deforestation, reduction in biodiversity, declining knowledge of plants and their utility (e.g. Thaman et al. 2010), and lack of adherence to traditional conservation practices, reduced the significance of wild foods—whether fauna or flora. Complex subsistence food production systems gradually gave way to less intensive agricultural systems, with less diversity of production and therefore of the local nutrition base, and greater dependence on the market economy. Loss of diversity has reduced productivity, cultural utility and ecological stability (Clarke and Thaman 1997), and increased the risk from hazard, with implications for residual food security (Fig. 1).

Absorption into an increasingly global system meant greater dependence on purchased and imported foods. Diets gradually shifted to incorporate imported foods because of, firstly, the status, prestige and modernity often attached to them (or the ability to purchase them); secondly, their taste (especially welcomed by the young); thirdly, convenience (especially after hazards)—for purchase, preparation, cooking and storage; fourthly, variety (especially on atolls); fifthly, necessity (notably in growing urban areas, where wage earners were without land and time); sixthly, because imported foods were often cheaper than local foods; and seventhly, mass marketing and promotion, at least in the more modern era. Finally, but controversially, people 'were said to be lazy and therefore to prefer Spam, canned tuna and canned mackerel over seafood that they must catch themselves' sometimes imputed to a 'moral decline' that followed monetisation (Rudiak-Gould 2013: 27). In much of Micronesia, a shift away from traditional foods was encouraged and inculcated by American school lunch programs where elementary school students received rice, tinned meat and fish, noodles and other processed foods, some of which was taken home by students to share with relatives (Flinn 1988; Denman and Dewey 1989). Modern food was associated with modern education.

Agricultural decline

Subsistence agriculture—that is food production—is declining and has almost disappeared from some

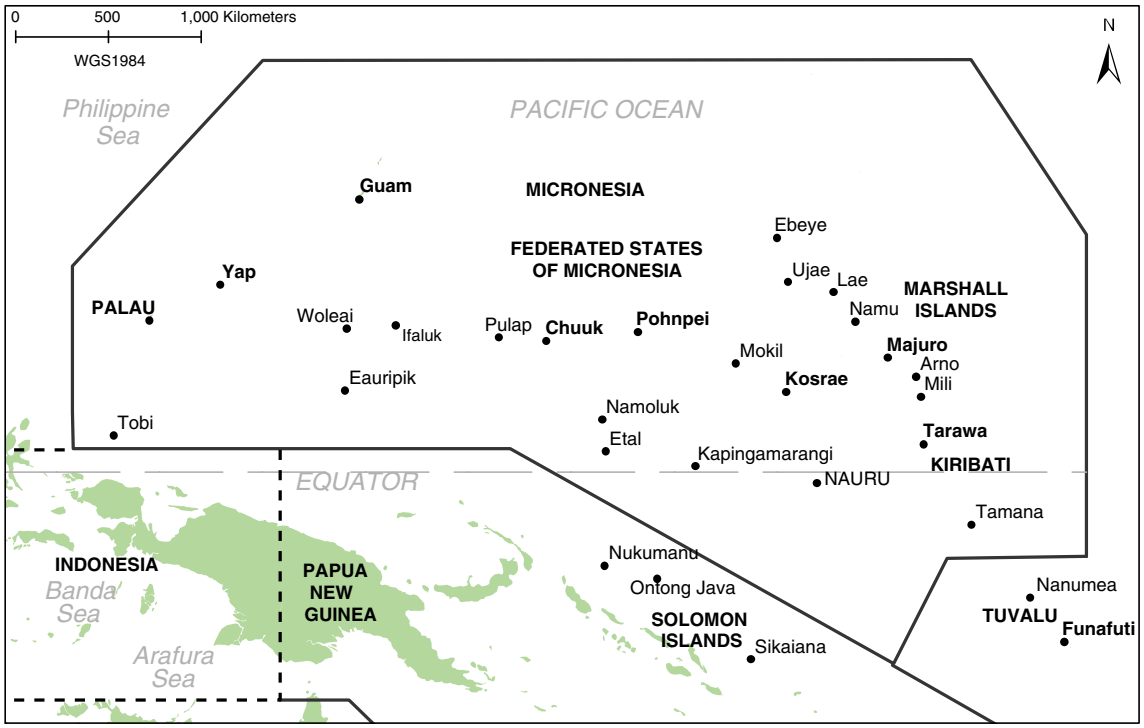

Fig. 1 Micronesia

Micronesian islands, as populations have become more urban, agricultural work offers fewer attractions (especially for youth who disdain agricultural employment), and food is increasingly purchased, alongside conversion of agricultural land to other uses, ageing farmers, inadequate prices and weak marketing structures, 'parcelisation' into tiny plots through inheritance, price fluctuations (especially for copra), 'modern' education and higher wages in the formal sector. After trade liberalisation in the mid-1990s, many islands experienced a surge of cheap food imports, making local production more vulnerable and marginal. Subsistence and cooperation have evolved towards commercialism, individualism and new forms of consumption, with a resultant loss of community and social cohesion.

The greatest shifts in agricultural production and marketing have been the outcome of changes in the global trading system. Production of many long-term staples, such as copra and bananas, has declined; several are no longer traded since prices in remote places are too low to justify marketing. Copra has gone from most Micronesian atolls and elsewhere, victims of the 1990s copra price crisis, scarcely remaining even where there are no other local income earning opportunities (Pollock 1996; Chambers and Chambers 2001; Rudiak-Gould 2009). A corollary has been attempts at specialisation in a few niche export crops, but even on larger islands these have rarely been successful. Inability to achieve economies of scale, production costs (including labour) and the cost of credit affected competitiveness, while larger countries were better placed. While greater integration and free trade theoretically provide incentives for local producers to become more efficient, diversify and specialise, intervening opportunities and multiple other factors prevent this (Hezel 2006; Connell 2013). Unable to compete in deregulated markets, especially in small islands, household-based agriculturalists have simply withdrawn from commercial farming.

Local markets provide a potential source of income for villages not too distant from urban centres, and such 'subsistence incomes' are often the dominant source of income where wage employment is scarce. However, distant villages have been disadvantaged by rising fuel prices so that either rural people no longer market produce or market prices are very high, and thus, a combination of static (or declining) production and high transport costs means that in many urban Pacific markets, food prices are extremely high, as in Kiribati, a situation reported on for thirty years (Thaman 1982; Connell 2013; Christensen 1995), discouraging the purchase and consumption of locally marketed food. Moreover, cooking takes time and considerable fuel. In Kiribati, Marshall Islands and Tuvalu, urbanisation has been so extensive that virtually, no land remains on the central urbanised atolls for food production, other atolls are too distant for effective and economic market participation and, unlike other Pacific countries, food markets are conspicuous by their absence.

Islands, especially those with capital cities, notably Tarawa, Majuro (and also Ebeye) and Funafuti, have experienced a 'coastal squeeze', where populations have increased, high density urbanisation has occurred, and agriculture has disappeared or intensified, fallow periods have shortened and cash cropping expanded. Land shortages, tenure constraints, preferences for wage employment, new tastes, poor marketing infrastructure and disappointing returns have all discouraged food production. Modern education has taken youth from fields, gardens (and lagoons); hence, indigenous technical knowledge has declined. Such disintensification has usually involved a reduced agricultural area (both absolutely and per capita), a shift from more demanding crops (in terms of labour), and techniques (such as irrigation and mulching), and the loss of particular varieties of cultivars (Caillon and Degeorges 2007; Gaillard and Manner 2010). Particularly demanding pit cultivation of taro, the traditional staple of most atolls has universally declined or disappeared, even when not threatened by hazards, as a labour intensive activity of low status (e.g. Marshall 2004a; Caillon and Degeorges 2007; Oles 2007b; Rudiak-Gould (2009). Even on atolls, where agricultural diversity was minimal, labour intensive activities were abandoned quite early in the twentieth century; on Arno (RMI), only one tenth of the taro pits were planted by 1950, and abandonment was apparent on other Marshallese atolls like Namu, Lae and Mili by the 1960s (Pollock 1992; Connell 1994), and by the 1980s in the more remote atolls of Bougainville (Feinberg 1986; Pollock 1992). Even on more remote atolls like Woleai (FSM) taro patches were not well maintained by the 1990s—a function of land tenure disputes, disdain for agricultural pursuits and frustrations over saltwater incursions after cyclones. Nonetheless, in most places, some new crops have also been introduced because of their higher yields, ease of cultivation or preferred taste (e.g. Scourse and Wilkins 2009). On Bellona (Solomon Islands), broad patterns of land use have remained much the same for forty years, but crop combinations changed with sweet potato and cassava (which require less labour input) becoming more dominant, with some reduction in crop (and nutritional) diversity. Greater access to cash, mainly from remittances, resulted in agriculture becoming simply a supplement to a diverse 'portfolio' of livelihood strategies (Birch-Thomsen et al. 2010).

In pre-colonial times, food storage was common, though never easy where root crops were staples, to ward against natural hazards (where cyclones might destroy taro pits and coconuts for many months), but this labour intensive activity has given way to a dependence on government supplies and the abandonment of 'famine crops' such as arrowroot, gone from the Marshall Islands by the 1970s (Connell 1994). On Euaripik (FSM), storage of coconuts gave way to copra making and imported convenience foods (Scourse and Wilkins 2009). In the 1990s in Laura, on Majuro atoll (RMI), breadfruit was being allowed to fall and rot, because money was more readily available and people preferred store food that was quicker to prepare (Pollock 1996). Where income-generating activities existed outside agriculture, or remittances were particularly substantial, the transition away from agriculture was unusually rapid, as on Mokil/Mwoakilloa (FSM); (Oles 2007a, b) and Ujae (RMI) (Rudiak-Gould 2009). On atolls such as those of the Tuamotus (French Polynesia), people prefer to 'eat from the store' and have no wish to 'return to the past', though nutritional status has declined (Chazine 2005). When a UN Integrated Atoll Development Project in Woleai (FSM) in the early 1990s demonstrated more intensive agricultural techniques that would increase root crop production, the local response was: 'We know all that but we have money now so we can go to the store'.

Where migration has been considerable subsistence, agriculture generally plays a reduced role, imported foods have become more important and agricultural land has gone out of use. Agriculture is widely typified and derided as an activity of low status and prestige, especially for men. In the Cook Islands, men who work on the land (or in other forms of manual labour) are described as *repo taro* (dirty taro) a derogatory term that also refers to 'nothing men', without land or capital, who are typically also denigrated as coming from outer islands and atolls (Alexeyeff 2008). Place and people are the antithesis of modernity. Over half a century ago in Samoa, declining interest in agriculture and the presence of uncultivated land was the outcome of the 'low social status accorded to skill and diligence in agriculture' (Ward 1959: 126). Such attitudes have hardened, and farmers are universally ageing.

Yet, significant agricultural decline is not universal. In relatively remote islands, such as Anuta, Tikopia (Solomon Islands), Kadavu (Fiji), Tobi (Palau) and Pulap (FSM), agricultural diversity has been retained (partly out of necessity as transport links with the capital city have worsened), which has incidentally strengthened food security and enabled the islands to be more resilient to hazards (Flinn 1988; Kuhlken 2007; Mertz et al. 2010; Furusawa and Ohtsuka 2009). Islanders have also revitalised subsistence agricultural systems when cash incomes have declined for some reason, as on Ontong Java atoll (Solomon Islands), (Bayliss-Smith et al. 2010), if migration is not a viable option. Where externally oriented economies have collapsed dramatically, as on Nauru, with the effective demise of phosphate mining at the end of the twentieth century, agricultural systems have been slowly revitalised even in hitherto unpropitious circumstances.

By contrast on some central atolls, such as Tarawa, Ebeye and Majuro, many young people have neither seen

nor experienced the traditional agricultural economy, nor have they consumed much traditional food as outer islands have no marketable surpluses. That poses direct problems for weaning (Christensen 1995), emphasises how food transitions have been partly driven by youth (Flinn 1988) and points to problems for shifting dietary preferences towards local products. Until quite recently, Pacific islands economies were characterised both by limited monetisation and by the existence of an agricultural and fishing system which offered both a 'subsistence safety-net' and an 'exit option' from inadequate cash crop prices (Rodman 1987). As subsistence economies have weakened, market orientation strengthened, and land degradation occurred, safety-nets have frayed, making sustainability, food security and withdrawal from an urban and global economy more difficult to achieve.

Fishing

Fishing is at least as central to the livelihoods of small islands as agriculture. Trends in Pacific island fisheries have been similar to and paralleled those in agriculture, usually much less visibly, in itself constituting a problem. In Micronesia, not untypically, the catch value of inshore fisheries has declined relative to inflation and the cost of imported goods (Rhodes et al. 2011; Houk et al. 2012). As some species have been depleted and catches fallen, local inshore fisheries have gone further offshore but been outcompeted by larger foreign-owned longliners. Technological changes and market expansion have influenced patterns of exploitation, distribution and consumption, and greater ease of access and 'modern' education have tended to result in attenuation of local knowledge of fishing techniques and fish behaviour, as in Etal, Kapingamarangi and Eauripik atolls (FSM); (Nason 1975; Lieber 1994; Scourse and Wilkins 2009). Even in remote atolls, superior access to affordable modern technology (from steel hooks to outboard motors and freezers) has resulted in greater efficiency, greater individualism and competitive activity, rather than communal activity. Fishers have become more rapacious, individualistic and competitive (Oles 2007b), as modern fishing gear is easily handled by individuals. Blasting has killed off significant proportions of reefs in some areas, and children have become adept at breaking coral reefs with iron bars. Management practices, and their absence, vary considerably.

Pressures on inshore fisheries and marine environments are greatest around urban areas, especially where the poor can take advantage of this resource (in contrast to more easily guarded land resources). This has created conflicts over access to fishing grounds, reduction in species availability and less productive fishing around some urban areas, notably Majuro, with a consequent rise in prices and diminished accessibility of fresh fish. It has been predicted for the Pacific islands that from 2010 to 2035.

> The amount of fishery products originating from coastal fisheries that is accessible to urban residents will decline sharply due to overexploitation and habitat destruction. A growing proportion of the population will not be able to catch sufficient fish to provide for household consumption, and purchased fish will become relatively expensive. Food security issues will grow tremendously in importance (Gillett and Cartwright 2010: 7).

Even well-managed coastal fisheries will only be able to meet demand in a few island states by 2030, although one of these is RMI, and alternative subsistence and income sources are urgently required (Bell et al. 2009; Kronen et al. 2010). Effective management is needed but a lack of political will, weak enforcement of fisheries regulations and few income-generating alternatives 'have created a history of noncompliance and degrading fisheries' (Peterson and Stead 2011: 2). Larger fish are more likely to be in decline since they are targeted by local and international fishers, mature more slowly and often form aggregations, which increases their vulnerability. Local fish consumption is the main driver of decline of inshore fisheries, especially where fish are a significant and (for some people) a unique marketable commodity. Fish marketing has, however, been problematic in many places, and especially outer islands, because of the absence of freezers and other infrastructure (notably regular transport), and the lack of knowledge and capital for commercial orientation.

Social change and diverse market pressures have meant that various conservation practices have disappeared, even in relatively remote areas where populations are not growing quickly. On Ujae, as elsewhere, the traditional system of environmental stewardship has collapsed (Rudiak-Gould 2009). Management practices have come under increased pressure with sustained entry into the cash economy, increased capacity for exploitation through improved gear technology (e.g. nylon nets, spear guns, snorkelling masks, waterproof torches), weakened leadership and reduced respect for custom (Johannes 2002; Ruddle 1998; Veiteyaki 1997). In Tanna (Vanuatu), coastal management declined because of lost beliefs in the efficacy of ritual prohibitions (assisted by religious teaching), nighttime harvesting (aided by modern torches) when surveillance is difficult, population growth and mobility (hence less community cohesiveness), modern education (and reduced environmental knowledge), greater demand for cash (and few alternatives), conflict between local leaders and remoteness from (weak) government intervention (Winthorpe 2004). Younger people place less value on

management and view the sea through a commercial rather than 'traditional' lens (Veiteyaki 1997; DeMers and Kahui 2012).

Traditional fisheries systems have generally shifted towards more open-access commons (Aswani 2002; Christensen 2011), resulting in widespread efforts to introduce marine protected areas (MPAs) to reverse resource depletion, despite considerable reluctance, where fishing livelihoods are perceived to be at stake. Where population density is greater and population growth faster, establishment and compliance have been weak. At Tetepare (Solomon Islands), local market fluctuations influenced resource extraction from the MPA; when copra prices fell, coconut crabs were hunted and fishing increased; while 'logistical challenges and isolation have to date limited the opportunities for Tetepare harvesters to access large-scale, permanent markets [but] high population growth…more portable refrigeration and aspirations for a higher standard of living are likely to intensify pressure on marine and terrestrial resources' (Moseby et al. 2012: 234). Similar pressures are widespread, but relatively remote islands where populations have not grown significantly have retained a greater suite of traditional management practices and have more effective MPAs (Aswani 2002; Aswani and Vaccaro 2008).

Poverty, few alternative opportunities and uneven development constantly trump management and conservation whether of woodlands or coastal waters, so that sustainable management is rare, epitomising the 'tragedy of the commons' with inadequate regulation and self-interest triumphing over cooperation (Wilkinson and Salvat 2012). Economic and environmental issues are routinely intertwined. In the Lau islands (Fiji), as people gained alternative incomes, they became less dependent on fishing and exerted less pressure on the marine environment, while isolation from markets prevented fishing down the food chain, as occurred closer to markets (Turner et al. 2007). Where poor people depend on marine resources for food and income, especially in peri-urban areas of Micronesia where social controls are weakest, management is least effective. It is here above all that the 'subsistence safety-net' has largely disappeared, and the nexus between poverty, inadequate nutrition and resource degradation become most evident.

Coral island linkages

Achieving sustainable livelihoods on small islands and especially atolls has often been difficult. In pre-colonial times, islands achieved sustainable development partly through extended geographical ties, typified by dispersed clans, and linkages across atolls and between clusters of islands, marked by elaborate exchange systems and complex regional and local reciprocal socio-economic-political linkages, to secure social relations and claim and use land elsewhere (Alkire 1978; Petersen 2009). Population growth was also regulated, sometimes by such means as abortion, infanticide and sponsoring one-way voyages. Islands were rarely isolated for long, and even the tiny island of Tikopia (Solomon Islands) was part of a 'world system' for most of its three-thousand-year human history (Kirch 1986). Survival and adequate nutrition necessitated external ties. Small islands could not afford to be insular.

Extreme population pressure on resources was evident on many islands by the nineteenth century (Bayliss-Smith 1975). In the Tokelau atolls, migration was well established in life and thought; 'some of nearly every group of siblings must *tahe* ('emigrate') simply because the local resources are seen as insufficient' (Hooper and Huntsman 1973: 403–404). A century later, as in Solomon Islands atolls, migration had become 'a household strategy, by which migrants and their families (including those staying behind) diversify sources of incomes in order to minimise risks, such as loss of income and crop failures' (Birk and Rasmussen 2014). That has intensified as migration has been prolonged, expectations have risen and aspirations increased, and a culture of migration been established where migration was anticipated and normative (Donner 2002; Connell 2008, 2015). Changing aspirations, the increased necessity and desire to earn cash, a preference for bureaucratic employment, a taste for 'respectability' and distaste for agricultural work have given migration a primarily economic rationale: a movement in search of wage employment, rare in most rural areas and the security of the 'fast money' of wages rather than the 'slow money' of crop sales (Finney 1967). Migration became characterised by movement away from remote places to more accessible coastal locations, particularly urban areas and capital (usually primate) cities at home or abroad. Small islands became increasingly dependent on remittances.

On some small islands, population pressure on resources became such that some migration was essential, sometimes involving resettlement in distant islands, as in i-Kiribati migration first to the Phoenix Islands in the 1930s and then to the Solomon Islands. Hazards also saw the resettlement of some outer island populations to the centre. Where feasible, that also meant the colonisation of nearby larger islands as on Nupani (Reef Islands, Solomon Islands), where around the early 1960s islanders who were 'never self-sufficient' began to use land on much larger Ndende island, some 40 kilometres away, because of intense pressure on land, to the extent that 'every square foot of ground suitable for cultivation has long been planted' (Davenport 1969: 173, 174). By the 1980s, the southern atolls of Palau were almost abandoned, and the same

pattern of growing central populations and absolutely declining populations in remote islands was emerging in other archipelagic states, including the three Micronesian states. Decline was been most rapid on atolls where both development prospects and provision of services are limited, as in Mokil (FSM), Sikaiana (Solomon Islands) and Nanumea (Tuvalu); (Connell 2013).

The outcome of migration from small islands was rapid urbanisation, deliberately encouraged by the post-war American administration (Connell 1991). More than two-thirds of the Marshallese population, half that of Kiribati and a third of that of FSM now live in urban centres. At independence in 1979, the population of Tuvalu was more or less evenly divided between eight main islands; a quarter of a century later, half the population was on the urbanised island of Funafuti. Modern employment opportunities and services are concentrated in urban centres, somewhat inevitable in small, fragmented states where human resources and capital are limited. As physical infrastructure decays on outer islands, youths emigrate, populations fall and age, services are inadequately provided, so incentives to remain decline, and a downward spiral is enhanced. Even on relatively large atolls, migration of younger men placed 'an exceptionally heavy burden on the able-bodied males who fish and collect both subsistence crops and coconuts for copra, so that they and others expressed the opinion that there were not enough to make any substantial effort at developing the island's agricultural potential' (Kiste 1968: 384).

Dependency ratios increased, and more was expected of those who stayed; hence, they too sought to migrate. Ironically, the contemporary migration patterns that in many places began in the 1960s, and alleviated stresses arising from ecological problems resulting from population pressure became situations where the loss of labour was so great that subsistence activities were directly threatened.

A major outcome of migration has been remittances, especially as migration became international from the 1970s. Remittances are such a significant part of national income that, thirty years ago, four smaller island states (Kiribati, Tokelau, Cook Islands and Tuvalu) were conceptualised as MIRAB states, where MIgration, Remittances, Aid and the resultant largely urban Bureaucracy were central to the socio-economic-political system (Bertram and Watters 1985). Not only did that indicate the weakness of local productive economies, but a substantial part of remittances was spent on imported foods, especially in the earliest phase of migration (Lewis 1988; Connell and Brown 2005). Remittances from metropolitan states now sometimes come in the form of processed food—with inbound passengers regularly carrying giant KFC packs and similar products. Remittances from migrants constitute a significant and usually the primary source of income in such outlying islands as Ponam (PNG), Mauke (Cook Islands), Nanumea (Tuvalu), becoming even more crucial after the virtual collapse of the copra trade in the 1990s (Connell 2013; Chambers and Chambers 2001). In islands like Ponam and Nanumea, having large families in the hope that one or more children might eventually provide remittances was a conscious economic survival strategy.

A recent Pacific neologism, become common phrase, is 'outer islands'. Such islands are perceived as different, sometimes culturally, like the outer islands of Yap and Chuuk and the Polynesian atolls of Pohnpei (FSM), but ubiquitously because they lack the development options, service provision and modernity of centres. In the Reef Islands (Solomon Islands), islanders had early become 'painfully aware of their isolation' (Davenport 1972: 59). In outer islands, especially 'incorporation in a wider polity and the *escape* this offers through outmigration, counters the limits of small size and narrow resources' (Ward 1982: 182, my italics). Islanders increasingly recognised the need to have an established community on a central high island on which to depend (Marshall 2004a; Pam and Henry 2012). Any private sector has disappeared from most outer islands, almost before it was established, and public services have suffered because of the unwillingness of providers to live in remote areas and the breakdown of transport infrastructure. The rise of container shipping and bulk carriers and the decline of the copra trade have resulted in ships simply bypassing many islands, a process well in place by the 1970s, and air services have likewise bypassed small islands, further disadvantaging them.

Nutrition and health

The outcome of shifts in agriculture and fishing, migration (internal and international), urbanisation, and continued absorption into the global economy, is that food security is threatened by changing production practices, land and water degradation, and land losses with food production growing slower than the rate of population increase. Changing nutrition is partly associated with declining food production and reduced diversity, mainly derived from changing tastes, low incomes, the inability to purchase adequate diets (at high market prices), a growing dependence on store foods, and the poor quality of cheap imported processed foods and drinks. In RMI, where an estimated 90 per cent of locally consumed food is imported, 'today local foods are used mainly on special occasions as a reserve when imported foods are not available and for variety from imported foods' (FAO 2008: 132). Dominant consumption of local foods is seen to equate with poverty. Imported foods range from corned beef, turkey tails and meat flaps to rice, sugar, instant noodles,

biscuits and soft drinks (e.g. Evans et al. 2001; Dixon and Jamieson 2005; Cassels 2006; Oles 2007b; Foster 2008; Gewertz and Errington 2010; Errington et al. 2013; Rudiak-Gould 2009; Thow et al. 2010; Seiden et al. 2012). Rice and flour have become food staples even in quite remote communities, sometimes eaten without accompaniments. Rice is a long-established import and one of the few imports where there have been national, flawed and inappropriate, attempts at import substitution. Even by the 1970s, it was almost ubiquitous, central enough in diets to be a staple rather than merely a snack and, in Chuukese atolls at least, now being linguistically categorised with traditional root crop staples (Flinn 1988). Noodles have rapidly taken over as the ubiquitous, quintessential fast new 'modernist staple' (Errington et al. 2012: 92). Tinned fish is a common import in many island contexts, with imported fish, meat and chicken preferred to local versions (e.g. Dixon and Jamieson 2005). In Woleai, where more than 200 species of edible fish inhabit the lagoon, the best-selling item in most stores was tinned fish. Fresh fruit is imported but can be damaged and rot during transport and prices are high. Processed food is also sent from urban centres to outer islands, with one employee of a Marshall Islands NGO engaged in diabetes reduction, suggesting a direct association between proximity to an airstrip and the consumption of an unhealthy diet (McMurray and Smith 2001). Even in the most remote islands, stores are dominated by imported goods: on Vatulele (Fiji) more than a third of store goods were foods, most of which came from outside Fiji (McInnes and Connell 1988). Imports, especially food, have embedded islanders in wider worlds, with the humble village store the ubiquitous symbol and microcosm of globalisation.

Household food expenditures are dominated by imported goods. In Kiribati and Tuvalu, the two main calorie sources are rice and sugar, and household food expenditure is dominated by bread and rice (SPC 2011). By the 1970s, stores were of significance in most Micronesian villages and food was often the main purchase. On Tamana atoll (Kiribati), where food production was never easy and droughts not unusual, 85 per cent of the average household's expenditure was on food: flour, rice, sugar, tinned meat and fish, biscuits and prepared foods (doughnuts, bread and cups of tea) were the most important, regularly purchased items (Lawrence 1977: 171). Households might go several days without solid food; 'if fish is available, it is eaten at any time of the day; if not morning or evening, meals are likely to be toddy or *katokaben* (a mixture of grated coconut in toddy), and at any time during the day, a dish of breadfruit, pawpaw or *bero* [a fibrous wild fig] or a flour or rice dish might be eaten' (Lawrence 1977: 178). At much the same time on marginally more affluent Namu (RMI):

> Children going off to school might search … for a piece of leftover breadfruit or some rice. A pot of rice with coconut cream or some breadfruit roasted in the coals would be ready by about 10.30, together with a pot of tea. A group of men might have gathered at a house where the resident provided a cup of coffee, a real luxury. The very young children of the household were fed sweet tea and a breadfruit, flour or rice soup … occasionally someone might drink a coconut, but these were precious and therefore the supply was conserved … If one of the men in the household had been successful fishing the day or the night before, the fish would be grilled…otherwise a piece of coconut would suffice as relish to go with the breadfruit, rice or bread. A cup of sweet tea was served with the evening meal (Pollock 1992: 44).

Twenty years later on Ujae

> For breakfast the starch was flour made into zestless pancakes, uninspired donuts, bare-bones bread or flour soup… If I was extremely lucky I would be served instant ramen, starch in another form. For lunch there would be rice. It came in two varieties: plain or drenched in coconut oil. On the side there might be a cooked breadfruit. Or the whole meal might be replaced by two boiled bananas. Dinner was the same, perhaps with a fresh fish on the side (Rudiak-Gould 2009: 26).

On remote Nukumanu (PNG) by the 1980s, flour and rice had become the two main staples after coconuts, and such 'luxuries as coffee, tea and sugar' had become necessities (Feinberg 1986). While pigs or chicken might be killed to accompany an occasional feast on these islands, these were not nutritious diets, and rice and flour were often scarce when the supply ship was late. It is scarcely surprising that store foods were a welcome diversion and addition. Fifteen years later, little had changed on Tamana though local foods were being consumed more frequently, since remittances had fallen; the same imported foods were purchased though 'chewing gum and tomato sauce' had now become 'basic essentials' (Lawrence 1992). Twenty-five years later on Namu, rice had become even more important, when there was little or no pandanus or breadfruit, while rice, tea, flour and sugar remained the four key purchased goods (Pollock 1996). Imported starches were taking over from taro and breadfruit.

If 'modern' diets are poor, traditional atoll diets were rarely adequate, and vitamin A deficiency—a cause of night blindness—was not unusual. Early nutrition studies pointed to substantial disadvantages particularly in Majuro, where food imports were already considerable (Murai

1954), but also on outer islands such as Ifaluk (FSM) where traditional diets had been retained (Bates and Abbott 1958). Mild deficiencies of vitamin A put children at risk of respiratory diseases and diarrhoea, both of which are a common cause of child mortality in Kiribati, where 15 % of children had vitamin A deficiency in 1990 (Christensen 1995; Brewis 1996). Diarrhoea and parasitic diseases, often following consumption of contaminated food and water, are a major cause of morbidity, and dental caries is widespread (but underreported and neglected). Nutritional problems and the partly consequent chronic disease problems have been documented in detail for FSM (Englberger and Fitzgerald 2003) and are broadly similar elsewhere in Micronesia. Non-communicable diseases (NCDs), at epidemic levels for heart disease, diabetes, obesity and cancers, have proliferated, especially in urban centres, following dietary shifts and sedentarism, reaching globally extreme proportions in several states, as also in Polynesia, where they are the leading cause of death (Cassels 2006; Inaoka et al. 2007; Estimé et al. 2014). In Micronesia, stunted infants can quickly become overweight children, and then obese adults, parts of the same nuclear family. The isolated island state of Nauru has a world record diabetes rate of over 70 % of adults. In the Marshall Islands, a third of all women and a quarter of men have diabetes. In Kosrae (FSM), 59 % of adults are obese (Cassels 2006). Iron-deficiency anaemia is reported to be 20 % or greater in children and pregnant women in 15 of 16 Pacific island states (SPC 2010). Costs of reducing NCDs are high and a growing burden on national health systems (e.g. Anderson et al. 2013). Inexpensive measures to prevent stunting, such as breastfeeding promotion and micronutrient supplementation, are overwhelmed by the need for money for expensive treatments for NCDs like diabetes. Space precludes discussion of alcohol, and its distinctive production, marketing and contribution to premature death, violence and anomie (Marshall 1979, 2004b).

Imported foods have met needs for greater diversity, but at some financial and nutritional cost. Inadequate food safety laws and capacity to enforce them have resulted in imports of low-quality food (old, damaged and contaminated products, or with low vitamin and mineral content but high in fat, sugar and/or salt) that pose health risks. At the core of dietary, disasters have been turkey tails, whose import began in the 1960s. So close is the correlation between high levels of consumption and diabetes that on Namoluk atoll (FSM), diabetes has been labelled 'turkey tail disease' (Marshall 2004a). Ignored in metropolitan states, cheap fatty meat products are forcefully marketed in the Pacific, along with other 'ultra-processed food' by transnational corporations and through chain stores, with minimal regulation (Hawkes 2006; Moodie et al. 2013). Attempts to control the import of mutton flaps and similar products, at least in Fiji and Samoa, have been thwarted by threats of sanctions at the WTO, and regional and international trade agreements have disadvantaged nutrition in island states (Thow et al. 2010; Snowdon and Thow 2013). Food and beverage imports are consistently more than a third of the value of all imports, so contributing significantly to trade imbalances. The inability to develop and retain policies banning inappropriate imports may simultaneously worsen nutrition, health, dental health and the balance of trade. Rising food prices has undermined children's nutrition, especially amongst the urban poor, where people are turning to cheaper but less nutritious food. In urban areas, poverty partly explains such shifts, and thus, 'any government that heavily taxes these products or bans them will suffer the ire of the working poor at elections and so the issue is largely avoided' (Grynberg 2010: 34). In Kiribati, the former President, Ieremiah Tabai, observed: 'if the shops are without rice and sugar, it is a big political issue' (pers. comm. 2012). The shift away from traditional staples poses particular problems for food security after hazard events, while hazards have reduced the availability of local foods and hastened the transition to imported foods. Finally, climate change—and especially more frequent cyclones—is likely to reduce the viability of local agricultural systems even further, if repeated overwash increases salinity (particularly in taro cultivation), while predicted droughts and more saline lenses will increase vulnerability to sanitation and hygiene problems, just as changing sea temperatures will alter fish and coral habitats and potentially reduce fisheries productivity.

Dysfunctional policy? Diasporic practice?

A suite of changes have transformed food production and consumption in the Pacific in the past half century. These include changing production practices (notably the decline of subsistence), population increase and urbanisation, new attitudes to diets, modernity and status, access to imported foods, prices and pricing policies, deteriorating terms of trade, aggressive marketing, the shift towards a corporate food regime, a decline in conservation practices, more 'sophisticated' resource (seafood) extraction (unaccompanied by sophisticated management), an intensified 'coastal squeeze' and dependence on the state. Small islands, particularly those of Micronesia, have long faced nutrition and food security problems, hence the existence of linkages between islands, migration and resettlement. Food shortages were not unusual in the past, and diets involved little diversity, so the ability to incorporate new foods was welcomed. That resulted in a transition, especially in urban centres, from local foods that were high in vitamins and fibre to imported foods that were tasty, but high in sugar,

salt, fats and refined carbohydrates (Corsi et al. 2008). Diets diversified and worsened. Such processes have been largely resistant to tentative policy redirection.

Various constraints to increased local agricultural and fisheries production exist: greater population pressure on scarce coastal resources (with ecological degradation), land shortages (and land tenure issues), educational systems oriented to bureaucratic employment, high wages, no taxation on imported goods, limited marketing infrastructure, inadequate and expensive transport and few skilled marine scientists or agriculturalists. Agriculture and fisheries have been relatively neglected by island states, or focused on exports, and health promotion and nutrition units, where they exist, are underfunded appendages of something else. A widespread urban bias in development policy has contributed to outmigration from small islands.

Agriculture and fishing still provide valuable livelihoods, generate lease fees (in fisheries), enable some local market provision and are one key to food security and nutritional well-being. Yet, agriculture has disappeared in some Micronesian islands, and dwindled in most, while the same kind of cumulative downward spiral in agriculture has also affected fisheries, if not to the same extent. Few wooded areas remain, biodiversity has declined, wood is a scarce commodity and cooking fuel expensive. Complex human ecologies have become fragile with greater individualism (and rising populations), resulting in more disputes and less social cohesion. Depletion and overexploitation of global fisheries have put increased pressure on island resources, with the continued rise of an Asian middle-class, and greater demands for fish consumption. Climate change is likely to further reduce biodiversity, especially in low-lying atoll states (Barnett 2011; SPC 2011), and threaten residual food security. Pronouncing agriculture and fisheries the background to the economy, and thus the key to food security, has never been successful.

As agriculture and fishing have become less likely to satisfy local needs for income generation, many individuals have moved into other economic activities, and diversification has brought greater occupational multiplicity, in order to construct a portfolio of livelihood activities to improve their standard of living, part of a long history of flexible adaptation (Birch-Thomsen et al. 2010; Connell 2013). Diversity and multiplicity provide a contemporary 'subsistence safety-net'. That has been necessary since governments have rarely looked favourably on rural people. Cultural, geographical and linguistic gaps that separate bureaucrats from farmers and fishers saw the latter viewed as illiterate, ignorant, backward and lazy, and incapable of innovation, hence unworthy of policy intervention. Concerted efforts to develop and implement effective integrated rural and regional development policies have been absent. Policies appear in token form on paper at the behest of international agencies. Rural bias and decentralisation of services in favour of fisheries, agriculture and integrated rural development are implausible. Households have had to diversify themselves to achieve development.

Moving towards 'sustainable food security' and food sovereignty requires both a reasonable degree of local production (supply) and scope for distribution and entitlements (demand), which centres on improved incomes, greater equity and effective market access: a focus on capabilities rather than calories. More effective markets, dependent on better infrastructure, with fairer prices—even though greater support for local food production might actually drive up domestic prices—are extremely difficult to implement in Micronesia. Urban populations and informal settlements are growing fast, urban poverty is increasing, but with no great interest or public policy directed to the governance and management of urbanisation, maintained by a myth that Pacific islanders are rural people and that they should, can and will return to rural areas (Connell 2003, 2011). That is neither accurate, feasible or appropriate, and such marginalised populations require the capabilities to attain healthy and nourished lives—food security becomes a problem of attaining adequate and sustainable livelihoods. It is not a question of how much food is produced—though that is of some significance—but whether those in need have adequate physical, social and economic access to food. Thus, food security becomes an increasingly urban problem. Poverty is the main cause of food insecurity. Micronesia perfectly and tragically exemplifies the global context where healthier foods (and therefore diets) are more costly than less healthy options (Rao et al. 2013). Economic policies (such as tariffs or bans on imports) have been tried, but other than controls over a very small number of minor products, including soft drinks, such policies oppose the interests of growing urban populations, who seek cheap food, and defy WTO regulations. Single-sector approaches are inadequate. Poverty reduction requires broad-based development, superior education, transport infrastructure, integrated health, agriculture and fisheries programmes, but at every turn the size and scale of deeply fragmented Micronesian states, weak governance and inadequate institutions, militate against economic growth and national integration. Producing and marketing local food in any volume are simply impossible. Constant policy suggestions that are aimed at education and consciousness raising (e.g. Corsi et al. 2008) are thus doomed to failure. Ordinary Marshallese women (in the opening quotation), and others, well understand the problems, but the solution is elusive—since it cannot presently be achieved within RMI, or elsewhere in Micronesia, since economic growth is improbable.

Extraordinary challenges exist in seeking to reverse a fifty-year long trajectory of change, because of the connotations attached to various foods and nutritional strategies. Multiple attempts have been made in the past to stimulate and encourage 'traditional' agriculture (through research, extension, credit, etc.) but a 'return to tradition' is rarely perceived as progressive. Indeed, Micronesians have generally gone from inadequate to unhealthy diets. Even encouraging a shift in attitudes in favour of urban gardening confronts 'modern' attitudes and land shortages. 'Regression' is no-one's priority and has occurred only in adversity, as remoteness or income decline necessitates self-reliance: 'a return to traditional lifestyles is not perceived as an option by many Marshallese' (McMurray and Smith 2001: 139). Nor elsewhere. The kinds of policies sometimes mooted that involve changing consumption patterns and increasing local productive capacity, to change living styles at given income levels using taxes and pricing policies, are unlikely to be chosen while emigration remains an unrestricted option (at least in RMI and FSM). But, as the FAO has reported for the RMI.

> Without substantial changes it will be difficulty to reverse the current trajectory of development in the RMI. … There have been widely expressed sentiments of the necessity for greater self-reliance, yet the reality of achieving this is increasingly improbable. The principal difficulty of development in the RMI is not simply one of reallocating of resources towards improved infrastructure, agricultural development, agriculture investment, etc., but is that of producing a fundamental change in attitudes, demanding wage restraints, raised taxation (on imports and perhaps wages) etc., that is extremely difficult to achieve in a small country where the majority of the population are now urban dwellers (FAO 2008: 125–126).

Not surprisingly, the FAO did not indicate how that might be achieved. Concerted comprehensive policy formation in loosely structured democratic states is already difficult. In Micronesian states, public regulation and market intervention is particularly weak, in an international context dominated by neo-liberal discourses and an emphasis on free markets and trade. In situations where the prospects for economic growth are slight, the difficulties are greater. Where dealing with malnutrition in its various forms should provide a bridge between economic growth and human development, achieving multiplicity, diversity and more flexible livelihoods—towards higher incomes and purchasing power—is unlikely to happen domestically. Kiribati has sought to achieve greater migration levels, in pursuit of 'migration with dignity', and a superior flow of remittances (Connell 2013) while both FSM and the Marshall Islands, despite substantial migration, have yet to benefit from a superior flow of remittances (Friberg et al. 2006) as many Micronesian migrants in the USA are disadvantaged by inadequate education and remain in poorly paid, entry-level employment. It is the peculiar irony of Micronesia that solutions to seemingly domestic Micronesian nutrition problems are most likely to be resolved only by more extensive migration and remittances. Micronesia is shifting towards a diasporic future—a pragmatic choice, following that already made through most of Polynesia—so that, more than in most other nations, food security requires a rather desperate and unusual global solution.

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