H. C. Brookfield, ed., *Population-Environment Relations in Tropical Islands: The Case of Eastern Fiji.* MAB Technical Notes 13. Paris: UNESCO, 1980. Pp. 233, appendices, no index. $18.00.

This collection of ten papers is the most recent in a series of publications arising out of a UNESCO/UNFPA project which, between 1974 and 1976, involved some fifteen scientists in fieldwork throughout eastern Fiji. Details of publications and participants are given in two appendices. The stated aim of the collection is to provide an overview of the project team's approach and research results for the benefit of all students and

potential managers of man-environment relations, especially in developing countries, and including those engaged in the second stage of UNESCO's "Man and the Biosphere" project in the Caribbean.

The Fiji project team, in consultation with the Fiji government from 1973, concerned itself primarily with the policy-oriented question of how to use resources for the maximization of human welfare. Definition of the resource base, therefore, was an initial preoccupation for natural and social scientists. The latter's findings are reported in detail in earlier project publications. The natural scientists present two papers in the collection under review: one preliminary and inconclusive piece on land potential by Latham and Denis, and a wide-ranging survey of Pacific marine resources by Salvat. The natural resource base was found not to be in a state of static equilibrium. Two papers by McLean emphasize the "dynamic instability" of the islands' physical environment, which results from external shocks (such as hurricanes and long-term rises in sea level), and which makes it difficult to separate the human from the natural factors in the process of environmental change.

Change rather than stability was also found to characterize Fijian society,, as Brookfield argues in the penultimate paper. Adoption of the dependency paradigm generated the expectation that the integration of tribal economies into world capitalism would produce disintegration at the local level. But Fiji had been chosen as the field of study because it was believed that the eastern islands had experienced a relatively light Western impact, and because, therefore, it would provide a useful baseline comparison for (Caribbean) societies which had experienced a more sustained and intensive contact. Specifically, with respect to rural economy, it was assumed that traditional redistributive mechanisms still operated to ensure economic homogeneity of the village. In fact, it turned out that the eastern islands had been "impacted' quite heavily--to the extent that rural inequality of income distribution was comparable to that in rural India (p. 186)--and that despite this, there was a surprising degree of local autonomy. (For a relevant case study see Knapman and Walter, "The Way of the Land and the Path of Money . . .," *The Journal of Developing Areas,* Jan. 1980, pp. 201-22.) At the level of village economy, the latter found expression in the maintenance of substantial subsistence production for auto-consumption, a feature team members came to see as basic to a village development strategy aimed at risk-minimization and which provides a "tolerable 'prosperity' " (p. 192). (Brookfield insists this is not "primitive affluence.")

In the discovered resilience of precapitalist modes of production, Brookfield sees a possible deficiency of dependency theory rather than a

peculiarity of the Fijian situation. It is an observation familiar to followers of the arid scholastic debate over the concept of a colonial mode of production. (See Aidan Foster-Carter, "The Modes of Production Controversy," *New Left Review,* Jan.-Feb. 1978, pp. 47-77.) And like the protagonists in this debate, Brookfield, adapting arguments in Piaget's *Structuralism,* seeks a theoretical resolution. The goal is a theory of change, including rapid change triggered by crisis, which embraces conquest of one set of forces by another and recreation of opposition to invading forces in a new context. But in the end, though scientists need more than just an open mind and a notebook, there is no substitute for inductive study of the man-biosphere system in areas which may have in common only the fact that they are "underpopulated pieces of dependent periphery in the developing world" (p. 187): "It is experience together with comparison that teaches wisdom, not theory" (p. 221).

In this connection, the papers by Bedford, Bayliss-Smith, Hardaker, and Bedford and Brookfield present the fieldwork experience of the social scientists in the project team and are aimed directly at planners through their concern with the carrying capacity and development opportunities of island economies. Bedford examines the replacement of circular migration by a "massive exodus" from rural areas which outweighs all other demographic factors, and which generally reflects a fact central to the well-known Todaro model--that expected urban income greatly exceeds actual rural income. He suggests improved transport between rural and urban areas would increase the relative incidence of circular migration and thus reduce net permanent emigration. But in view of the latter's nature and causes, this could hardly be expected to alter migration flows substantially as Bedford recognizes. More fundamentally, the urban-rural income disparity and rural income inequality would have to be reduced.

The critical question, then, is what combinations of welfare and population levels island economies can sustain. Given technology, the population potentially supported by a fixed land area varies inversely with the desired welfare level, where welfare increases as income and leisure time increase. Bayliss-Smith explores the arithmetic of this relationship for different crops and interestingly charts the transition from subsistence to partial monetization on the island of Batiki. In pre-colonial times, an island population of 500 could be supported at an acceptable income level by about 17 hours work per productive person per week. But in the 1970s, only 125 persons could be supported for an input of 23 hours. Since the actual population was over 250 and 900 Batikians had already emigrated, carrying capacity clearly was inadequate. An enforced idleness

resulted from the land-extensive nature of coconut cash cropping, which was relatively unresponsive to increased labor inputs, and which suffered the effects of a declining world price. Increased carrying capacity would be possible under a root crop regime, provided the marketing and transport facilities were available.

Hardaker also examines an island economy's production potential but uses a linear programming model to do so. Proceeding on an inadequate data 'base and on the untested assumption that the model is a reasonably accurate simplification of the Taveuni Island economy, he shows that optimal resource allocation would generate a mean annual cash income per head of $635 from sales of copra, taro and yaqona (the national stimulant). Employment of surplus land and labor would increase this figure, and such employment would be guaranteed if export demand for taro increased and/or if an assumed constraint on the area planted to yaqona were relaxed. The model of course generates new cash income figures if various constraints and prices are altered. "Little confidence can be attached to the exact magnitudes of variables" (p. 95), but Hardaker is reassured by the fact that "the general patterns of the results obtained conform well with a common sense interpretation of circumstances affecting the level and patterns of economic activity in the island'.' (p. 106). The common sense interpretation is that expanded export markets and increasing the cultivated area permit higher cash incomes per head and that the person/land ratio is so low as to dispel the Malthusian specter. One consequently doubts that linear programming is established as a cost-efficient planning technique.

No short review can do justice to the richness of data, ideas, and argument in this collection of papers. The very richness inevitably will be a source of frustration to planners inasmuch as the overriding message has to be that the real world is complex and poorly understood, but that nevertheless planners ought to include environmental management in development planning. Yet they are not left without guidance. True to its pragmatic orientation, the project team comes up with one firm policy recommendation--to encourage, in accordance with a proclaimed policy of national self-sufficiency, the substitution of food production for the domestic market in place of copra production for the export market. Such a policy, it is argued, would ensure a more intensive use of eastern island resources and a consequently higher, more stable rural income level (on 1975 prices for copra and root crops). Unfortunately, the implicit assumption is made that food is a homogeneous good, and that greater domestic production means reduced food imports and a foreign exchange saving which will compensate for the loss of copra export proceeds (eastern Fiji

accounting for about half of the Fiji total). Development planners in a country which may be subject to a foreign exchange constraint will not rest easy with this assumption; in fact, food import-substitution strategy is focused on rice and meat and dairy products, which constitute a high proportion of food imports, and it is not self-evident that taro is regarded as a substitute for these goods. There is also the possibility that in a hazardous natural environment it makes sense to import some food from a variety of overseas sources. Thus, while the team's rural development strategy deserves serious consideration and will draw much support because of its correct emphasis on agricultural development, there is an evident need to explore the island-regional-national economy connections more carefully. Perhaps research in the Caribbean will prove enlightening on this score.

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