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IN THE EASTERN ISLANDS OF FIJI

(Man-and-the Biosphere Programme)

PROJECT WORKING PAPER No.7

KORO IN THE 1970'S:
PROSPERITY THROUGH DIVERSITY?

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THE UNESCO/UNFPA POPULATION AND ENVIRONMENT PROJECT IN THE EASTERN ISLANDS OF FIJI: A DESCRIPTION

The UNESCO/UNFPA Project was conceived within the framework of the Man-and-the Biosphere Programme of UNESCO, and forms part of Project 7, 'The Ecology and Rational Use of Island Ecosystems'. It was designed as an international project, to be one of a series in different regions of the world, both to feed into, and to provide a measure of design for, national programmes of research into man/biosphere relations. After the agreement of the Government of Fiji was obtained in 1973, the project was funded in 1974, and research began later in the same year. Field work ran through 1975 until mid-1976.

The project has had twin objectives. On the one hand its purpose is to explore the scientific study of human activity in and on specifically defined environments. On the other hand it has also had the objective of providing researched guidelines for policy aimed at optimizing, within the limits of possibility, the satisfactions of life for the people concerned, within the context of rational use of environment. The objectives are not seen as in conflict; the same research programme feeds both aims, and we have sought to demonstrate that scientific research into population and environment can equally serve both 'pure' and 'pragmatic' ends, each being the better for the incorporation of the other. The two general reports of the project, to be published in the MAB Technical Notes Series, will reflect these two faces of our work.

The research team has represented the disciplines of human and physical geography, demography, soil science, marine biology, nutrition, agronomy and agricultural economics. Topics under review have ranged from the fields of soil and vegetation ecology and the impact of natural hazards, through studies of land use and land holding, detailed community studies and the economics of farm-decision making, to regionally-comprehensive studies of production and communication, historical demography and migration. This list is not exhaustive. The emphasis given to different topics, and hence different specialisms, reflects the problems identified in the particular area. The method of research has varied; community studies are best carried out by an individual researcher, but often several specialists have lived and worked together in the field, each pursuing his own line of interest, but constantly interacting, so that almost all members of the project have become aware not only of the work of their colleagues, but also of the methods used and the problems raised.

This project has had a smaller local component than we wished or had planned. In common with many developing countries, Fiji has only a limited pool of skilled specialists, and we were not able to secure the collaboration of certain persons from

whom the project would have gained much. However, we have collaborated very extensively with the field and headquarters staff of three Ministries and have also collaborated, in a real sense, with the populations of the islands in which we have worked.

The design of the project has been governed by the resources available to us. We have carried out some general studies over the whole eastern island area, and several members of the project have been able to tour quite large areas of an oceanic region. However, we have concentrated our efforts principally on two islands, and have worked less intensively on three others. These five islands, respectively Taveuni, Lakeba, Kabara, Koro and Batiki, were chosen to reflect a range of physical types and also of economic development, and of distance - measured in the real terms of access - from the national centres.

For the most part the full evidence of integration of our work will appear only in the general reports. However, a great body of data and discussion cannot be presented in these reports, and we are thus also publishing a series of Project Working Papers, which will contain from one to three reports by individual specialists, or, in a few instances, the collaborative and integrated work of more than one. This series has limited distribution, and its primary purpose is to make our work available quickly in Fiji itself. All Project Working Papers are 'cleared' only with the Chief Technical Adviser; they therefore do not necessarily represent the views of UNESCO or UNFPA, or even of the project as a whole. Responsibility for all statements made and views expressed rests with the author.

Harold Brookfield
Chief Technical Adviser

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EDITORIAL INTRODUCTION

The project began in the field with Tim Bayliss-Smith on Koro, and he was the last of us in the field, again on Koro. We went to Koro for two reasons: first because we wished to include one of the larger and wetter islands of Lomaiviti in our selection; second, because Watters (1969) had worked at Nacamaki village 17 years before us. So Tim Bayliss-Smith, himself experienced in the low island environment of an atoll north of the Solomon islands, settled in Nacamaki village in 1974, and returned there again briefly in 1976. Except for myself, and that only briefly, no other member of the project ever went to Koro, so that whereas elsewhere we have the contributions of from two to ten people, in Koro we have only the work reported here. In between his two visits to Koro, Tim Bayliss-Smith participated in our much larger effort on Lakeba, and this wider experience has aided him in revising his earlier report on Koro in preparation of this Project Working Paper.

The central message of this study falls into the field usually described as 'behavioural'. Watters regarded Nacamaki as 'rather conservative'; it was a place where 'people are content with low production levels even though they know that greater yields can easily be attained' (Watters 1969, p.143). Bayliss-Smith challenges this view. He finds Koro farmers representative of many in adapting to a situation fraught with uncertainty, and he contrasts the 'view from the periphery' with the 'view from the centre' to suggest that the former has a very real and resilient rationale. He nails his flag to this mast, and defends not only the farmers of Nacamaki, but also of a much wider area in Fiji and the world, from their detractors. In particular, he defends the strategy of maintaining a strong subsistence sector at the cost of 'full participation' in the cash economy, and by implication strongly dissents from all views based on a 'transition' from subsistence to cash economy.

There is no need for the project director to say more than this of a paper which speaks for itself, and presents a view which we all share; here it is ably argued, and strong evidence is brought forward to sustain this assessment of village production patterns. His conclusion is of some importance in regional development argument. It is often suggested that people such as those of Koro require welfare support. But the argument here seems rather to mean that the Koro people have very successfully looked after their own welfare, through a mixed strategy in which subsistence and cash sectors are held in balance. What such people need, therefore, is not exhortation to abandon the security of their mixed strategy, and denigration when they decline to do so, but assistance with their commercial enterprises so that these can become more secure. Then they might be both able and willing

to participate more fully in the national economy.

Tim Bayliss-Smith brought this paper to completion under all the pressures of participating in writing our general report. But it is written fresh from the field, having been completed in hardly more than a month after his return from Fiji. His work-style fascinated this editor; surrounded, seemingly overwhelmed with paper, he none the less always managed to find what he wanted, would break off from his own interests to produce this or that extra piece for the general report on demand, and in particular find numerate evidence of a telling kind from his incredibly finely-written notebooks. Koro has become a very important element in the final structure of this project; the reason why is clear in these pages.

I - INTRODUCTION

This report examines the relationship between the population and environment on Koro Island in the 1970's. The field data were collected mainly in Nacamaki village on Koro, during two visits in July and August 1974 and in July 1976. To interpret these data naturally requires some understanding of the wider spatial and temporal context of Nacamaki village. The report therefore begins with a consideration of the history of the population of Koro within its regional setting in the Lomaiviti group of eastern Fiji, and traces briefly the changes in resource use that have occurred from the late 19th century to the present day. The position of Nacamaki village within Koro is then discussed, and the smaller scales at which decision-making occurs within the village are considered: clan (mataqali), household, and individual.

The report concludes that the Nacamaki population have maintained a relatively satisfactory level of welfare during the 1970's despite some very unfavourable trends in marketing and prices. This is partly a result of the inherent soil fertility of Koro island and the abundance of agricultural land, but it is also because the apparently 'traditional' character of Nacamaki society and the conservative pattern of resource use on the island have both proved remarkably adaptive. Communal life is vigorous and progressive yet not unduly restrictive, permitting some degree of individual initiative; while the population's livelihood derives from a relatively diverse pattern of resource exploitation in both the subsistence and cash sectors.

From both the social and the economic point of view, these aspects of diversity at Nacamaki represent an excellent strategy for at least partially countering the severe import price inflation and unpredictable oscillations in the price of export products that have hit the Lau and Lomaiviti islands in recent years. Unlike some of its less fortunate neighbours, Koro has been able to avoid the growing poverty that has resulted elsewhere from complete dependence on the copra trade. In the last two decades its level of material welfare has not declined and from some points of view it has improved, but this state of affairs has been achieved only because the importance of the subsistence sector has been maintained, and only when favourable prices have been received for at least one of the main cash crops. The island's relative prosperity has continued, but current trends in the terms of trade make its future look far from secure.

Acknowledgements

I am very grateful to the staff of the Ministry of Fijian Affairs and to the Commissioner Eastern, Jone Radrodro, for their help with the shipping and administrative arrangements

that twice transported me from Suva to Koro with the minimum of delay. On Koro I am indebted to very many people, but in particular to my assistant Suliano Manakiwai of Nacamaki and the Treasurer of the Nacamaki Cooperative Society, Mika Vueti. I am also grateful to Michael Young and Val Lyon for drawing the maps and diagrams, and to Colleen Morton for her sterling work on the final typescript. Comments on an earlier draft of the report were kindly provided by Professor Ray Watters of the Victoria University of Wellington, whose detailed study of one village on Koro was a valuable starting point for my own research on the island.

II - KORO ISLAND

2.1 CLIMATE

Six climatic regions have been defined in Fiji by Twyford and Wright (1965), according to the three criteria of mean annual rainfall, degree of seasonality in rainfall, and temperature, the third factor only operating above 2,000 feet (600 m) in the upland areas of the large islands. The highest point on Koro reaches 1,714 feet (514 m), so the island's climate is everywhere 'lowland' in type.

The interior of Koro consists of a plateau about 15 km long and 3-4 km wide which is everywhere 1,000 feet (300 m) or more above sea level. This plateau represents a considerable barrier to east-west air streams in particular (Figure 1). Such topography results in substantial orographic rainfall and increased cloudiness on the plateau and on windward coasts, and significant 'rain shadow' effects on the lee side. The most consistent air stream in Fiji is that associated with the south-east trades, so that the coastal strip of north and east Koro tends to experience a greater degree of seasonality in rainfall, with relatively dry conditions occurring between June and October.

Twyford and Wright therefore place most of Koro within their climatic Zone III, which represents lowland climates with a very weak or no dry season and a moderate well-distributed rainfall. A narrow coastal strip along the northern and eastern coasts they place in Zone II, that of lowland climates with a moderate dry season. The distribution of soils and, to some extent, vegetation reflect this difference.

The only climatic data available for Koro are twelve months of daily rainfall readings made by Mr E. Mani of Nasau Junior Secondary School in 1973 (Table 1). On the basis of these records Nasau, on the east coast of Koro, would appear to be within Zone IV, not Zone III, of the Twyford-Wright classification. No month receives less than 6 cm of rain, and every month except January has well over 9.6 cm, thus satisfying both wetness and non-seasonality criteria. The annual total was 2740 mm. In spite of this apparent uniform wetness, there was, however, one period of at least 29 days in January without rain or with only a trace. A second drought of 35 days occurred in August-September. Drought periods of this duration are quite sufficient to cause moisture stress in plants, and provide also suitable conditions for the burning of secondary vegetation.

One year of data is obviously quite inadequate as a basis for general conclusions, but it seems probable that the interior of Koro, at least, is wetter than Twyford and Wright have implied. Only perhaps in the extreme north of the island are markedly seasonal rainfall conditions experienced, but along the eastern coastal strip more limited droughts are also experienced.

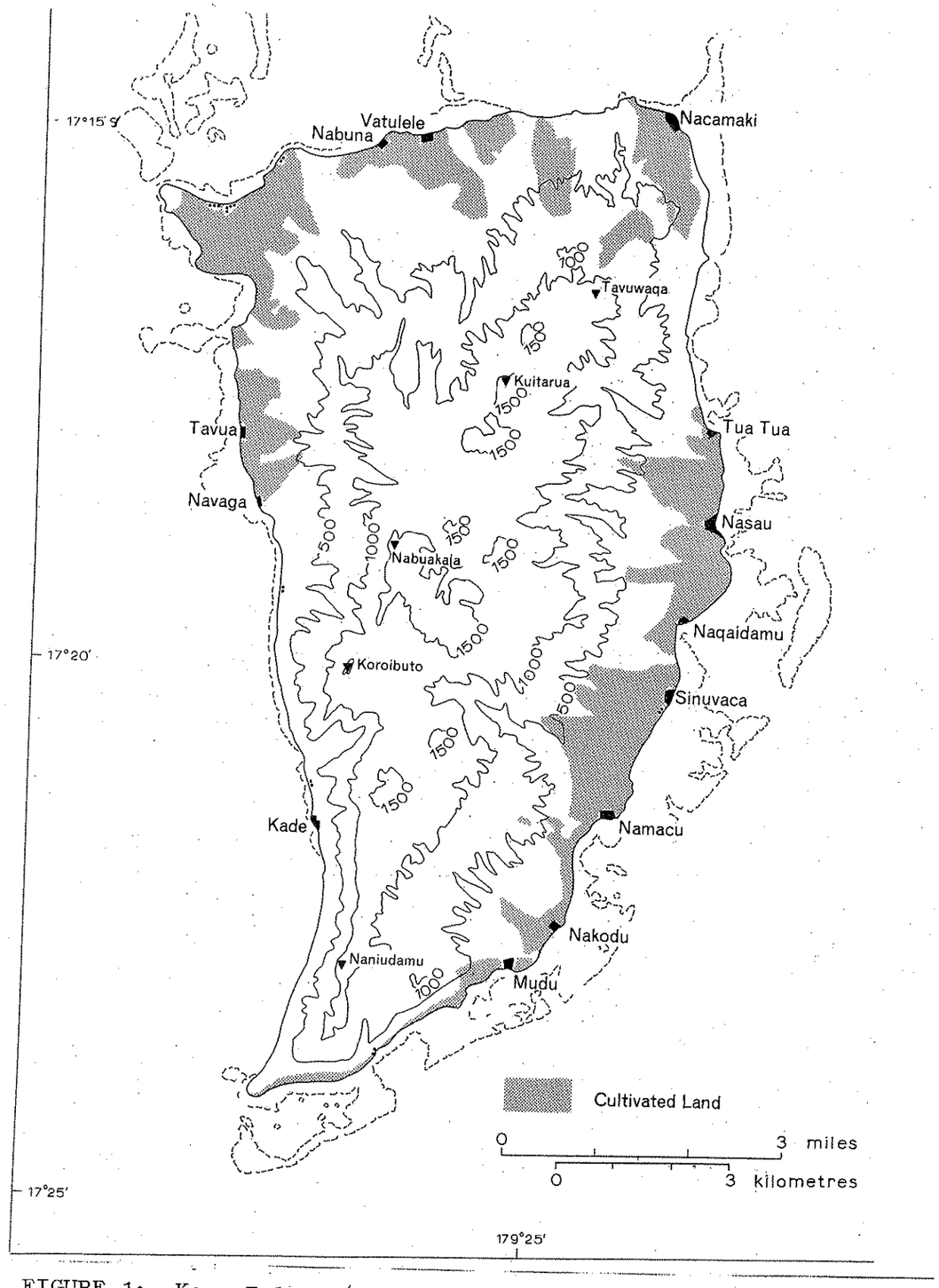

FIGURE 1: Koro Island (Source: D.O.S. 1967).

TABLE 1. Rainfall at Nasau*, east coast of Koro, 1973.

Month	Total Rainfall (mm)	Number of Raindays**	Longest drought period (days)
January	8	2	29
February	268	4	16
March	541	19	3
April	625	17	3
May	319	7	15
June	36	2	18
July	314	8	12
August	35	4	35
September	142	11	-
October	132	6	7
November	170	9	12
December	150	5	21
Total	2740	94	***

Notes. * Nasau Agricultural Station, approximately 20 m above sea level.

** Figures exclude days when a "trace" of rainfall was recorded (i.e. less than 0.5 mm).

Source: Mr E. Mani, Nasau Junior Secondary School.

Extreme wind conditions may be equally important from the human point of view as extremes of rainfall. Hurricanes can occur in the Fijian region between November and April. Koro has escaped damage in recent years, unlike southern Lau and Kadavu, but an account of 1910 indicates the destruction that can result even in the peripheral zone of a hurricane's path:

> Koro is reported to have suffered considerable loss of fruit trees. Coconuts, bananas, and dalo have been demolished, the latter by a tidal wave [at Kade] reaching inland some 50 yards. A number of houses have collapsed, but in this respect the island has not suffered as much as adjacent islands (im Thurm 1910).

Extremely heavy and intense rainfalls are often associated with such tropical cyclines, leading to soil wash and even gullying on exposed slopes.

2.2 VEGETATION

Much of Koro is still forested. Until recently the seaward slopes of the island were the only areas cleared for teitei (gardens) and coconuts, but in the last ten years cultivation has extended inland along the lines of access provided by the roads. Nevertheless, substantial tracts of inland forest remain, much of it probably secondary rather than primary since all settlements in pre-European days were sited away from the coast (see chapter 3.3). Yams will not grow well above about 1,000 feet (300 m) on Koro, so it is at the higher altitudes that less disturbed forests are likely to persist.

No work has been done on the forest trees of Koro, or on variations in forest types, but two particular variants are obvious. The first is beach forest, found along shorelines not cleared for coconuts. Typical species include Barringtonia asiatica, Hibiscus tiliaceus, and Cordia subcordata, the last species being of some commercial importance as timber. A second variant is vaivai thicket (Leucaena leucocephala), an introduced species which has colonised cliffs and grassland areas especially in the north east of the island, in the areas of Nacamaki clay loam and hill soils. According to Twyford and Wright (1965:437), vaivai thicket "has a local (and well-deserved) reputation as a soil restorative": it is easily removed by cutting and does not regenerate when smothered by a mile-a-minute creeper (Mikania micrantha). It also forms a valuable source of firewood for the copra driers at Nacamaki.

The normal cultivation sequence that is followed on Koro at present has the effect of replacing woodland, scrub or grassland with coconuts and other tree crops. Subsistence crops are grown after the initial removal of the natural vegetation, and also subsequently after the clearance of undergrowth beneath the planted palms and trees. The long-term effect of cultivation is thus to extend greatly the 'managed forest' area into unmanaged, naturally regenerating vegetation. Two types of managed woodland can be distinguished. The coastal strip of coral sand flats and the

areas only recently planted tend to have pure coconut plantation, with a ground cover of grasses, herbs or scrub according to the system of maintenance. Other areas, especially long-established plantations near the villages, tend to have mixed coconut woodland, with other useful trees interplanted with the palms, e.g. citrus trees, ivi (Inocarpus fugiferus, the Tahitian chestnut), mago (Mangifera indica; the mango), and uto (Artocarpus edulis, breadfruit). The density of the mixed coconut woodland often excludes much of the ground flora associated with the better-spaced coconut plantations. These two types obviously merge into each other.

The garden areas (teitei) of Koro are described in more detail later (see chapter 3.5). They are important as vegetation types because of their role in the deflected succession that can occur after the abandonment of the cultivated plot. Invasion of the plot by herbaceous plants and grasses begins almost as soon as it has been created, and weeding is a major gardening task. In the normal course of events scrub will begin to replace the invading weeds, and increasingly better soil conditions soon permit the re-establishment of trees. If, however, reuse of the land occurs too quickly, or if there is firing at the grassland stage of the succession, then a dense closed cover of reeds (gasau), mainly Miscanthus floridulus, will develop. The rate of re-invasion of bushes and trees is much reduced. Often further phases in the succession are excluded altogether because the reeds are burnt over too frequently for trees to become established. In low rainfall areas or where soil fertility is marginal, further impoverishment can occur, as in the talasiga areas of Fiji where a scanty cover of short grasses and ferns have replaced gasau. In the humid and fertile conditions of Koro this degree of deterioration is not possible.

In pre-colonial Fiji the area surrounding each defended hill-top settlement was kept clear of vegetation by burning, and easily accessible areas were probably cultivated with excessive frequency. On Koro there are several hills with a gasau cover which probably originated under these conditions, especially along the north and east coasts (e.g. Suvai and Bacikona, near Nacamaki). These open grasslands are maintained today by burning, which occurs usually by accident, during the preparation of teitei at the forest-gasau boundary. In some places the grassland is being extended today by agricultural activities, but at the same time some older areas of gasau are being allowed to revert to scrub or woodland. Near Nacamaki, vaivai thicket has invaded open areas as an early phase in this forest regeneration.

The vegetation of Koro therefore includes several woodland and forest types, both managed and unmanaged, and savanna-like areas that have resulted from cultivation and burning. The pattern is undoubtedly dynamic, but the overall direction of change cannot be identified without much more detailed research being done.

2.3 SOIL RESOURCES

The geological structure of Koro has not yet been studied in detail, but it seems probable that the island has more in common with Taveuni than with the rest of the Lomaiviti group. According to Twyford and Wright (1965:33), the rocks which form Koro are more basic than those in the other Lomaiviti islands, and are frequently olivine-augite basalts. The physiography of Koro is also similar to Taveuni: the degree of dissection of the basalt flow slopes is roughly equivalent to the Taveuni flows of intermediate age, suggesting that the island is extremely young, probably late Pleistocene. Fringing reefs, first described by Dana (1875), occur along most of the east side of Koro but are absent from the west coast.

Along most of the west coast a tall scarp rises steeply to over 1,500 feet (450 m), dissected by numerous streams (see Figure 1). From this west coast scarp eastwards there is in most places a zone mantled with basaltic ash, with gentle slopes and soils lacking in boulders. Towards the east this plateau surface becomes more broken, and is dissected by frequent gorges and stream valleys. Basalt boulders occur most frequently in the soil, and the slopes, though steep, are less extreme than along the eastern scarp. There is also, in the north and east, a narrow strip of coastal flats, almost a kilometre wide near Nasau.* This zone is underlain by coral sand, and is almost entirely planted with coconuts.

Twyford and Wright estimate that the island has altogether 77 per cent steep land, 7 per cent rolling land, and 16 per cent flattish land. They comment that "for a young volcanic island, a good proportion of land is of very gentle slope in Koro, with its basalt flows and ash" (1965:37). The soil pattern that emerges is basically simple. Soils from ash occur mainly on the upper plateau and are silty or sandy soils, deep, very friable but fairly well leached. Soils from flows and agglomerates are found nearer to the sea. A high proportion are on moderate to steep valley sides, but in the north in particular are found some gentler flow slopes, probably undissected, and with soils derived from the original olivine basaltic lava. These soils are generally clays, often sandy, quite deep, and characteristically plastic when moist. They are considered to be moderately to highly fertile (Twyford and Wright 1965:433).

The excellent soil resources of Koro, combined with its benign climate and relatively favourable topography, have meant that its agricultural potential has attracted much comment. Its surplus food resources led to its annexation by the expanding Bau Kingdom in the early 19th century, but the changes later in the century led to much cultivated land being abandoned (see

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* These flats appear to back on to a fossil cliff line, and correspond also to wave-cut notches about two metres above sea-level. These features may represent evidence of the former eustatic level described by Dana (1875) from other parts of Fiji, including Ovalau.

chapter 3.3). In 1870 a European visitor commented that "this rich soil, which has been gathering fertility from the repose of centuries, will not be permitted much longer to lavish its strength in magnificent but useless vegetation" (Britton 1870:61). Essentially the same point was made a century later by the Government Soil Survey:

> It is felt that Koro should be given very high priority, along with Taveuni and Gau, for agricultural development. Soils are generally fertile, the island is well-watered and there are many easy slopes.... The plateau on the creat of the island is ideal for tea gardens, vegetables, citrus, rubber, coffee, oil palm, probably coconuts, all if fertilizer is provided, and for rich dairy pastures.... Bananas properly fertilized would be expected to give very high yields and cocoa, unshaded and fertilized, the same (Twyford and Wright 1965:433).

These authors commented, however, that "development on Koro would be dependent on a great improvement in communications and access". Only the first phase of this programme, the provision of an internal road network, has so far been accomplished. External shipping links are indeed quite frequent, but are maintained mainly by small ships concerned entirely with copra trading. There is no wharf on the island, and, for example, no effective means for the existing surplus production of vegetables to be marketed in Suva. Further large-scale development will require the means whereby the wide range of crops envisaged by the soil agronomists can be transported efficiently and reliably to market. But probably more important is the need for a much deeper understanding of the population's relationship to its resources, for without motivation and labour no substantial changes in land use will ever be accomplished. It is this latter aspect that will be investigated in the following chapters.

III - KORO AND THE OUTSIDE WORLD

3.1 KORO AS A DEPENDENT STATE OF BAU

The rich food resources of Koro and its strategic position between Viti Levu, Vanua Levu and the Lau group were both factors that prevented the island from having much autonomy in the pre-colonial era. From its dependent relationship within Fiji in the 19th century, Koro moved swifty in the 20th century towards dependency on the market trading centres of Levuka and, more recently, Suva. This second phase of external orientation has been far more profound in its effects on the economic structure of Koro, but it is a less complete committment than the central government would wish.

Events on Koro before 1800 are unrecorded, and cannot yet be reconstructed. On the neighbouring island of Wakaya, archaeological evidence seems to indicate a continuous occupation of defended hilltop sites for over 2,000 years (Palmer 1967). Potsherds collected on Koro from the slopes of Suvai, a defended hill near Nacamaki, are much more recent. They derive from Ra Province, north-east Viti Levu, and probably date from the last three centuries (F. Clunie, pers.comm.). Watters (1969) suggests that the present Koro population is derived from immigrations of Navaudra people from this same part of Viti Levu, and secondly from Polynesian people coming from the direction of Tonga, both groups being superimposed over a "ground stratum" of early Melanesian stock.

The environmental evidence of early settlement history (chapter 2.2.) is not easy to interpret. The relatively restricted development of gasau grassland on Koro does not necessarily imply low population densities in prehistoric times by comparison with the other islands of Lomaiviti. The island's high soil fertility and normally adequate rainfall mean that forest regeneration can occur quite readily despite prolonged cultivation and the use of fire.

The island's 19th century history can be reconstructed with more confidence. Before 1809 Koro, like the rest of Lomaiviti, was a dependency of Verata in Viti Levu. In that year the small island of Bau off the east Viti Levu coast acquired European firearms and mercenaries, and began a long period of expansion. By about 1820 all of the Lomaiviti islands had been taken over from Verata as tributary states (Wilkes 1852:34). Koro's status in 1840 was described as follows:

> Koro is a direct tribute under Bau, not as Somosomo [Taveuni], which ... although afraid of Bau is in reality a royal residence ... The Koro people had to convey their tribute to Bau themselves and were not obliged or honoured with the commission to collect it from other places, being classed only with the common qalis (tributary places), such as Ovalau, Batiki, Moturiki, Moala etc. (Jackson 1853:452).

Among the obligations of the Koro people was hospitality and entertainment to all visitors who were en route to Bau with tribute. In return for these services Bau provided security and prestige (Tippett 1968). Koro provided a refuge for the Bauan chief Tanoa, after a coup d'etat in 1829 (Wilkes 1852:36), and in 1843 Tanoa's son Cakobau permitted the Wesleyans to begin their inner-island missionary work there (Calvert 1858:254; Lyth 1843:70). It was a decision he later regretted: the Christian converts on Koro were challenging Bau authority by 1851, and three years later were in open rebellion and in possession of half the island (Waterhouse 1866:192,266).. It took a three month campaign by Cakobau before his position was restored.

The main role of Koro within Bau was initially the supply of basic foodstuffs such as yams, taro and fermented breadfruit (madrai). According to one source in 1834, "Goro is famous among the natives for its cloth [masi] and oil" (Anon.1834). A few years later Wilkes (1852:105) reported that its main products were coconut oil and turtle shell, but whether these items were traded direct to Europeans or whether they were also sent direct to Bau is not known.

Cakobau embraced Christianity himself in 1854, and the conversion of the Lomaiviti islands was well under way by the end of the decade (Calvert 1858:358). Bauan authority over Lomaiviti remained undiminished, however, and probably intensified with the growth of trade in Fiji in the 1860's. When Cakobau acquired a 30-ton schooner in 1869 he made payment with 400 casks of coconut oil from Koro, Gau, Batiki, Moturiki and Ovalau, and the gift of plantation land on Koro (Fiji 1880: C,154). The dependency of Lomaiviti persisted after cession to Britain in 1874, and it was not until the turn of the centure that government and people began to question the rights of the Bauan chiefs. In 1914 it was reported that "the Lomaiviti natives are becoming more and more inclined to dispute Bau's pretentions to tribute" (Fiji 1914). On Koro today the only remaining vestige of the island's dependency is the existence of several Bauans who were allowed to settle on vacant tracts of freehold land and become independent farmers (Watters 1969:197).

3.2 LAND TENTURE AND LAND ALIENATION

Although the dependency of Koro to Bau was an enforced one, a side-effect was that land alientation to Europeans in the pre-colonial era was greatly restricted. It is in this respect that the history of Koro begins to diverge sharply from that of Taveuni, which in the 1860's was the scene of massive land alienation and the development of European plantations (Ward 1968). The land resources of Koro were quite as rich as those of Taveuni (albeit less entensive), but the island's qali status to Bau and the rigid control exerted by Cakobau over land sales prevented European settlement on the Taveuni scale:

> Cakobau guards his three islands [Koro, Nairai and Batiki] like the apple of his eye, and will not sell at any price ... Koro possesses very great natural advantages, and when the old king dies there will, no doubt, be a scramble for the land. (Britton 1870:24,61).

Fortunately for Koro, cession in 1874 brought a halt to further land alienation. On Koro the only land to be settled by Europeans seems to have been along the north coast. Three hundred acres were leased at Vatulele in 1868 for one shilling

per acre per year, of which 140 acres were under coconuts, cotton and corn in 1880 (Fiji 1880:C,171). The only land sale was at Matana, the north-west point of Koro, where a substantial acreage was given by Cakobau in 1869 to a black American, Bill Berwick, in payment for a schooner. During the 1870's Berwick sold parts of this land to at least five Europeans, to Cakobau's regret (Fiji 1880:C,152). The peak of white settlement on Koro was in the early 1880's : in 1881 there were 19 Europeans on the island and nearly 220 plantation workers, mainly indentured 'Polynesians' from the Solomon Islands (Fiji 1881).

It may have been the severe hurricane of 1886 that effective destroyed the fragile plantation economy that was becoming established. In some villages on Koro not a house was left standing, and lowland areas were inundated by the storm surge. The European planters suffered severely : houses were blown down, boats were wrecked and crops destroyed (McLean 1976). Only the large plantation at Matana was able to survive into the 20th century as a viable commercial entity. The great majority of land on the island therefore remained in Fijian hands; apart from the unoccupied central plateau which was declared Crown Land by the Lands Commission in 1916.

3.3 POPULATION CHANGES

The political and cultural changes of the middle and late 19th century led to two important population changes. The first was a change in population distribution. If the chronology for Nacamaki village (chapter 4.1) is typical of Koro as a whole, then the movement of settlements from heavily defended inland sites to the coast began after 1860 and was completed by about 1890. This corresponds to the period of Christian conversion, which started on a large scale about 1855 and was fully accomplished by 1870 (Calvert 1858; Britton 1870). Access to trade was undoubtedly another factor encouraging the movement to the coast. The quite extensive forested tracts now being opened up in the centre of Koro have therefore been unused for at least a century. Elsewhere in Fiji, Twyford and Wright (1965:174) find "ample pedological evidence ... that, by and large, the ancient Fijian was seldom under necessity to overexploit his soil resources". Many areas with the best soils and best living conditions remained unused because they were not accessible from any easily defensible position. Unfortunately, no evidence is available from Koro on the distribution of primary rain forest. Such data could provide

indirect evidence of pre-contact land use intensity and so, indirectly, of population size.

The second contact-induced population change of the 19th century was a decline in numbers. In many areas of Fiji this process may have begun in the first few decades, as a result of the intensified warfare that followed the introduction of fire-arms and iron tools. Introduced diseases also took a heavy toll, but their impact was perhaps localised until later in the century, when the relative security provided by the Cakobau and, later, British Governments led to freer population movements and, consequently, to the uninhibited diffusion of epidemics. Like all of Fiji, Koro was severely affected by the measles epidemic of 1875. The Fiji Times reported during the epidemic that 400 to 500 people had died on Koro (Fiji Times 1875a, b). After the epidemic had finished the Colonial Secretary estimated a total death toll for the island of 688 out of a total population of 2543 (Squire 1877). The basis for these apparently concise figures is not known, and their accuracy has been doubted (MacArthur 1968:9). Nor can we say for certain whether 2500 represents the approximate population level on Koro before European contact, since a decline may already have been underway before 1875. The figure given by Wilkes (1852) in 1842 of 2000 can only have been based on guesswork.

MacArthur has analysed the decline in the total Fijian population during the thirty years following 1875. She concluded that "shattering epidemics of unfamiliar diseases...not only killed a large proportion of the population but, through age-selective mortality, left its age structure distorted", thus reducing drastically the birth rate. During this period of depopulation it is also likely that as a result of the concurrent cultural changes there was "some upheaval in the attitudes of both sexes to marriage", with attitudes to child-bearing changing as a natural corollary (MacArthur 1968:xiv,30). This reduced fertility is seen by MacArthur as only a contributory cause of depopulation, but for Lomaiviti at least its significance may have been underestimated. As late as 1921, in the Fijian population as a whole there was a late age of marriage for women, and probably a low rate of remarriage. Of all women aged 15 to 44 years, 35 percent were reported by the census to be unmarried, widowed or divorced. For Gau, in Lomaiviti, the equivalent figure was 36 percent, for Koro 40 percent, and for Nairai, Batiki and Moturiki together 45 percent. Only 9 percent of Fiji Indian women in the same age groups were not married in 1921 (Fiji 1922). Since that time the increasingly more balanced age and sex structures and improved standards of public health have encouraged a steady growth in numbers, in Lomaiviti as elsewhere.

The population changes that have occured on Koro since 1875 are shown in Table 2 and Figure 4. There were temporary increases in the population during the 1880's (Thomson 1896), but the general trend was downwards until the period 1911-1921. After 1936 the rapid rate of increase began to accelerate, and

TABLE 2. Enumerations of the de facto population of Koro.

Date	Fijians			All Others			Total			Source
	M	F	P	M	F	P	M	F	P	
2/1875	u	u	2543	u	u	u	u	u	u	Squire 1877
6/1875	u	u	1955	u	u	u	u	u	u	Squire 1877
4/1881	750	657	1407	206	30	236	956	687	1643	Fiji 1881
4/1891	706	634	1340	0	0	0	706	634	1340	Fiji 1892
3/1901	678	600	1278	u	u	u	u	u	u	Fiji 1901
4/1911	615	570	1185	10	2	12	625	572	1197	Fiji 1911
4/1921	647	588	1235	36	10	46	683	598	1281	Fiji 1922
4/1936	725	729	1454	70	39	109	795	768	1563	Burrow 1936
10/1946	778	830	1608	75	57	132	853	887	1940	Gittins 1946
9/1956	1109	1058	2167	52	29	81	1161	1087	2248	MacArthur 1958
10/1966	1426	1370	2796	24	23	57	1450	1393	2843	Zwart 1968

M - males
F - females
P - persons
u - unavailable

averaged 2.09 percent per annum during the next three decades. The population passed its pre-cession level about 1960, and in 1966 was over 2,800 (including non-Fijians). It continues to increase at the present time, but almost certainly emigration is now starting to slow down the rate of growth.

An immigrant element in the Koro population first appears in the census of 1881, when there were over 200 Fijian and "Polynesian" labourers on the island, presumably indentured to European plantations. Ten years later this population component has disappeared. Independent non-Fijian immigrants first became important in the 1920's. In 1936 74 Indians, 14 Chinese and 21 others were enumerated on Koro. Most of these were probably storekeepers or held leases to small coconut plantations. In 1946 the Indian component had grown to 101 out of 132 non-Fijians. Of the Indians, 71 were enumerated as living outside the Fijian villages. During the twenty years following 1946 the non-Fijian component more than halved in number, partly because of leases on copra plantations not being renewed, but mainly because of the hopeless competition that independent storekeepers faced from the Cooperative Society stores, which opened in all villages during this period (Boyan 1961).

3.4 ORIGINS OF KORO'S DEPENDENCY ON TRADE

Interaction between Koro and the market economy was rather limited until the beginning of the 20th century, and until about 1860 the island's economic structure was probably oriented almost entirely towards fulfilling its own subsistence needs and meeting the surpluses demanded by Bau. Undoubtedly the achievement of this surplus was assisted by the acquisition of iron tools, which must have greatly streamlined the process of bush clearance that preceded each new season's yam garden (were). Yams may indeed have been the principal export of the island until the 1860's (Seeman 1862:59), but in the period 1800-1860 there is also evidence of limited trading with European ships.

The first visitors to the island were the sandalwood traders, who were, however, attracted to the island more by its food resources than by its sandalwood, which was limited in quantity. At least four ships are known to have called there between 1801 and 1815 (im Thurm 1925). Lockerby in 1808 purchased from the "king"

> sixteen fine large hogs and a quantity of breadfruit, etc. In return we gave him a whale's tooth, several pieces of iron, and some glass beads for his wife... The people are very friendly and you can purchase hogs, yams, fowls, etc. very cheap, and you can get a pilot to carry you to (Bua) Bay. (Lockerby 1925; 1972:183).

The sandalwood trade was shortlived, but by the 1830's the beche-de-mer traders were calling at Koro quite frequently to obtain fresh food supplies and any turtle shell that was available. The barque Peru, for example, visited the island in June, August

and November 1831, and the captain had no difficulty in bartering for yams, breadfruit, plantains and pigs (Eagleston 1830-33). Some turtle shell was also obtained on the first visit. In October of the same year another ship "bought some shell, above 38lb, some pigs, tarrow" (Driver 1831-32). By 1842 coconut oil is also being mentioned as one of Koro's products. The islands "oil and tortoise shell exceeds in quantity that of any other island of the group" (Wilkes 1852:105). These trade items could all have been produced within the traditional economic structure of the island, and are unlikely to have led to major changes in land use.

A second and more intense phase in the market involvement of Koro begain in the 1860's, with the establishment of shore-based trading stores run by Europeans. For most of them, trading was probably a side-line developed to supplement their meagre earnings from the plantations which were established on land acquired during the short-lived cotton boom of 1886-70, and which later diversified into corn, arrowroot, livestock, and of course coconuts (Fiji 1880; Cummings 1881; Cooper 1882). In 1881 there were 19 Europeans on the island subsisting in this way (Fiji 1881), but by 1907 only three remained (Allen 1907). In 1911 twelve non-Fijians were enumerated on the island (Table 2), and thereafter the number of aliens increased stradily as Indians and Chinese replaced the Europeans, acquiring leases to land for small plantations and stores. Since the mid-1950's, these stores have been largely but not entirely replaced by Fijian ones organised by the cooperative movement (Spate 1959: 50).

3.5 ASSOCIATED CHANGES IN LAND USE

The existence of trade stores provided one incentive to Koro people to begin production of cash crops. A second incentive was the requirement of the British colonial government after cession in 1874 for tax gardens of cash crops to be established in all villages as a means of fulfilling the annual head tax. (Frazer 1973). What effect this had on agricultural innovation on Koro is not known, but informants at Nacamaki state that major changes did not occur until after 1910. Elderly persons agree that at the beginning of this century the subsistence basis of life on Koro was still yams (uvi) and plantains (vudi), supplemented by breadfruit in season and by wetland taro (the latter absent from Nacamaki, which lacked irrigable sites). Dry taro (dalo) is said to have been introduced about 1911, to Nacamaki initially and to other parts of Koro soon after. Cassava (tavioka) was introduced about the same time.

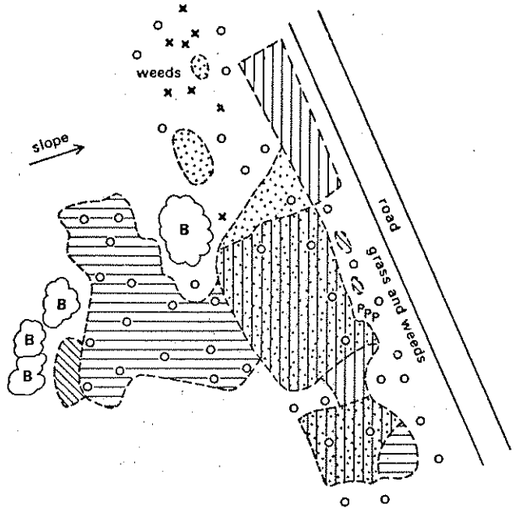
In the cash crop sector, informants also agree that the first big changes did not occur until the decade 1910-1920. At this time the price for copra offered by the Levuka traders rose to £30 per ton, and a large expansion in the area under coconuts took place. At Nacamaki mature stands of forest on the hill slopes behind the village were cleared with axes, burnt over, and planted with yams and seed coconuts. After the yam harvest the coconut seedlings were left to grow. This process of upslope expansion, whereby the initial swidden plot is planted with permanent tree

crops, continues on Koro to the present day, stimulated by rising per capita monetary needs and the expanding population. The second main source of income at the present time is kava (yaqona), which was first grown for the market about 1932. Other crops have been grown on a small scale. Several men have experimented with growing peanuts for example, but marketing arrangements in Suva have been unsatisfactory. Between about 1930 and 1962 bananas provided another important source of cash income for Koro (Watters 1969), but again shipping and marketing arrangements were unreliable and the trade collapsed.

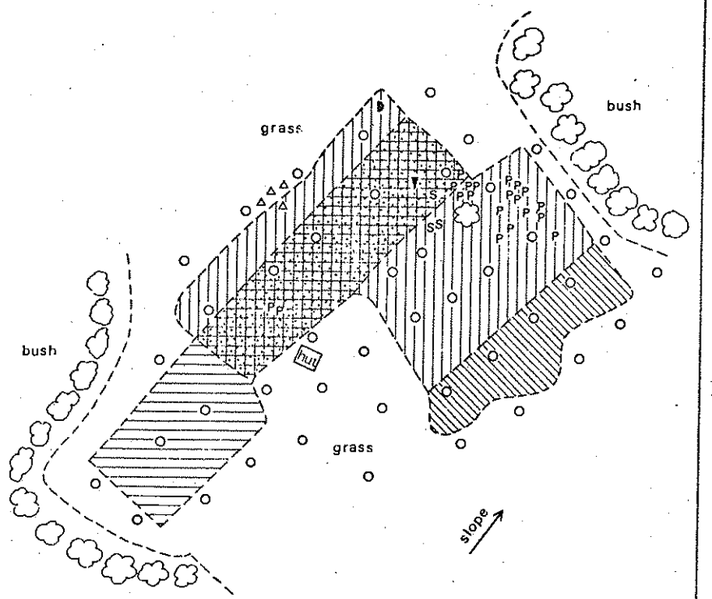
A feature of all these cash crops is that they have been integrated almost completely into the cycle of shifting cultivation for food production, a cycle which itself is now based largely on introduced subsistence crops (Figure 2). Typically, the cycle now begins with a new yam garden being cleared in an over-grown area already supporting mature coconuts (planted perhaps during the previous cycle). Yams are planted beneath the palms, and during the first season dry taro and kava plants are inter-planted amongst the yam mounds. After the yams are harvested the taro and yaqona continue to be cultivated, with papayas, bananas and plantains as minor crops. After perhaps two successive crops of taro the kava bushes take over altogether, and are harvested in the fourth and fifth year. Alternatively, cassava is planted after the taro. At any time coconuts may be planted to fill gaps in the palm canopy, or if the garden is in a hitherto unplanted area. By the fourth year the cultivator's main efforts have been diverted to other plots, and the remaining yaqona and food plants are left to compete with the invading weeds. A period of 5-8 years will then normally elapse before the same patch of ground is again cleared for a new yam garden, and the cycle recommences. The coconut palms continue to yield, of course, throughout both cultivation and fallow. The nuts can be found and removed at any stage in the cycle, but the periodic clearance of the undergrowth greatly facilitates coconut collecting, and probably improves productivity.

On Koro there is thus a strong interdependence between the cash and the subsistence sectors. From the producer's point of view it is an efficient method of satisfying his and his family's needs, and it is also a flexible form of production in the face of changing demands and prices. Apart from yams, every important crop component in the system is an introduction (even yaqona, which was grown very little in the days when the drink was a chiefly prerogative). Koro has been called a conservative island. According to Watters (1969:110), the people "have retained a good deal of the traditional way of life: the easy attainment of their material needs has induced few radical departures from traditional forms". In terms of social relationships this analysis may be true, but from the point of view of livelihood the island economy has been extremely dynamic, despite the main innovations having occurred relatively late after initial European contact.

Nacamaki : Household 23



Nacamaki : Household 40



Yams (Uvi)
Taro (Dalo)
Kava (Yaqona)
Cassava (Tavioka)
Alocasia (Via)

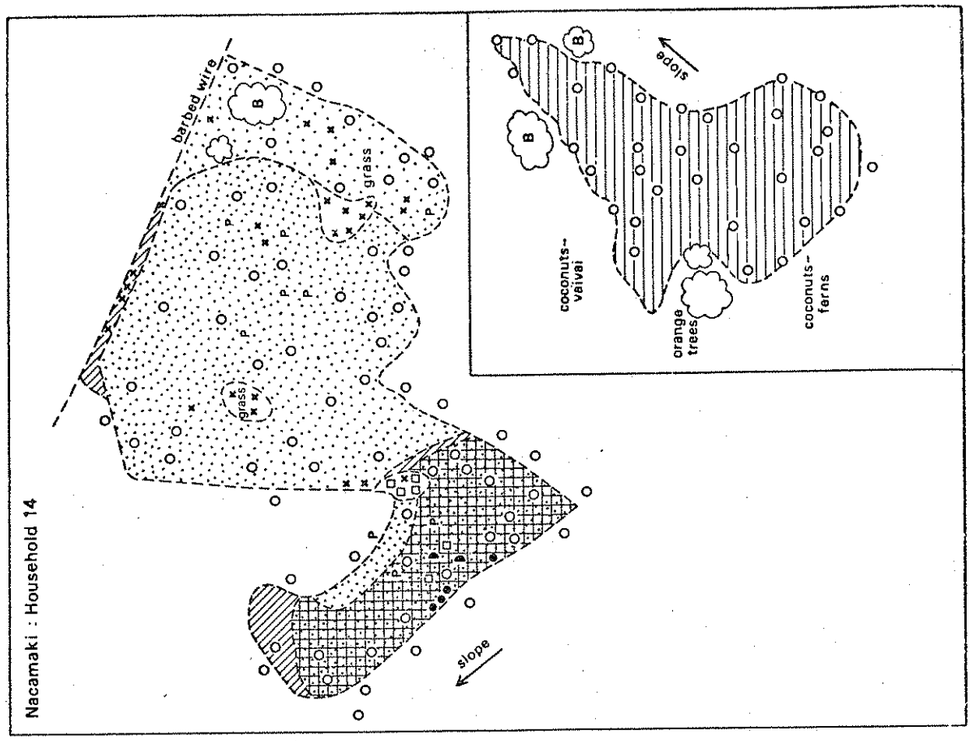
Coconut
Breadfruit
Papaya
Banana or Plantain

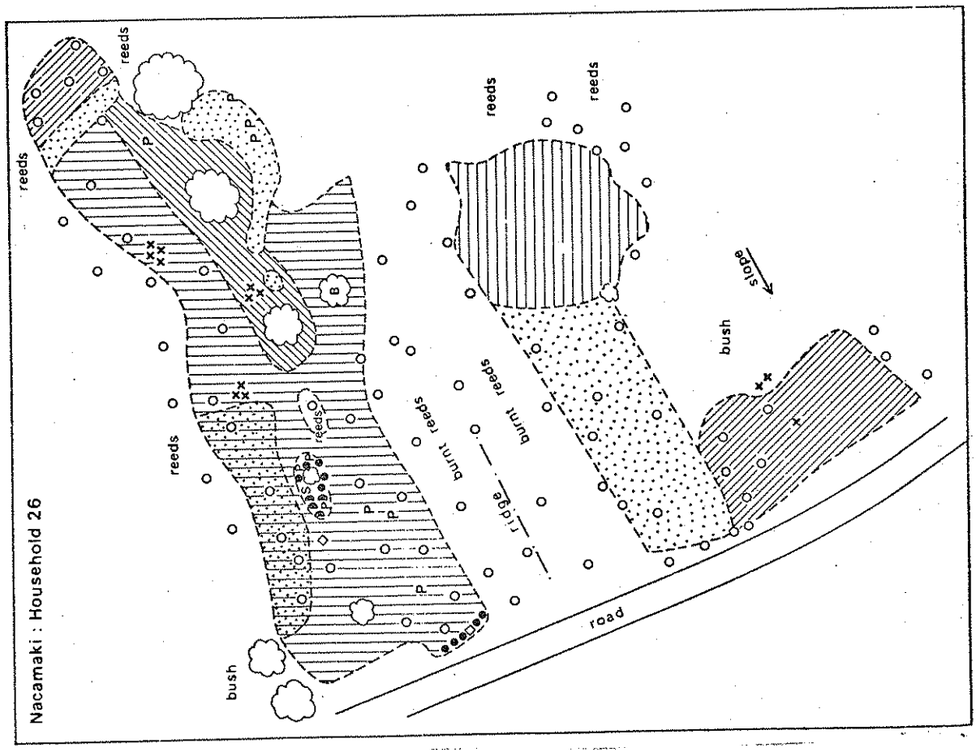
Sugar cane
Pineapple
Egg plant
Abelmoschus (Bele)
Xanthosoma (Dalo-ni-tana)
Maize
Chillies

Other mature trees

0 feet 100
0 m 30

FIGURE 2: Cultivated land (teitei) of four Nacamaki households, 1974.

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3.6 ASSOCIATED SOCIAL AND POLITICAL CHANGES

The growing dependence of the Koro economy upon external markets is paralleled by internal changes in the organisation of Koro society. In the early 19th century, at least, the political integration of the island was only weakly developed. A sandalwood trader in 1808 stated:

> We anchored off the west side, before a town
> in which the king of the island resided...
> We were received with ceremony and respect
> by this king, who informed us he was at war
> with the people on the east side (Lockerby 1925).

The hereditary paramount chief of the island, Tui Koro, lives at the present day at Nasau, his authority now integrated into the central government system, and most of the present forms of island unity on Koro are basically colonial in origin. Administrative necessity dictated that the island become one tikina (district) under one buli, but regional differences and the problems of overland travel made it advisable for the east and west coast villages each to be allotted a different magistrate.

With the 19th century peace, enforced first by the Cakobau regime and then by the British government, the hitherto dispersed clans (mataqali) moved down from the hills and grouped in a total of fourteen coastal settlements. There was also an increase in inter-village migration and economic exchange. In most respects, however, the fourteen settlements were distinct economic and political entities, in many cases separated from each other by difficult terrain and zones of unused land. Economic specialisation at this spatial scale was and is negligible. Each village maintained its own contacts with the outside world through visiting trading boats. There was no notably superior anchorage or particularly favoured administrative centre to act as a single focus for growth and innovation.

The beginnings of the economic integration of the island, as yet very incomplete, can be traced through variations in the growth rates of the fourteen villages (Table 3). In 1911 all the villages were small, and they varied little in population size (mean 85 persons, standard deviation 33). In subsequent years the range steadily widened, until in 1966 Nasau, Nacamaki and Namacu were clearly dominant in an emerging hierarchy of centres (mean 184 persons, standard deviation 72). Inter-village migration in response to variations in economic opportunity has probably been the main process in this increasing differentiation of settlement size.

The economic integration of Koro has been stimulated by the road building programme and social services provision of the Fiji Government. Encouraged by the soil resources report of Twyford and Wright (1965), the government embarked on a Koro development programme, using Nasau on the east coast as a convenient centre. Roads now connect Nasau with the six villages that lie to the south, and with Tuatua to the north, and from Nasau a road

TABLE 3. De facto resident populations of villages on Koro, enumerated 1911 - 1966.

Village	1911	1921	1936	1946	1956	1966
Nacamaki	171	173	163	198	313	302
Namacu	104	129	166	187	224	263
Nakodu	60	93	103	134	150	206
Nasau	119	118	129	159	242	330
Mudu	104	75	76	99	129	172
Naqaidamu	90	55	81	88	103	101
Tuatua	72	109	81	103	123	189
Nabuna	74	81	119	147	140	179
Vatulele	65	72	68	51	90	148
Tavua	39	42	49	37	65	89
Kade	75	51	70	74	83	127
Navaga	51	72	101	109	170	189
Nabasovi	79	67	56	63	108	130
Sinuvaca	82	98	153	125	136	153
Mean	85	88	101	112	148	184
Standard deviation	33	35	39	49	69	72

Sources: see Table 2.

crosses the island to Vatulele and Nacamaki (see Figure 1). A hospital and junior secondary school have been established, and almost by accident Nasau has become the government station on Koro. By 1966 its population exceeded that of Nacamaki, now relatively isolated and in decline. At Nasau there is now a temporary population of school children and government personnel, and it is also the medical centre for the island and the natural focus of many meetings.

In some respects, therefore, each village's isolation and autonomy has been reduced. In the social sphere some individuals interact extensively (and, one suspects, with increasing frequency) with kin in other villages. Interaction in the strictly economic sphere is, however, still in the embryonic stage. The inter-village movement of goods is still negligible except along the east coast road. Despite the existence of a Koro Cooperative Societies' wholesale depot at Nagaidamu, most of the cooperative stores still make their own arrangements for marketing and the purchasing of goods. This village independence is likely to continue, at least until the construction of a jetty and a growth in the number of vehicles on the island make a more centralised arrangement feasible.

IV - NACAMAKI VILLAGE

4.1 ORIGINS

In the Fijian rural context, the social and spatial unit that is generally the most meaningful in people's lives is the nucleated village. On Koro decision-making at the village level is now less powerful than formerly in regulating people's daily work, but communal works and community-based values are still very prevalent. The focus of most social contacts and loyalties is still the settlement in which a man was born or in which a woman marries. Although somewhat modified by long term migration, for most residents their patterns of within-village interaction greatly exceeds their between-village relationships and movements. In this chapter various aspects of Nacamaki village, Koro, will be examined, in particular its land resources, population, sources of income, and patterns of expenditure. Variations in the social distribution of land, labour and income are, however, best examined at the next two levels of the hierarchy, at the scales of mataqali and household (chapters 4.2 and 4.5).

As already described (chapter 3.3), the present fourteen coastal villages of Koro are the result of a process of migration and coalescence that took place about 1860-90. The previously more dispersed inland settlements, with each clan (mataqali) occupying a defended hill top site and using the surrounding land, were abandoned in favour of coastal sites where neighbouring

mataqali groups came together to form larger, nucleated settlements. At Nacamaki, at the northeast corner of the island, this process seems to have been gradual. The oldest woman now living in Nacamaki was born about 1870 on Tuvuwaqa, the highest hill in the vicinity (see Figure 3). Before this woman married her mataqali had moved three times: to Suvai, a lower hill also with defensive ditches, then to Nakoromatua, on the cliff top near the present village, and finally to Nacamaki itself, the final move being accomplished before 1890. Other mataqali settlements were migrating coastwards at the same time. Government pacification was a pre-condition for the abandonment of defended hill sites, but access to trade, marine resources, mission education, and a permanent water supply were more positive inducements. The contemporary population decline may also have made some coalescence of mataqali groups desirable from the practical point of view.

Nacamaki has therefore been in existence for about 85 years, and it is not surprising that in social terms it is not a particularly unified community. Land tenure is still through mataqali affiliation, there are two separate and distinct churches (Methodist and Catholic), and the present Nacamaki Cooperative Society is a recent phenomenon, replacing three former cooperative stores organised informally among the three largest mataqali. The rather variable degree to which individuals are prepared to participate fully in the Cooperative and in other communal projects is another indication that Nacamaki village is far from being socially homogeneous.

4.2 LAND RESOURCES AND LAND TENURE

Nacamaki is located on the north-east coast of Koro, which means that of all the island's villages it experiences probably the most seasonally variable climate (see section 2.1). The greater drought hazard that this seasonality entails is reflected in the distribution of gasau grassland and vaivai thicket, both of which are more frequent on the hill slopes of north-east Koro than elsewhere on the island (see chapter 2.2). The topography is, however, rather less precipitous than elsewhere on Koro, especially when compared with the west coast. The Nacamaki hinterland consists of only small areas of flattish land, mainly the coastal flat immediately to the west of the village, but Twyford and Wright (1965:36) indicate that inland of the village are substantial areas in their topographic category 4, hilly to moderately steep land, representing mean slopes of about 16-25°. Land in the 'steep' category is restricted in area, and the more precipitous categories are absent altogether.

The soils of north-east Koro are dominated by what the Soil Survey have termed Nacamaki Clay Loam and Hill Soils. On the more extreme slopes are found Nasau Steepland Soils, which are shallower and stonier versions of the Nacamaki soils. The Clay Loams are described as "six inches of very dark grey brown friable clay loam, slightly to moderately sticky and plastic when moist, of strongly developed very fine blocky structure, which overlies a brown clay horizon of similar structure" (Twyford and Wright 1965:435). The soils are said to be fertile for subsistence

crops and coconuts, but rather droughty in the dry season. Exchangeable calcium and magnesium are generally high, phosphate is variable, but potash is only moderate or low. Twyford and Wright consider that they could be developed for arable crops provided soil conservation measures were adopted on the slopes and fertilisers were provided. Alternatively, they could be used for pastures. In Watters' (1969:119) words, "most soils...would support permanent systems of cropping, and a transition from shifting cultivation is environmentally feasible". The distribution of cultivated land near Nacamaki is shown in Figure 3.

There are five land-owning clans (mataqali) represented at Nacamaki, where the relationship between each mataqali population and the 'official' land area is an extremely unequal one. The total area demarcated by the Lands Commission settlement of 1916 for use by the Nacamaki mataqali amounts to about 780 hectares, which is divided as follows:

Mataqali	Resident Population in 8/1974	Percent of Total land
Manukuira	59	40.1
Sarabau	81	32.2
Narewa	56	18.7
Vatuda	30	8.2
Qarai	36	0.8

In reality, the actual degree of inequality in land distribution is much less acute than is suggested by these figures. For one thing, the two largest mataqali (Sarabau and Manukuira) occupy large areas of gasau grassland or vaivai thicket, of restricted agricultural value, whereas the three smaller clans have the better land and, since the construction of the road in 1970, the better access to it. A second factor is that de facto land rights are in many cases different from the codified de jure allocation. As Nayacakalou (1971) has pointed out, the surveying of land and the registration of those with rights to it through their patrilineal mataqali of birth has introduced an artificial rigidity into what was traditionally a very flexible form of land tenure. On Koro, where there is no overall land shortage, the Native Land Trust Board 'rules' are disregarded in most cases of need (e.g. members of Qarai mataqali), or where a man marries into the community from elsewhere. Similarly, disputes over the use of land (or, more usually, the tree crops growing on it) have been resolved by men changing their mataqali affiliation, on an informal basis. Differential access to land is therefore not an important factor in explaining variations in the pattern of agricultural production.

4.3 POPULATION SIZE AND STRUCTURE

The size of the Nacamaki population and its structure have changed considerably during this century (Table 4 and Figure 4). The village was almost stable in numbers until the late 1940's, fluctuating within the range 163-198. This was followed by a period of rapid growth, with a maximum of 344 enumerated in 1959

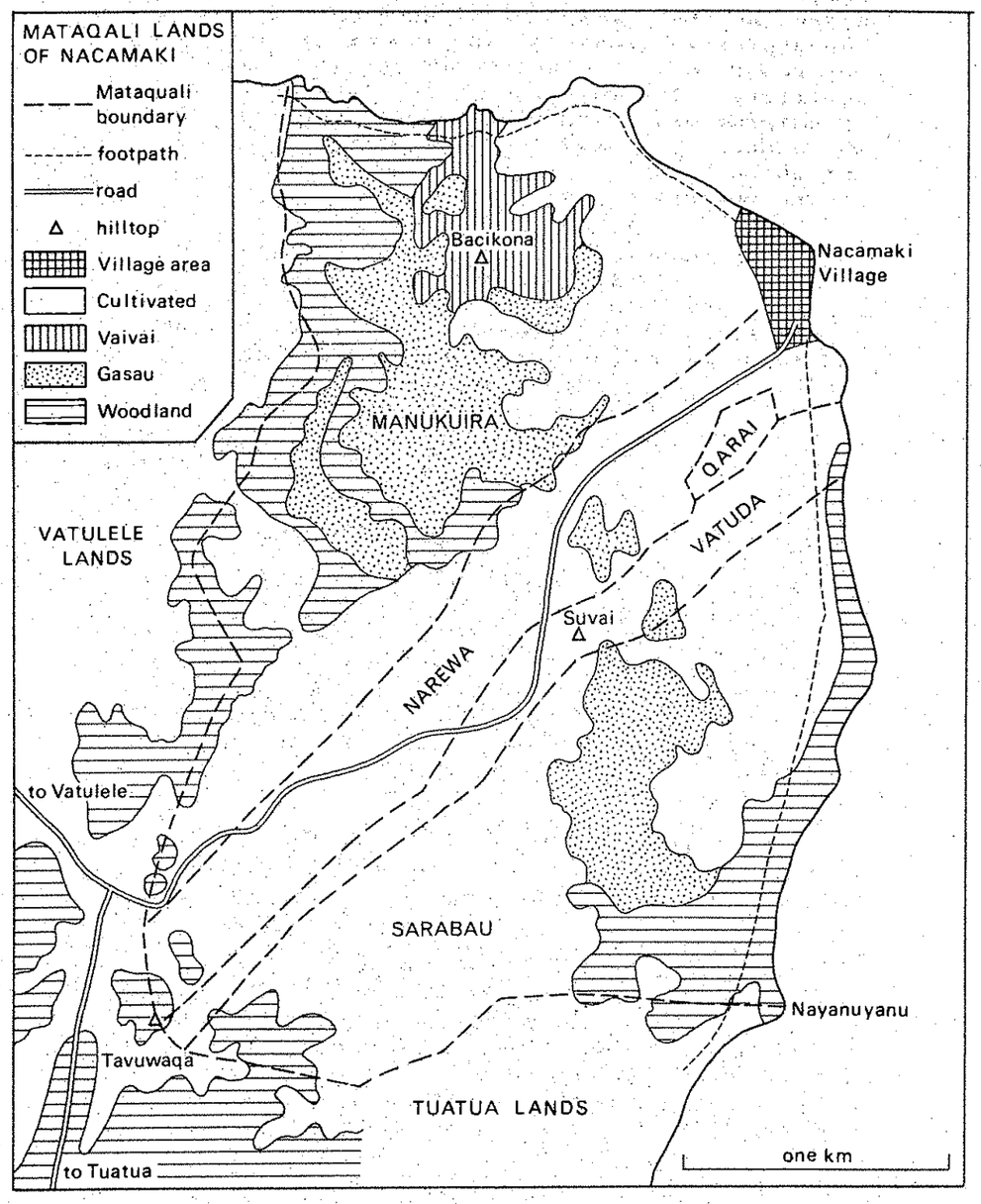


FIGURE 3: Vegetation or mataqali boundaries at Nacamaki, Koro

(Watters 1969). During the 1960's and early 1970's there was a decline, but by the mid-1970's numbers had again stabilised. The explosive growth of the 1950's is best explained as being the result of a reduced mortality rate with, perhaps, increasing fertility. The more recent fall in numbers is clearly a functio of emigration, which was probably negligible before 1950 (althou the absence of males aged 25-29 in 1921 may indicate some losses but which is now a potential threat to the balanced composition of the community.

These conclusions are supported by a comparison of the age pyramids for 1921, 1958 and 1974, the three years for which data for five year age groups are available (Figure 4). The 1921 population has the irregular distribution among age classes and the narrow base that are characteristic of populations subject to heavy infant mortality during periodic epidemics. By contrast, the 1958 pyramid has the broad base characteristic of youthful, expanding populations. By 1974 the population pyramid has again altered, and is in fact intermediate between 1921 and 1958, but for different reasons. As a result of out-migration there are fewer young adults, especially females, in the population as a qhole, and the overall fertility has declined somewhat. Mortality rates are low (11 per thousand in the two-year period 1974-76 compared to a birth rate of 32 per thousand). As a result there is a contraction in numbers in the age groups below 10 years. These data suggest that Nacamaki is not now satisfying its people's aspirations as fully as in the 1950's, although out-migration has occurred on a much smaller scale than from other islands in eastern Fiji, such as Batiki and Kabara (Bedford 1976), where there are obvious deficiencies in the quantity or quality of agricultural land available.

The threat to Nacamaki's demographic stability is at presen potential rather than actual. An examination of the age and sex composition of the 1974 population (Appendix 1) indicates that in proportional terms no great changes have yet taken place. In 1958 Watters (1969:138) calculated that the ratio of dependen (the 0-14 and over 60 age groups) to producers was exactly 50%, and the male productive workforce was 27% of the total populatio In 1974 the equivalent figures were 50.6% and 26% respectively. The main change has been the increased mobility of the populatio and an increased readiness to emigrate from Koro on a temporary or even semi-permanent basis when such a move is perceived as advantageous.

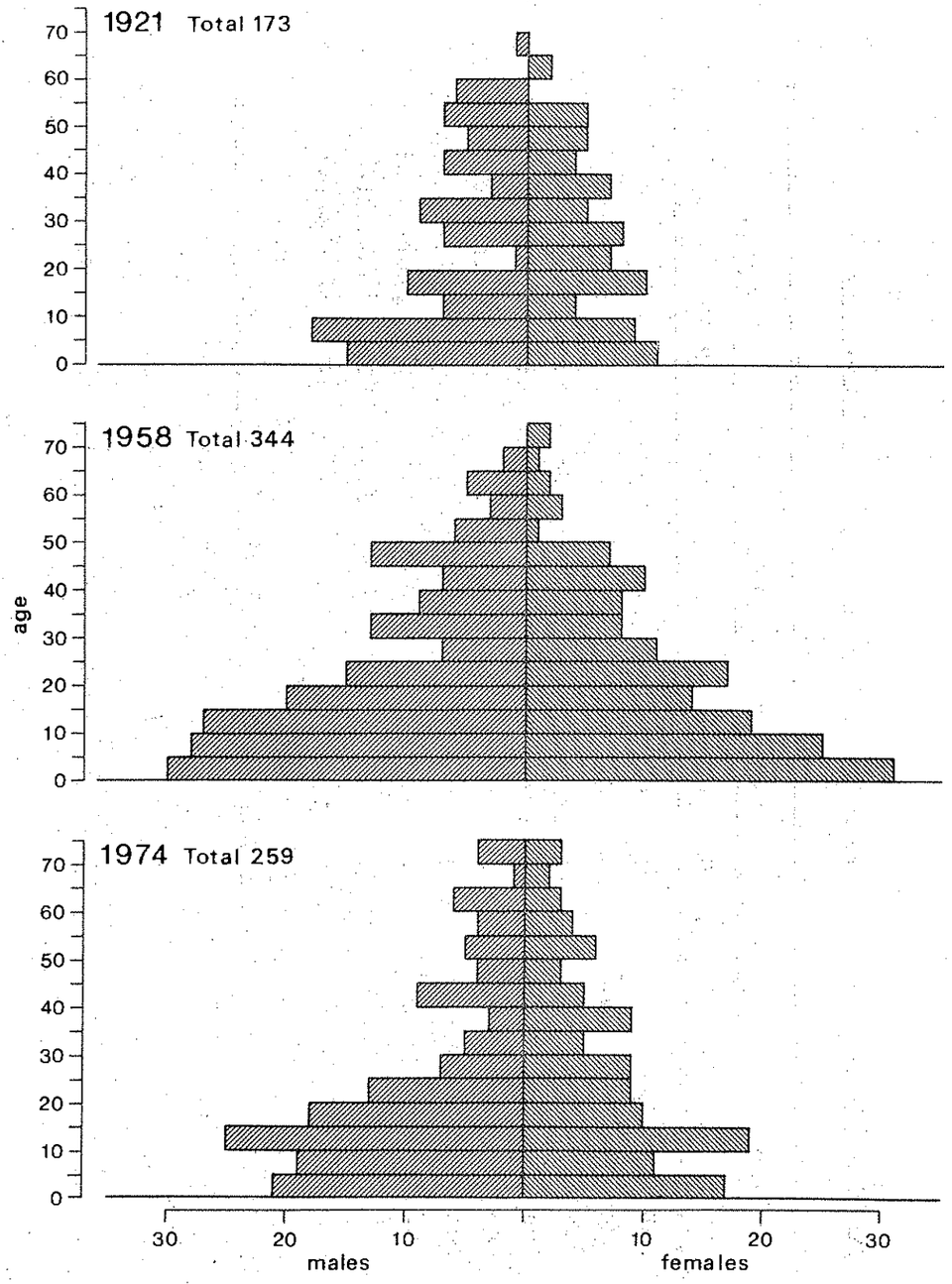


FIGURE 4: Nacamaki, Koro: age composition of the populations enumerated in 1921, 1958 and 1974.

TABLE 4. Enumerations of the de facto population of Nacamaki village, Koro.

Date	Fijians			All Others			Total			Source
	M	F	P	M	F	P	M	F	P	
4/1911	92	79	171	1	3	3	93	81	174	Fiji 1911
4/1921	96	77	173	u	u	u	u	u	u	Fiji 1922
4/1936	75	88	163	1	0	1	76	88	164	Burrow 1936
10/1946	94	104	198	0	1	1	94	105	199	Gittins 1946
9/1956	162	151	313	1	0	1	163	151	314	MacArthur 1958
1958	185	159	344	u	u	u	u	u	u	Watters 1969
10/1966	167	135	302	0	1	1	167	136	303	Zwart 1968
8/1974	144	115	259	0	0	0	144	115	259	This paper
7/1976	150	117	267	0	0	0	150	117	267	This paper

M - males
F - females
P - persons
u - unavailable

4.4 POPULATION MOBILITY

Throughout Fiji there has been a general increase in population mobility which is symptomatic of the growing integration of the main urban centres with the outlying islands, and of a greater awareness on the part of a better educated and more literate rural population of opportunities and horizons wider than those of the immediate village or island. The threat inherent in such a process is that it becomes an integral component in the whole complex of processes, economic, demographic and perceptual, through which initially favoured regions expand and prosper at the expense of the peripheral regions, which stagnate (Myrdal 1957).

Not all of the movement of people on Koro has been away from the island. In 1974 there were 29 persons (21 women) in the resident population of Nacamaki who were not born in the village, and 23 (17 women) who were born on another island (Table 5). More women than formerly are migrating into the village of Nacamaki upon marriage. In the age group 15-29 12 out of the 28 women enumerated in 1974 were born outside Nacamaki, whereas among those over 30 years only 9 out of the 40 were born elsewhere. As suggested above, there also seems to have been an equivalent, if not greater, emigration from Nacamaki of women who have married away from home.

A comparison of the migration experience of the population in 1958 and in 1974 indicates very strikingly how much broader the world view of Koro islanders has become:

Emigration Experience	Persons in 1958	Persons in 1974
None	298	64
To Suva or Levuka	18	40
To Suva/Levuka and other parts of Fiji	21	142
Overseas	7	13
Total:	344	259

(Sources: 1958 - Watters 1969:139; 1974 - Table 5).

In 1958 only a small minority (13 percent) at Nacamaki had travelled in their lives to Suva or beyond, whereas sixteen years later 75 percent had had this experience, and 5 percent had been overseas. Lack of travel experience in the 1970's is confined almost entirely to persons less than 15 years old (Table 5).

It is the presence of Koro people living in the towns on a fairly permanent basis that encourages visits by related persons, and which permits them to live away from home for several weeks or months before returning. As well as the two de facto populations that were recorded in the census of July 1974 and July 1976, there is therefore an additional de jure Nacamaki population of persons

TABLE 5. Origin, education, migration and employment experiences of the de facto Nacamaki population, 1st August 1974.

	Males				Females				Males and Females
	0-14	15-29	30-44	45+	0-14	15-29	30-44	45+	all ages
ORIGIN									
0 Nacamaki	65	37	4	20	47	16	14	17	230
1 Other Koro	-	-	1	1	-	3	1	-	6
2 Gau, Nairai	-	-	-	1	-	2	3	2	8
3 Ovalau	-	-	-	1	-	3	-	-	4
4 Taveuni	-	-	-	-	-	2	-	-	2
5 Vanua Levu	-	1	1	1	-	1	1	1	6
6 Viti Levu	-	-	-	-	-	-	-	1	1
7 Lau	-	-	1	-	-	1	-	-	2
All Origins	65	38	17	24	47	28	19	21	259
EDUCATION									
0 none	24	1	-	5	18	-	-	11	59
1 rural prim.	30	10	6	3	18	13	12	7	99
2 junior sec.	10	10	-	-	11	9	-	-	40
3 urban prim.	1	10	10	16	-	5	7	3	52
4 secondary	-	7	1	-	-	1	-	-	9
All levels	65	38	17	24	47	28	19	21	259
EMIGRATION									
0 none	34	3	-	-	22	5	-	-	64
1 Suva and/or Levuka	18	6	-	-	12	3	-	1	40
2 rest of Fiji	13	26	14	17	13	20	19	20	142
3 overseas	-	3	3	7	-	-	-	-	13
All experiences	65	38	17	24	47	28	19	21	259
EMPLOYMENT									
0 none	65	29	8	9	47	27	19	21	225
1 unskilled	-	4	4	13	-	-	-	-	21
2 artisan	-	2	3	2	-	1	-	-	8
3 white collar	-	3	2	-	-	-	-	-	5
All types	65	38	17	24	47	28	19	21	259

Notes on categories:

Origin: place of birth, except in cases where mother was temporary resident only (e.g. Nacamaki women in Suva for maternity hospital).

Education: 1. Rural Primary: i.e. normally village school in place of birth.
2. Junior Secondary: Koro Junior Secondary school at Nasau in most csees.

Emigration: 2. Rest of Fiji is accessible only via the ports of Suva or Levuka in most cases.

Employment: 1. e.g. labourer, soldier, sailor; 2. e.g. carpenter, mechanic, policeman; 3. e.g. clerk, teacher, priest.

born in or married into the community but often residing elsewhere. Of those who were enumerated in 1974 47 were absent in 1976, whereas 43 persons not present in 1976 had returned two years later. Others were not present on either occasion but had visited Nacamaki in the interim period. The de jure population so defined, consisting of all persons residing in or visiting Nacamaki during the two year period, is considerably larger than the de facto one. For adults only (persons over 15 years), the numbers are as follows:

	De Facto Population (1974)	(1976)	De Jure Population, 1974-76
Adult males	79	89	120
Adult females	68	72	102
Total adults	147	161	222

This de jure population of 1974-76 spent periods away from Nacamaki ranging from nil to over 100 weeks during this 104 week period (Figure 5). Only 25 adult males (21% of the total) and 40 females (40% of the total) did not make an inward or outward trip to or from Koro, and some made several. In 1958, by contrast, Watters (1969:139) found that 88% of all adults had not left the island in the preceding 12 months. Most people's trips away from Koro in 1974-76 were of fairly brief duration, and amounted in total to less than 26 weeks of absence. At the other end of the spectrum (Figure 5) is a smaller group of relatively permanent migrants whose total period of absence exceeded 90 weeks. Often, their absence from Koro results from their stage in the life cycle: many are at secondary school or in salaried employment, returning home only for brief holidays. Some will return to Nacamaki on a more permanent basis in later life.

An unknown number of persons did not visit the village at all during 1974-76. Some of these are truly permanent migrants, although they retain nominal rights in their mataqali land. The total de jure population of Nacamaki must be very large, but it would be difficult if not impossible to define it in any meaningful way.

Women travel less often than men. Considering all outward trips made from Nacamaki to some non-Koro destination, the number of trips per person was as follows:

Number of Outward Trips in 2 years	Adult Males	Adult Females
0	38	51
1	51	35
2	24	15
3	6	1
4	1	0
Total adult population:	120	102

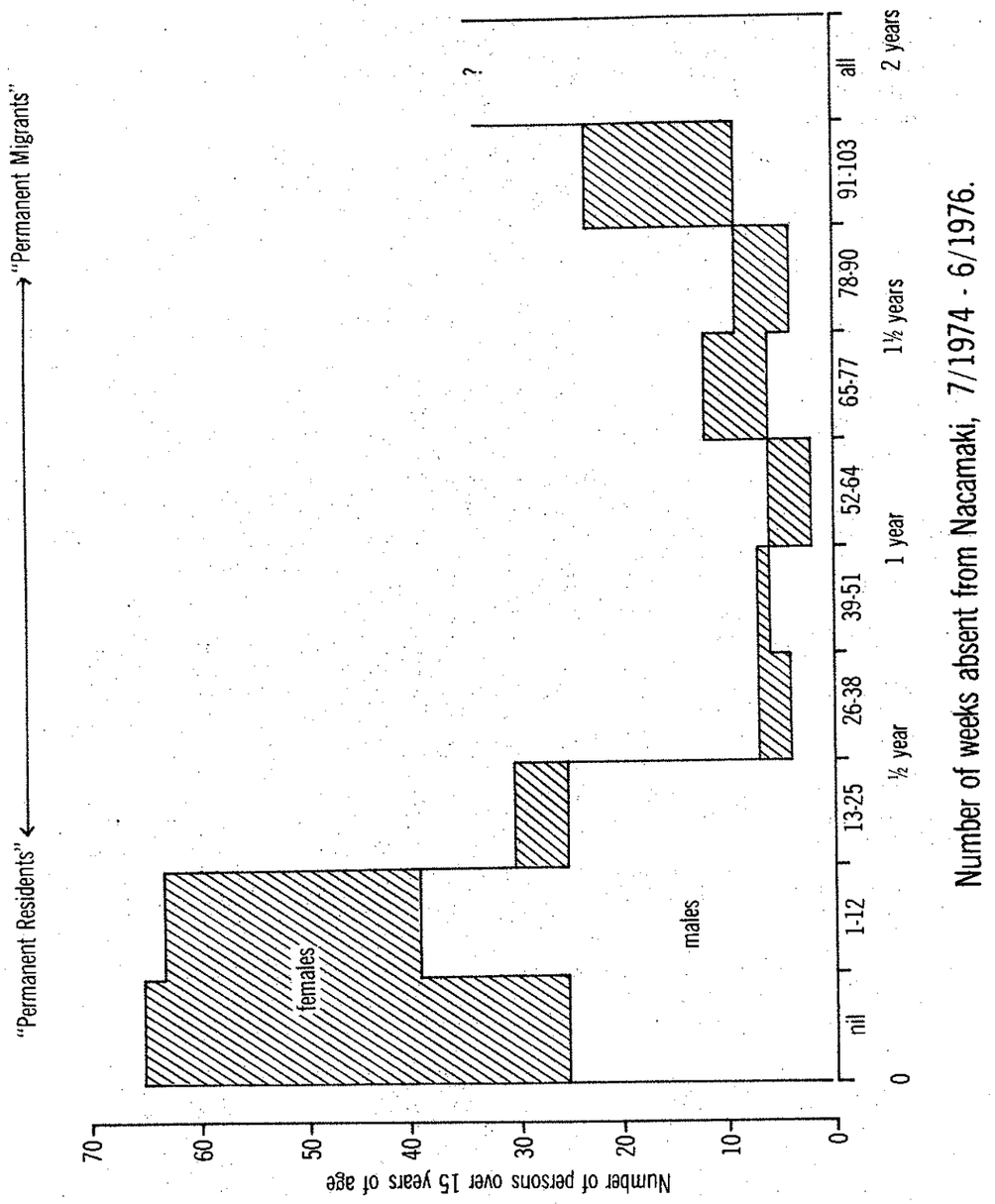


FIGURE 5: Amount of time spent away from Nacamaki by members of the adult population, 1974-76.

These figures imply an average number of trips per adult per year of 0.50 for men and 0.33 for women. Middle-aged men (aged 45-59 years) are the most mobile group with an average of 0.75 outward trips per year, which probably reflects their privileged financial position as heads of households. The old women (aged over 60) are the least mobile adult group, averaging 0.22 trips per year.

The reasons stated for making outward trips are varied, and in some cases away visits are no doubt multi-purpose, but most can be classified into seven groups (Table 6). Out of a total of 121 outward trips by men in 1974-76, 39 (32 percent) resulted in paid employment, mainly in Taveuni (plantation work), Levuka (carpenters and ships' crew), and of course Suva (various jobs); eleven trips were for the purpose of selling yaqona or taro in Suva, or for buying particular items of equipment. Seventeen percent of all adult trips were to go to school, or to accompany children to school, or for hospital treatment. About half of the trips (men 46 percent, women 54 percent) had no explicit purpose other than social visiting or holidays. The comments made by young men in particular show that travelling away from home is a popular way of spending spare cash, and this is one reason why there were fewer absentees in 1976 than there had been two years previously: 1974 was a time of very high copra prices and relative affluence.

Paradoxically, therefore, both increased and decreased income levels can stimulate migration from Koro. The travelling that stems from a cash surplus is, however, merely an acceleration of the normal circular mobility already described, whereas dissatisfaction with economic life on Koro encourages migration for the purpose of finding employment elsewhere. This in turn is likely to lead to a prolonged or even permanent absence from Koro which, if it were to happen on a large scale, could only be detrimental to the economic and social life of the home community.

4.5 THE FIJIAN HOUSEHOLD AS A SOCIO-ECONOMIC UNIT

Control is exerted over aspects of Fijian economic life at each level in the hierarchy that extends from individual through family, clan (mataqali) and village, and up to higher levels at island and larger scales. The most important scale, however, especially in man-environment relations is the family, or household unit, which is predominant in the organisation of production and consumption on Koro.

Undoubtedly this unit has changed very much in character in recent decades. Accounts of 'traditional' (i.e. colonial) Fijian society stress the importance of the extended family in economic relations, with authority exerted by the senior male. For example, on the island of Moala (midway between the Lomaiviti and Lau groups)

> The advantage of the extended family lay not merely in its ability to deploy manpower widely, but also to apply

TABLE 6. The reasons for travelling away from Nacamaki, 1974-76

Reasons stated for outward trips.

1. Social visit or holiday
2. Employment (N.B. often a Type 1 trip that results in employment)
3. To buy or sell specific items
4. School
5. Accompany school children
6. Hospital or maternity hospital
7. As a result of becoming married, widowed or divorced

Reason	Number of Outward trips of each type, 7/1974-6/1976									
	Males over 15 years					Females over 15 years				
	15-29	30-44	45-49	60+	Total	15-29	30-44	45-49	60+	Total
1	26	5	13	12	56	12	12	9	4	37
2	27	6	3	3	39	2	-	-	-	2
3	2	6	3	-	11	-	-	-	-	-
4	8	-	-	-	8	14	-	-	-	14
5	-	-	1	2	3	-	7	-	-	7
6	1	1	1	-	3	3	1	-	-	4
7	-	1	-	-	1	1	2	1	-	4
All	64	19	21	17	121	32	22	10	4	68

Source: field notes.

> it collectivly in certain subsistence activities. The extended family has given a margin of economic security beyond that which a nuclear family could provide and has operated to mitigate the economic inequalities likely to develop among conjugal units. (Sahlins 1962:88).

Sahlins also stresses the importance of the extended family in transition ceremonies, in regulating property rights, and in political activities.

In the 1940's and 1950's there was a tendency on Moala for the traditional family to break up, giving way to the development of independent nuclear families. This change Sahlins (1962) attributed to changes in the population structure and in the domestic economy. Firstly, the enclaving market economy disrupted patterns of marriage and family composition by encouraging the flow of young men away to the towns. Secondly, the introduction of new crops and the coming of the copra trade altered the pattern of land use and work. In the purely subsistence economy, cultivation and collection occurred over a wide area and often involved periods of absence from the village. Such scattered land use was best served by the extended family, with its comparatively large size, its co-ordinated labour pool, and the common meals at which the returns of diversified production were equitably distributed.

The penetration of the market involved for Moala a concentration on a few crops, and often a spatial concentration of activities. It also involved the adoption of the new attitudes and objectives that develop when production is geared to the market, and more individualistic notions of consumption begin to prevail. On Moala, only where the land suitable for copra was dispersed or was located at some distance from the village did the extended family retain its advantages as a productive organisation. Elsewhere it yielded increasingly to independent nuclear families (Sahlins 1957, 1962).

Very much the same changes seem to have occurred on Koro, although emigration cannot have been as important a factor until very recently. On Koro, however, the cash economy began to influence social organisation at an earlier date than on Moala, which is more isolated and less suitable for copra production. Changes in housing exemplify this trend. Moalan houses in the late 1950's were still almost entirely built of local materials, whereas on Koro 68 percent of all houses had iron roofs as early as 1936 (Burrow 1936). By 1958 almost half of the houses in Nacamaki were entirely constructed of imported materials (Appendix 7), and by 1974 there were only six houses remaining out of 75 that incorporated any local materials (mainly reeds (gasau) for walling and thatch). House-building and maintenance was one of the most labour intensive tasks in the Fijian village, and one that required the mobilisation of many workers. Contrary to Watters' (1969:137) claim that at Nacamaki in the 1950's there was "little or no (money) investment for productive purposes",

the transformation of village housing during this and the more recent period represents a massive saving in recurrent labour inputs. It also eliminates another raison d'etre for the continuation of the extended family as the primary economic unit.

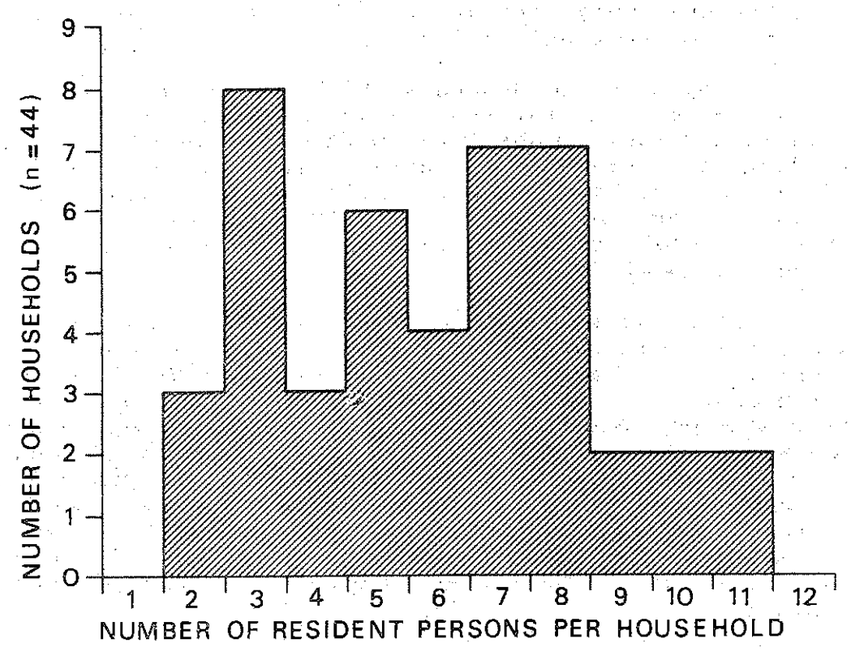
In 1974 there were 44 households at Nacamaki, resident in 69 dwellings, an average of 3.75 persons per house. This density is substantially lower than that recorded in three previous surveys: in 1921 there were on average 5.6 persons per house, in 1936 6.8, and 1958 5.1 (Appendix 7). This change results from the recent decrease in the resident population of the village following emigration, and secondly from the increasing number of independent nuclear families setting up their own households. In 1974 there were 25 households consisting of one nuclear family, 15 with two (most often parents living with a married son), and only 4 with three nuclear families (Figure 6). Several families had a spouse (usually male) absent at the time of the census, and the modal number of resident members per household was only three (mean 5.9, range 2-11 persons).

4.6 THE DOMESTIC MODE OF PRODUCTION IN THEORY

In order to investigate to what extent each family is operating in order to maximise its household income, the household's labour resources can be compared with its actual work input over a given period. If each household was operating as an independent economic unit, with individualistic corporate aims and unlimited production (i.e. wealth) objectives, then the labour-rich households would have similar work inputs per producer as the households poorly endowed with labour resources, and as a result would be richer. The method of analysis suggested by Sahlins (1972), following Chayanov (translation, 1966), is to calculate the ratio of consumers per producer for each household. This ratio cannot be less than 1.00, since all producers also consume. This statistic is then compared with the work input per producer for the same household. Where the 'domestic mode of production' (DMP) prevails, then for a sample of households productivity intensity (labour input) will be inversely related to productive capacity (consumer/producer ratio) - in other words, in a community of domestic producing groups, the greater the working capacity of the household the less its members work. This relationship was first demonstrated quantitatively by Chayanov for Russian peasant farms ('Chayanov's Rule').

Sahlins identifies three elements in society which he sees as being necessary for the Domestic Mode of Production to be maintained. All three apply to rural Fiji to a large, though decreasing, extent. They are: a small labour force differentiated essentially by sex, simple technology, and finite production objectives. One of these three elements cannot change substantially without becoming incompatible with the other two, so that the DMP can be highly stable.

> The standard of livelihood does not substantially increase without putting into question the existing family organisation...So long, therefore, as the domestic mode prevails,



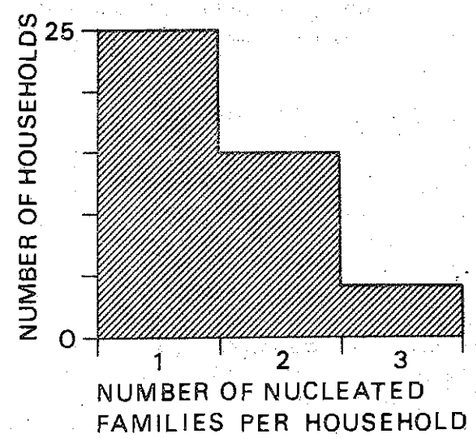


FIGURE 6: Number of persons and families per household at Nacamaki, 1974.

> the customary idea of livelihood will be suitably restrained (Sahlins 1972:87).

An important consequence of this inherent resistance to change is that the internal contradictions set off by rising standards define an absolute limit, which must be a level of welfare (i.e. production) which is attainable by the majority of households, leaving under-exploited the productive capacity of the better endowed minority. The DMP therefore involves a level of total production that is low relative to the society's economic capacities.

Sahlins presents a wealth of evidence showing that tribal societies organised according to the DMP subsist at population densities well below the carrying capacity of the areas they are occupying. His evidence for variations in productive intensity between households indicates, however, that in such societies the slope of intensity that Chayanov's Rule would predict exists only as a tendency. The perfect inverse relation between labour intensity and relative working capacity of the producing unit is, perhaps, one that is most nearly approached among independent peasant farmers (as in Czarist Russia), whereas less developed societies tend to be better integrated socially. In such societies

> Kin and political relations between households, and the interest in others' welfare that these entail, must impel production above the norm in certain households in a position to do so. That is to say, a social system has a specific structure and inflection of household labour intensity, deviating in a characteristic way and extent from the Chayanov line of normal intensity (Sahlins 1972: 103).

4.7 DOMESTIC PRODUCTION INTENSITY AT NACAMAKI

Can any "characteristic deviation" from Chayanov's Rule be discerned for Nacamaki households in 1974? In order to discover what variations exist between households in labour resources, the composition of the family unit must be defined, and any changes that occurred in the twelve months preceding the census (i.e. arrivals and departures) must also be considered. Decisions must then be made concerning what persons consitute 'producers' as opposed to mere consumers. Since both adult males and females do productive work, the only categories that it seemed reasonable to exclude were non-adults (those below 15 years) and non-productive adults (those at school, those incapacitated by old age, and those women with children below three years old, and hence almost fully occupied in the domestic sphere). By excluding such categories, the manmonths of residence in Nacamaki of consumers, (i.e. all persons) can be related to manmonths of residence by producers, for each household. In this way Consumer/Producer ratios are obtained (Figure 7; see also Appendix 3). The frequency distribution of the sample of households (39 out of 44 total) shows that the majority have 1.0 - 2.0 consumers per producer, but that some are much less well endowed with workers,

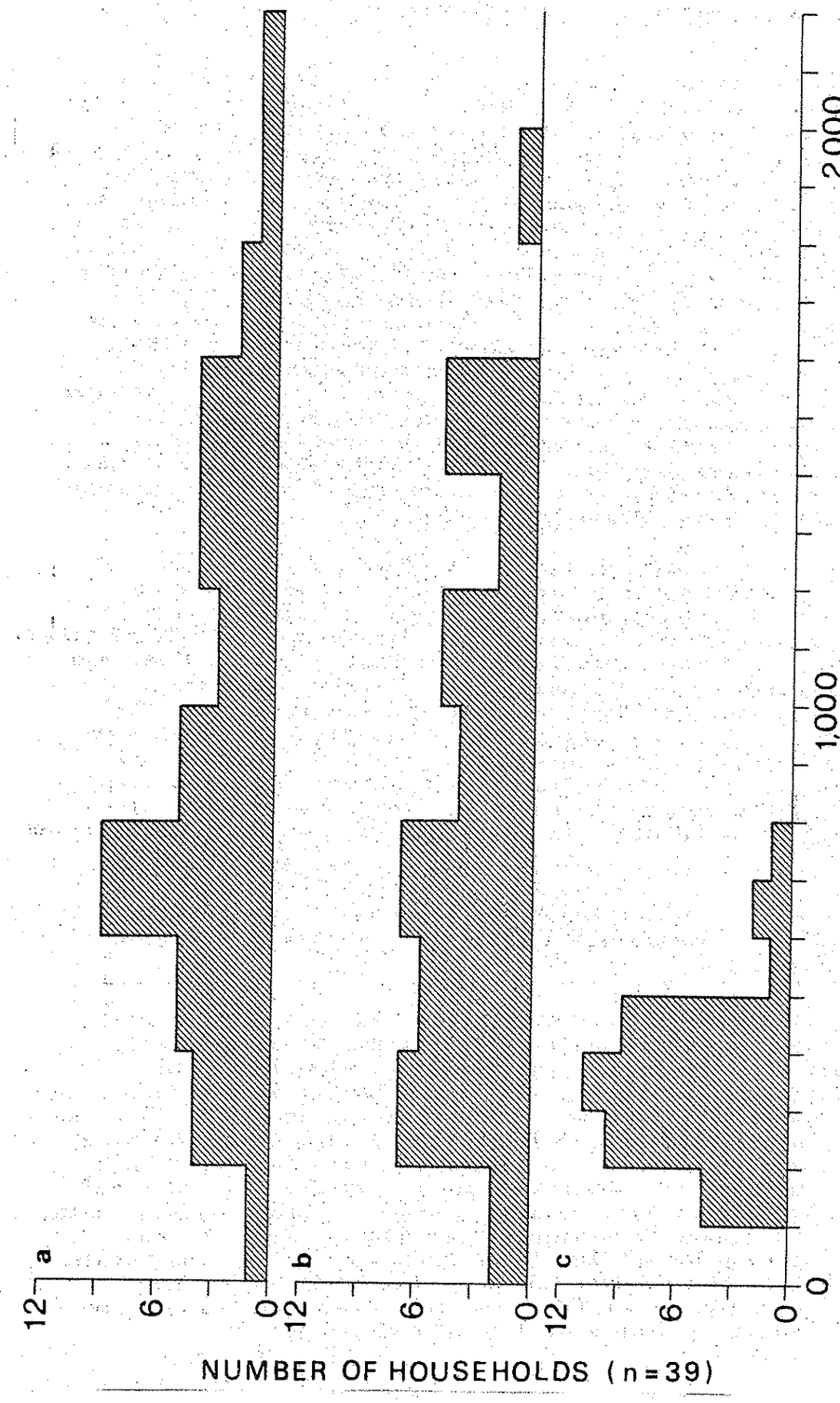


FIGURE 7: Income of a sample of Nacamaki households, 8/1973 - 9/1974.

a. Total Annual Income per Household, 1973-74.
b. Total Annual Environmental Income per Household, 1973-74.
c. Environmental Income per Producer, Nacamaki Households, 1973-74.

with ratios averaging up to 3.5 consumers per producer for the year.

The assessment of labour inputs for the same households over the same period is much more difficult.* For Nacamaki the only surrogate measure capable of assessment in the time available for fieldwork was cash income per household, for 9/1973 to 8/1974. Two sources were used: first, the daily records of copra and yaqona purchases by the Nacamaki Cooperative Society during the twelve months, supplemented, secondly, by interviews with each family to determine other sources of income, such as taro shipments, remittances,and Cooperative Society wages. The aggregate results of this survey are discussed below (Chapters 5.1-5.3), and are shown in Appendix 3. The variation between households is shown in Figure 8. Total household incomes averaged $940, but ranged between $170 and $2160, with $600-800 as the modal class. To some extent these differences merely reflect differences in size of family, but when environmental incomes (i.e. excluding wages, remittances and pensions) are expressed as dollars per producer per year (figure 8c) the variations between households still extend over a fourfold range. Most households, however, fall between F$200-500 per producer.

In many societies such income differentials would merely reflect a variable level of participation in the cash sector or the unequal operation of constraints such as land shortages or role specialisation, which limited the incomes of certain families. At Nacamaki role differentiation is certainly very limited, and a flexible system of land tenure allows fairly free access to land for all residents, despite apparent inequalities in the division of land between mataqali (see Chapter 4.2). Young men can still find empty areas in which to plant coconuts, albeit at some distance from the village, and persons without coconut palms can usually obtain access to mataqali common land (areas of mixed coconut land close to the village), or to the plantations of persons who have migrated away from the island. Individual variations in activity and aspiration certainly exist, but they are reduced by emigration which tends to remove the better educated and more dissatisfied people who cannot fit in with community norms.

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* Very few fieldworkers have ever collected such data, and if they have their surveys usually refer either to an extremely small number of households, e.g. Rappaport (1967) for the Tsembaga Maring of the New Guinea Highlands, or else refer to an aggregate sample of adults not differentiated according to household, e.g. Bayliss-Smith (1977) for Ontong Java atoll, Solomon Islands. Chayanov (1966) uses the annual cash income of each farm as his measure of labour intensity, expressed as roubles/producer. Sahlins (1972), reworking other anthropologists' data, also has to use indirect measures. Either the area of land cultivated by each household, in acres/producer (for the Mazulu of Rhodesia), or the production of the staple food by each household, in kg/producer (for the Kapauku of New Guinea), must stand as surrogate measures of labour intensity.

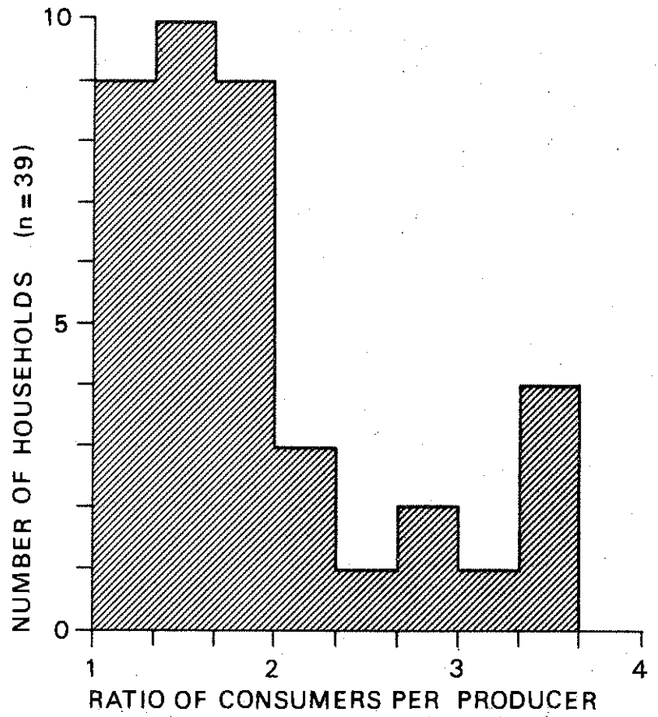

FIGURE 8: Consumers/Producer ratios for 39 Nacamaki households, (9/1973 - 8/1974).

$$\text{CONSUMERS} = \frac{M_c}{12}$$ where M_c is manmonths of residence of all household members, 9/1973 - 8/1974.

$$\text{PRODUCERS} = \frac{M_m + M_f}{12}$$ where M_m is manmonths of residence of productive males in the household, 9/1973 - 8/1974, and M_f is manmonths of residence by productive females in the household, 9/1973 - 8/1974.

"Productive persons" are all persons over 15 years except:

(a) persons at school
(b) females with children under 3 years old
(c) aged persons not able to work.

In the particular year 1973-74, however, the abnormally high copra price (see Chapter 5.3) meant that the area of bearing coconuts in the de facto ownership of particular households strongly affected cash income levels. Variations in income per producer could therefore be random with respect to the extent to which the consumer/producer ratio was or was not favourable. It is therefore perhaps surprising that there does exist some correlation for the 39 sample households, though the relationship is far from clearcut (r = 0.412). The households weak in manpower (i.e. large C/P ratio) do, on the whole, achieve higher incomes per producer than those with more favourable consumer/producer ratios, indicating some tendency towards the more intensive use of labour that the Chayanov Rule would predict (Figure 9).

Unfortunately, the data available for Nacamaki do not permit precise estimates to be made of what would constitute a 'slope of normal intensity' supposing that the perfect DMP was prevailing. Such a slope would describe the variation in income that would be required to supply each household with the customary livelihood, assuming each was a self-sufficient entity (Sahlins 1972: 109). This "true Chayanov slope" can only be drawn if a per capita annual income level can be defined which would supply each individual with what was socially regarded as being an adequate income. At 1974 price levels the annual incomes being received were, in most households, almost certainly in excess of previous perceptions of adequacy. On the other hand the cash incomes attainable during the slump in copra prices in 1972 were clearly inadequate. This earlier period is recalled as being one of unpleasant austerity, and one that acted as a spur to emigration. An 'adequate income' is probably a concept that will always defy precise definition, but at Nacamaki it almost certainly lies somewhere between these two extremes.

An examination of the relationships between cash and subsistence sectors and of production and expenditure patterns in the period 1971-74 (see below, chapter 5.1-5.3), suggest that for Nacamaki at this time $100 was the approximate 'adequate' personal income. In 1973-74 the boom in copra prices meant that practically all households exceeded this target (Figure 10). With a slope of labour intensity at $50 per person, which was about the mean income level from 1970-72, the huge improvement in 1973-74 becomes even more apparent. But if the actual mean income of 1973-74 is taken as the yardstick against which each household's performance is gauged, then it can be seen that there exists a tendency towards greater equality of work input by producers in different households than Chayanov's Rule would predict. In other words, the labour-poor families are working slightly less hard than expectation, while the work inputs of labour-rich households are somewhat bigger than expectation.

The interpretation of this divergence is not easy. The possibility of data inaccuracy cannot be disregarded, although the basis for the bulk of the household income data is the carefully documented daily purchase records of the Nacamaki

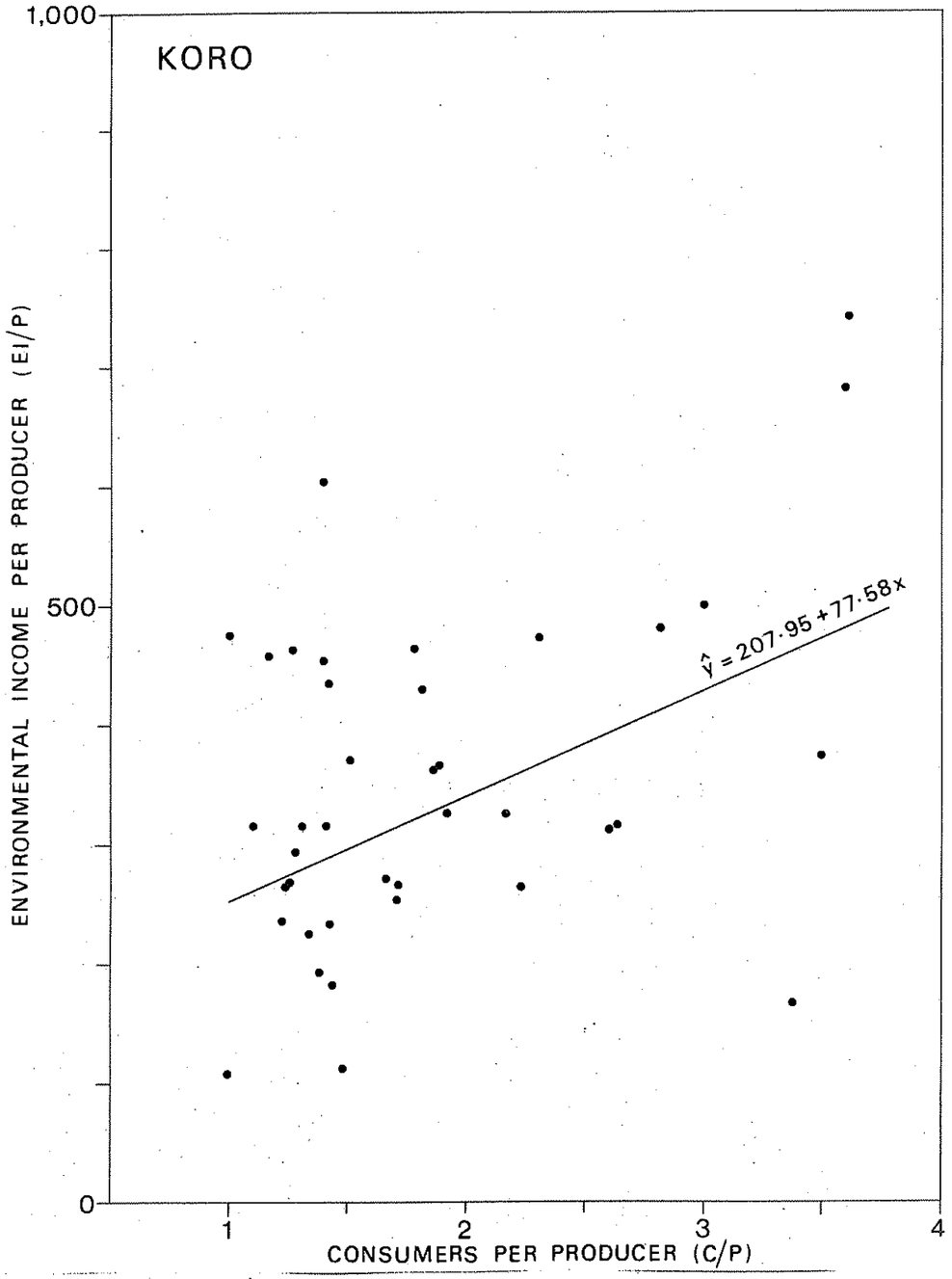

FIGURE 9: Intensity of labour use in a sample of 39 households at Nacamaki, 9/1973 to 8/1974.

Cooperative Society. One likely explanation for the deviation is that transfers of cash are occurring from well-endowed household units to related persons belonging to less well-off families. Such transactions undoubtedly take place, and are generally reciprocated with gifts of yams, taro, fish or handicrafts such as mats. At the same time, there are undoubtedly 'entrepreneurial' tendencies among certain heads of household who are attempting to improve their household incomes by making the fullest use of their family's labour resources. Without further work on inter-household exchanges it is not possible to decide which of the two processes explains more of the deviation from the regression, and more of the difference between the actual and the theoretical slopes of labour intensity.

4.8 INDIVIDUALISM VERSUS COMMUNALISM

An examination of expenditure patterns (Appendix 4) shows that in 1973-74 about four-tenths of the total income of the village was not accounted for either by consumer spending in the local store or by savings. Much of this residue went on 'social expenditure' such as education, the Church, weddings and funerals, and travel. There is also communal fund-raising, both for short-term projects like feasts (described in Appendix 4) and for larger-scale enterprises. These latter are administered by the chief rather than the elected turaga-ni-koro (headman), who is responsible for the feast collections. The idea for these funds came from the Copra Cess and other deductions that are made from copra earnings by the central government. It was money from the Copra Cess that financed the building of most of the concrete and iron buildings in the village in the 1950's. When these deduction were reduced in 1973 the Nacamaki people decided to continue a similar scheme within the village. Two recent projects were the purchase of a landrover in 1975, and the provision of domestic electric lighting which also went into operation (with government help) in 1975. These projects, which are specific to Nacamaki, represent the community's "productive investment" which Watters (1969) found to be so lacking in 1958. The other villages of Koro, lacking such positive leadership and organisation, are not yet involved in communal innovation of this kind.

On the other hand, the demands placed on the individual by these communal obligations seem to be at least as onerous as the village labour obligations of colonial times. There are many men who feel that in real terms they are not much better off than previously. In response to a question in the Resource Base Survey of the Divisional Administration in 1974, asking "what are the problems that hold you back from raising your income?", the following replies were received in Nacamaki:

Too much communal obligation (work and/or money)	12
Transport difficulties, especially farm to village	11
Poor marketing arrangements discouraging planting	3
Unstable prices for selling produce	1
Insufficient labour available for hire	1
Total replies	28

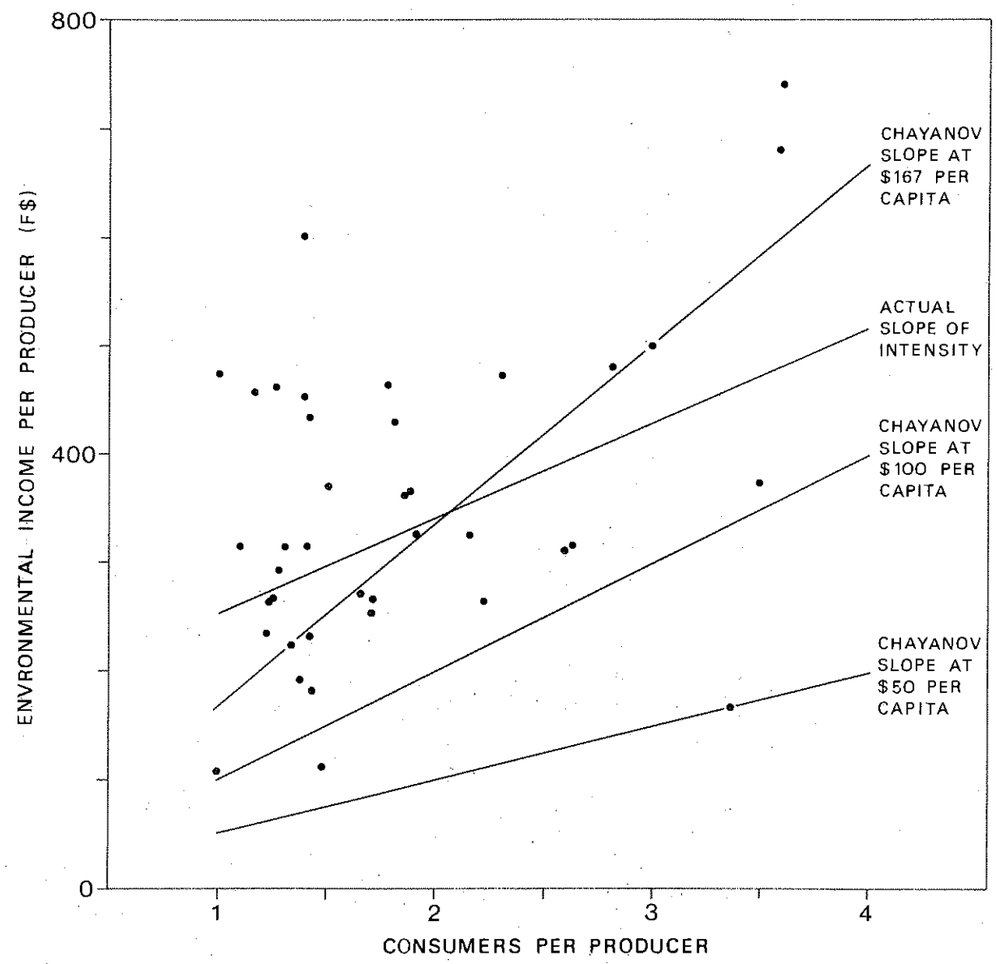

FIGURE 10: Actual compared to different theoretical slopes of household labour intensity.

The real reason for the lack of significant material improvement at Nacamaki is a long-term deterioration in the terms of trade (see chapters 5.3-5.4). It is also true, however that the whole ethos of Fijian culture still tends to discourage material accumulation or even conspicuous consumption by the individual, which is one reason for the existence of a large number of categories of social and communal expenditure. In the subsistence sector this situation has always prevailed (food exchanges, reciprocal labour exchange, etc.). In the cash sector, there is increasing dissatisfaction with the difficulty that people experience in retaining and using the money that they have earned through their personal efforts. As well as being difficult to retain, however, significant accumulations of wealth (sufficient for capital goods rather than everyday store purchase) also seem harder to attain than before. The reasons for this are structural rather than social, as the changing patterns of production in the last twenty years clearly show.

V - THE INTERACTION OF CASH AND SUBSISTENCE SECTORS

5.1 THE SUBSISTENCE ECONOMY IN THE 1970s

Despite over half a century of increasingly intense involvement in the external market economy, Koro still retains a very substantial substantial subsistence sector. The category 'subsistence' is perhaps a misleading one, since as already described (Chapter 3.4) the planting of new coconuts for copra and the production of yaqona and taro for sale are closely integrated with the production of food crops for home consumption in both land use and work organisation. In this section the quantitative importance of the subsistence sector at Nacamaki is described in terms of the labour that is devoted to it and the proportion of the population's food energy that it supplies. The rationale for the continued importance of this sector, as against the cash sector that government policy has favoured and encouraged, is discussed in later sections of the report.

The importance of subsistence activities within the total time allocation of adults was investigated by means of a survey conducted at Nacamaki in July and August 1974. The daily activities of 126 adults, representing all but 21 of the resident population over 15 years old, were recorded for one week each during a four-week period (Appendix 5). The problem with such a survey is that it may cover a period of the year unrepresentative of the whole. Informants commented that in August the men were putting considerable efforts into clearing and planting new yam gardens, and that a survey conducted in, say, January would record less agricultural work, more fishing, and probably smaller overall work inputs especially if the weather was bad.

The 835 mandays covered by the survey must therefore be taken as only an approximation of the overall picture. Only 564 mandays out of the total covered were available as 'work days', the remainder being occupied by holidays, days of illness, or days of absence from the village, visiting other villages or attending school. As a proportion of the potential work days, the men used many more for 'productive work' (197 out of 269) than the women (96 out of 295), a reflection of the extent to which most women are usually fully occupied with domestic tasks. Considering the total adult population, productive work days (assuming 8 hour working days) accounted for half of the time available to men and one quarter of the time available to women. Extrapolating, these figures imply that on average men do productive work for 1435 hours (179 days) per year, or 28 hours per week, whereas women do the same for 646 hours (81 days) per year or 12 hours per week. Since the survey was conducted in the dry season, a busy time of the year, these data are more likely to be over- than under-estimates. It should be stressed, however, that these figures are averaged out over all persons at Nacamaki over 15 years, and therefore include data for some of the very old and the very young who are much less active than average.

The definition of productive work is, of course, essentially arbitrary, especially for women. Village life could not function properly without the domestic work that the above calculations ignore: washing, childcare, and cooking. Similarly, social visits to other villages and meetings also play a part in maintaining village cohesion. Nevertheless, the activity data suggest that at Nacamaki the people are moderately busy rather than overworked, especially the men. 'Productive work' was measured in the survey as hours of work within the village, or hours spent at work away from the village, so that the 28 hours per man that is estimated includes periods of rest during the day.

Activities were divided into Productive, Unproductive (mainly communal and social) and Unrecorded (mainly domestic and leisure). Productive activities were further subdivided into those directly concerned with food-gaining, those involving crafts and construction, and those concerned with gaining money (i.e. copra work). The mean allocation of time between these various categories is shown in Table 7 (see also Appendix 5). The data suggest that for men subsistence activities occupy some 3.3 hours per working day, or a total of 105 eight hour working days per year. This represents 42 percent of all working time that is available (after Sundays, other holidays, and days lost through illness have been subtracted from the total), and 58 percent of the productive work effort. Women are active in the subsistence sector for 2.0 hours a day or 80 days a year, which is 53 percent of their productive work effort. The male activities within the subsistence sector are almost all food gaining (mainly teitei cultivation, 97 days per year); the female activities are mainly fishing (38 days a year) and making mats (21 days).

A majority of the productive work that is carried out at Nacamaki is therefore devoted to the subsistence sector. The

TABLE 7. Summary of average adult work inputs at Nacamaki.

Activity	Work Input per Person			
	Hours per Working Day*		Eight-hour Days per Year	
	men	women	men	women
I Productive				
(a) Food-gaining	3.3	1.6	103	48
(b) Crafts	0.1	0.7	2	32
(c) Money-gaining	2.5	0.4	76	11
II Unproductive				
(communal and social)	0.8	0.5	25	14
III Unrecorded (domestic work and leisure)	1.3	4.9	40	152
Total Subsistence Work Input (=Ia + Ib)	3.4	2.2	105	80
Subsistence Work as a Proportion of total time available[x]	42%	33%	42%	33%

Notes. * 'Working days' do not include Sundays, public holidays, and days of enforced idleness through illness. (See Appendix 2).

[x] Assuming an 8-hour working days and a 246 day working year.

Source: Appendix 6.

return from this effort is equally impressive, but can only be estimated by indirect methods since no direct surveys were made of subsistence production or consumption. The approach adopted is to calculate the food requirement of the Nacamaki population in energy terms, and then to estimate the three main categories of food supply: imports, subsistence crops, and marine sources.

This procedure has been carried out for three twelve-month periods, as follows:

1. January to December 1966
2. September 1973 to August 1974
3. July 1975 to June 1976

The first period was one of moderate copra prices and low import prices; the second was one of very high copra prices and relative prosperity; while the third and most recent period saw a fall in real incomes with severe inflation in import prices.

The procedure for calculating the subsistence consumption of Nacamaki will be discussed in detail for the 1973-74 period, for which the most detailed data are available. To calculate the total food demand, information is needed on the average size and structure of the population throughout the twelve months. The census of August 1974 (Appendix 1) and interviews with each household provide an estimate of the total 'residential input' of different age groups for the 12 months that preceded the field-work period. Appendix 7 shows these data, together with the estimated per capita calorie needs of the various age groups, calculated using FAO (1957) procedures. Thus one can estimate a total energy requirement of about 236 million kilocalories for the Nacamaki population as a whole for the year in question.

The accounts kept by the Nacamaki Co-operative Society store, which is the sole source of imported foodstuffs, show that in the year 1973-74 about 80.4 million kilocalories of the total energy needs of Nacamaki were supplied by purchased foodstuffs (Appendix 4). This figure represents 34 percent of the total diet, the remainder of which must therefore have been derived from direct exploitation of the island environment.

The island's resources consist of both terrestial and marine ecosystems. The marine ecosystems of fringing reef, barrier reef, lagoon and reef flat are much less important in quantitative terms. A survey was made of all marine foods that came into Nacamaki village during one week of August 1974 (Appendix 7). The survey period was chosen so as to correspond neither with the unfavourable monthly periods of moderate tidal range, nor with the extreme high and low tides that occur at the new moon, and which tend to be very favourable for fishing. It is thus hoped that the survey represents a period of intermediate productivity and activity, and that it will therefore be reasonably representative of the year as a whole. The annual figures that can thus be calculated for the total catch and its energy and protein value are shown in Table 8. Fish itself contributes

TABLE 8. Estimate of annual fish production at Nacamaki, with calculated energy and protein yield.

Marine product	Production (net portion)			Calorific Yield		Protein Yield	
	Per week		Per year	kcal/kg	Total	g/kg	Total
	lbs	kg	kg		kcal/year		kg/year
Fish	405.2	183.8	9558	1320	13,144,560	188	1,797
Octopus	38.6	17.5	910	1044	950,040	231	210
Holothurians	33.9	15.4	801	934	748,130	120	96
Gastropods	46.6	21.2	1102	710	782,420	147	162
Clams	2.3	1.0	52	1264	65,730	227	12
Other molluscs	2.7	1.2	62	723	44,830	105	7
Turtles	*		504	790	398,160	160	81
All marine foods					16,133,870		2,365

Sources: All production estimates (except turtle) based on one week's survey of total production at Nacamaki (See Appendix 7).

* Turtle figures are based on estimates supplied by informants, with an assumed annual catch of eighteen turtles, half large (mean 36 kg) and half small (mean 20 kg) in size.

Calorific and Protein values:

Fish: FAO (1949), average figure for mixed species, based on whole weight.

Gastropods: McCance and Widdowson (1960), mean of values cited for cockles, whelks and winkles.

Turtles: Platt (1962).

Others: Murai, Pen and Miller (1958). Values for 'Other molluscs' are those given for bivalves.

some 13 million kilocalories of the 16 million total, and a similar proportion of the protein. As a proportion of the total diet, the marine ecosystems thus contribute about 8 percent of the energy, but a much larger proportion of the protein.

By substraction, it can therefore be calculated that about 59 percent of the Nacamaki diet was derived from subsistence agriculture in 1973-74 (Table 9). Observation suggests that the starchy root crops (taro, yams and cassava) provided the bulk of this energy, with coconut, leafy vegetables, and animal foods (pigs, fowls) as supplements. The land use of four sample households whose gardens were mapped confirm this impression (see Figure 2). The foods supplied by the subsistence sector, and especially those derived from the land, are therefore of equal or greater importance in the Nacamaki diet to those obtained via the cash sector.

The estimates for the other two years (Table 9) show that the importance of home-produced foods was similar in 1975-76 (60 percent of the diet) and significantly greater in 1966 (67 percent of the diet). In 1958 Watters (1969:131) suggested that about 80 percent of the food supply of Nacamaki came from the subsistence sector, so that the data would appear to suggest a steadily increasing reliance on external trading, which is a general trend within the Pacific (McGee 1975).

Unless the terms of trade improve, however, it seems unlikely that the dietary dependence of Nacamaki upon imports will increase any further. Consumption of imported foods other than the four basic staples of sugar, flour, rice and biscuit represented 20 percent of the dietary calories in 1966, 23 percent in the prosperous year of 1973-74, but only 11 percent in 1975-76. This represents a marked decline not only in the consumption of 'luxury' imports, but also of popular items like tinned meat and tinned fish which contributed 6 million kcal to the diet in 1966 (9.7 percent of the total imports) but only 5.2 million in 1976 (7.7 percent). Even on a per capita basis this constitutes a slight decline in the population's dependency on imported protein over the last ten years.

The reasons why subsistence activities still occupy some 55 percent of productive working time at Nacamaki, and why subsistence foods still provide 60 percent of the diet, are clearly related to the limited appeal of the commercial sector. It appears that the former trend towards increased involvement in external trading has been arrested in the mid-1970's. In order to explain this apparent conservatism the characteristics of the cash economy must therefore be examined.

5.2 THE CASH ECONOMY IN THE 1970's

Since the second decade of this century the main source of Koro's monetary income has been copra. Despite the island's potential to produce a wide range of tropical products (Chapter 1.3), the coconut became the first significant cash crop of the

TABLE 9. Estimates of the importance of subsistence and cash sectors in the Nacamaki diet, 1958-76.

Year	Population's Total Energy Requirement 10^6 kcal	Energy supplied (10^6 kcal)			Percentage supplied by subce. agriculture
		Purchased Imports	Marine Sources	Agricultural Sources	
1958	255	51	18	186	73
1966	232	61	16	155	67
1973-74	236	80	16	140	59
1975-76	209	68	16	125	60

Notes and sources:

1958: All figures on energy supply are approximate, and are based on Watters' (1969) surveys.

1966-76 Requirement: 1966 de facto population of 302 is from Zwart (1968). 1973-74 and 1975-76 residential input is derived from field surveys (Figure 5 and Appendix 6).

Imports: Appendix 4
Marine: Estimate based on 1974 survey (Table 8)
Agriculture: Figures obtained by subtraction.

Fijian population. Coconut plantations are the dominant land use of the coastal lowlands (see Figure 1), and since 1910 coconuts have increasingly been planted inland wherever access and topography permitted shifting cultivation to be practiced (see Chapter 3.5). At Nacamaki in the late 1950's there were on average one hundred new coconuts a year being planted by each farmer (Watters 1969).

Copra's dominant position has been challenged by two other crops, bananas and yaqona. Bananas were exported from about 1930 until the mid-1960's, when problems of shipping and quality control finally caused the government to withdraw its support from areas further than 35 miles from Suva (Fiji 1966). Output fluctuated considerably as a result mainly of the shipping problems: At Nacamaki, for example, 1960 and 1961 were the peak years in the postwar period with annual outputs of over 1,000 cases, whereas in 1958 only 59 cases were shipped from the village (Watters 1969).

The production of bananas on Koro for export seems to have started only when copra prices fell so drastically about 1930 that an alternative source of income was urgently needed. Yaqona (kava) also emerged as a new cash crop at this time. Informants state that it was first planted as a cash crop in 1932, when the price in the Levuka market was 3d per lb. Five years later the price was still only 6d (5 cents). Not until the 1950's did yaqona challenge copra as the primary cash crop of the island. In 1958 the Suva price for yaqona rose above 5 shillings (50 cents) for the first time, and Nacamaki producers were able to respond by increasing their output considerably. In that year yaqona provided an estimated 51 percent of the total cash income of Nacamaki, compared to copra's 31 percent (Table 10). In the early 1970's its contribution to the cash economy was well below that of copra, but the slump in copra prices after 1975 led to such a revival in yaqona selling that by 1976 it had recovered first position.

The sale of root crops to the urban market in Suva emerged in 1971 as a possible replacement for export bananas. Organised by the National Marketing Authority, the scheme faltered initially due to shipping problems. In 1976, however, a Koro Farmers Association was formed, based in Nasau and organised by Tui Koro, which agreed to supply the N.M.A. with one ton of taro each month on a regular basis. At Nacamaki only three individuals were involved in growing root crops for sale in 1975-76, but if the copra price remains unfavourable there is no doubt that others will become interested despite the rather poor price that the N.M.A. offers (see Chapter 5.7).

Quantitative estimates of the importance of the various crops and other income sources are shown in Table 10 for three twelve-month periods. The environmental sources of income are ranked in terms of their contributions to the total as follows:

Rank	1958	1973-74	1975-76
1.	Yaqona (51%)	Copra (75%)	Yaqona (50%)
2.	Copra (31%)	Yaqona (5%)	Copra (27%)
3.	Bananas (4%)	Root Crops (4%)	Root Crops (2%)

TABLE 10. The aggregate cash economy of Nacamaki, 1958, 1973-74 and 1975-76.

Source	Total Income (F$)			Mean Income per capita (F$)		
	1958	1973-74	1975-76	1958	1973-74	1975-76
ENVIRONMENTAL						
Copra	3770	31040	10440	11.0	100.5	38.2
Yaqona	6220	2090	19070	18.1	6.8	69.9
Bananas	550	-	-	10.5	-	-
Taro	350	1460	700	1.00	4.7	2.6
Shell		140	80		0.5	0.3
Livestock		340	250		1.1	0.9
TOTAL	10340	35070	30540	33.5	113.5	111.9
NON-ENVIRONMENTAL						
Coop.Soc.Wages and salaries	u	3300	5120	u	10.7	18.8
Pensions and govt.grants	u	380	700	u	1.2	2.6
Returned migrants' money	u	1070	1000	u	3.5	3.7
Remittances sent by relations	u	820	900	u	2.7	3.3
Miscellaneous sales	u	570	250	u	1.8	0.9
TOTAL	1380*	6170	7970	4.0	20.0	29.2
TOTAL CASH INCOME	12270	41240	38510	35.7	133.5	141.2

Notes: u - no data available
* - estimate based on Watters (1969)

Sources: 1958: mean household income data of Watters (1969:135) are multiplied by 52 to obtain total income figures, and divided by 344 (census of 1958) to obtain mean per capita incomes.

1973-74: my household survey data were multiplied by 46 to obtain total income figures, and divided by 309 (mean resident population 9/73 to 8/74 - see Appendix 6) to obtain mean per capital incomes.

1975-76: my household survey of environmental earnings was supplemented by cooperative society data and estimates of non-environmental income sources. These figures were divided by the mean resident population 7/75 to 6/76 of 273 (see Figure 5).

For the 1970's other data are available for copra and yaqona only (see Appendix 8). Changes in the output and price of these two products have led to see-saw fluctuations in their relative importance:

Year	Copra Income (% of total)	Yaqona Income (% of total)
1970-71	$6,060 (31%)	$3,700 (28%)
1971-72	5,910 (54%)	2,300 (21%)
1972-73	9,160 (65%)	1,500 (11%)
1973-74	31,040 (75%)	2,090 (5%)
1975-76	10,440 (27%)	19,070 (50%)

To a large extent these fluctuations reflect the responses of producers at Nacamaki to very variable external circumstances. In the case of the perishable goods (bananas, taro) the frequency and reliability of shipping services - which are entirely controlled by external agents - is the important factor. With copra and yaqona, however, changes in output reflect a positive response to price changes.

5.3 THE TERMS OF TRADE: COPRA AND YAQONA

The prices of Koro's two main export products are characterised first by unpredictable fluctuations, but secondly by a long-term deterioration especially when calculated in real terms to compensate for the acute inflation of the last four years. Copra, for example, rose steadily in price between 1941 and 1954 from 0.3 to 6.3 cents per lb (Sahlins 1962:37). In the 1950's it fluctuated between 5 and 6 cents, and in the mid-1960's dropped to below 4 cents. The present price is just under 6 cents, which in real terms represents a massive deterioration in profitability. The price received by Nacamaki villagers for green copra was identifical in 1958 and 1976, at 1.47 cents per lb, whereas retail prices rose by about 180 percent between the two dates. Paradoxically, however, the year 1974 was by far the most favourable one for copra in the entire post-war period.

The cooperative society's records for all copra shipped from Nacamaki for each month since 1965 show how unstable the price has become in recent years (Figure 11 and Table 11). From 1965 to 1971 fluctuations were small in amplitude and there was a gradually rising trend, but in that year the price dropped sharply, reaching its lowest point in June 1972. From then until 1974 there was an even more spectacular rise, following the Middle East oil embargo and a drought in the Phillippines and Indonesia, but the boom was shortlived. In June 1975 the government was forced to subsidize the copra price in order to prevent a recurrence of the 1972 crisis, when both output and living standards had suffered severely throughout eastern Fiji. The 1975-76 price contains about 50 percent of government subsidy.

Information on the yaqona price at Nacamaki is more fragmentary (Table 11). In 1958 net receipts from yaqona were about

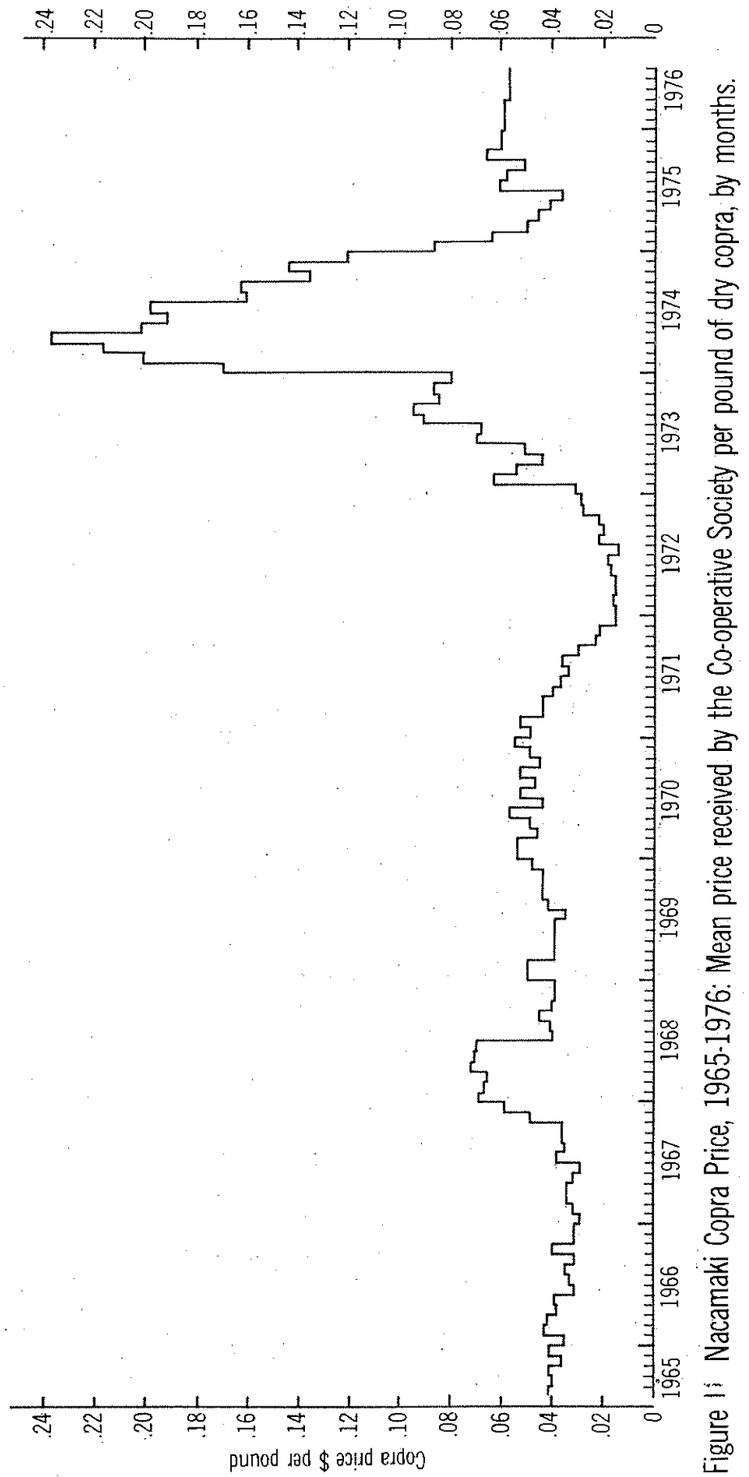

Figure 11 Nacamaki Copra Price, 1965-1976: Mean price received by the Co-operative Society per pound of dry copra, by months.

TABLE 11. The terms of trade at Nacamaki, 1958-76

Year	Selling Prices ($ per lb)		Buying Prices	
	Copra	Yaqona	Retail Price Index	Energy Purchased per Dollar spent
1958	u	.29	90*	12,600*
1966	.036	u	100	11,350
1967	.035	u	u	u
1968	.051	u	108.3	u
1969	.043	u	u	u
1970	.050	.26	114.1	u
1971	.031	.31	u	u
1972	.019	.29	132.4	10,140
1973	.071	.39	u	
1974	.181	.47	198.3	5,960
1975	.058	1.13 and	u	5,770
1976	.058	1.49**	262.0	

Notes: U - unavailable
* - estimate based on inflation trends in the 1950's (Burns 1960:112)
** - sales to the cooperative society and to private traders, respectively.

Sources: 1958 - Watters (1969), plus estimates of buying prices.
1966-76 - Nacamaki Cooperative Society records
Retail Price Index - see Table 12
Energy per $ - See Appendix 4

29 cents per lb, which was the same price as in 1972. In other respects, however, these two years differed considerably:

Year	Cooperative Store Price		Yaqona Production	
	Green Copra (100lb)	Yaqona (lb)	Weight (lb)	Value as % of total income
1958	$1.47	$0.29	21,500	51%
1972	$1.50 falling to 0.50	$0.29	10,100	28%

In the 1950's yaqona was more important as an income source than copra, but their positions seemed to have reversed during the 1960's. The economy therefore became increasingly dependent on the copra price remaining relatively favourable, and as a result producers were unable to respond to the fall in the copra price in 1972 by expanding yaqona production. Yaqona output in 1958 was over 21,000 lb compared to only 10,100 lb in the crisis year of 1972. There is a 2-3 year time lag between planting and harvest, so much of the production in 1971-73 probably represents yaqona that men had originally intended for their own consumption, but which they were then obliged to sell to compensate for poor copra receipts.

The opposite situation seemed to develop in 1973-74 when copra money was plentiful and therefore the exported portion of yaqona output declined as producers delayed harvesting their plants or used them instead for home consumption. In August 1974 yaqona drinking was taking place in at least four Nacamaki houses each night, and at each session a minimum of 4lb of yaqona was used. This represents at least 5 tons of production per year, worth $2770 or $60 per household. If this home consumption is included total output in 1973-74 reaches 9630 lb, which is not far short of the exported output only of 1972-73.

The yaqona price has risen significantly since 1973, and in 1975 it jumped to over $1.00 per lb. If the price remains at anything like this level then a substantial change in the economic structure is likely to occur, with yaqona cultivation (interplanted with yams in year 1 and taro in year 2) replacing copra as the main activity in the cash sector. But as Spate (1959:50) has pointed out, the price of yaqona in Fiji is subject to "an apparently indefinitely elastic demand for the finished product". It would be as unwise for the population of Koro to commit itself exclusively to yaqona in future as it was in the 1960's for it to rely so heavily on copra. In the face of such uncertainity in the external market, the most sensible response for producers occupying a peripheral position in an economic system is for them to maintain as much productive diversity as possible, and so maximise their freedom of response to any opportunities that may emerge.

5.4 THE TERMS OF TRADE: RETAIL PRICE INFLATION, 1966-76.

One apparently inevitable feature of the external market economy is a relentless inflation in the price of imported goods, which for Koro include items produced in Fiji (sugar, rice, biscuit) as well as Fijian imports like flour, tinned fish and kerosene. It is this factor that makes a comparison of economic welfare and the real purchasing power of money in different time periods so difficult. At Nacamaki almost all buying and selling is done through the cooperative society: almost all copra and (until recently) yaqona are sold to the society, and the society store is virtually the only source of imported foods and consumer goods. Since records of most of these transactions have survived, the pattern of preferences and prices can be reconstructed in some detail.

The average cost of a standard 'shopping basket' of goods is shown in Table 12, from mid-1966 through to mid-1976. The price of these items rose from $3.14 to $8.22 over this period, representing an inflation of 162 percent. By comparison, the official Consumer Price Index only increased by 85 percent between May 1968 and the middle of 1975 (Fiji 1975). Though less acute than the inflation rate on Lakeba (Bayliss-Smith 1976), Koro's rapidly rising cost of living is a further indication of the penalties of occupying a peripheral and dependent position within an economic system.

5.5 EXPENDITURE PATTERNS, 1966-76

A consequence of retail price inflation is that less and less food energy can be purchased for cash dollar spent. In 1966 the imported food of Nacamaki provided 11,350 per dollar, whereas in 1973-74 (when expenditure patterns were very similar) each dollar yielded only 5,960 kcal. By 1975-76 the yield per dollar had fallen to 5770 kcal despite a much smaller expenditure on non-staple foodstuffs (i.e. foods other than sugar, rice, flour and biscuit).

In the crisis year of 1972 consumption patterns were even more constrained than in 1975-76. The actual energy yield per dollar was maintained at close to the 1966 level (despite 32 percent inflation in the intervening period) through expenditure being heavily concentrated on the cheapest energy sources (sugar, flour, rice and biscuit). In 1972-73 the non-staple foods provided only 10 percent of the purchased food energy, and tinned fish and tinned meat only 1.2 percent, both significantly less than in other years:

Year	Percent of Total Purchased Food Energy		Energy Purchasing Power of each $1 spent
	'staple' imports	Fish & Meat	
1966	80.1	9.7	11,350
1972-73	89.7	1.2	10,140
1973-74	77.2	9.9	5,960
1975-76	89.2	7.7	5,770

TABLE 12. Inflation at Nacamaki, 1966-76

Item	Unit	Selling Price in Nacamaki Cooperative Store					
		7/66 ¢	7/68 ¢	7/70 ¢	7/72 ¢	7/74 ¢	7/76 ¢
Sugar	1 lb	5	5.8	6	7	9	14
Rice	1 lb	10	12.5	13	15	35	30
Flour	1 lb	8.4	7.9	8.1	8	18	20
Biscuit	1 lb	15	15	15	18	35	40
Margarine	8oz tin	20	20	20	20	40	50
Dripping	1 lb	20	22.5	25	36	50	65
Mackerel	15oz tin	20	22.5	25	25	43	45
Mackerel	7oz tin	12.5	12.5	13	16	28	26
Milk-dried	12oz tin	36.7	40	43	48	65	90
Milk-evap.	16oz tin	20	20	23	20	35	40
Corned Beef	12oz tin	35	42.5	50	60	65	120
Tea	4oz pkt	22.5	22.5	24	20	38	42.5
Washing Soap	Bar	30	30	30	32	53	76
Toilet Soap	Bar	10	12.5	13	16	20	30
Tobacco	1/10 lb	20	22.5	20	36	38	75
Cigarettes	Pkt of 10	10	12.5	15	20	25	28
Kerosene	Pint	7.5	7.5	7.5	7.5	10.2	12.5
Benzene	Pint	11.2	11.2	7.5	11.2	15	18
TOTAL		$3.14	$3.40	$3.58	$4.16	$6.22	$8.22
INDEX		100	108.3	114.1	132.4	198.3	262.0

Source: Nacamaki Cooperative Society records.

The years 1966 and 1973-74 show remarkably similar patterns of expenditure (see also Appendix 4): during both periods one-fifth of the imported food was in the non-staple category, of which nearly half consisted of tinned fish and meat. Since both were also periods of relative affluence (1974 in particular), the expenditure data can be taken as representing a fair approximation of consumer demand relatively unconstrained by a lack of money. Both 1972-73 and 1975-76, on the other hand, show some suppression of demand for non-staple foods, and so cannot be taken as truly representing the 'normal' pattern of food preference.

The same conclusion follows from an examination of total store expenditure (both food and non-food items) as a percentage of total income, which was high (63 and 61 percent) in the periods both before and after 1973-74, but lower in that year (55 percent) despite an unprecedented spending spree on store goods (Appendix 4). Comparable data are not available for 1966, but the high proportion of non-food store expenditure in 1966 would also suggest that relatively affluent conditions prevailed. Data on cigarettes are particularly revealing: adult males smoked on average 2000 cigarettes in 1966, 2715 in 1973-74, but only 900 in 1972-73 despite the rising trend in cigarette as against tobacco smoking.

5.6 CALCULATING REAL INCOME LEVELS IN ENERGY TERMS

In order to assess the real purchasing power of the cash income of Nacamaki during the last two decades, some way is needed of converting money into a form that corresponds more closely to its 'real' value. A convenient way of doing this, and one which enables subsistence incomes to be included in a direct and realistic way, is to express the money received in different years in a 'perceived energy equivalent'. The data on food expenditure during the relatively unconstrained years of 1966 and 1973-74 are critically important for this purpose. These data enable the potential food energy yield per dollar to be calculated in the 1970's using the index of retail price inflation at Nacamaki, and in 1958 by extrapolation using published price data from elsewhere in Fiji, (Figure 12). The declining potential energy yield per dollar (corresponding to the actual yield only in 1966 and 1973-74) itself permits the per capita cash incomes to be converted into an energy form that represents real purchasing power much more realistically (Table 13a). It can be seen that the fourfold increase in per capita cash incomes that has occurred in the last 18 years represents a much smaller change in potential energy income, from 0.45 million kcal per person in 1958 to 0.64 million in 1976. The crisis year of 1972-73 provided a very similar income level to 1958, while 1973-74 was slightly more favourable than 1975-76.

The picture changes somewhat when energy incomes from the subsistence sector are added to those from the cash sector (Table 13b).* On a per capita basis these subsistence incomes fell

* The subsistence sector has always provied difficult for economists to quantify in monetary terms. The traditional approach to the non-monetary sector was to evaluate its output according

[footnote continued]

to the rate it would have fetched if sold in the cash market. In O'Loughlin's (1956) national income estimates of Fiji, for example

> Although food crops entering the monetary market were evaluated at the prices which they obtained in the relevent food markets, the non-cash output has been evaluated at an average price, rather than that which would obtain in the nearest local market. In Fiji it is not always the nearest market which is the most accessible, and in any case the range of prices between markets was low (O'Loughlin 1956:12).

Even in national income accounting, such an approach would not be very satisfactory for the outlying islands. For Koro it would mean that in 1975-76 taro would be valued at something like the Suva market price, which was 11-16 cents per lb, when the price being received by growers on Koro was only 6 cents per lb.

It is now recommended by U.N. economists that "non-monetary output should be valued at purchaser's values wherever a realistic and applicable market price can be identified", but they admit that this method "is usually inappropriate in the South Pacific as producers' prices understate the contribution of non-monetary consumption to the standard of living" (Dommen 1974:20). Where a market price cannot be satisfactorily determined for a product the U.N. team recommend valuation according to the local price of the labour input. This method is equally unsatisfactory for places like Koro, where labour costs are seldom perceived in monetary terms and where actual labour hire occurs only infrequently. The U.N. team did recognise that an alternative existed, which is close to the approach I have adopted in this report, namely valuation of food consumption according to the monetary value of a diet nutritionally equivalent to the subsistence food intake. They claim, however, that "experiments with this sytem appear to yield an unrealistically high value for food consumption" (Dommen 1974:21).

What is unrealistic in the context of gross national product statistics may not be at all unreasonable at the micro-scale. I argue in this report that subsistence incomes calculated in the 'alternative' way mentioned above will correspond, in rural Fiji, far more closely to their perceived local value than if they are assessed according to output market price or labour valuation, even though the approach may be inappropriate at larger scales of enquiry or for different purposes.

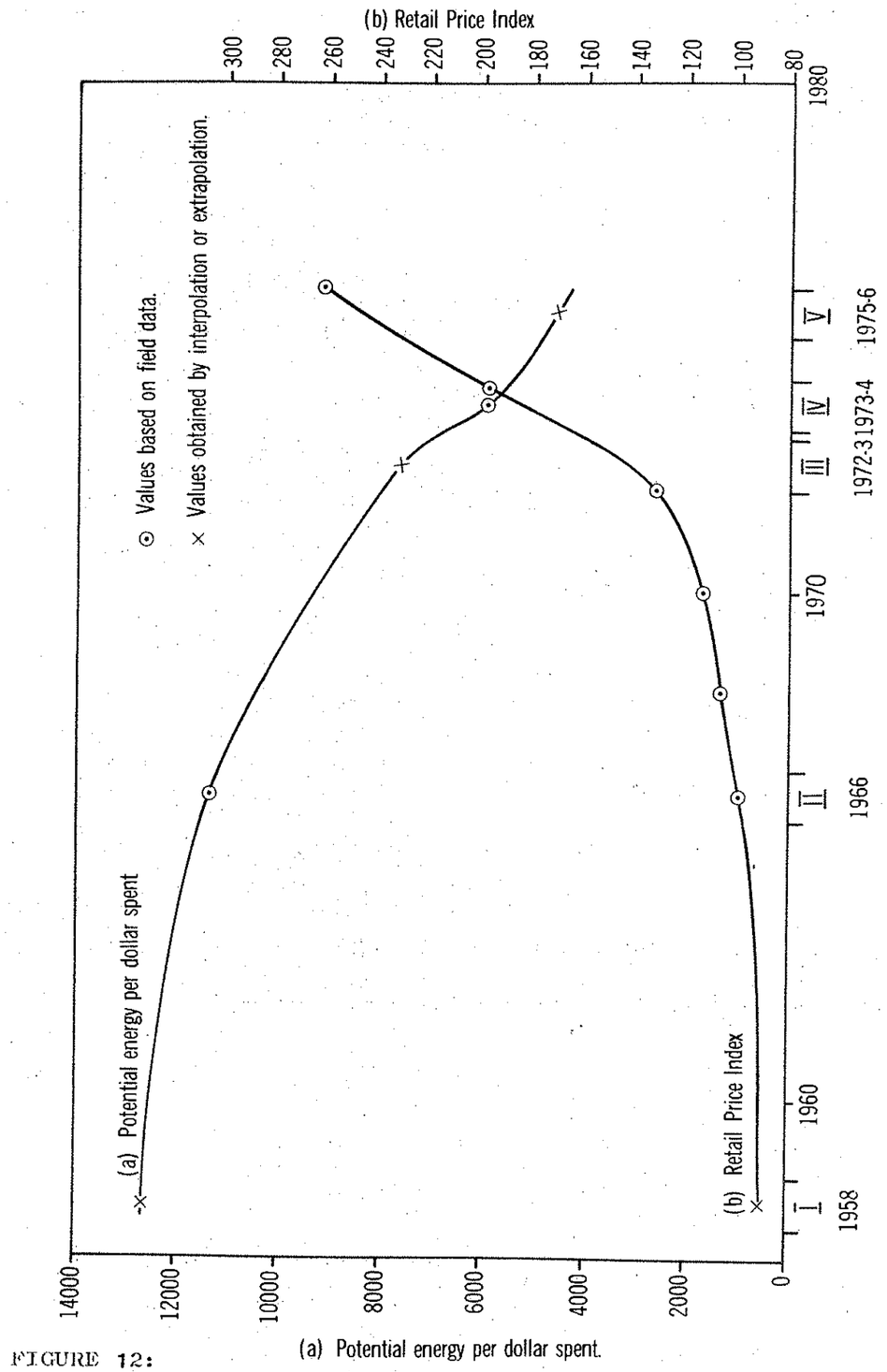

FIGURE 12: Change in retail prices, and change in the purchasing power of money calculated according to potential food energy, Nacamaki. 1958-1976.

TABLE 13. Total Energy Income of Nacamaki, 1958-76

(a) CASH SECTOR

Year	Population	Cash Income ($)	Potential Energy Income: Purchasing Power of money (kcal/$)	Potential Energy Income: Total (10^6 kcal)	Potential Energy Income: Per Capita (10^6 kcal)
1958	344	12,270	12,600	154.6	0.449
1966	303	u	11,350	u	u
1972-73	315	14,200	7,630	108.3	0.344
1973-74	309	41,240	5,960	245.8	0.795
1975-76	273	38,150	4,590	175.1	0.641

(b) SUBSISTENCE SECTOR* AND TOTAL

Year	Total Energy (10^6 kcal): Population's Requirement	Contribution of subce.sector	Energy Income Per Capita	Total Energy Income per capita (10^6 kcal)
1958	255	204	0.593	1.042
1966	232	171	0.564	u
1972-73	241	187	0.594	0.398
1973-74	236	156	0.505	1.300
1975-76	209	141	0.517	1.158

Notes: u - unavailable

Sources: Tables 9, 10, 12; Figure 12; Appendix 4 and 6.

* Unlike in Tables 14-15, consumed yaqona is excluded from the subsistence income because of the unknown level of consumption prior to 1974.

from almost 0.6 million kcal in 1958 to just over 0.5 million in 1976. The total energy income has therefore increased very little during this period, with a significant rise only in the boom year of 1973-74. The actual quantities are, of course, abstract indices of material welfare which (like G.N.P. figures) mean little in themselves, and it is the changes in quantity that are important:

Year	Index of Total Energy Income (1958 = 100)
1958	100
1972-73	90
1973-74	125
1975-76	111

The index shows that from the point of view of the Koro people their material welfare has improved since 1958 only when there has been substantial improvement in the price of copra (1973-74) or yaqona (1975-76), and that when neither crop is in demand the standard of living has actually fallen (1972-73).

An example more specific than total income is the production of root crops, which illustrates nicely the difference between the national viewpoint and that of the subsistence-based periphery. If a Koro villager in 1976 sells taro to the N.M.A. he receives 13.2 cents per kg (6c/1b). It can be assumed that he or his family will supply most of the labour needed to produce the crop and that labour will therefore have to be withdrawn from the subsistence sector, necessitating at least a partial dependence on purchased foods. However, the $132 per tonne return from taro only allows the purchase of 600,000 kcal in average store purchases, or 884,200 if the diet were to be rice and flour in equal proportion. If on the other hand the producer consumed the tonne of taro himself he would gain instead up to 1,322,100 kcal in direct food energy.* The recipient of the cash income from taro would clearly have a wider choice of goods open to him, but in view of the central (and preferred) role of taro in the diet it is not surprising that most producers on Koro regard selling the crop as being a waste of energy, because in the most literal sense this is precisely what it is. In other words, valuing the crop at its market price rather than its opportunity cost grossly underrates its importance.

5.7 LABOUR PRODUCTIVITY IN DIFFERENT SECTORS

Decision-making in agrarian societies does not occur simply in response to fluctuations in the price received for goods, whether 'price' be measured in monetary or potential food energy terms. Usually some consideration is also given to the inputs

* Domestic consumption will normally increase the farmer's yield since waste through corm rot, etc., can be avoided. Up to 1.2 t of taro may be needed for each tonne sold to the N.M.A. (Hardaker 1976).

TABLE 14. Productivity of the Nacamaki economic system in 1973-74, in energy terms

	Sector of Productive Activities					
	Subsistence agriculture	Fishing & Shellfish Collection	Other food-gaining activities	Crafts	Copra	Yaqona
LABOUR INPUT (hours/year)						
Adult Males (79)	51060	722	3179	1011	47899	9915*
Adult Females (68)	2665	20414	2778	17238	6067	-
Total (309 persons)	53725	21136	5957	18249	53966	9915
CASH OUTPUT						
Money Earned	$1460	$140	$340	-	$31040	$2090
A. Potential Energy equivalent at 5960 kcal/$ (10^6 kcal)	8.7	0.8	2.0	-	185.0	12.5
SUBSISTENCE OUTPUT						
B. Consumed Products (10^6 kcal)	138	16	2	-	-	**
TOTAL ENERGY INCOME						
A + B (10^6 kcal)	146.7	16.8	4.0	-	185.0	29.0
PRODUCTIVITY OF LABOUR						
10^3 kcal/hour	2.73	0.79	0.67	-	3.43	2.92

Notes: * Estimated at 151 hours per 100 plants and 4.4 lb per 3 year old plant (Watters 1969:127; Hardaker 1976).

** An estimated 5760 lb of yaqona was consumed, worth $2770 or 16.5 million kcal, and it is included in the total.

Sources: Labour Input - Appendix 5.
Cash Output - Table 10.
Subsistence Output - Table 9.

required, especially if land is not limiting. For example, in a purely subsistence economy the staple food is likely to be derived from whichever crop provides the best ratio of energy yield to labour input. The surveys of work inputs discussed above (Chapter 5.1) enable some estimates to be made of the productivity to labour of different activities at Nacamaki (see Table 7 and Appendix 6).

Estimates of the total labour input in various sectors are shown in Table 14 for 1973-74. Subsistence agriculture (excluding yaqona cultivation) and copra appear to have required very similar total labour inputs of just under 54,000 man hours in the year in question, with fishing, crafts, yaqona and other subsistence food activities (in that order) of lesser importance. Total output was assessed by adding the potential energy equivalent of the cash incomes obtained from each sector to the consumed energy output (Table 14). For subsistence agriculture, copra and yaqona (where 'qualitative' considerations apply less strongly than to activities like fishing which are indulged in partly for reasons of preference), the input-output relationship for 1973-74 was as follows:

	Labour Input (hours)	Total Energy Income (10^6 kcal)	Productivity (10^3 kcal/hour)
Subsistence agriculture	53,700	146.7	2.73
Copra	54,000	185.0	3.43
Yaqona	9,900	29.0	2.92

Both yaqona and (especially) copra show more favourable productivity ratios than subsistence agriculture, indicating that at this period the terms of trade provided quite strong incentives for a full participation in the market economy. The actual response in 1973-74, as already described (Chapter 5.2), was more or less in accord with these productivity rankings: copra was exploited to the full, yaqona was kept in reserve since the unusually good returns from copra made yaqona selling unnecessary, while subsistence crops declined a little in importance (see Table 9) but were not neglected since the recent experiences of 1972 had shown the unwisdom of depending on cash crop prices remaining favourable.

By 1975-76 the situation had altered dramatically (Table 15):

	Labour Input (hours)	Total Energy Income (10^6 kcal)	Productivity (10^3 kcal/hour)
Subsistence agriculture	45,100	126.2	2.80
Copra	27,200	47.9	1.76
Yaqona	20,500	117.4	5.76

A deterioration in the copra price and an improvement in the yaqona price, superimposed over a continuing inflation in imported goods, has caused a total alteration in the productivity rankings

TABLE 15. Productivity of the Nacamaki economic system in 1975-76, in energy terms

	Sector of Productive Activities					
	Subsistence agriculture	Fishing & Shellfish Collection	Other food-gaining activities	Crafts	Copra	Yaqona
LABOUR INPUT* (hours/year)						
Total (273 persons)	45256	21136	5957	18249	27199	20457
CASH OUTPUT						
Money Earned	$700	$80	$250	-	$10440	$19070
A. Potential energy equivalent at 4590 kcal/$ (10^6 kcal)	3.2	0.4	1.1	-	47.9	87.5
SUBSISTENCE OUTPUT						
B. Consumed Products (10^6 kcal)	123	16	2	-	-	**
TOTAL ENERGY INCOME						
A + B (10^6 kcal)	126.2	16.4	3.1	-	47.9	117.4
PRODUCTIVITY OF LABOUR						
10^3 kcal/hour	2.79	0.78	0.52	-	1.76	5.76

Notes: * Calculated assuming same input:output relationship prevailed as in 1973-74 between labour expended and quantity produced.

** An estimated 5760 lb of yaqona, worth $6510, was consumed, and is included in the total.

Sources: As Table 14.

of the three alternative sectors. The Nacamaki response was, of course, continued participation in all three, but much more attention was devoted to yaqona than had been the case two years previously, and copra was being relatively neglected. Subsistence farming continued to provide the same reliable yield, and it showed a relative increase in its importance in the food supply (see Table 9). The minor change in the productivity of subsistence farming merely reflects a decline in the amount of root crops that were sold rather than consumed.

VI - CONCLUSION

6.1 THE VIEW FROM THE PEPIPHERY

Enough has been said to make it quite clear that recent changes in land use and time use by the population of Koro constitute a thoroughly rational response to events in the outside world. A response is required because of Koro's new political position within colonial and post-colonial Fiji and because of the enhanced knowledge of the outside world that this position has entailed, reinforced by education and wider travel. In consequence there now exist new material aspirations that can only be satisfied through the cash economy; and there have emerged opportunities to sell agricultural produce, primarily copra copra and yaqona but sometimes also bananas, root crops, peanuts and other products. These marketing opportunities promise one means through which the new aspirations can be satisfied, but in recent years the market has proved to be far from reliable. The continuing importance of subsistence farming represents a necessary insurance against the short-term price fluctuations and the long-term deterioration in the terms of trade. Migration (as opposed to circular mobility) is another response to unsatisifed aspirations, and on a large scale it is one that would constitute as much a threat to the centre as to the periphery of Fiji.

The measurement of total energy income, as discussed above, provides an abstract measure whereby changes in material welfare within a peripheral economy can be gauged. As Crocombe (1971) has pointed out with specific reference to Koro, alternative ways of assessing output using the monetary values of the external economy tend to be even more abstract when one is dealing with societies like Koro that have substantial subsistence sectors. A calculation in terms of the potential market value of subsistence products as if they were to be sold, or even in terms of the hypothetical costs of labour, is inherently unsatisfactory for portraying welfare levels within such societies. These approaches stem directly from the point of view and relationship that the external market economy has towards its small, dependent components. Results obtained by the economists' approach towards

income cannot indicate realistically the incentives towards monetary as against non-monetary activities in a society dominated by production for use rather than for exchange. Nor can they help greatly in understanding the attitudes of producers on an island like Koro towards the outside world.

There is, of course, no perfect solution to the problem of comparing and measuring two forms of production, subsistence and monetary, when they originate in two spheres that differ so markedly in associated values, attitudes and social organisation. Societies like Koro - despite their growing diversity - nevetheless seem in general to prefer to adapt the products and demands of the market economy to their own systems of production and use, and initially do not abandon their 'traditional' attitudes and responses in favour of individualistic and profit-seeking sorts of behaviour. As Spate (1959) recognised, in Fiji this adaptation is probably a transitional phase, and it is one that has already broken down in a few highly acculturated areas, but while it persists it needs to be studied as far as possible in its own terms rather than in those of the market. It was with this aim in mind that a measure of perceived energy income was adopted. Its use enables one to state with confidence that Koro's growing dependence on trade in the last two decades has not been accompanied by any marked improvement in material welfare, and that the island's future prospects are equally disquieting.

6.2 THE VIEW FROM THE CENTRE

There is a conflict between centre and periphery which is perhaps inherent in the emergence of the nation state. In Fiji it is manifested by the government's concern for promoting 'economic development' in the sense of greater participation by rural areas in the market economy. From the national point of view this is a vital objective, but at the local scale such development may do little to enhance welfare in the absence of effective control by government of the terms of trade. Fijians at all levels are, of course, increasingly aware of the conflict (e.g. Tupouniua et al. 1975), but in a plural society like Fiji the inequalities in land distribution and market participation appear to leave the government with little choice. Watters' analysis of 15 years ago remains accurate today as broadly representing the view from the centre:

> An overall assessment of productivity (in Fiji) can be gauged by comparing the contributions of each community to the net domestic product of the Colony...The total contribution of the Indian community in all sectors is more than twice as large as that of the Fijian community. This problem of low Fijian producitivity lies at the root of the Colony's basic problems. (Watters 1969: 21)

While this macro-economic viewpoint has relevance in indicating some broad objectives for national planning, at the village level it fails to illuminate the rationale behind the web of decision-making that underlies the relationship of the population

to its environment. This failure is particularly apparent in situations where there is little or no land shortage, as on Koro. From the point of view of the Koro villager, raising productivity--in Watters' sense of increasing yields per unit area--is rather unimportant. The villager's "contribution to the net domestic product" of the country is also a purely academic concept which reaches him only through the bias that is implicit in the advice of agricultural extension officials, who are concerned very largely with new and better cash crops.

The productivity of his labour is, however, a measure of great importance to the villager, who continues to operate in a milieu in which production objectives are finite and social obligations are inescapable. The producer therefore aims to satisfy his various goals by participating in the various activities open to him in differing degrees. The rather low level of returns and the unreliable behaviour of the prices normally prevailing in the cash sector both serve to dampen interest and involvement, in a way that is perfectly 'economic' provided the term is widened to encompass the concept of maximising utility rather than profit.

The 'macro' view of Koro island is in sharp contrast to the view from the periphery:

> The most formidable obstacles to economic development at Nacamaki ... essentially stem from the complex cultural patterns of a subsistence people whose productive activities were originally motivated as much by social and ceremonial matters as by purely economic considerations. These cultural patterns have led to a poor performance in cash cropping judged even by the most tolerant European or Indian standards. (Watters 1969:142).

Judged by its own standards, however, the economy of Nacamaki seems to function with considerable efficiency. Manpower and land are allocated in different ways as demands and prices have changed, and the impression is one of a flexible economic response in relation to culturally-constrained goals. Arguably, the problems that emerged in the early 1970s following low copra prices resulted from an excessive amount of the 'economic development' that Watters and others advocate, or at least an excessive reliance on one main source of cash income, rather than from too many obstacles to change. The future of Koro cannot be planned without reference to the needs of Fiji as a whole, but if it could then an increased diversity of income sources but a continued high level of self-sufficiency in foodstuffs would seem to provide the best means for maintaining or improving the present levels of welfare.

APPENDIX 1. Age and sex composition of the de facto population of Nacamaki, Koro, 10/August/1974 and 10/July/1976

Age (years)	Number of Males		Number of Females		Number of Persons	
	1974	1976	1974	1976	1974	1976
0 - 4	21	19	17	15	38	34
5 - 9	19	21	11	13	30	34
10-14	25	22	19	16	44	38
15-19	18	17	10	12	28	29
20-24	13	16	9	12	22	28
25-29	7	14	9	10	16	24
30-34	5	6	5	4	10	10
35-39	3	2	9	8	12	10
40-44	9	11	5	6	14	17
45-49	4	4	3	4	7	8
50-54	5	3	6	6	11	9
55-59	4	3	4	2	8	5
60+	11	13	8	8	19	21
All ages	144	151	115	116	259	267

APPENDIX 2. Changes in Housing at Nacamaki since 1921

	1921	1936	1958	1974
Type of House				
Traditional	ns	ns	32	2
All Iron	ns	ns	14	19
Wood and Iron	ns	ns	13	27
Thatched with Iron Roof	ns	ns	7	4
Concrete with Iron Roof	ns	ns	2	3
TOTAL HOUSES	31	24	68	75*
Total Number of Households	ns	ns	52	44
Persons per Household	ns	ns	6.61	5.89
Persons per Occupied House	5.59	6.83	5.06	3.75

Sources: 1921 - Fiji (1922)
1936 - Burrows (1936)
1958 - Watters (1969)

Notes: * Six of these 75 were empty at the time of the survey, their occupants absent in Suva.

ns - not stated.

APPENDIX 3.

Table A: Composition of 39 households at Nacamaki, mid-August 1973 to mid-August 1974.

Matacali and Census Number	Producers (manmonths of residence 1973-74)		Dependents (manmonths of residence 1973-74)						Ratio of Consumers per Producer C/P
			Age in years				males	females	
	male	female	0-4	5-9	10-14	15-19	>20	>20	
Manukuira									
4	35	12	-	24	24	-	-	-	2.0
1	39	2	10	-	12	12	-	10	2.1
3	10	10	-	10	-	-	-	-	1.5
7	35	36	-	-	24	12	-	-	1.5
8	8	10	10	-	20	-	-	-	2.7
8A	11	-	16	-	-	-	-	8	3.2
9	30	12	24	-	-	-	-	12	1.9
16	24	12	24	-	24	-	-	12	2.7
Sarabau									
10	31	24	-	24	24	20	-	-	2.2
13	35	24	-	-	-	12	-	-	1.2
12	31	-	12	24	36	-	-	12	3.7
14	23	24	24	12	-	-	-	12	2.0
15	32	12	12	24	12	-	-	-	2.1
21	22	-	24	24	24	-	-	12	4.8
36	12	12	12	12	24	-	-	-	3.0
44	11	-	12	12	24	-	-	12	6.4
41	19	-	12	-	12	-	-	-	2.3
Narewa									
17	28	12	22	-	-	-	12	8	2.0
18	24	12	12	-	12	-	-	6	1.8
19	12	12	-	-	12	-	-	-	1.5
20	12	9	12	12	36	-	-	12	5.0
22	-	12	12	-	-	-	-	24	4.0
23	24	12	-	-	-	-	-	-	1.0
24	12	-	24	24	12	-	-	12	7.0
26	35	24	10	-	12	-	-	5	1.5
26A	9	-	24	-	-	-	-	9	4.7
28A	12	12	-	-	12	-	-	-	1.5
Votuda									
40	38	24	-	-	12	-	-	-	1.2
11	46	11	12	24	35	-	12	12	2.2
38	10	24	12	-	-	-	-	10	1.6
42	23	12	-	-	-	-	-	-	1.0
43	12	-	-	24	24	12	-	-	6.0
45	20	12	18	-	12	-	-	12	2.3
Qarai									
34	3	-	-	-	-	-	12	-	5.0
29	17	12	6	-	-	-	-	18	1.8
30	12	-	18	-	-	-	-	7	3.1
31	35	36	-	12	12	12	-	-	1.5
32	18	26	12	12	-	-	-	6	1.7
35	8	-	8	-	-	8	-	-	3.0

Note: all residents above the age of 15 years are considered as 'Producers' unless they are (i) too elderly to work, (ii) mothers with infants below the age of 3 years, or (iii) at school. All persons in these categories, and all others, are regarded as 'Dependents'. Producers + Dependents = Consumers

APPENDIX 3 [continued]

Table B: Income of 39 households at Nacamaki, mid-August 1973 to mid-August 1974.

Mataqali and Census Number	Income 1973-74 (Fiji dollars)							Ratio of Environmental Income per Producer
	Environmental Sources (EI)					Non-Env. Sources	TOTAL	
	Copra	Yaqona	Dalo	Shell	Live-stoc			EI/P
Manukuira								
4	818	63	-	-	-	60	941	237
1	812	74	-	15	-	604	1505	267
3	669	-	-	-	20	434	1123	459
7	713	247	14	3	45	122	1144	192
8	387	142	23	10	14	290	866	430
8A	254	2	45	-	-	50	351	327
9	1321	114	-	-	-	102	1537	435
16	887	118	-	9	-	192	1206	362
Sarabau								
10	1677	174	25	-	80	153	2109	468
13	1002	72	-	-	-	60	1134	238
12	652	4	30	-	-	258	944	266
14	394	-	-	-	-	26	420	112
15	1528	54	-	-	-	396	1978	456
21	484	90	8	-	-	50	632	318
36	596	27	30	7	-	20	680	367
44	233	-	450	-	-	-	683	742
41	580	7	-	-	-	22	609	372
Narewa								
17	664	157	-	15	14	92	942	365
18	504	9	-	-	-	60	573	257
19	745	5	80	-	6	6	842	836
20	551	112	100	7	-	2	772	770
22	134	1	-	-	-	34	169	169
23	279	20	6	-	2	50	357	110
24	266	86	24	-	-	-	376	376
26	1134	61	-	3	-	168	1366	265
26A	234	-	-	-	-	172	406	312
28A	148	260	120	2	-	32	562	294
Vatuda								
40	1431	76	-	9	-	72	1588	318
11	1395	52	-	-	-	10	1457	317
38	665	522	260	8	14	172	1641	605
42	876	409	-	17	-	8	1310	479
43	647	8	-	12	15	60	742	682
45	588	12	14	-	15	85	714	255
Qarai								
34	41	27	-	-	57	105	230	500
29	554	36	4	-	-	68	662	268
30	330	9	-	-	-	310	649	339
31	935	271	5	-	-	50	1716	228
32	872	150	-	-	-	200	1222	316
35	314	4	-	-	-	190	508	475
Total	26314	3475	1238	117	282	5235	36666	
Mean per household	674.7	89.1	31.7	3.0	7.3	134.2	940.0	

APPENDIX 4.

Expenditure at Nacamaki

The changes in consumption that have occurred at Nacamaki (Tables A, B, C and D) give some support for Crocombe's (1971: 511) argument, that in the Pacific the under-lying assumption of those promoting 'economic development' is that it simply involves "Making more money, and leaving it not so much to consumers as to manufacturers and merchants to determine how it shall be spent". Town-based capitalist entrepreneurs thus become the main beneficiaries of change. In many cases increasing cash crop production does very little to increase welfare at village level.

Crocombe illustrates this point of view with specific reference to Nacamaki, probably in the mid-1960's:

> Most of the buying and selling there is undertaken by the cooperative society, and the main export is kava (yaqona). At the time of my visit by far the largest stocks for sale in the cooperative store were beverages: beer, rum, cordial, raspberry drink, Coca-cola, tea, coffee and cocoa. It is unlikely that those who promoted 'economic development' there intended that it would result in the production of more of one beverage, kava, to exchange for other beverages. (Crocombe 1971:509).

He noted other paradoxes at Nacamaki. Raw peanuts were being sold to the cooperative for 9-10 cents per pound, the money being partly used to buy canned American peanuts at fourteen times the price. Taro was being shipped to Suva, partly to buy bread, "a much more expensive but much less nutritious food". The indirect effects of participation in the cash economy were, he felt, equally bizarre:

> Because people are busy producing kava and peanuts and taro and other products for export, they do not have adequate time for fishing. One of the major items in the cooperative store was canned Japanese and South African fish, again providing much less volume and much less nutritional value at very much greater expense, than the people could acquire for themselves by lagoon fishing. One does not score high points in the statistics competition by eating one's own fish, taro and peanuts, not because they do nothing for welfare, but because they are not converted into cash and passed through a market mechanism and measured, and our planning equipment usually gives greater weight to products which are. (Crocombe 1971:510).

Crocombe does not suggest a return to subsistence - he cites the selling of copra in order to purchase soap, biscuits and margarine as examples of where trade enhances welfare. Nor is it true, as he suggests, that most people's cash income goes

into 'trivial' products for which a demand has been artificially stimulated by advertising and by restrictions on the range of choice. At Nacamaki the staple items (flour, sugar, biscuit, rice, tea, tobacco, soap, clothing, hardware) have probably always come first in terms of choice and volume of sales.

Nevertheless, it seems to be true that until 1974 the expansion of consumer demand was not in such basic products so much as in non-essentials and over-priced luxuries, as well as in the various categories of 'social expenditure' (school fees, church dues, community funds). Already at Nacamaki the traditional economic system of determinate and finite objectives for production has disappeared, and its replacement by a system with the indefinite goal of generalised 'wealth' accumulation has begun. Judging by the pace of change in other developing countries, it may not be long before Marx's words become appropriate for Fiji: "How sublime", he wrote, "seems the ancient conception that made man the objective of production, in comparison with a modern world where production is the objective of man - and wealth the objective of production" (quoted by Sahlins 1972:84).

Both in 1972-73 and in 1973-74 about four-tenths of Nacamaki's income was not accounted for by consumer spending in the village's Co-operative store, or by savings. Three main categories of 'social expenditure' exist which consumed a large proportion of this residue. The first category is the Church, which in 1958 took less than one percent of village income, but which now seems to have acquired a more important position. The money is deducted from copra payments before people ever receive them, and is a popular way of fulfilling religious duties. For every man- or woman-day of copra cutting, ten cents is taken out of the money that is paid out by the Co-operative store after the coconut has been weighed. The tithe was reduced to five cents per working day during the copra slump of 1972-73. This tithe plus normal collections raises for both churches (Methodist & Catholic) at least $1,000 per year, which covers their own expenses plus contributions to the national organisations.

A second category of social expenditure are communal funds not of a religious nature. These include small-scale collections as well as the financing of much larger village projects. There were two collections made for immediate communal purposes during August 1974. One was for a feast provided for a group of visiting tourists, who had come to Nacamaki to see the calling of turtles, a local phenomenon (Attenborough 1960). The second was also a feast provided for the families of five men who returned to Nacamaki after six months spent working to raise village funds on Taveuni. They returned with $330, and as in the first instance the occasion was marked by a collection of $0.50 from each able-bodied man, to buy the pig and other foods needed for the distribution. The money was thus recycled within the community, but the benefits were more patchily distributed than the costs. Large-scale projects in this category are described in Chapter 4.8.

The third large category of social expenditure is on education. School fees are the largest item, together with uniforms, books, etc., and they place a particularly heavy burden on parents with several children away at secondary schools. Within Nacamaki, the primary school is the object of particular community pride. To help finance the school, each child is required to bring one coconut to school daily. Periodically, a voluntary working party splits the nuts and sells the copra to the Co-operative, to raise school funds. The non-permanent school buildings are maintained with communal labour.

In addition, there are several other financial obligations of a 'social' nature. These include family weddings, funerals, etc., the annual Provincial Rate, and the increasing cost of travel to Suva to visit the growing number of absent relatives.

TABLE A: Amount and value of food purchases at Nacamaki 1966-76

Food Item	Quantity (kg)				Value ($)			
	1966	1972-3	1973-4	1975-6	1966	1972-3	1973-4	1975-6
Sugar	6909	6683	7313	8084	753	1007	1665	2556
Rice	1905	2444	4038	2041	429	855	2271	1355
Flour	3041	2134	2853	4128	483	469	979	1651
Biscuit, plain	1092	1477	1533	1807	367	662	1234	1625
Fish, tinned	1479	131	1921	1513	668	725	2058	1617
Oil, edible	75	32	304	-	39	9	303	-
Dripping	297	254	261	302	131	200	311	434
Meat, tinned	310	73	567	147	235	163	1427	522
Milk, powder	63	57	310	35	75	81	292	148
Margarine	93	152	196	46	50	136	329	91
Milk, evaporated	6	197	240	163	5	165	185	144
Sweets	29	51	105	51	40	71	183	111
Peas, dried salted	-	1	112	-	-	3	197	-
Milk, sweet condensed	24	-	95	-	22	-	96	-
Biscuits, sweet	7	-	29	-	45	-	57	-
Jam	8	43	44	24	10	50	68	41
Onion and cabbage	155	136	408	297	42	70	112	174
Spirits	79	73	36	-	433	117	60	-
Beer	588	20	-	-	372	24	-	-
Oatmeal	2	-	11	-	1	-	23	-
Milk, bottled	42	-	50	-	14	-	13	-
Potatoes, Irish	25	-	44	-	11	-	20	-
Cheese, processed	1	-	6	-	1	-	10	-
Fruit, tinned	10	-	24	36	4	-	66	51
Fresh meat	99	-	-	-	78	-	-	-
Butter	127	-	-	54	128	-	-	216
Chocolate	3	-	-	-	12	-	-	-
Eggs	4	-	-	-	4	-	-	-
Beverages[a]	u	u	u	u	953	157	661	482
Flavourings, etc.[b]	u	u	u	u		341	517	639
Chewing Gum[c]	u	u	u	u		48	248	260
TOTAL					5404	5353	13485	12117

Notes: a - tea, coffee, cocoa
b - curry powder, sauce, salt, baking powder, yeast
c - as with items a and b, assumed that calorific value is negligible.

Source: Records of Nacamaki Co-operative Society

TABLE B. Energy Gain from Food Purchases at Nacamaki, 1966-76.

Food Item	Unit Energy Value * (kcal/kg)	Energy Yield (10^6 kcal)			
		1966	1972-3	1973-4	1975-6
Sugar	3940	27.15	26.33	31.18	31.77
Rice	3610	6.88	8.82	14.58	7.37
Flour	3500	10.64	7.47	9.99	14.45
Biscuit, plain	4090	4.47	6.04	6.27	7.39
Fish, tinned	3140	4.64	0.41	6.03	4.75
Oil, edible	9300	0.70	0.30	2.83	-
Dripping	9200	2.73	2.34	2.40	0.57
Meat, tinned	3350	1.04	0.25	1.90	0.49
Milk, powder	5300	0.33	0.30	1.64	0.18
Margarine	7950	0.74	1.21	1.56	0.37
Milk, evaporated	1590	0.01	0.31	0.38	0.26
Sweets	3270	0.10	0.17	0.34	0.17
Peas, dried, salted	3030	-	0.04	0.34	-
Milk, sweet condensed	3540	0.09	-	0.34	-
Biscuits, sweet	5560	0.04	0.14	0.16	-
Jam	2610	0.02	0.11	0.11	0.06
Onions and cabbage	230	0.04	0.03	0.09	0.07
Spirits	2220	0.18	0.16	0.08	-
Beer	320	0.19	0.07	-	-
Oatmeal	4040	-	-	0.04	-
Milk, bottled	660	0.03	-	0.03	-
Potatoes, Irish	700	0.20	-	0.03	-
Cheese, processed	3740	-	-	0.02	-
Fruit, tinned	770	0.01	-	0.02	0.03
Fresh Meat	2630	0.26	-	-	-
Butter	7950	1.01	-	-	0.43
Chocolate	5170	0.02	-	-	-
Eggs	1580	0.01	-	-	-
Beverages	-	-	-	-	-
Flavourings, etc.	-	-	-	-	-
Chewing Gum	-	-	-	-	-
TOTAL		61.32	54.26	80.37	68.36

* McCance and Widdowson (1960)

TABLE C. Expenditure other than foodstuffs, Nacamaki Co-operative Store, 1966-76.

Category	Total Value of Expenditure ($)			
	1966	1972-73	1973-74	1975-6
Kerosene and Benzene	543	445	1024	1658
Cigarettes	1581	1476	5362	6258
Tobacco	226	556	844	471
Hardware	525	228	705	250
Soap and toiletries	567	702	1235	1619
Other non-edible goods	2058	262	1131	1470
Total Non-Foodstuffs	5499	3669	10301	11727
Total Foodstuffs	5404	5095	13485	12117
Total Store Expenditure	10903	8764	23786	23844
Total Income	u	14200	41240	38510

Source of Expenditure data: Nacamaki Co-operative Society Records.

Source of Income data: 1973-4 and 1975-6 - Table 10.

Income 7/1972 - 6/1973 is estimated as follows ($)

Copra	7,000	(data on production in 5/73 and 6/73 used)
Yaqona	2,100	(complete data available)
Taro	1,500	(estimate)
Shell	200	(estimate)
Livestock	400	(estimate)
Other	3,000	(estimate)

u - unavailable

TABLE D. Expenditure patterns at Nacamaki, 1958 and 1973-74.

Category	Total Expenditure $		Expenditure per Household $		Expenditure per Capita $		Percent of Total Income %	
	1973-74	(1958)	1973-74	(1958)	1973-74	(1958)	1973-74	(1958)
Foodstuffs	13,485	(5,228)	293	(101)	43.6	(15.2)	32.7	(42.6)
Cigarettes and Tobacco	6,106	(520)	132	(10)	19.8	(1.5)	14.8	(4.2)
Kerosene and Benzene	1,024	(u)	22	(u)	3.3	(u)	2.5	(u)
Other Store goods (1) Productive use	705	(u)	15	(u)	2.3	(u)	1.7	(u)
Other Store goods (2) Consumer use	2,366	(u)	51	(u)	7.7	(u)	5.7	(u)
All Store purchases	23,686	(8,788)	515	(169)	77.2	(25.5)	57.4	(71.5)
All other expenditures and savings	20,119	(3,484)	437	(67)	65.1	(10.2)	48.8	(28.4)
Total income	41,240	(12,271)	897	(236)	133.5	(35.7)	100	(100)

Source: 1958 -Watters' (1969:136) data on households, with total and per capita expenditures calculated.

1973-74 -Nacamaki Co-operative Society records on total expenditure, with per household and per capita averages calculated (see Tables A and C).

u - unavailable

Notes on categories: Other store goods (1) Productive use - includes hardware, tools, fishing equipment, building materials.

Other store goods (2) Consumer use - includes clothes, calico, soap, batteries, stationery, toiletries, etc.

APPENDIX 5.

Summary of Activities Survey, 29 July to 25 August 1974, 126 adult residents of Nacamaki village for one week each.

Activity and Time-unit		Adult males	Adult females	Adult persons
	sample size	62	64	126
Mandays	A. Total in the Survey	401	434	835
	B. Spent absent from Nacamaki			
	a. Other Koro villages	14	31	45
	b. Nausa Junior Secondary School	13	10	23
	C. Non-active in Nacamaki			
	a. Sickness	23	16	39
	b. Old age	18	17	35
	c. Sundays	57	59	116
	d. Other obligatory holidays	7	6	13
	D. Potential productive work days in Nacamaki (A - B + C)	269	295	564

Manhours				
I Productive Activities				
(a) Subsistence Sector: Food-gaining				
Teitei cultivation	844	47	891	
Village plot cultivation	5	-	5	
Horses - catching, etc.	9	-	9	
Pigs - feeding, etc.	12½	9½	22	
Prawns - gathering	½	10½	11	
Wild yams - collecting	13	-	13	
Fishing (qoli, siwa)	10	302	312	
Shellfish collecting (vivili)	-	58	58	
Domestic firewood	4	29	33	
Total	898	456	1354	
(b) Subsistence Sector: Crafts				
House building	9	-	9	
Coconut oil making	-	52	52	
Tapa cloth manufacture	-	18	18	
Pandanus mats - leaf processing, weaving	5	198	203	
Baskets, brooms - making	-	5	5	
Sewing clothes	-	31	31	
Total	14	304	318	
(c) Cash Sector				
Copra - collecting coconuts	347	98	445	
- collecting firewood	156	9	165	
- drying copra	118	-	118	
- loading copra	20	-	20	
Cooperative Store business	22	-	22	
Total	663	107	770	
II Unproductive Activities				
Communal village works	93⅓	67⅔	161	
Formal meetings	40	18	58	
Inter-village travel (social visits)	51½	41½	93	
Hospital visits	10	10	20	
Rugby Football	26	-	26	
Total	221	137	358	
III Unrecorded Activities				
Domestic work (washing clothes, cooking, cleaning house, etc.)	)			
Child-related work	) 1432	2636	4068	
Leisure (excluding holidays, days absent, and sick days)	)			
Productive + Unproductive + Unrecorded Activities, grand total manhours	3228	3540	6768	
Hours of darkness (12 hour day assumed)	3228	3540	6768	

Notes: Sample: survey covered one complete week of activities of all resident persons in Nacamaki aged 15 years or over in August 1974.

Activities: all totals for manhours in categories, Ia, b, c and II were estimated through daily interviews with persons in the sample. Totals in category III were derived by subtraction from total potential, assuming 269 potential mandays for males and 295 for females, and assuming a 12 hour day of possible activity.

Category I a: teitei cultivation includes some work associated with kava (yaqona) cultivation, which is partly a Cash Sector activity.

APPENDIX 6. Manmonths of residence in Nacamaki village, with estimate of the energy requirements of the resident population, September 1973 to August 1974.

Sex and Age Class	Manmonths of Residence, 1973-74			Estimated Calorific Requirement, 1973-74.	
	Interviewed sample, 39 households	Estimate for other 7 households	Total	Daily (kcal) (FAO 1957)	Annual 1973-74 (kcal)
Persons 0-4	394	30	424	1183	15,256,760
Persons 5-9	274	108	806	1773	43,466,570
Persons 10-14	451	126	577	2439	42,805,470
Males over 15	842	166	1008	2698	82,720,680
Females over 15	735	153	888	1914	51,697,140
Total, all persons			3703 months*		235,946,620

Sources: Resident data: Appendix 1 and field notes.

Calorie requirements: FAO 1957, assuming average body weight of males 70 kg and females 60 kg, and mean environmental temperature of 25 degrees Centigrade.

Annual Requirement = Total Manmonths of Residence X Daily Requirement X (365/12).

* Equivalent of 309 persons per year.

APPENDIX 7.

Summary of survey of fish production at Nacamaki, August 1974.

Day	Number of women, Fishing technique	Manhours of fishing		Marine Fauna caught (weight in lbs)					
		Total	Mean	Fish	Octopus	Holothurian	Molluscs		
							Gastropods	Clams	Others
15th	10 [a]	38.8	3.83	34.3	5.1	4.8	0.1	0.4	0.1
16th	4 [b]	11.2	2.79	4.8	-	-	0.4	-	-
"	4 [c]	4.8	1.21	-	-	-	-	-	0.8
17th	9 [c]	19.3	2.15	3.4	4.4	3.9	19.1	-	-
"	26 [a]	154.5	5.94	177.3	10.4	8.2	4.2	1.1	0.4
18th	0	-	-	-	-	-	-	-	-
19th	7 [c]	25.2	3.60	3.9	-	10.6	8.3	0.8	-
"	16 [b]	99.7	6.23	80.9	7.6	-	-	-	-
20th	3 [a]	8.3	2.77	19.3	-	-	0.1	-	-
"	2 [c]	1.5	0.75	-	-	-	0.4	-	0.3
21st	14 [c]	42.2	3.01	0.3	4.1	6.4	12.9	-	1.1
"	12 [b]	30.0	2.50	38.5	-	-	0.1	-	-
"	2 [a]	8.0	4.00	2.7	7.1	-	1.0	-	-
Total [a]	41	209.0	5.10	233.5	22.5	13.0	4.4	1.5	0.4
[b]	32	180.8	4.40	164.2	7.6	-	0.5	-	-
[c]	36	93.0	2.58	7.4	8.6	20.9	40.7	0.8	2.2
Grand Total	109	442.8	4.06	405.2	38.6	33.9	46.6	2.3	2.7

Notes:

Fishing Techniques: a - siwa. Underwater spear-fishing and/or line-fishing, mainly individually or in pairs.

b - goli. Fishing with nets, among the reefs or at the exits of tidal traps, mainly in groups of up to a dozen women.

c - vivili. Gathering of shell-fish, etc., from exposed reef flat or reef front at extreme low tide, mainly on an individual basis.

Weights of catch: for holothurians and molluscs all weights are net, i.e. estimate of edible portion only, based on subtraction of mean shell weight from mean total weight of a sample.

APPENDIX 8. Changes in annual copra production and production of yaqona for sale, Nacamaki 1958 and 1970-76.

Year	Copra [a]		Yaqona [b]		Total Income [c] (all sources)
	Total Production (tons)	Total Income ($)	Total Production (lbs)	Total Income ($)	
1/1958-12/1958	168	3,770	21,466	6,220	12,270
9/1970-8/1971	243	6,060	11,271	3,700	13,000
9/1971-8/1972	365	5,910	9,295	2,300	11,000
9/1972-8/1973	480	9,160	5,056	1,500	14,200
9/1973-8/1974	375	31,040	4,254*	2,090	41,240
7/1975-6/1976	189	10,440	14,110	19,070	38,510

Notes:

a. Data sources: 1958 - see Table 9. Watters (1969)
1970 - 1976 - (1) Nacamaki Co-operative Society records (1970-71, 6 months records; 1971-72, 8 months records; 1972-73, 3 months records, seasonally adjusted by factor of 0.9, and increased by estimated $1400 worth of copra, 70 tons, sold direct to Suva in period after 2/1973; 1973-74 and 1975-76, 12 months records). (2) Interviews with heads of households to estimate copra sold direct to Suva in 1973-74 and in 1975-76.

b. Data sources: 1958 - see Table 9 and Watters (1969).
1970-1974 - Nacamaki Co-operative Society records give a complete time series. In 1972-73 a small but unknown quantity of yaqona was sold direct to Suva. Figures for 1973-74 include an estimated $232 worth of yaqona sold direct to Suva.
1975-76 - Society records and interviews with producers selling direct to Suva, Levuka and Indian traders.

c. Data sources: 1958 - see Table 9 and Watters (1969).
1970-71, 71-72, 72-73 - figures are approximations, based on total copra and yaqona income plus estimates for other sources.
1973-76 - see Table 9.

* In addition an estimated 5760 lb was consumed in Nacamaki.

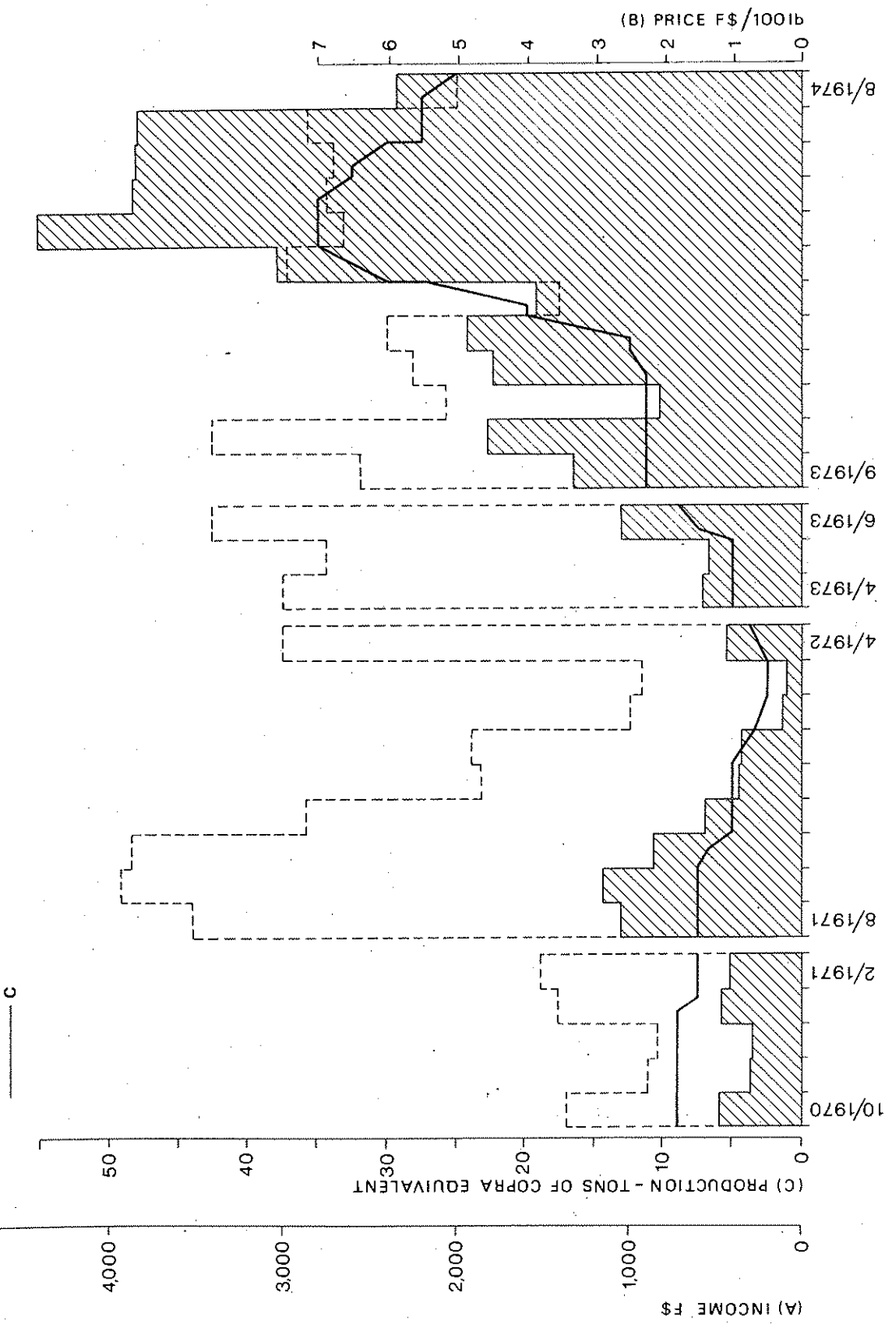

FIGURE 13: Changes in copra income (A), copra price (B), and copra production (C), at Nacamaki, 1970-74.

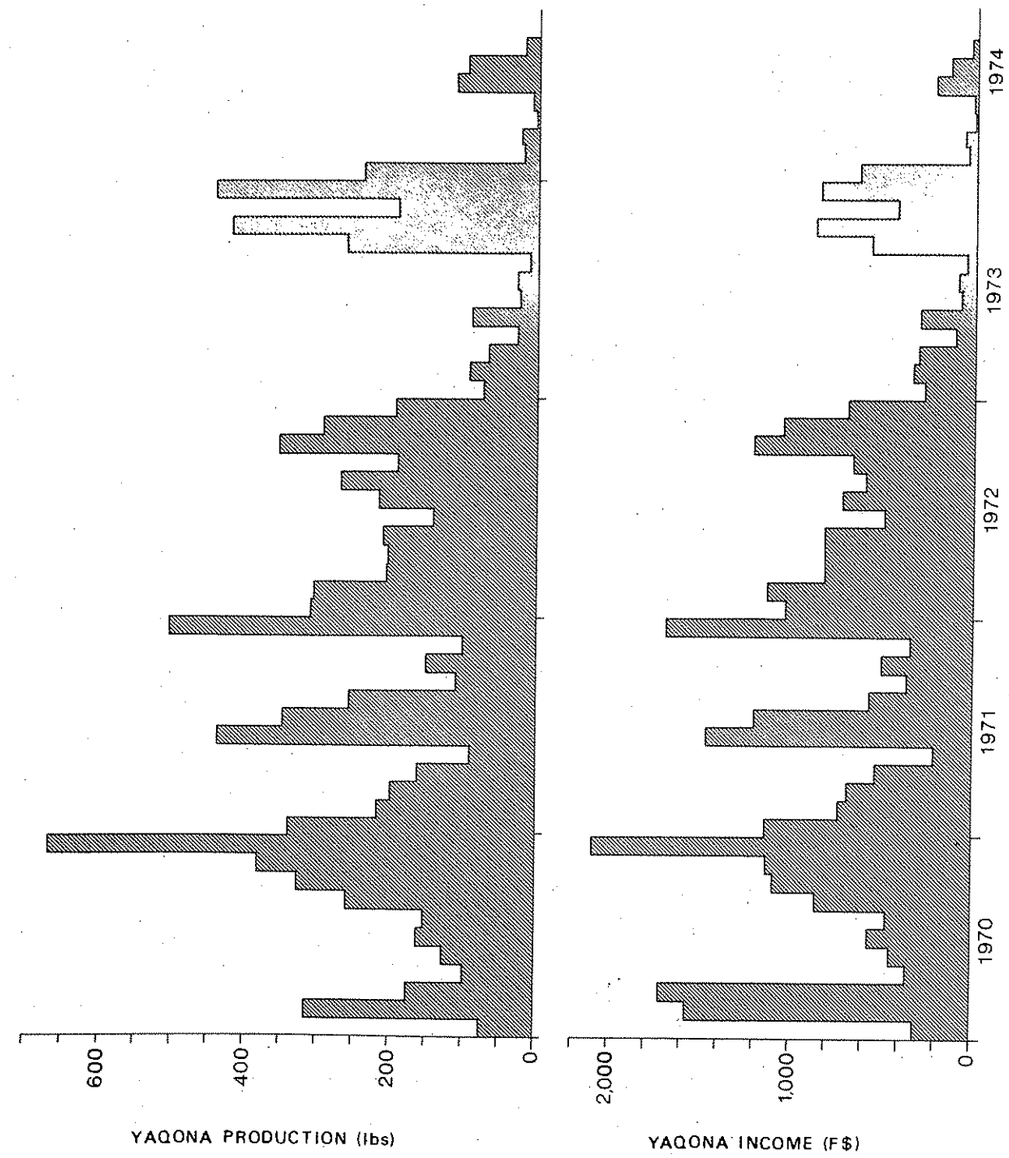

FIGURE 14: Changes in yaqona production and yaqona income at Nacamaki, 1970-74.

References

Allen, P.S. (ed.), 1907. The Cyclopedia of Fiji. Sydney; McCarron Stewart.

Anon. 1834. Extracts from Logs. Pacific Manuscripts Bureau, Australian National University, Canberra. Film PMB225.

Attenborough, D. 1960. Quest in Paradise. London: Lutterworth.

Bayliss-Smith, T.P. 1976. Hurricane Val in Lakeba. UNESCO/UNFPA Population and Environment Project in Eastern Fiji, Project Working Paper 10.

-- 1977. Energy use and economic development in Pacific communities. In- Bayliss-Smith and R.G.A. Feachem (eds.), Subsistence and Survival: Rural Ecology in the Pacific. London: Academic Press.

Bedford, R.D. 1976. Kabara in the 1970's. UNESCO/UNFPA Population and Environment Project in Eastern Fiji, Project Working Paper 3.

Boyan, R.H. 1951. Koro: Fiji island of progress. South Pacific Bulletin 11 (1): 37-38.

Britton, H. 1870. Fiji in 1870...Melbourne: Samuel Mullen.

Burrow, W. 1936. Report on the Fiji Census, 1936. Legislative Council, Paper No. 42. Suva: Government Printer.

Calvert, J. 1858. Fiji and the Fijians: Mission History. London: Heylin.

Chayanov, A.V. 1966. The Theory of Peasant Economy. Homewood, I11.: Irwin.

Cooper, H.S. 1882. The Coral Lands of the Pacific. London: R. Bentley.

Crocombe, R. 1971. Review Article: Watters, R.F., 'Koro'. Journal of the Polynesian Society 80: 505-520.

Cummings, C.F.G. 1881. At Home in Fiji. Edinburgh: Blackwood.

D.O.S. 1967. Lomaiviti Group, Sheet 1: Koro (1:50,000). Directorate of Overseas Surveys, Kingston, England.

Dana, J.O. 1875. Corals and Coral Islands. London: Sampson Low.

Dommer, E.C. (ed.), 1974. Estimating Non-Monetary Economic Activities: A Manual for National Account Statistics. U.N. Development Advisory Team for the South Pacific, Suva.

Driver, W. 1831-32. Logbook of 'Charles Doggett'. Pacific Manuscripts Bureau, Australian National University, Canberra. Film PMB39.

Eagleston, J.H. 1830-33. Logbook of Barque 'Peru'. Pacific Manuscripts Bureau, Australian National University, Canberra, Film PMB205.

F.A.O. 1949. Cited in - Murai, M. 1954. Nutrition study in Micronesia. Atoll Research Bulletin 27: 1-239.

-- 1957. Calorie Requirements: Report of the Second Committee on Calorie Requirements. Nutritional Studies No. 15., Rome:F.A.O.

Fiji, Colony of, 1880. Minutes of the Executive Council Sitting for the Hearing of Claims to Land, 1879-80. Pacific Manuscripts Bureau, Australian National University, Film PMB DOC 206.

-- 1881. Census Report 1881 (Encl. to Desp. 183 of 29/12/1881 to S/state). MS. in Central Archives, Suva.

-- 1892. Colonial Reports - Annual. No.45. Fiji Annual Report for 1890. London: H.M.S.O.

-- 1901. A Report on the Census of 31 March 1901. Minute Paper 2919 of 1901, Suva.

-- 1911. Report by the Commissioner of the Census. Legislative Council Paper No.44. Suva: Government Printer, Fiji, Native Affairs Department, 1914. Eastern Division Annual Report, 1914, Fiji Archives, Suva.

-- 1922. Fiji Census, 1921 (Report on the Census) Paper No.2. Suva: Government Printer.

-- 1966. Fiji Development Plan 1966-1970: Development Planning Review. Legislative Council Paper No. 11. Suva: Government Printer.

Fiji, Prices and Incomes Board, 1975. Inflation in Fiji. Suva: Government Printer.

Fiji Times, 1875a. No.509, March 10. Levuka, Ovalau.

-- 1875b. No.521, April 21. Levuka, Ovalau.

Frazer, R. 1973. The Fijian village and the independent farmer. In - Brookfield, H.C. (ed.), The Pacific in Transition. London: Arnold.

Gittins, J.W. 1946. A Report on the Results of the Census of the Population, 1946. Legislative Council, Paper No. 35. Suva: Government Printer.

Hardaker, J.B. 1976. Economic aspects of agriculture and marketing in Taveuni. UNESCO/UNFPA Population and Environment Project in Eastern Fiji, Project Working Paper No.6.

Im Thurm, E. 1910. Fiji: Report on the Hurricance of March, 1910. Colonial Reports, Miscellaneous. No.72. London: H.M.S.O.

-- (ed.), 1925. The Journal of William Lockerby, Sandalwood Trader in the Fijian Islands 1808-1809. London: Hakluyt Society.

Jackson, J. 1853. Appendix. In - J.E. Erskine, Journal of a Cruise among the Islands of the Western Pacific. London: J. Murray.

Lockerby, W. 1925. The Journal of William Lockerby...1808-1809. Im Thurm (ed.), London: Hakluyt Society.

-- 1972. Directions for Fegee Islands. In - Dodge, E.S. (ed.), A William Lockerby Manuscript in the Peabody Museum of Salem. Journal Pacific History 7: 182-188.

Lyth, R.B. 1843. Day book Journal. MS, Mitchell Library, Sydney.

MacArthur, N. 1958. Report on the Census of the Population, 1956. Legislative Council, Paper No. 1 of 1958. Suva: Government Printer.

-- 1968. Island Populations of the Pacific. Canberra: Australian National University Press.

MacCance, R.A. and Widdowson, E.M. 1960. The Composition of Foods. Special Reports, Medical Research Council, No. 297. London: H.M.S.O.

McGee, T.G. 1975. Food dependency in the Pacific: a preliminary statement. Working Paper No. 2, Development Studies Centre, Australian National University.

McLean, R.F. 1976. Notes on Tropical Storms and Hurricances in the Eastern Islands of Fiji. UNESCO/UNFPA Population and Environment Project (mimeo).

Murai, M., Pen., F., and Miller, C.D. 1958. Some Tropical South Pacific Island Foods. Honolulu: Univ. Hawaii Press.

Myrdal, G. 1957. Economic Theory and Underveloped Regions. London: Allen.

Nayacakalou, R.R. 1971. Fiji: manipulating the system. In - Crocombe, R. (ed.), Land Tenure in the Pacific. Melbourne: Oxford Univ. Press.

O'Loughlin, C. 1956. The Pattern of the Fiji Economy. Legislative Council, Paper No.44, Suva: Government Printer.

Palmer, B. 1967. Archaeological sites of Wakaya Island. Records of the Suva Museum, 1 (2). Suva, Fiji.

Platt, B.S. 1962. Tables of Representative Values of Foods commonly used in Tropical Countries. Special Reports, Medical Research Council, No.302. London: H.M.S.O.

Rappaport, R.A. 1967. Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People. New Haven, Connecticut: Yale University Press.

Sahlins, M.D. 1957. Land use and the extended family in Moala, Fiji. American Anthropologist 59: 449-462.

-- 1962. Moala: Culture and Nature of a Fijian Island. Ann Arbor: Univ.Michigan Press.

-- 1972. Stone Age Economics. London: Tavistock.

Seeman, B. 1862. Viti: an Account of a Government Mission to the Vitian or Fijian Islands in the years 1860-61. Cambridge: Macmillan.

Spate, O.H.K. 1959. The Fijian People: Economic Problems and Prospects. Legislative Council, Paper No. 13. Suva: Government Printer.

Squire, W. 1877. On measles in Fiji. Transactions of the Epidemiological Society of London 4: 72-74.

Thomson, D. 1896. In - Fiji, Colony of, Report of the Commission appointed to enquire into the decrease of the native population. Suva: Government Printing Office.

Tippett, A.R. 1968. Fijian Material Culture. A Study of Cultural Context, Function and Change. Bishop Museum Bulletin 232. Honolulu: Bishop Museum Press.

Tupouniua, S. et.al. (eds.), 1975. The Pacific Way. Suva: South Pacific Social Sciences Association.

Twyford, I.T. and Wright, A.C.S., 1965. The Soil Resources of the Fiji Islands (2 vols.), Suva: Government Printer.

Ward, R.G., 1968. Land use and land alientation in Fiji to 1885. In - History of Melanesia, University of Papua New Guinea and Research School of Pacific Studies, Australian National University.

Waterhouse, J. 1866. The King and People of Fiji. London: Wesleyan Conference Office.

Watters, R.F. 1969. Koro: Economic Development and Social Change in Fiji. Oxford: Clarendon Press.

Wilkes, C. 1852. Narrative of the United States Exploring Expedition during the years 1838, 1939, 1840, 1841, 1842. Vol. II. London: Ingram, Cooke.

Zwart, F.H.A.G. 1968. Report of the Census of the Population, 1966. Legislative Council, Paper No. 9 Suva: Government Printer.