

PACIFIC 2010

UNIVERSITY OF CALIFORNIA, SAN DIEGO



3 1822 01677 2030

IR/PS
Stacks
HD
2195.65
.Z8
H37
1994

Pacific Policy Paper

13



Strategies for Melanesian Agriculture for 2010: *tough choices*

J. Brian Hardaker and Euan Fleming

Digitized by Google

INT'L RELATIONS/PACIFIC STUDIES LIBRARY
UNIVERSITY OF CALIFORNIA, SAN DIEGO
LA JOLLA, CALIFORNIA



PACIFIC

2010

© National Centre for Development Studies 1994

This work is copyright. Apart from those uses which may be permitted under the *Copyright Act 1968* as amended, no part may be reproduced by any process without written permission from the publisher.

ISSN 0817-0444

National Library of Australia Cataloguing-in-Publication entry

Fleming, Euan

Pacific 2010 : strategies for Melanesian agriculture for 2010 ; tough choices.

ISBN 0 7315 1931 0.

1. Agriculture – Economic aspects – Melanesia. 2. Melanesia – Economic conditions. I. Hardaker, J.B. (John Brian). II. Australian National University. National Centre for Development Studies. III. Title. (Series : Pacific policy papers ; no. 13).

338.10993

Cover photograph: Norman Plant (Department of Foreign Affairs and Trade)

Series editor: Maree Tait

Design: May Stinear and Annie di Nallo

Editing and pagemaking: Arawang Information Bureau Pty Ltd

Printed in Australia by Paragon Printers

Contents

Authors	vi
Editorial note	vi
1 Strategic decision-making for Melanesian agricultural development	1
2 Strategic agricultural planning in Melanesia	7
3 Inter-sectoral strategies and the agricultural sector	20
4 Specific agricultural sector strategies	27
5 Agricultural marketing strategies	103
6 Government capacity to implement agricultural development strategies	143
References	147
Index	153

Authors

Euan Fleming is a lecturer in agricultural economics at the University of New England, Armidale, and has taught agricultural economics and farm management in the South Pacific. He has a PhD in agricultural economics from the University of New England. He has undertaken consultancies and research work in Fiji, Solomon Islands, Tonga, Vanuatu and Western Samoa. His main research interests are in agricultural marketing and rural development policymaking.

J. Brian Hardaker is professor and head of the Department of Agricultural Economics and Business Management at the University of New England. His PhD in agricultural economics is from the same university. He has undertaken research and consultancies in Australia, the South Pacific, India and Indonesia on problems of farm economics in developed and developing economies and improving technology in agricultural development, as well as working on issues in rural development policy.

Editorial note

This monograph, *Strategies for Melanesian Agriculture for 2010: tough choices*, is one in a series which has been commissioned as part of the National Centre for Development Studies project *Pacific 2010*. As with associated publications, it seeks to highlight the consequences of failing to recognise and plan for the effects of population growth in the island states of the South Pacific over the next two decades.

The challenge of planning for the long-term needs of Pacific states is directed not only to the island leaders but also to those in the industrial countries responsible for the design and delivery of all forms of overseas development assistance.

The objective of *Pacific 2010*, and the publications which it has initiated, is to present in a clear, focused manner some of the issues which are believed to be of importance to the region's future.

1

Strategic decision-making for Melanesian agricultural development

Despite some set-backs encountered along the way, the four countries under study (Fiji, Papua New Guinea, Solomon Islands and Vanuatu — for shorthand, referred to hereafter as the Melanesian countries) have made impressive general progress since independence. Their achievements in certain sectors, especially agriculture, have been less impressive. Today, economic conditions are testing for agriculture and are likely to remain so in all countries.

The purpose of this study is not to dwell on past economic achievements and failures. Rather, it is to address some strategic questions about the longer-term development of Melanesian agriculture, in the light of both problems that exist today and emerging trends in the environment in which agricultural enterprise takes place. In particular, the aim is to suggest how agriculture needs to change so that it will be a vibrant part of Melanesian economies in the year 2010.

Agriculture is very important in the Melanesian countries. A majority of the people in these countries depend on agriculture for at least a part of their livelihood. In the long-term development of these economies, however, agriculture must decline in relative importance. By 2010, even though agriculture will still be a major employer of labour and will contribute significantly to foreign exchange earnings and to manufacturing and service industries, the

share of agriculture in the gross domestic product of these countries will be much smaller than it is today.

Notwithstanding its decline in relative importance, agriculture must provide the fundamental driving force for long-run economic transformation. To fulfil this role, agricultural activities need to be strong and dynamic. Unfortunately, in the past two decades, agriculture's performance in the Melanesian countries (and in the South Pacific generally) has been inadequate. Yet it is fair to say that the development planning process to date in these countries has not been very helpful. A broad planning issue facing each Melanesian government, therefore, is how to ensure that in the future, agriculture fulfils its vital role as the engine for general economic development.

Smallholders have dominated subsistence food production in Melanesia, and there is little doubt that they will continue to do so. Today, many smallholders also grow cash crops. Because of the bulky and perishable nature of the staple tropical root crops, however, the commercialisation of smallholder agriculture has mostly occurred through the production of other crops for export. Many of the strategic issues examined in this study revolve around the ways in which agricultural export industries should develop.

Smallholder participation in commercial production has been uneven, both within communities and between regions. Especially in the early stages of development, not all smallholders in an area participated in cash cropping, and for various reasons, there has been a geographic concentration of commercial production. This has meant some socioeconomic differentiation among the rural classes, leading to concerns about equity. For example, Maeaba (1993) has shown in respect of Solomon Islands that there is marked inter-personal maldistribution of cash income and expenditure within rural villages. Such interpersonal inequalities cannot be ignored by rural planners, although, as regions within Melanesian countries participate unevenly in cash crop development, concerns about spatial inequalities — between regions and between urban and rural populations — are likely to grow.

‘... agriculture must provide the fundamental driving force for long-run economic transformation’

Macroeconomic assessment and broad development strategies are not enough

The World Bank has proposed the adoption of a new approach to planning which emphasises macroeconomic assessment and broad development strategies (Cole 1993:vii). There is nothing inherently wrong with this proposition, but it is unlikely, by itself, to be sufficient to ensure that agricultural development will be maximised. In fact, while getting the macroeconomic settings right will have important benefits for agriculture, there is a real risk that insufficient attention will be paid to agriculture's primary development role, and even less attention given to the emerging problems of future generations in rural areas. The new planning approach must include proper attention to emerging long-term rural problems.

To ensure that agriculture can contribute substantially to economic development over the next two decades and beyond, far-sighted agricultural development strategies are crucial. These strategies should be tiered in order to capture the 'big picture' decades ahead, and at the same time be specific enough to deal with particular chronic and newly emerging agricultural problems.

As outlined below, the aim of the study is to provide such an approach. Consequently, the impact of general national development strategies and macroeconomic influences on agriculture's future are not dwelt upon. Instead, strategies dealing directly with rural issues are the main focus of discussion.

The importance of agricultural development

Agriculture in Melanesian countries needs to be vibrant and dynamic, for only agriculture can drive the process of overall development at the pace needed to meet the challenge of the future. Agricultural development can serve as the engine of economic growth in several ways.

First, most people in Melanesia still depend on agriculture (including fishing) for their livelihood. If they are to experience higher incomes, agriculture must be improved.

Second, agriculture can provide the stimulus to growth of other sectors. One avenue is through the expanded purchasing power of farm people once smallholder incomes are raised. Evidence provided by Jones, Fleming and Hardaker (1988) shows that

smallholders spend an appreciable proportion of their incomes on goods and services that can be locally produced, or that have a significant local content. Such local production takes place using relatively low-capital, labour-intensive methods that are well matched to the present resource endowments of Melanesian countries.

Third, agricultural households are the largest group in Melanesian populations, and hence their savings are vital to the process of economic growth. The propensity of rural people to save, given real increases in cash incomes and reasonable access to banking facilities, has probably been underestimated, as has their willingness to invest in profitable investment opportunities, either on or off the farm.

Fourth, if Melanesian countries are to compete in increasingly competitive world markets by selling exports and offering services such as tourism, local wage rates must be kept within bounds. The chief determinant of wage levels is food prices. Unless local production of food for sale in fresh produce markets (without direct substitutes of imported foods) is expanded faster than the rate of growth in demand, there will continue to be upward pressure on prices, and thus on wage rates. A similar upward pressure on wages and living costs can come about if falling agricultural exports lead to a deterioration in trade balance, leading in turn to a balance of payments deficit and to currency devaluation, and so to higher prices for imported goods, including foods. Under either scenario, it is increasingly difficult for a Melanesian country to compete internationally.

Fifth, employment is needed for the large numbers who will, as a result of high rates of natural growth in population, join the workforce in the next two decades. Gannicott (1993) projected changes in the economically active population from 1991 to 2011 in each Melanesian country. For Fiji and Papua New Guinea, the projections indicate 43 and 55 per cent increases, respectively, over the 20-year period. These increases are substantial, but insignificant compared with the projected 95 and 102 per cent increases, respectively, in Vanuatu and Solomon Islands.

Although employment will need to be expanded in all major productive sectors in Melanesian economies, only agriculture has

the potential for increases in employment on the scale required, and within the cost constraints prevailing in these capital-scarce countries. With no safety valve of mass out-migration, no other sector offers the possibility of creating productive employment opportunities at a pace that will match the growth in the labour force already set by high past and present birth rates. The financial capital required to develop the industrial or service sectors, such as tourism, or even the more capital-intensive agricultural modes of production, to the required extent would be many times more than could be afforded without unrealistic and unacceptable levels of foreign investment. The ability of agriculture to absorb most of the large numbers of job market entrants in rural areas will be severely tested for the next generation in Melanesian countries.

On the other hand, in the longer run there will be a relative decline in agricultural production and employment as other sectors of the Melanesian economies grow. A dynamic agricultural sector that is advancing technologically can progressively release both labour and capital from the savings of rural people for expanding industrial and service industries.

Finally, relative to producers in most other productive activities, agriculturalists overwhelmingly use renewable resources. If these resources are used wisely, the development created by agriculture can be sustainable well into the future.

Sustainable agriculture and development

We believe it is inappropriate to separate the concept of sustainable agriculture from that of agricultural development. Instead, the focus should be on a unified concept of sustainable agricultural development.

Sustainable development of a farming system is a pattern of growth which optimises future economic and social benefits in that system. It is part of more general sustainable development, which Pearce, Barbier and Markandya (1990:2) defined as follows:

We take development to be a vector of desirable social objectives; that is, it is a list of attributes which society seeks to maximise ... Sustainable development is then a situation in which the development vector ... does not decrease over time.

According to Lynam and Herdt (1989:396), sustainable development of a nation first needs to be defined at the highest level, from which the sustainable development criteria of lower order systems, such as farming, are derived. While Melanesian farming systems are part of broader social, economic and ecological systems, and farmers within them can contribute to the attainment of general sustainable development, their contribution need not be vital. But given the crucial role of agriculture in Melanesian development, it is difficult to see how sustainable development in a broad national sense could take place without sustainable development of at least the majority of the farming systems. In other words, the higher order systems in Melanesia rely heavily on the sustainable development of lower order farming systems.

To maintain their integrity, farmers have to experience constant or falling economic and environmental costs of production as output is expanded. For Lynam and Herdt (1989:385), this means that farming systems need to have 'a non-negative trend in total factor productivity over the period of concern'.

Little evidence of a quantitative nature is available on trends in total factor productivity in Melanesian farming systems, so judgments and observations made over the passage of time have to be relied upon. On his return to North Malaita after 15 years, Frazer (1986) was able to observe changes and collate local judgments which indicated declining total factor productivity. To the extent that the North Malaitan situation is unrepresentative of current circumstances in much of rural Melanesia, in that population pressure on land resources is much higher in North Malaita, this might be of little concern. To the extent that the North Malaitan situation is a harbinger of future trends, the observations made by Frazer become critical to strategic thinking about Melanesian agriculture.

‘... only agriculture has the potential for increases in employment on the scale required, and within the cost constraints prevailing in these capital-scarce countries.’

2

Strategic agricultural planning in Melanesia

Development planning

The need for governments to intervene in markets by planning and implementing development strategies is based on the existence of gross market failure. There are several causes of market failure (that is, the failure of the market to perform efficiently its functions of resource allocation and use, distribution of rewards from production, and rationing of output among consumers). P. Smith (1992:329) argued in the context of rural development that market forces 'do not work in situations of uncertainty or extreme diversity of interests or values, or where there are high transaction or information costs'. Such situations are common in developing economies, including Melanesia.

Government intervention in the direction of economic activities lies at the heart of national development planning. The extent of such intervention marks the distinction between centrally planned and free market economies. The two extreme positions are the *laissez faire* approach — allowing unfettered market forces to dictate the rate and direction of economic growth — and central planning, in which the state owns and controls all means of production.

Neither extreme can be found in its pure form, as governments have always intervened at least to a limited extent in influencing agricultural activities while never owning and control-

ling all factors of production (especially, in the case of agriculture, family labour). Hence, the form of almost all agricultural economies, including Melanesian economies, has been influenced by a mix of public and private planning decisions. The balance reached by a particular government will reflect the prevailing view about the relative importance of market failure versus government (institutional or political) failure.

Until recently, the most common choice among developing economy governments was for quite far-reaching government intervention, in recognition of pervasive market failure. In particular, market failure has been considered largely responsible for the persistence of widespread poverty in developing economies, notably in rural areas. Such a view of the need for intervention has largely been the stance of governments in Melanesian countries, although concern appears to have been less about rural poverty than about protecting the welfare of agricultural producers.

The most visible outcome of the interventionist view of the role of government in the planning process has been the preparation and implementation of fixed-period development plans. While this feature of the planning process was a product of centrally planned economies, until recently it was almost universally applied throughout the developing world, including Melanesia, although Papua New Guinea has not produced development plan documents, and reliance on development plans has been erratic in Solomon Islands. Nevertheless, in all four countries there has been a strong reliance on central planning processes despite some lip service to decentralisation in decision-making in Papua New Guinea and Solomon Islands. The underlying assumption of such plans is that governments have the capacity to influence strongly the individual decisions and actions of all in the population, and bring about higher economic growth with greater equity.

Growing disillusionment with central planning

Three problems have become almost universally recognised under the central planning approach as it relates to the agricultural sector. First, government planners are not the only ones who can make planning decisions: for instance, numerous decisions that governments cannot control are made daily by agricultural households.

Second, markets are not the only imperfect institutions; government institutions are also flawed. Attention has therefore recently switched to the widespread existence of institutional or political failure in developing economies, as the shortcomings of government intervention have come under greater scrutiny. Third, agricultural plans can also be conspicuously ineffective: development plan documents often bear little relation to the actual situation and events, particularly in rural areas. The limits to effective planning of rural development are readily apparent in Melanesia.

Consequently, the allure of government intervention has faded, helped by the recent failure of many centrally planned economies. The outcome has been a swing of the pendulum back to a reliance on market-led development. Market forces are now more widely credited with the capacity to bring about necessary economic growth and poverty alleviation without inherent contradictions. To a large extent, this study is concerned with the question of how policymakers in Melanesian countries can ensure that this pendulum, the initial movement of which is welcome, does not swing too far.

Appropriate nature of government intervention

Despite the trend towards greater reliance on market forces, some government intervention in the agricultural sector is inevitable, and the key is to formulate and implement agricultural development strategies which lead to government intervention in a consistent and efficient manner. These strategies should, in principle, be aimed at removing the most damaging forms of market failure, and leave market forces to operate where they are reasonably effective in promoting both growth and rural poverty alleviation.

“Market forces are now more widely credited with the capacity to bring about necessary economic growth and poverty alleviation ... this study is concerned with the question of how policy makers in Melanesian countries can ensure that this pendulum, the initial movement of which is welcome, does not swing too far.”

Considerable investment of public resources in development activities has taken place in attempting to develop commercial smallholder production in Melanesia. Governments have committed their bureaucracies to providing advice and assistance on a wide range of agricultural matters: land development; research activities; extension assistance in such areas as selection of seed material, improved production practices, crop maintenance and input usage; and the marketing of the agricultural output. These tasks have principally been the responsibility of agricultural ministries and statutory marketing boards. The approach adopted has been strongly top-down, and advice given to smallholders has not always been heeded.

It is difficult to be precise about how Melanesian governments should intervene in agriculture, and how they should set future priorities for intervention. Nevertheless, some strategic areas are more conducive to effective government intervention, and more likely to yield substantial advances towards the achievement of development objectives. The key to good intervention by government is to get the strategies right and to ensure that they are consistent with the likely long-term decisions made by individual households.

Emergent strategies

The central planning approach, as it relates to the agricultural sector, has three main problems. First, government influence in rural areas is limited. Even if planners formulate what they regard as a good strategy, or set of strategies, their ability to influence individual farm households is limited. Second, the knowledge of government planners of activities and decision-making in farm households is inevitably deficient. Consequently, strategies pursued by governments are commonly dissonant with those adopted by farmers. Third, in any event, governments typically lack the necessary resources and organisational skills to implement selected strategies.

Melanesian governments therefore should not try to dictate strategic directions through some central planning process, but should do what has been suggested by Mintzberg (1987:69): develop a better knowledge of the system they are trying to create,

understand its capabilities, and promote emergent strategies. All actions in a system converge into patterns which make effective use of the resources of the system. The key to emergent strategies is to recognise the emerging patterns of agricultural economic activities that make good use of agricultural resources, learn from these activities, and foster them.

“Melanesian governments ... should not try to dictate strategic directions through some central planning process, but develop a better knowledge of the system they are trying to create, understand its capabilities, and promote emergent strategies.”

The South Pacific is full of examples where successful patterns of activity have emerged and flourished because they suited the circumstances and resources in the agricultural sector: the original development of the copra industry, coffee development in the Highlands of Papua New Guinea and, more recently, taro exports from Western Samoa and vanilla and pumpkin exports from Tonga, to mention just a few. Governments did not centrally plan these developments, but in small ways assisted them. In other cases, which it would be too invidious to specify, the heavy hand of government has worked to the contrary, snuffing out potentially remunerative ways of using agricultural resources that had been developed by farmers and marketers.¹

What, then, is the role of government in formulating emergent strategies? To foster, protect on occasion if necessary, and help evolve activities emanating from individually chosen strategies when environmental forces are changing. Governments must craft agricultural development strategy, where ‘formulation and implementation merge into a fluid process of learning through which creative strategies evolve’. They need to get away from the ‘planning image’ which ‘distorts those processes and thereby misguides organizations that embrace it unreservedly’. For ‘organization’ here, read agricultural sector planning agency (Mintzberg 1987:66).

While the deliberate, central planning approach to develop-

¹ Defined generally here to mean any person or organisation involved in marketing agricultural products or inputs.

ment strategies is unlikely to be successful, Mintzberg also conceded that, in their pure form, emergent strategies are also unlikely to be successful. A successful strategy usually emerges from a combination of deliberate and emergent behaviour:

No organization ... knows enough to work everything out in advance, to ignore learning en route. And no one ... can be flexible enough to leave everything to happenstance, to give up all control. Craft requires control just as it requires responsiveness to the material at hand.

Mintzberg used the term material in the context of a potter crafting a piece of pottery. With a little imagination, one might consider agricultural strategists crafting agricultural development by making best use of the materials, or resources, available in the agricultural sector. This means giving free rein to the skills, knowledge and entrepreneurship of rural people, while exerting some subtle control to ensure this activity is directed as much as possible to attainment of social as well as individual goals.

The government therefore needs some indicative strategies to guide its control activities, to know what trade-offs exist between development goals, between agricultural/rural sectors and the rest of an economy (Chapter 3), and in resource use by producers and marketers (Chapters 4 and 5, respectively). These strategic choices are highlighted in this study but, in the final event, it will be the crafting ability of the government's agricultural strategists that will determine whether governments can aid individual endeavour to improve welfare in the agricultural sector.

The following discussion opens with a proposed set of broad goals for agricultural development. Then key strategies and priority areas for government intervention are outlined.

Agricultural development goals

Agricultural systems are human systems, the members of which live and work (or, if unemployed, seek work) in agricultural pursuits in rural areas. Agricultural development planning is defined here in a general sense as development planning for enhancement of the welfare of people in agricultural systems.

While Melanesian governments ostensibly pursue a wide range of agricultural development goals, if planning documents are

to be believed, there are typically three that are common to all agricultural development plans:

- income growth in farm households
- an acceptable income distribution among rural people
- high levels of employment.

These goals are assumed to be the centre-piece of agricultural development efforts in Melanesia to 2010.

Growth of farm output and income It is now widely accepted that economic growth alone is insufficient to secure economic development for the rural populations of developing economies. Placement of greater emphasis on other development goals, though, should not obscure the central importance of achieving increases in real income per head of population in rural areas: economic growth in Melanesian agriculture is still a necessary, if not sufficient, condition for sustainable development. Raising labour productivity and incomes are the means by which general development of the whole economy can be stimulated.

It is in relation to raising farm household incomes that there has been perhaps the greatest gap between rhetoric and action in agricultural development in South Pacific island nations in general, and Melanesian countries in particular. The rhetoric has been evident in development goals. Raising the incomes of the rural population and improving equity have been prominent goals. Yet the direct impacts of major strategies to improve farm household incomes and the welfare of rural people have been negligible or negative. Rural people are numerous in Melanesian countries and many are poor.

The contribution that the agricultural sector makes to economic development is best measured in terms of changes in aggregate agricultural output, especially in terms of the direct changes brought about in food supply and contribution to foreign exchange earnings through exports. Expansion of agricultural output can also indirectly serve as an engine of economic growth, in the various ways already discussed.

Equity and income distribution

The incorporation of equity and income distribution goals in development plans is a recognition that not all classes of rural people share equally in the benefits of growth in the agricultural sector. It is commonly asserted that the eradication of poverty in absolute terms is not a great issue in Melanesia, and is unlikely to become so in the years leading up to 2010. This view is too sweeping. There is considerable absolute poverty in Melanesian countries which, although not as crushing and pervasive as in some other developing economies, does exist in pockets and is still a serious development problem. Certainly, more disaggregated data are needed: an index such as the infant mortality rate disaggregated to the local level may tell a more disturbing story than does the national aggregate figure. For instance, it is evident that the delivery and quality of rural education and health care in some rural areas of Papua New Guinea is deteriorating.

The first and most obvious need in coming years is for agriculture in Melanesian countries to continue to satisfy the basic needs of the expanding population, an increasing proportion of whom will live away from the villages and so produce little or no food for themselves. The provision of other basic needs such as fresh water, sanitation and housing, not to mention services such as education, health care and security, will be a major challenge. At least some of these needs will have to be satisfied from within the agricultural sectors.

Relative inequality is likely to grow. Government attention must be directed to the existing distribution of productive resources in agricultural production, differences in access to markets and institutions serving agriculture, and varying abilities to take advantage of new agricultural technologies. There is also a risk of divergences in income between the urban and rural populations, and between regions endowed with vastly different resource bases.

‘The first and most obvious need in coming years is for agriculture in Melanesian countries to continue to satisfy the basic needs of the expanding population, an increasing proportion of whom will live away from the villages and so produce little or no food for themselves.’

Strategies need to be framed to prevent these divergences from growing too great if governments are true to their belief in a certain degree of regional equality. Ethical considerations apart, widening gaps between rich and poor may lead to security problems that are already of considerable concern, and are impeding development efforts, in some Melanesian countries. Agricultural strategies help to reduce regional inequalities, but might not be enough. In some places, out-migration might be the only, or at least the best, strategy.

Employment Employment goals are usually highly correlated with equity and income distribution goals. They take on special significance in Melanesian agriculture, which continues to be the most important employer of labour in these countries. At present, there are limited employment opportunities in modern manufacturing and extractive industries, as well as in many service industries. If non-agricultural industries are to flourish in countries with predominantly rural populations, such as Melanesia, large and sustained increases in agricultural labour productivity are essential.

Agricultural sector versus farm-household planning goals

As already noted, it is all too common for government development planners to overlook the fact that most strategic planning decisions are made at the micro level. In the agricultural production system, farm households make a myriad of planning decisions each year. Therefore, to implement its own sectoral planning decisions, the government relies on many people at the micro level behaving and acting in a designated way.

The potential conflict among sets of goals at different planning levels is a major theme of this study, and is developed in Chapters 4 and 5. A major premise is that planning decisions currently made in Melanesia at the sectoral level are often at odds with those made at the micro (farm and marketing firm) level. (Also, those at the national level are often at odds with those made at the sectoral level.)

There are two main causes of the frequent lack of congruence between household-level decisions and those made by government

planning agencies. First, the latter commonly neglect to consider farm-household responses to circumstances and situations. Second, where they do consider them, they either presume that households adhere to particular values and make certain decisions, or assume that all households respond in the same way which, of course, they do not. The potentially dysfunctional consequences of these mismatches are obvious. Take, for example, an agricultural strategy selected at the sectoral level. If planners believe (wrongly) that smallholders respond perversely to changes in product prices, they may make serious blunders in setting policies that affect these prices, such as levels of export taxes. Hence, when studying strategies in the agricultural sector, it is critical to examine decision-making in individual farm households.

Preview of suggested strategies for Melanesian agricultural development to 2010

Background to agricultural strategy assessment The context in which we assess alternative strategies is one of a continuing strong contribution to overall economic development by predominantly village-based farming systems. In turn, most village economies are expected to continue to be heavily based on agriculture during this period.

In assessing alternative strategies the obvious place to start is in the production system, and production strategies are indeed important elements in overall agricultural strategy making. As a consequence of the growing monetisation of village economies, however, especially through agricultural activities, agricultural marketing is becoming an increasingly important determinant of overall agricultural performance and, hence, the state of the village economy. There is little doubt that it will become even more crucial as Melanesian economies approach 2010. It is therefore important that agricultural marketing strategies be given equal prominence with production strategies, both in their own right and in coordination with production strategies.

While it is comforting to see Melanesian governments recently devoting more consideration to marketing issues, the nature of their consideration rings alarm bells. Of prime concern is the widely held misapprehension among key agricultural policymakers in Mela-

nesia that the response to economic incentives of agriculturalists (especially smallholder producers) is perverse. They appear to believe that farmers have fixed income aspirations so that, when prices are high, they sell less than when prices are low.

The empirical evidence, at least as far as export cash crops are concerned, shows that this is not true (Fleming 1988, 1989a). Market effects evince positive responses from agriculturalists in general, and smallholders in particular. The responses by Melanesian smallholders to price rises for principal export crops such as copra, coffee and cocoa are small but clearly positive in the short run and, moreover, tend to be greater than responses by largeholders. They can be expected to be greater in the long run. The situation in regard to supplies to domestic food markets is less clear because insufficient reliable information is available to permit careful economic analysis. It nevertheless seems that, in these markets, there are also commercial suppliers who respond to prices in the conventional way, even if there are some target income suppliers present. As commercial attitudes spread through the rural areas, more growers will emerge who will make their production and marketing decisions with a careful regard for price.

In assessing agricultural strategies, we assume a small but significant supply response by producers. Yet, despite positive market response to economic incentives by smallholders, no marked improvement in the performance of marketing systems in Melanesian countries has been observed over the past two decades, except for a few exceptional efforts by private marketers of specialty crops (Fleming and Hardaker 1986). There is, therefore, at least *prima facie* evidence that agricultural marketing systems are not contributing effectively to agricultural and rural development.

This leads to the second major concern about the emerging interest of governments in agricultural marketing. Too often, government decision-makers, frequently spurred on by politicians, do not sufficiently research the causes of poor agricultural marketing performance, and react by accusing private marketers of exploiting producers and making exorbitant profits. Evidence in Melanesian and other developing economies (Antony and Fleming 1991; Fleming and Antony 1991) shows that it is seldom the case that marketers charge excessively high marketing margins unless they

are a monopoly (usually statutory authorities) or unless access by producers to marketing information is severely limited.

Strategies to eliminate dualism Melanesian countries are characterised by dualism in the sense that two or more sub-systems within a system exist side by side, and those sub-systems remain predominantly distinct from one another over the long term.

The major form of distinction is different returns to the factors of production between the systems. These differences in returns do not narrow over time, and may become larger.

In relation to agriculture, two main forms of dualism exist:

- between the agricultural sector and other sectors of the economy
- within the agricultural sector.

Inter-sectoral dualism

Dualism between the agricultural sector and the rest of the economy is reflected in lower returns to labour in the agricultural sector compared with other sectors in the economy. This situation is an outcome of a number of factors, including: different uses made of technologies between sectors; differential access to factor markets, especially capital; differences in remuneration from product markets; differential access to public services, such as health and education; and government policies which artificially inflate the returns to factors in some sectors, notably in bureaucracies and through the imposition of minimum urban wages.

Dualism within the agricultural sector

Dualism within the agricultural sector can be looked at in terms of both the production system and the marketing system. In the production system, a dualistic structure is exemplified by the distinctions which mark smallholdings and largeholdings, with the latter exemplified by plantations. Technologies, input usage, access to markets and public services differ substantially between these modes of production, as do returns to productive factors. Similar dualism in production can exist between subsistence-oriented and commercial smallholders.

In the case of the marketing system, the dualism is between the (predominantly cash crop) export marketing sub-system and the (predominantly food) domestic marketing sub-system. The dualistic structure of the marketing system, as for the production system, can be classified by marketing organisation, market structure, technology, factor markets and product markets, and returns to factors used in marketing.

**Classifying
agricultural
development
strategies**

Five broad areas of strategic decision-making influence long-run agricultural performance, and thereby dictate the ability of Melanesian governments to meet their agricultural development goals:

- macroeconomic strategies, and their impact on agricultural performance
- inter-sectoral strategies as they affect the agricultural sector
- specific agricultural sector strategies
- farm-household strategies
- agricultural marketing strategies.

The strategies considered in this study are inter-sectoral strategies, specific agricultural sector strategies and agricultural marketing strategies. Coverage of these areas of strategic decision-making is general across the four countries under study.

Discussion of farm-household strategies is subsumed in that of agricultural sector strategies. The purpose of this approach is to highlight the potential for decision-making divergences which can occur between the two levels and which limit the effectiveness of the latter.

Macroeconomic strategies are not covered as they are considered to be outside the scope of the study. This is not to deny their potential impact on long-run agricultural performance. Many macroeconomic policy decisions admittedly have only a short-term impact on the agricultural economy, but some have had a more sustained effect in the recent past, and are more deserving of the tag strategies. There is some discussion later of macroeconomic issues in respect of inter-sectoral balance in supporting productive industries.

3

Inter-sectoral strategies and the agricultural sector

Two areas of inter-sectoral strategic decision-making by governments can have a substantial impact on activities and welfare in agriculture in the long term. They are the production sector emphasis on urban development rather than rural development, and the balance of rural regional development.

Production sector emphasis

Government intervention and inter-sectoral bias Many economists believe that market forces should dictate the relative fortunes of different sectors in a developing economy over time. Developing economy governments have tended to intervene in the economy in an attempt to hasten the process of changing sectoral importance. The strategic emphasis placed by these governments on different production sectors largely rests upon a choice between rural development and urban-based development, in terms of macroeconomic decisions, budgetary allocations and planning emphasis.

Macroeconomic decision-making affects the agricultural sector through the terms of trade, the price of agricultural labour, other production input prices, interest rates, subsidies and taxes, the cost of marketing inputs and economic infrastructure. Impacts are likely to vary between sectors. They also vary between plantations and smallholders in the agricultural sector, as exposure to the money

economy and usage of purchased inputs in production differs between these production systems. Nevertheless, virtually all farmers are substantially influenced by events in the money economy.

Macroeconomic decisions have had long-term effects on agriculture's relations with the rest of the economy in three main ways. First, they have been framed in such a way as to turn the agriculture–industry terms of trade against agriculture. Exchange rate policy, industrial policy and trade protection exert a potentially strong influence on economic returns to agricultural production, particularly in the agricultural export industries (for example, Jones, Fleming and Hardaker 1988; Stein 1991:29–33; Treadgold 1992:32–3). For example, the exchange rate influences welfare in an export-oriented industry, such as many agricultural industries, by affecting the competitiveness of producers in the world market. Where the domestic currency has been over-valued, it has been against the interests of the agricultural population.

Second, fiscal policies have been partly responsible for the limited and poorly planned and maintained rural infrastructure. This has inhibited the growth of rural production and incomes. Rural inhabitants have been relatively deprived of both social infrastructure (education, health etc.) and economic infrastructure (transport, communications etc.), partly as a result of the difficulties faced by governments in building up gross fixed capital and providing sufficient recurrent funds to maintain existing fixed capital, but also because of urban bias in public decision-making.

Third, one of the major financial problems faced by governments of small developing economies is the 'thinness' of the financial market. This is particularly evident in the case of rural financial markets on which the agricultural population relies for saving and credit transactions. Attempts by Melanesian governments to overcome the problems faced by agricultural households in gaining access to credit, through the operation of development or agriculture banks or subsidised credit projects, have been of limited value at best.

Melanesian planning documents indicate that governments acknowledge and appreciate the leading role that agricultural sectors must play for sustainable development. Yet economic

opportunities for the indigenous population (including those for the salaried class in the government bureaucracy) are increasingly being located in urban areas. The leading-sector role assigned to agriculture on paper has not translated into practice, and agriculture largely remains the 'poor cousin' among productive sectors. A major shift in priorities to direct more resources to rural areas is required if the agricultural sector is to fulfil its necessary leading role.

Inter-sectoral Imbalance and dualism

The inter-sectoral bias, observed above, is perpetuated in Melanesian economies by dualism between production sectors. Governments should see it as their role to remove, or at least mitigate, the effects of inter-sectoral dualism that cause income inequalities between those in the agricultural sector and those in other production sectors (especially between smallholders and others). Yet it is often not intervention that is needed, but government withdrawal from certain activities and cessation of policies. These activities and policies make a dualistic structure more entrenched by favouring non-agricultural economic activities.

Further, some forms of intervention by Melanesian governments aimed at preventing income inequalities between the agricultural and other production sectors have been misdirected, again tending to reinforce existing dualism. Witness, for example, government efforts to overcome differential access to capital markets through subsidised rural credit programs and to protect incomes of smallholder producers by providing monopoly marketing services for certain export commodities.

A major shift in priorities to direct more resources to rural areas is required if the agricultural sector is to fulfil its necessary leading role.

Regional balance

Questions of regional balance relate to equity in development between predominantly agricultural-based rural regions. Rural regional economies in Melanesia are almost everywhere based on

primary industries, usually subsistence food production, tree crop production, fishing and mining. Among the primary industries, agricultural production has historically been central to the monetisation of these rural regional economies. The contribution of agricultural industries has also been a major indirect impetus to economic development in other sectors of these regional economies, facilitating the growth of service and processing industries in regional towns, with consequent employment, income and output multiplier impacts. These service and processing industries are usually linked to commercial agriculture, and are another significant component of economic activity in the main regional urban centres. Other rural centres of importance are the ports through which rural commodities are exported.

Inter-regional disparities in incomes and rates of economic growth are marked, and probably growing, in Melanesian countries. For example, Treadgold (1987:36) observed:

Papua New Guinea provides a disturbing picture of regional imbalance. Not only has the pattern of inter-provincial income inequality been comparatively entrenched, but its overall severity increased to a remarkably high level in 1980.

Regional imbalances arise principally from three sources: variations in natural resource endowments and location; institutional factors, including public decisions on infrastructure and/or public/private decisions relating to the location of commercial agricultural ventures (notably export cash crops); and historical factors, especially those relating to European arrival and economic penetration.

There have been interactions among these three sets of factors. First, infrastructure investment decisions have tended to exacerbate existing differences between regions. Lack of infrastructure, especially transport and communications, has been the major obstacle to the development of widespread commercial agricultural production in more remote regions. At the same time, fragmented and rugged terrain typically has made the provision and maintenance of such infrastructure expensive and has had a profound impact on the rural regional economies where most of the export crops are grown.

Second, historical factors have combined with spatial variations in resource endowments. Growing recognition by colonial

powers before independence, and newly independent Melanesian governments after independence, of the need to hasten economic development was accompanied by an acknowledgment of a basic reliance on agriculture for economic development. This was interpreted in most cases as a need to emphasise export cash crops — a view that was reinforced by the availability of convenient markets in the former colonial powers, and region-specific suitable agroecological conditions, including freedom from serious pests and diseases, for growing certain cash crops (for example, arabica coffee production in the Highlands of Papua New Guinea). During the first three post-war decades in Papua New Guinea, for example, cash incomes from commercial agriculture in Western Highlands Province and Eastern Highlands Province became many times those in many other provinces.

Third, institutional factors have fed on historical events. Notably, established export-oriented plantation systems provided a demonstration effect to indigenous farmers, and provided technical support for the production by smallholders of cash crops that could be equally effectively grown by plantations and smallholders alike. Smallholders in regions without significant plantation systems lacked institutional support for cash crop development.

Historically, these interactions among factors have tended to intensify with economic growth and have caused an increase in income inequality followed eventually by a decline. However, the comfort of knowing that a decline in spatial inequalities will follow an initial increase associated with economic growth, does not appear justified in Melanesia. Treadgold (1987) concluded that changes in spatial income inequalities in Papua New Guinea have been taking place in the absence of economic growth. Inter-regional transfer of resources which would have reduced regional disparities in income and economic opportunities have been constrained by three main factors in Melanesia: the immobility of certain resources; social tensions emanating from migration; and government interventions which perpetuate existing inequalities.

Therefore, Melanesian governments cannot afford to wait for economic growth eventually to lead to lessening inequalities in the 21st century. As regional equity is an important goal, the pressing strategic question facing them as they notice increasing divergences

in wealth between regions is what, if anything, to do about it. A decision needs to be made between alternative regional development strategies. Governments can follow a number of paths. They can: concentrate public investment in fast growing regions, and hope that the benefits of growth trickle down to the more economically backward regions; disperse public funds more evenly among regions; or give priority to backward regions. For the trickle-down approach to work, governments would need to ensure the spatial development of efficiently operating factor and product markets.

‘Melanesian governments cannot afford to wait for economic growth eventually to lead to lessening inequalities in the 21st century. As regional equity is an important goal, the pressing strategic question facing them as they notice increasing divergences in wealth between regions is what, if anything, to do about it.’

A common reaction has been to establish special projects or programs for disadvantaged regions. But these have not been very successful either in introducing new and profitable cash crops or in tipping the balance of infrastructural investment away from the more favoured regions. A variant on this reaction has been to use pricing policies as a means of redistributing funds from exports from the regions closer to export points (usually better off regions) to more remote (usually poorer) regions. This approach has not been very successful either.

Both of the ‘special backward region emphasis’ approaches underline the dilemma facing governments. Either through their own ineptitude or lack of resources, or because distance, historical and resource endowment factors conspire against them, they appear virtually powerless to bring about shifts in the economic capacity of regions. Attempts to close the income and wealth gaps therefore hinge upon social strategies, implying a preparedness to subsidise poorer regions in the long term purely on equity grounds.

Unless the ability of governments to change the course of regional development improves dramatically in the next few years through spatially efficient factor and product markets, they will

have to face the hard question of whether they are willing to subsidise poorer regions indefinitely, or withdraw support and let out-migration take place as people from poorer regions seek greater opportunities elsewhere, perhaps overseas.

There is an efficiency argument here too. Some regional inequalities might be corrected by, say, appropriate infrastructure investments. These investments might be highly profitable but may not have been made due to some form of market failure — a version of the ‘circular and cumulative causation’ story.

‘Unless the ability of governments to change the course of regional development improves dramatically in the next few years through spatially efficient factor and product markets, they will have to face the hard question of whether they are willing to subsidise poorer regions indefinitely, or withdraw support and let out-migration take place as people from poorer regions seek greater opportunities elsewhere, perhaps overseas.’

4

Specific agricultural sector strategies

Numerous agricultural development strategies could be selected for analysis in this study, but only the eight most critical ones have been chosen. These strategies are regarded as most likely to influence the pattern of agricultural development and the welfare of the Melanesian rural population by 2010. These eight strategic choices can be represented in a four-tier hierarchy, as follows:

Tier 1

- *Mode of agricultural production:* unimodal versus bimodal; village-based smallholding versus plantation versus nucleus estate versus group blockholding.

Tier 2

- *Land tenure:* adjustments to existing land tenure arrangements; communal versus private versus state ownership
- *Farm size:* extent of farm size changes within production modes
- *Growth pattern:* adaptive versus radical versus entrepreneurial.

Tier 3

- *Technology:* research and extension focus on high-input versus intermediate-input versus low-input agricultural technologies

- *Degree of commodity specialisation: diversification versus concentration of agricultural industries*
- *Use and conservation of agroecosystem resources: rates of exploitation of agricultural resources, especially in respect of land degradation.*

Tier 4

- *Level of factor intensity: capital intensity versus labour intensity in agricultural production.*

These strategic decisions are logically sequential and involve choices between alternative paths, rather than levels, of use of productive resources in the agricultural sector. The only apparent exception is the rate of exploitation of resource use, but this is really a choice between the rate at which non-renewable resources are used and renewable resources are degraded, between the current and future generations.

Production mode needs to be considered first, because it will influence all other strategic choices. For a given production mode, farm size, land tenure and growth pattern decisions can then be considered. These will have implications for third-tier strategic decisions about technology, specialisation in production and rates of exploitation of agricultural resources. The latter three strategic choice sets will, in turn, influence factor intensity in agricultural production.

Strategists are also faced with hard decisions about productive resource use within the second and third tiers. Strategies within these tiers are related in the sense that decisions in one area affect decisions in others. For instance, decisions on technology have implications for those about the rate of resource exploitation and specialisation. In some cases the relationship will be complementary while it will be competitive in others. Selection of technologies sensitive to the agroecosystem, for example, can slow down the rate at which resources are used up over time. On the other hand, selection of a complex set of technologies for a particular activity might restrict the ability to diversify agricultural production because that technology set is knowledge intensive. Farm managers may need to invest large amounts of time to understand and apply the

technologies, leaving little time to devote to the production of other commodities.

In all cases within tiers, the relationships between strategies are reciprocal. As indicated above, technologies selected can influence the rate of resource exploitation. Decisions about the rate of using resources can circumscribe the choice of technologies.

If strategic choices are to make sense as a whole, it is imperative that strategists have a good grasp of these relationships. Otherwise, a choice involving, say, massive and irreversible changes to the agroecosystem might have dire consequences for other choices and for the long-term survival of the whole farming system. Further examples of key relationships among strategies are analysed in the various sub-sections of this section.

As well as choices about use of productive resources, there are choices facing agricultural strategists about the use of the institutional resources. Strategists capable of making and implementing informed strategic agricultural decisions operate in institutions with limited budgets. Hence, consideration of each strategic decision needs to be made bearing in mind the institutional ability to put that decision to good long-term effect.

Choice of mode of agricultural production

Nature of the choice

The major production decision in agriculture exercising the minds of Melanesian and South Pacific Island nation planners relates to the appropriate mode of production to lead agricultural development. To a large extent, the debate has focused on the smallholder/plantation dichotomy. Whatever the merits of this debate, governments have identified smallholders in their development plans as playing a major role in agricultural development.

Unfortunately, this lip service paid to the pivotal role of smallholders in agricultural development has seldom been matched with resources. While many development initiatives have been directed towards smallholder agricultural production (subsidised rural credit schemes have been almost universal, for example), their inappropriateness in concept or execution has meant they have had limited positive impact on agriculture.

Smallholder and plantation modes are not the only alternatives. Nucleus estate and group blockholdings are two other possibilities. Choice of mode of agricultural production therefore rests between four alternatives:

- smallholdings
- plantations
- nucleus estates
- group blockholdings.

The relative merits of these four different agricultural production systems are compared below, with a view to resolving the best option to lead Melanesian agriculture towards 2010.

With the exception of smallholdings, these agricultural production systems involve major transformation of existing farming systems in Melanesia. While plantations have been in existence in Melanesian countries for more than a century, they are not an outcome of changes from within the traditional farming system but rather an implanted foreign production system modified to suit local conditions. Nucleus estates are the outcome of an attempt to marry improved traditional farming systems with modified plantation systems. Blockholdings can arise in three main ways: the combination of individually-farmed parcels of communal land; the resumption of (sometimes abandoned) plantations; and the clearing of previously uncultivated areas of communally-owned land. The block of land is then developed by a group of village-based land owners using modern farming methods.

Evidence on yields of export crops undoubtedly favours plantations over smallholdings, but little evidence exists of the yields achievable in Melanesian conditions from nucleus estates and blockholdings. Yields, however, tell only part of the story. More important measures are profitability, comparative advantage, and flexibility and resilience in times of adversity. Unfortunately, few measures of comparative advantage have been compiled but, where available, they show that low-input smallholdings fare best in all but times of high commodity prices.

Unimodal versus multimodal approach

An assessment of the relative merits of unimodal and bimodal (generalisable to multimodal) agricultural development by Johnston and Tomich (1985) demonstrates the advantages of a unimodal approach. While not underestimating the obstacles of a unimodal or 'dispersal' strategy, Johnston and Tomich (1985:37) concluded that

the nature of new technologies and the level of external support in money and manpower are such that they can be expanded progressively to reach a large and growing percentage of a country's small farm units ... positive interactions between agricultural and industrial development ... mean more rapid growth of non-farm output and employment as well as more widespread increases in productivity and incomes among rural households.

Importantly, a unimodal strategic approach offers the best chance to rid Melanesian agricultural sectors of their dualistic structure. Clearly, a bimodal structure reinforces dualism. Assuming a unimodal strategy is accepted, we now assess the prospects for following each one of the four main modes of agricultural production outlined above.

Prospects for smallholdings

The dominant smallholder system has generally served the needs of Melanesian countries well in the past, and has the advantage of consistency with a unimodal strategic approach to production. Seemingly lack-lustre performance over the past couple of decades, however, casts doubt on its suitability to spearhead agricultural development efforts towards 2010. The key questions are whether it has the inherent potential for further development and, if so, whether the external obstacles that prevent it from achieving this potential can be removed.

Is smallholder development inherently constrained?

Proponents of this dismal view find evidence in the high, and increasing, levels of food imports in many South Pacific island nations, including Melanesian countries, arguing that they reflect the failure of local agriculture. The contrary argument is that, in accord with the well-known principle of comparative advantage,

Melanesian smallholders often find it best to produce cash crops for export rather than food crops for local sale.

More generally, the argument about smallholder development hinges not on the past performance of smallholder agriculture but on its potential. By turning the blame for past disappointments in development efforts onto smallholders, the failures of previous strategies and policies are excused. Yet any study of the history of agricultural strategy and policy formulation and implementation in Melanesia (and throughout the South Pacific) exposes so many weaknesses that it is hardly surprising that results have not been better. Laying the blame on smallholders is a convenience which encourages government decision-makers to look for some alternative quick and easy path to development. Unfortunately, there is none.

The answer to the above question requires information, which is not readily available, on the dynamic relationships between subsistence production and cash crop production. A general assessment can nevertheless be made by noting the merits of village-based smallholder farming systems. An examination of resources in smallholder farming systems shows that the major constraints are (predominantly family) labour and capital. The major capital item in most smallholder farming systems is the stock of trees cultivated as perennial crops. In a sense, the stock of trees in Melanesian agriculture is itself largely a form of capitalised labour, as maintenance labour is the major input into the growing of a mature tree. Gimbol, Battese and Fleming (1993), for example, found that the elasticities of output with respect to labour and capital were dominant in the production functions they estimated for smallholder cocoa production in Papua New Guinea. Unfortunately, they did not include management as a factor of production in their estimates, for the obvious reason that it is very difficult to measure. Yet management may be the crucial factor constraining smallholder agricultural development.

There is little evidence available on smallholder management, but it is worth reviewing some supporting comments made by Gillbanks (1985) about assertions made by Shaw (1985) in respect of the coffee industry in Papua New Guinea. These statements have general relevance to all agricultural industries in Melanesia. As

summarised by Gillbanks, Shaw posited the following attributes of village farming systems in Papua New Guinea which reflect positive management influences.

They are dynamic systems capable of assimilating and developing new productive activities. Examples given by Gillbanks prove this point. Among them are obviously the development processes of the coffee and cocoa industries in Papua New Guinea. Other examples include the ginger industry in Fiji, kava industry in Vanuatu and cocoa industry in Solomon Islands.

They are efficient means of feeding people. Cash crop production is seldom the most important component of a village farming system. To treat it as such, and expect smallholders to respond accordingly, is to invite failure in what one is trying to achieve in development of the farming system. As only smallholdings are important suppliers of domestic food, their future in domestic food production seems assured at least for the foreseeable future. It is in the export crop sector that government strategists are most interested in the suitability of smallholdings relative to alternative production modes.

In addition, smallholders possess the following four general characteristics.

They are rational in what they grow given their circumstances and preferences. Gillbanks deduces from this statement that it is no use trying to foist particular crops upon smallholders. They will act rationally in growing those crops and using those production methods which best suit their circumstances and goals.

They are receptive to new ways of doing things and new farming activities. Some people speak of South Pacific smallholder production as traditional, implying that little has changed since the days of the pure subsistence systems. This is not so. New crops, and new ways of growing traditional crops, have been adopted almost everywhere. One need only observe the broad range of exotic crops now widely grown by smallholders to see that this is true. Numerous other examples of change can be cited and, without doubt, the pace of adaptation of smallholder agriculture is quickening.

Hence, conservatism and lack of initiative may not be the reasons behind a perceived failure to adopt certain recommendations (for example, increased external input use in cash crop

production). Rather, the best direction of technical progress in smallholder production is probably that which preserves its low-cost advantage, even if the resulting yields reach nowhere near those of intensive production. Carrad (1982:11) observed that the village-based smallholder is not the stereotype of a culturally backward and ultra-conservative farmer, but is very open to demonstration and example. He noted that smallholders 'are innovative and their innovations deserve serious appraisal'.

They can undertake agricultural activities — even export cash crops — without the need for large amounts of credit. Practically all cash crops grown in Melanesian smallholder farming systems have been established with little or no resort to loans or other forms of credit. The required investments have come mainly from the capitalisation of labour. Credit is therefore not a prerequisite for smallholder cash crop development. The smallholder cocoa and coffee industries in Papua New Guinea, for example, developed with remarkably little financial assistance.

On the other hand, plantation, nucleus estate and blockholding developments have required substantial borrowing. The financial capital required to develop these more capital-intensive modes of production to the extent required for them to spearhead agricultural development would be many times higher than could be supported domestically. High levels of foreign investment would be required.

They persevere only with those crops or techniques which give a good return to labour. Smallholders in Melanesia typically treat labour as their scarcest resource, and attempt to maximise returns to family labour. As in developing economies throughout the world, they allocate their resources in as efficient a way as possible, given their goals and their knowledge of (inherently uncertain) production relations and prices.

In summary, a number of arguments can be put in favour of smallholdings as the most attractive production mode for the future

‘... a number of arguments can be put in favour of smallholdings as the most attractive production mode for the future of commercial agriculture in Melanesia.’

of commercial agriculture in Melanesia. The characteristics possessed by smallholder households imply that smallholder development is not constrained by the inherent shortcomings of this mode of production.

Are there external obstacles that prevent smallholdings from achieving their full development potential?

Behind this question lies the concern that smallholder agriculture has reached a plateau in its development process, not because it is inherently constrained but because external factors which are difficult to remove are impeding its growth. A number of external factors constrain smallholder development. These are difficult to remove, but not impossible. Chief among the constraints are poorly formulated government policies and strategies. Key strategic issues are addressed, with recommendations on how development strategies can be improved to help rather than hinder the process of smallholder development.

Another concern relates to stagnation in the productive capacity of the smallholding sector caused by static or declining yields. Information is needed on the stock of trees on smallholdings and the bearing capacity of those trees. The bearing capacity is important because tree stocks are one of the key resource constraints to agricultural development.

Little information is available on the age distribution of smallholder trees for export crops. While smallholder trees are probably younger on average than those on plantations, the indications are that average ages are increasing. It seems, therefore, that on current trends there will be some significant slow-down in smallholder output in Melanesian countries over the next decade. In these circumstances, rehabilitation and replanting in the smallholder sector will be key strategic issues.

Smallholder yields vary more between provinces than do plantation yields. Yields in some regions or provinces are sometimes many times those achieved elsewhere. Also, yields are even more strongly positively skewed for smallholdings than they are for plantations. Yields are limited mainly by a combination of management and environmental factors. Management factors include weed growth, damage by foraging animals, and poor

maintenance and inappropriate shading of perennial crops. Environmental factors include altitude extremes, poor soil structure, drainage and quality and low planting density.

It is also tempting to argue that smallholdings suffer more than other production modes from locational disadvantages. Distance is a more severe constraint for smallholdings than for plantations and nucleus estates. This is because a greater proportion of smallholders is located in more remote regions of the country which are less well served by the transport and communications networks, but this tends to be more a historical accident than a potential disadvantage for the future. In respect of international transport, plantations can often achieve lower international transport costs per unit of throughput because they sell a higher value product and have better connections to buyers (sometimes a related organisation).

If there is any future for plantations it rests on the prospects of export industries. Apart from world prices, to which the fortunes of plantations are very sensitive, four key elements influence the future production potential, and thereby economic prospects, of the major agricultural export cash crop industries on plantations in Melanesia. They are yields, age of trees, area planted and planting density.

Although yields achieved by plantations are considerably higher than those achieved by smallholders (generally more than double), wide variations exist between plantations. Also, plantation yields tend to be positively skewed, with the bulk of plantations obtaining low to moderate yields.

Prospects for plantations

There is a scarcity of new plantings, and a large proportion of current plantings is of medium to late age, an ominous sign for the future of the plantation sector in the absence of a major replanting program. Three main factors explain the increasingly skewed age distribution of trees in plantation export production systems: land available for the expansion of plantation production has become increasingly scarce; the quality of land for export crop production has been unsatisfactory where it has been available; and plantation owners increasingly have perceived declining political

support for their activities, discouraging them from developing or redeveloping their production systems.

Planting densities have probably increased over time on plantations, but they are unlikely to have any significant impact on the decline in yield resulting from an ageing tree population.

Doubts must exist about the future productive capacity of the plantation production system in Melanesia. The system's current lack of profitability and generally high domestic resource cost ratios, and poor immediate prospects for returning to profitability, reinforce these doubts.

The principal argument in favour of persevering with a plantation system already in existence is that it has worked well in the past, and should be encouraged to continue to do so, provided it can do so efficiently. But this assessment relies on commodity export prices being much higher than they are today, or will probably be on average in the future (notwithstanding the recent upturn in commodity prices), and on an ability of plantations to reduce their production costs without any drastic impact on yields.

An option is to persevere with plantations at their current levels of activity because they provide other benefits to an export industry. For example, plantations provide a good means of testing some research findings or novel technologies, and the best operations produce high quality output which enhances international reputation. It is far from clear, though, that such benefits are substantial enough to make preservation a worthwhile option.

Before political independence, it was envisaged by colonial powers that the plantation sector would play a major role in developing Melanesian smallholder agriculture. This influence seems limited, although evidence is difficult to garner. The major influence has been indirect, in that village-based smallholders copied what they observed plantation owners doing. There is an argument that the plantation sector still has a role in helping smallholder development. A good deal of production skill and experience resides in the plantation sector which, in principle, could be tapped for this purpose. For example, under the right conditions, existing plantations could form the basis of nucleus estates (see later) or be applied to run-down blockholdings and to smallholders wishing to use advanced production technology to improve yields and/or quality.

Also, even in a depressed market, efficient plantations could prosper by offering a quality product and developing appropriate niche marketing strategies. Of all Melanesian producers they should be in the best position to ensure high quality standards. They are also best placed to develop and provide value-adding services to harvested products. Therefore, if world prices were to remain low, niche marketing of export commodities may be the only way for plantations to achieve high enough returns to remain viable.

‘Doubts must exist about the future productive capacity of the plantation production system in Melanesia. The system’s current lack of profitability and generally high domestic resource cost ratios, and poor immediate prospects for returning to profitability, reinforce these doubts.’

Prospects for a nucleus estate system

The best description of a nucleus estate system, with plantation mode of management, is given by Ward and Proctor (1980). Hardaker, Fleming and Harris (1984a,b) disputed the prospects for using nucleus estates as a spearhead for agricultural development in South Pacific island nations.

Using a variety of development criteria, Hardaker, Fleming and Delforce (1986) reviewed the evidence for and against nucleus estate systems in the South Pacific. Their conclusion was that such systems are likely to be inferior to smallholdings in promoting agricultural development. Relative to smallholdings, there is a heavy reliance on expert management. Good financial and personnel management skills are required, together with an ability to make decisions in a risky environment, and strong supervisory skills, in particular. Yet high quality indigenous management is a scarce resource in all South Pacific island nations.

A nucleus estate system can be a viable mode of production when the outputs from agriculture require immediate processing for which substantial economies of size and/or strict quality control are needed, or timeliness is paramount in meeting export requirements. The most attractive option for a nucleus estate system is that in which foreign investment is undertaken to establish the system, and

management is vested in a well-established foreign corporation. Governments in Melanesian countries could be more open-minded about the advantages that foreign corporations can bring in agricultural processing and marketing.

‘Nucleus estate systems are likely to be inferior to smallholdings in promoting agricultural development.’

Prospects for a village-based blockholding system

Examples of the development of village-based blockholding systems include an initiative in Papua New Guinea of introducing intensive techniques and economies of size into tree crops, notably coffee, grown on traditional land (Gimbol 1988), land use development schemes in Solomon Islands (Lauder 1987), and *mataqali* group developments in Fiji.

The Papua New Guinean example is typified by events in the coffee industry. Using a bank loan, villagers or clan members pool between 5 and 20 hectares of land to plant a block of coffee. A precondition of the loan is the employment by block owners of professional managers to provide technical advice and management inputs.

In the case of land use development schemes in Solomon Islands, the government has followed a policy of returning land alienated from expatriates in the late 1970s to its traditional owners. Through the operations of the Land Use Development section of the Ministry of Agriculture and Lands, it persuaded groups of traditional land owners to participate in what was called the Communal Farm Development Project by offering inducements such as input subsidies, finance from the Development Bank of Solomon Islands and management assistance. Very few of these ventures are viable.

Customary ownership in Fiji, which accounts for around 82 per cent of the total land area, permits, among other arrangements, the use of land by landowning groups.

Blockholdings, or land managed by groups, differ from nucleus estates in terms of decisions about resource use in two main ways. First, in the former mode, there is no estate about which members are grouped. Second, in blockholdings, production

decisions are made by group members, or via a manager, whereas individual farmers make their own decisions in nucleus estates, although some decisions might be made on behalf of individuals by the manager of the estate.

Blockholdings have been established essentially by following a production strategy that is a hybrid of the plantation and smallholding systems. Despite the apparent potential of the system (for example, the estimated domestic resource cost ratio in the coffee industry in Papua New Guinea is less than that of plantations), few blockholdings have been managed well enough to achieve real profitability. Most have inherited the weak, rather than the strong, points of both parent systems. Good management practices in the plantation sector, providing for well-kept plantations, high yields and reasonably good-quality products (admittedly, many plantations are also not achieving this ideal), have seldom been achieved by blockholdings. And as for nucleus estates, a dearth of organisational skills has been a major obstacle to ensuring appropriate management practices (Lauder 1987; Fleming and Antony 1993). Nor has the resilience of low-input smallholders been replicated, judging by present circumstances in the coffee industry in Papua New Guinea (Fleming and Antony 1993).

The desirability of further investment in coffee blockholdings has been dented in the past couple of years by low commodity prices. The original intention in the coffee industry in Papua New Guinea in the late 1970s and early 1980s was for the blockholdings to become self-funding and self-managing, enabling them to dispense with the services of management agencies on repayment of their loans and improvement in the management capabilities of the blockholders. This has not occurred.

Many blockholders still rely on outside management agencies whose substantial costs impose a heavy burden on the blocks in troubled times and can even be a difficult commitment to meet in good times. Yet, without such management inputs, performance levels usually fall. In either event, the levels of indebtedness of the blocks remain high and they are unable to repay loans despite concessional interest rates. In summary, the blockholding sector remains heavily indebted and in a parlous state (D. Smith 1992).

If blockholdings were currently showing signs of expansion relative to other modes of production in the coffee industry in Papua New Guinea, there might be grounds for persevering with them. But the fact that they are losing ground raises doubts about their long-term viability. Further, the ability to establish more blockholdings is likely to diminish as pressures build on agricultural land. This, together with the dubious viability of this mode of production without outside management input, would make future reliance on it for agricultural development unwise.

The failure of blockholdings to date indicates that any future consideration of them as a viable alternative to other systems requires further experimentation with those blockholdings that are still operational. Blockholdings have been an interesting experiment in production systems based on intermediate technology. For the surviving blockholdings, further experimentation might be necessary to find ways of reducing production costs. For example, a large proportion of their costs is administrative and management overheads, of which the management fee is just one item. Ways of reducing these costs have to be found.

Conclusions

The two main conclusions that can be drawn from the above discussion are:

- Village-based smallholdings are the only viable strategic option for the development of farming systems in Melanesia. First, the plantation mode will never be able to meet the needs of the majority of those earning a living in rural areas from agricultural production. Second, blockholdings have shown that they tend to inherit more of the shortcomings than the positive attributes of both smallholder and plantation farming. Finally, logistical problems of establishing and managing outgrower schemes, and doubts about the efficacy of nucleus estate management in a Melanesian farming system, lead to the conclusion that a wholesale change in farming operations to a nucleus estate system would be unwise. As indicated above, some forms of production could benefit from having a nucleus estate production mode, but preferably based on private, probably foreign, investment.
- The continued existence of other modes of production is not

ruled out, but government actions to ensure their viability should be subsidiary to meeting the goals of smallholder development.

Choice of land tenure

Land and its ownership impinge heavily on the appropriateness of different modes of agricultural production. The implications of land tenure systems in Melanesia cannot be discussed separately from an assessment of the future of the four alternative production sectors.

Assuming that smallholdings will be the predominant mode of agricultural production in the future, the merits of adjusting the land tenure system and inducing farm size changes within production modes are major strategic issues that are difficult to confine to objective economic criteria. The former, in particular, is an issue that raises psychological, social, cultural and ethical issues, and which obviously therefore cannot be decided on economic criteria alone.

Although contentious, the issue of land tenure is critically important and should not be avoided. Its important contribution to strategic reform does not mean that the current land tenure system is inherently bad.

The following discussion is conducted bearing in mind that the economic contributions to the debate are but one small, albeit significant, component of the land tenure issue. The focus of analysis in this section is upon the ways in which tenure arrangements affect agricultural production within the production modes discussed above. Four issues are considered: the impact of land tenure on efficiency of agricultural production; the influence of land disputes on agricultural production; the effect of customary land ownership on the effectiveness of agricultural research; and the issue of the land tenure system and its possible contribution to land degradation.

Customary land ownership and production efficiency

Evidence is mounting throughout the developing world that, except for cases of extreme land shortage, the institutional framework can restrict development options in the agricultural sector more than do unfavourable resource endow-

ments. In particular, the tenure system may facilitate or hinder farmers' access to the most important resource, land, with adverse efficiency consequences. Land tenure institutions are commonly viewed as major impediments to development in Melanesia. There have certainly been conflicts over land use and, while work undertaken in the South Pacific Smallholder Project (Jones, Fleming and Hardaker 1988) shows that tenure difficulties are often less serious than simplistic analysis might suggest, existing land tenure arrangements pose a potentially serious threat to future agricultural development. The difficulty in getting land tenure strategy right for the future is that sometimes the so-called solutions are worse than current deficiencies.

Usually, the so-called traditional tenure systems (which, in fact, have often been distorted and inappropriately formalised by colonial legislators) function remarkably in putting land into the hands of those who can put it to good use, albeit sometimes by considerable bending of the rules. Traditional land tenure systems have great merit in their equitability: in a sense, they act as social security systems and have strong cultural roots.

Nevertheless, there have been negative as well as positive experiences with traditional tenure systems and commercial development, in the South Pacific in general and Melanesia in particular. Notably, there are problems of security and access that discourage investment and adversely affect the productivity and sustainable development of smallholder farming systems and the equitable distribution of benefits from farming. However difficult it is to prescribe improved tenure arrangements, and however politically awkward change is to achieve, government decision-makers will have to address these issues if tenure arrangements are to keep in tune with, and not impede, other changes in Melanesian rural economies.

The dilemma facing Melanesian governments is how they can preserve the positive attributes of traditional land tenure systems while modifying them in a bid to accelerate rural development. Further, how can a land tenure system provide a bridge between the maintenance of tradition and commercial development, by providing land for commercial (agricultural and non-agricultural) development without promoting the alienation of customary land?

Although only part of the story, two changes appear to be needed in most cases

- registration of titles to land by individuals and groups, giving security of tenure
- provision for sale or lease of land for which title has been granted.

In both cases, appropriate and effective safeguards need to be in place to protect the legitimate interests of the various parties. How these measures are best implemented is less clear, as discussed in the next section.

‘However difficult it is to prescribe improved tenure arrangements, and however politically awkward change is to achieve, government decision-makers will have to address these issues if tenure arrangements are to keep in tune with, and not impede, other changes in Melanesian rural economies.’

Land disputes and their impact on agricultural production

One of the controversies surrounding land ownership and the disputes to which it gives rise concerns the direction of causal relationships. Are disputes over customary land ownership and access a form of breakdown in law and order, or a way of overcoming existing deficiencies in the effective implementation of laws relating to land ownership? The answer to this question bears heavily on the nature of government intervention in resolving problems of land use, or lack of it.

Given the politics of land in Melanesia, it is by no means certain that government intervention in land tenure matters will be to the good. In his study of village agriculture in North Malaita, Solomon Islands, Frazer (1986:39) observed that land disputes have been getting worse.

In the past 20 years, land disputes have taken a new turn ... primarily because of the arrangements made by government for resolving disputes. With a system of courts in place it became more common for disputants to take their disagreements to court. Because of the way in which the courts work, and their tendency to give decisions

which make winners and losers, particular families have been able to gain control over clan territories. ... those who have lost court cases have had their rights severely restricted and now face an uncertain future.

The outcome, according to Frazer, has been greater competition to control land resources, and to develop undeveloped land as quickly as possible in order to assert ownership rights. Frazer observed that this has led to more rapid land degradation and reduced opportunity to use land productively for agricultural development. He recommended that it would be much better to take land ownership matters out of the hands of the courts altogether.

Frazer is justified in his recommendation in respect of the English system of adversarial courts, which is inappropriate for land disputes in countries such as Solomon Islands, but governments must nevertheless intervene in land tenure matters. The issue is about the nature of the intervention. Local or communal 'courts' are more likely to work, but they need to be able to hear claims from all contenders to resolve each land tenure matter once and for all. Government power may then be needed to enforce such decisions, as well as to oversee the whole process to ensure at least a reasonable amount of justice. Because of the deep social and cultural implications of changes in land tenure and use, outsiders are not in a good position to make recommendations on the form these courts should take. But it is very clear that a permanent and effective Melanesian solution is needed.

Customary land ownership and degradation of the agroecosystem

There is a continuing debate worldwide about the suitability of different forms of land tenure and stewardship of land resources. One of the most prevalent lines of thought is that a shift needs to occur from customary land ownership to private ownership if degradation of the agroecosystem is to be minimised. The more general issue of the appropriate use of resources in the agroecosystem is explored in a later section. The issue of customary land ownership and degradation of the agroecosystem is considered here.

Customary land ownership typically leads to a system in which land is treated as a common property resource. This may

mean that individuals use the land to their own benefit, but to the detriment of the collective owners, the so-called tragedy of the commons. Typically, such anti-social resource use also leads to resource degradation through over-use. But, of course, such over-use is not necessarily the outcome of resources being held in common. The communal owners may be able to apply rules to keep use by individuals to a level in accord with the common good, and hence with sustainable production.

In so far as attenuated property rights and common property resources are matters of concern, given that the overwhelming proportion of farmland is customary, Melanesian governments can consider actions to change such rights and access to these resources. The creation and enforcement of a system of individual land tenure may be possible but the distinction between communal and private property tends to oversimplify things, as it is based on law rather than a process of moving 'from general land rights to specific land rights by the gradual addition of one specific right after another' (Binswanger and Pingali 1987:311).

The risk of oversimplification exists in all Melanesian countries because of the complexity and heterogeneity of property rights. Tenure reform may result in a system that is simplistic and too inflexible to meet the changing needs of people who use these resources. Also, like land reform, it may be politically and administratively difficult to put into effect because the complexity of land tenure is not confined to law but also to the political and administrative environment in which the legal system operates.

Perhaps a better option, therefore, is to strengthen the management of common property resources. Sometimes, common property rights may be defined in theory but the rules and limitations are not enforced, so the rights cease to exist in practice. Such lack of enforcement makes the rules and limitations pointless. Often, some initiative by government is needed to restructure a regulatory organisation to permit better enforcement.

A popular view is that governments should allow landholders to make strategic decisions about long-term land use, particularly where the farming system strongly features tree crops. But governments in the past have intervened regularly to encourage new plantings of tree crops, and are likely to continue to do so. Given this

situation, the government should at least follow sound ecological guidelines in implementing such projects.

Subject to land access constraints, two recommendations by Harding, Bleeker and Freyne (1987:37) should be followed.

- Sites of new perennial crop plantings should be carefully considered, with only highly or moderately suitable land used.
- Site selection should take into account the needs of the whole farming system and, in particular, the food garden land requirements.

Economies of size

Assuming a focus on smallholder development, what evidence exists of economies to be reaped by increasing farm size? Little empirical evidence is available but, given smallholders' major activities and technologies, size economies are unlikely be important. Moreover, the sorts of technologies that are likely to increase smallholder productivity in the future are fairly scale-neutral (for example, hybrid trees, higher yielding root crop varieties, fertiliser and chemical input usage). Mechanised crop production is unlikely to be significant in Melanesian smallholder agriculture for some time to come, in part because the terrain and production systems do not lend themselves to mechanisation. Where mechanisation is appropriate, as in some land preparation and for transport, a market for hire services can usually overcome any scale problems.

Economies of size in processing and marketing are likely to be large, but economies in processing should not greatly disadvantage small producers. They certainly should not preclude smallholder production. The greatest diseconomies of small size come in collecting the surpluses of smallholders, especially given difficulties in providing economic infrastructure in rural areas (Overfield and Irog 1992). This problem is greatest when smallholders are producing a large variety of products for commercial sale. Fortunately, in Melanesia, such variety is typically among fresh produce for local markets, most efficiently marketed by small traders or farm-household members themselves.

Growth pattern

Classification As discussed earlier, it is assumed that Melanesian governments will pursue an essentially unimodal agricultural production strategy over the next couple of decades. Given this approach, they have a choice between different growth patterns that they can nurture among smallholdings via agricultural research and extension efforts and via other development programs such as provision of credit. In making changes to the way in which they operate to achieve farm growth, Melanesian farm households can follow any of three major paths: adaptive; radical; or entrepreneurial.

An adaptive growth strategy entails gradual acceptance of changed ways of operation, adopted in an incremental fashion and modified or adapted to satisfy the specific circumstances, resource endowments, and values and beliefs of individual families. Strategic decisions by governments which lead to innovations consistent with such a farm growth strategy usually have the advantages of low risk of non-acceptance by the majority of farm households and of failure. The chief limitation is a slow to moderate pace of farm development, especially in the early stages.

A radical growth strategy entails fundamental changes to agricultural activities included in the farm plan and the methods of agricultural production employed by farm households. The most common example of this type of strategy is where a predominantly subsistence farmer switches wholly, or predominantly, to commercial production of cash crops for export. The pros and cons of this approach are the opposite of those of the adaptive growth strategy: greater risk of failure of the changes to suit farm-household resources and circumstances, but the prospect of faster initial growth. Such a strategy is usually only possible with substantial government involvement.

An entrepreneurial growth strategy differs from the radical growth strategy in two important respects. First, the changes to the farming system need not be fundamental, but may entail small but innovative ways of improving farm performance which rely on greater capital intensity in production. Usually, this greater capital

intensity comes from increased purchases of inputs which embody improved technologies. Second, the outcomes of the changes are often largely unknown when attempted. That is, there is not already an existing set of farming practices employing the new methods. Examples include the addition to the farm plan of a new crop or crop variety not currently grown, or a production technique not currently being used. These new methods do not necessarily require wholesale changes to the farming system. The advantage of such a strategy is that, by experimenting with changes, farmers are best able to assess the worth of any innovations to their welfare. The major disadvantage, at least from a government's viewpoint, is that it is a tricky business trying to aid farmers in these endeavours, demanding of time, experience, knowledge and skills.

Melanesian smallholders have demonstrated capacity to adopt new methods. Many of the innovators in Melanesian agriculture, however, are outsiders. They may be people from a different part of the country, from a non-Melanesian racial background, or may be foreigners. They may bring considerable benefits to the Melanesian society from their productive efforts and by acting as leaders in the spread of technology to the general farming community. Those with links overseas may play a vital role in establishing markets for non-traditional exports, produced initially by themselves but later by other farmers. Yet such people are often discriminated against in a number of ways, most conspicuously by not being eligible to obtain land with secure tenure. If the entrepreneurial growth strategy is to be followed, the difficult issue of land tenure must be addressed.

On the other hand, Melanesian smallholders more commonly follow an adaptive growth strategy rather than radical or entrepreneurial strategies. That is, they are more likely to adopt small improvements to their farming system and adapt the system gradually to changing circumstances than to change it radically. The prevalence of an entrepreneurial growth strategy has probably been grossly underestimated by government planners in the past. Nevertheless, while they experiment and are willing to innovate, risk aversion tempers the adoption of entrepreneurial strategies.

In summary, smallholder farm households have been able to combine adaptive and entrepreneurial growth strategies, although

the mix of these two strategies varies among households according to willingness to take risks. They have proved themselves adept at handling a portfolio of economic activities, taking up small improvements, some of an innovative nature, where worthwhile, and making the smallholder sector as a whole more economically resilient.

“If the entrepreneurial growth strategy is to be followed, the difficult issue of land tenure must be addressed.”

Strategic implications for governments

Accepting that the smallholding farming system has to be the focus of any future agricultural land use strategy, the assessment made by Shaw of the future path of smallholder development in Papua New Guinea is valid for all Melanesian farming systems, and retains its currency despite the passage of seven years. It bears repeating.

This growth path for smallholder agriculture implies improved varieties, replanting, improved techniques, disease control, some cash inputs, improved processing and continual attention to efficient marketing. Some diversification or intercropping may be appropriate ... Technical improvements need not be complex. (Shaw 1985:51)

The susceptibility of smallholder households to successful radical changes is probably very low. A land use strategy based mainly on smallholder development in the production system has to be adaptive/entrepreneurial rather than radical. Development should not be seen as a discrete jump from one mode of agricultural production (or marketing) activity to another. Rather, small positive changes, widely spread, are easier to achieve, more likely to be sustained, and more likely to have beneficial equity effects. Hence, government strategic efforts should be directed towards helping smallholders adopt many small changes rather than encouraging or forcing them into quantum leaps in agricultural performance.

Too often in the past, development initiatives taken by Melanesian governments have assumed smallholders are willing to adopt a radical growth path. Examples include the introduction of

blockholdings; recommendations for the extensive adoption of new crops or crop varieties, such as hybrid cocoa trees, and recommendations for the adoption of highly intensive farming systems involving considerable purchases of inputs embodying new technologies. Too often, these initiatives fail because they do not fit the circumstances and resources of smallholder households, sometimes because what is recommended is simply unprofitable. For example, they are too demanding of labour or timeliness of certain tasks; farm operations become too complex; reliance on external inputs becomes too great; or risk of failure is too high. Disillusionment sets in among the farm population as a result of these experiences, making people less willing to adopt potentially beneficial changes in the future.

Farm growth strategy is influenced by its capital requirements. Cash is usually scarce in rural Melanesia and cash income can quickly evaporate, spent on priority needs of the household or of the extended family. Consequently, the money might not be on hand when it is needed for farm investment. In part, these are problems faced by people in the early stage of commercialisation; cash problems may decline as earnings increase and as people become more used to managing money. It will be desirable, however, to do two things to stimulate agriculture: improve the access of rural people to banking facilities, so encouraging saving and permitting expansion of private lending and investment; and foster a more entrepreneurial growth strategy in the agricultural sector. Investment funds must come largely from domestic savings if countries decide not to rely too heavily on aid and/or foreign investors. For farms, this means that rural saving needs to be made easier and more remunerative. If these domestic investment possibilities are too limited, then resort to foreign investment, which can bring with it a much-needed dose of entrepreneurship, might well be inevitable, and indeed could be achieved with limited loss of self-reliance if handled properly.

Agricultural research and choice of technology

Assuming some mix of adaptive and entrepreneurial growth strategies is encouraged by Melanesian governments, the next step is to consider the implications for agricultural research and technology

choice. In the following discussion the importance of improved agricultural production practices is emphasised and the choice facing smallholder households between low, medium and high technology practices is evaluated. The role of agricultural research in bringing about technological progress is discussed, then key strategic alternatives in agricultural research are evaluated.

Importance of improved agricultural production practices

Research into, and extension of, improved agricultural production practices, especially for smallholdings, is a matter of great strategic importance for Melanesian farming systems, whether it be in food crop, tree crop or livestock production. This is because technological improvements have the greatest potential capacity among alternative changes in production systems to increase land and labour productivities, improve product quality and reduce costs of production. Emphasis is given to potential changes, because a reliance on technological change places a strain upon the limited research capacity that exists in Melanesian agricultural sectors. This capacity is subject to scrutiny later.

Population pressures and increased aspirations of rural people mean that the improved systems must combine sustainability with greater productivity and profitability. Technical advances are essential to ensure that an agricultural industry becomes more competitive and remains ecologically and economically sustainable by improving productivity and, often, product quality, and by controlling pests and diseases. Where such advances have been easy to incorporate in existing farming systems, and have clearly been in the welfare interests of the farm household, Melanesian smallholders have shown themselves to be willing to adopt them.

Research and extension activities have the potential to influence agricultural performance through their impact on factor intensity, productivity and incomes in different farm production systems. If the correct strategic options are taken, research and extension can also interact positively with different farm ownership patterns, the commodity mix, and the rate of degradation of the agroecosystem.

The need for productivity increases in Melanesian agriculture is recognised throughout the South Pacific. It is commonplace for Melanesian government decision-makers to assume that good returns in cash crop production, in particular, can be achieved by greater use of purchased inputs. This is unsurprising given current very low levels of use by smallholders. Yet not a great deal of improved technology has materialised from formal agricultural research processes and been transferred to smallholders. Despite its apparent potential to contribute to agricultural development goals, agricultural research has not been a major contributor to improved agricultural productivity in Melanesian agriculture.

**Choice of
technology level:
high versus
intermediate versus
low agricultural
technologies**

A plausible reason for the lack of contribution to agricultural development by improved technologies is that those available have not been appropriate to the needs of smallholders. In particular, it is possible that the preference by researchers and others responsible for the introduction of new technologies has been for high technology when the circumstances and resources of smallholders call for less complex low technologies.

The strategic issue in this section, then, is how best to compare the advantages of low technology with those of higher labour and land productivity arising from the adoption of high technologies by smallholders. The characteristic that perhaps most distinguishes smallholdings from other production alternatives is their reliance upon low levels of purchased inputs. Yet an increased reliance by smallholders on purchased inputs embodying advanced technologies inevitably accompanies many of the available technological strategies.

Advantages of the low-technology route to smallholding development

The best direction of technical progress in smallholder production is that which preserves a smallholding's low-cost advantage. This quite often means that yields obtained from following this technological path are nowhere near maximum obtainable yields. Also, because most new technologies are embodied in purchased

inputs, it is difficult for smallholdings to make technological advances without risking their low-cost comparative advantage in production. Choice of technologies with low levels of complexity places less demand on the skills and knowledge of the farmer, which can be crucial given the diversified farming systems commonly practised. The low-technology route is also more likely to be socially acceptable to smallholders than other approaches requiring high levels of purchased inputs.

The low-technology strategies of smallholder agriculture potentially provide another advantage. With increasing unease in industrial economies about the use of chemicals in food production, the products of Melanesian smallholders could fill a growing niche market for naturally-produced outputs. Given sufficient marketing skills, low-technology production may prove to be something worth preserving, and the technological backwardness of smallholders in Melanesia, compared with their competitors, may be turned to advantage.

Disadvantages of low technology

On the other hand, the potential gains in labour and land productivity and quality gains from following the low-technology route are much more modest to smallholders. This means, in principle at least, a correspondingly lower potential to increase smallholder farm incomes.

Also, practices of intercropping and mixed cropping associated with low-intensity technology make it more difficult for smallholders to gain the knowledge of production that they would achieve if they were to specialise. The result in some Melanesian farming systems has been poor field husbandry, which causes low yields and greater risks of pests and diseases (although mixed cropping practices tend to mitigate these threats). This strategy more than any other illustrates the potential conflicts among goals facing smallholder producers.

What should a government do to resolve this dilemma?

Farmers in Melanesia do have an impressive track record in adopting new technologies that they find appropriate. Of course, they do not always take up the new methods that agricultural

officers or planners would have them adopt. The reason, as stated earlier, is that the improved method proposed is quite often no such thing.

Consequently, where smallholders have adopted improved technologies, they have seldom been willing to adopt them in their entirety, especially where new technologies require radical changes to their farming systems and practices. Instead, they will take up part of an innovation, adapting it to their needs. At the risk of over-simplification, this has led to a trichotomy in smallholder production, between high-input, medium-input and low-input agricultural systems.

The types of improved methods that appeal to, and are taken up by, smallholders are more likely to be those that make use of those resources that are relatively abundant and those that will economise in the use of scarce capital resources. In other words, smallholders will generally favour technologies that make best use of their own (and therefore, in general, of national) resources. In Melanesian rural areas, labour is generally the key national resource (Jones, Fleming and Hardaker 1988). The challenge to governments seeking to introduce improved technologies to smallholders, therefore, is to be sure that the innovations are truly appropriate in terms of use of smallholder family labour. In some rural areas, however, it is likely that land will become an increasingly scarce resource as 2010 approaches. In these circumstances, innovations would need to be sparing in their use of land.

How can Melanesian governments ensure the appropriateness of technologies they are attempting to disseminate? In short, their capacity in this regard is very limited. In a negative sense, they can help by not trying to force particular new technologies upon farmers. The key to successful introduction of new technologies for Melanesian smallholders, then, is twofold. First, governments can assist by creating an economic environment which encourages agriculturalists to search for and adopt innovations that make good use of scarce resources. The second initiative is for governments to provide adequate on-farm testing processes and information about the availability of different technologies and their attributes. Farm-household decision-makers can then make informed determinations on adoption according to their risk attitude, entrepreneurial

disposition, availability of resources and household circumstances. To force these households into a technological strait-jacket is to invite disaster. Success in the introduction of appropriate technologies for smallholders will come not just through suitable agricultural research and extension programs but also through an economic environment that induces appropriate agricultural innovations.

“... governments can assist by creating an economic environment which encourages agriculturalists to search for and adopt innovations that make good use of scarce resources and by providing adequate on-farm testing processes and information about the availability of different technologies and their attributes.”

Agricultural research and technological progress

A major reason why technological advances remain to a large extent only a potential force for agricultural development is that a sustained innovatory effort is needed to achieve improved production practices. In theory, improvements in agricultural production practices are mainly achievable through more and better agricultural research and extension, although it is not just a question of expanding these activities on the same basis as in the past or, as argued later, necessarily relying on public agricultural research and extension. Much of the public extension effort in Melanesian agriculture to date has been ineffective because there have been few improved methods emerging from indigenous research to promote, and because the efficacy of extension work is dubious. Greater resort to regional and international collaborative research work can help make national research work more effective. It should be pointed out, however, that the national agricultural research effort is not certain to improve through this collaboration alone. The regional or international collaborator must be able to offer an existing technology that presents prospects for fruitful collaboration.

More and better agricultural research in Melanesia is therefore needed, yet the capacities for such research are obviously limited. Agricultural research effort is very demanding of:

- financial resources, committed for long periods

- skilled and experienced staff
- close links to supranational research institutions which can provide supporting services.

All three of these demands have tended to remain unfulfilled in Melanesian agriculture over the past two to three decades, yet, given scarce research resources, their fulfilment is crucial if the research undertaken is to be both relevant and effective (Hardaker and Fleming 1989).

Strategic research and extension issues

There are five main areas where strategic decisions relating to agricultural research and extension have to be made. These decisions will influence the contribution of agriculture to development in Melanesian countries by 2010.

- Decisions about research priorities and the selection of a research portfolio.
- Decisions about the mode of agricultural research.
- Issues relating to the funding of research and extension.
- Matters relating to the staffing of research and extension organisations.
- Issues relating to the impact of research and extension.

Research priority setting and the research portfolio

A feature of national agricultural research programs in Melanesia is that they are small and are likely to remain so. Yet the demand for research is large, with a wide range of issues needing investigation. To succeed, countries need to use innovative approaches to seek, organise and apply new technologies (Eyzaguirre 1992). Priorities have to be set and a balanced program of activities put in place. As Eyzaguirre explains, by using a research portfolio as a strategic planning tool, it is possible to identify:

- the intensity of demand for various types of research output
- the policy environment for technology development
- the type and level of research needed to meet the demand
- the range of partners and organisations that can contribute to the research.

The development of a research portfolio will enable the research effort to be given a sharper focus. This sharper focus can be

assisted through forging closer links than have existed in the past between researchers and their smallholder clients. One way of establishing these links is by making greater use of on-farm research. Effectiveness can be improved by tapping more fully into the international knowledge network so that researchers avoid duplicating work done elsewhere and concentrate on applied and adaptive research, passing on more basic problems to better equipped research units overseas. This highlights the need for greater regional and international cooperation. Australia and New Zealand, as major aid donors in the region with good skills in agricultural research, should be able to contribute here if some of the petty rivalries that presently inhibit cooperation can be overcome. Similarly, there is a case for more involvement in the region by some of the international agricultural research centres.

Choice between a unimodal and a multimodal approach to research. The decision that a Melanesian government makes between a unimodal and multimodal approach to agricultural research depends very much on whether it follows a unimodal or multimodal development strategy. In the preceding discussion a unimodal strategy has been recommended. Hence, an essentially unimodal approach to applied agricultural research is also favoured.

Technology options vary for different modes of production, and consequently a multimodal research strategy is likely to be very demanding of research resources. New technologies developed for blockholdings and plantations are unlikely to suit smallholders because of their very different resource endowments and farming practices.

With limited research budgets, it would appear that the only research efforts that should be considered are those which would primarily benefit smallholders. In other words, research benefits accruing to blockholdings, plantations and nucleus estates should be by-products of research for smallholdings.

‘Effectiveness can be improved by tapping more fully into the international knowledge network so that researchers avoid duplicating work done elsewhere and concentrate on applied and adaptive research, passing on more basic problems to better equipped research units overseas. This highlights the need for greater regional and international cooperation.’

The proposed unimodal research strategy is, of course, not inconsistent with a situation where the other modes fund and perhaps undertake their own research. Such research might be carried out by a non-government research organisation or organisations (including individual producers), or by a parastatal organisation such as a commodity board. There are grounds to suggest that there are benefits to be had from the existence of a number of research organisations in a country.

Commodity emphasis: domestic food production versus traditional export crops versus non-traditional exports. In the past there has been a tendency for research priorities to be placed mainly on the traditional export crops, to the neglect of food crops. In most Melanesian countries this bias has now been somewhat corrected, reflecting growing concerns for national food security. There is a continuing need to consider the proper balance of research activity between production destined for the domestic market (including livestock) and that intended for export.

Main considerations in research resource allocation between commodities include the importance of each commodity in the particular country and the scope that may exist, with the available research resources, to attain appreciable productivity increases. The latter may depend on the availability of research findings from elsewhere that could be adapted to suit local conditions. Such findings could come from international agricultural research centres or from other national programs — to some extent the smaller countries may be able to 'piggy-back' on research in the larger Melanesian countries.

A consideration in selecting the research portfolio is that the main staples in Melanesia are generally not the focus of major research efforts in the Consultative Group on International Agricultural Research or other international research centres. Moreover, because the tropical roots and tuber crops are vegetatively propagated, there are disease risks in importing new varieties from overseas. Such considerations suggest a need to devote at least a part of the research effort to these crops. On the other hand, income elasticities of demand for the starchy root and tuber crops are generally thought to be low and, by their bulky and perishable nature, they do not lend themselves well to commercial

production. The long-term returns from research may therefore be less than might apply for staple grains, for example, or for export crops. It is important that Melanesian countries maintain, as far as possible, their present comparative advantage in production of traditional export crops, so again some research effort is needed.

In some countries, much of the research is done by specific commodity boards or research agencies. It might be thought that, in small countries, diseconomies of size in research would prevail, making it desirable to consolidate all agricultural research efforts within one organisation, such as the Ministry of Agriculture. However, after a careful examination of a number of case studies of agricultural research in small countries, Eyzaguirre (1992) has concluded that effectiveness is likely to be enhanced if several organisations participate in the research effort, although clearly there needs to be coordination to avoid duplication of effort.

High-value non-traditional exports may appear to offer special opportunities for small countries. These are high-risk products, however, making it questionable to what extent public sector research resources should be directed to these sorts of exports. A critical factor for success is the timely identification of market opportunities in an overseas country, a task usually best tackled by market researchers in the private sector rather than by a government research organisation. Any involvement of the latter may best be confined to the supply of technical information and advising on quarantine and phytosanitary requirements. Since windows of opportunity in niche markets can close as quickly as they open, there is a danger of national agricultural research organisations being drawn in to save a new industry that is doomed in any case.

Choice of research targets in terms of output, productivity and sustainability. Although yield increases are important in efforts to raise productivity and incomes, a single-minded emphasis on ever-increasing physical yields is almost certainly not a useful strategy. The technology applied by agricultural producers has important implications for their cost structure as well as the marketability of their products. Also, high-yielding but inappropriate technologies recommended to producers can damage the agroecosystem. In this respect, encouragement of intensification of

production by smallholders might be less appropriate than encouraging less intensive production processes more suited to their circumstances, knowledge and resources.

The requirements for intensification of Melanesian farming systems may seem to imply greater use of purchased (external) inputs to raise yields. This was essentially the recipe in the more fertile areas of some developing economies that have experienced rapid rates of agricultural growth through the use of modern varieties. There are two difficulties with this in Melanesian agriculture. First, there must be doubts about the consequences of the indiscriminate use of purchased inputs embodying improved technologies. In some circumstances, the agroecosystem may be too fragile for further intensification, or increased use of external inputs might lead to major external costs. Second, it may not be profitable to intensify production given that the remoteness from markets of much of Melanesian agriculture means that farmers' terms of trade are often unfavourable.

Nevertheless, farm incomes can be raised by increasing total factor productivity through improved farming practices, avoiding the need for further large increases in cultivated area either by clearing of forests or shortening of fallow periods — both of which have characterised recent agricultural growth patterns. Examples include more intensive intercropping, improved crop rotations including legumes to fix atmospheric nitrogen, or the introduction of new, more productive crop species. These measures almost inevitably involve some increase in the use of purchased inputs, so that their introduction must be accompanied by ecologically sensitive recommendations on input usage.

Emphasis on socioeconomic and post-harvest processes. Socioeconomic aspects of production and post-harvest work, including market research, are research domains that have not been well covered in Melanesian countries. Yet both are of strategic importance to the future of agriculture since both are linked to the policy-making process. Socioeconomic conditions tend to be very area specific, so that overseas research is unlikely to have much relevance. Basic data on costs and returns of different forms of agricultural production can support decisions about agricultural research priorities. Similarly, an assessment of market outlook for major commodities may be

valuable in a wide range of agricultural policy decisions, including choices of research priorities.

Choice of research mode

Knowledge-based versus experimental approach to technology assessment. Given the limited scale and scope of most national agricultural research programs in Melanesia, there are obvious limits to how many topics can be researched in depth. It makes sense, therefore, for a significant part of research and extension resources to be devoted to know-ledge-based studies of agricultural technologies. For example, there are many different agroecosystems in these countries, yet to develop and test a sustainable farming system for even one system would usually be a long-term project involving several scientists and considerable expense. It is clearly not feasible to investigate in depth the design of improved systems for every environment, even though the need is urgent in some areas where serious resource degradation is occurring.

The answer has to involve use of existing knowledge, based on scientific principles and work elsewhere, to design some best-bet options for a variety of situations. Because such options will not have been field tested, some failures are to be expected. It will be important to monitor developments so that ideas that fail can be spotted quickly before too much damage is done to the environment and to the credibility with farmers of the research and extension personnel who put up the particular proposals. Ideally, farmers would be taken into the confidence of the research workers so that at least a part of the monitoring can be left to the immediately affected community. This would allow further saving in the scarce time of researchers.

Adaptive versus 'original' research. For the same sorts of reasons, much of the research that is done will need to be adaptive rather than original. It is many times easier to take a technology, such as a new variety, and test it under local conditions, than it is to do the original work of technology development. The returns to the research resources are likely to be higher in such testing and adaptive work, provided only that a sufficient flow of possible technologies is available from overseas (or other) sources. A decision to follow an adaptive approach therefore requires that money and resources be

made available to the research organisations to strengthen the links with the potential suppliers of new technologies.

Mix of public and private agricultural research. Melanesian governments should look hard at their proper role in the development and dissemination of agricultural technology. The small scale of most national agricultural research institutions, and the problems experienced to date in regional and international research cooperation, give little grounds for optimism about what can be achieved through public research.

The alternative is to seek more technology transfer via the private (or at least non-government) sector. This has been the principal source of the introduction of new technologies in the past. Those responsible for deciding on the research portfolio should recognise and account for all organisations and individuals able to contribute to the development and introduction of better and more profitable farming methods. The field is large, and some potentially important players are currently being excluded or ignored.

First, there are the farmers themselves. Their technical knowledge is considerable and capacity to innovate not insubstantial. Quite apart from their indigenous technical knowledge, discussed later, a surprising number of Melanesian farmers have travelled overseas. Many bring back ideas that they try on their own farms. Of course, not all of these work, but some do, and spread to other farms, contributing to the overall advance of agricultural productivity.

Next, firms and individuals in the private sector, in the interests of making greater profits, may introduce new inputs or products to farmers. In some Melanesian countries, private traders have formerly been discouraged by a number of measures, such as granting monopoly powers to statutory marketing boards, so that this source of innovations is inhibited or excluded. In particular, multinational corporations, which might well be best placed to establish links to potentially valuable niche markets overseas, have been viewed with deep suspicion in some countries. In others, they appear to have fulfilled a useful role in promoting better farming methods.

Additionally, there are various non-profit and non-government organisations, such as charities and churches, which

have often been very active in promoting improved methods of farming. Some have engaged in research and development.

What policy implications flow from these views? At least two paths appear to offer some hope: foreign investment and greater attention to the development and dissemination of indigenous technical knowledge. The encouragement of greater foreign investment in agriculture is obviously one path because it provides access to a vast pool of existing technology and the human skills needed to experiment with its adaptation to Melanesian conditions and circumstances. Foreign organisations and people could be encouraged to bring in new crop varieties and production methods. Agricultural ministries would then become largely occupied with quarantine activities. The potential of indigenous technical knowledge is discussed in the next section.

Mix of indigenous technical knowledge and modern science. Indigenous technical knowledge by itself is unlikely to provide a sufficient base for the development of the agricultural technology necessary to raise productivity to the degree required to enable agriculture to spearhead Melanesian economic development. Nevertheless, it can be a very substantial resource to support, and help in the adaptation of, introduced technologies. Elsewhere (Jones, Fleming and Hardaker 1986) it is argued that indigenous technical knowledge is a resource largely untapped by public research institutions. It offers some valuable advantages of which two stand out. First, there is little need for the often time-consuming and costly processes of ensuring its adaptation to local circumstances, as is the case with introduced technologies. (Inter-regional transfer of this knowledge might nevertheless involve some modification because indigenous technical knowledge can be very location-specific.) Second, the dissemination process should be easy, relative to that for introduced technologies, because there is an existing pool of local agriculturalists who possess this knowledge. The challenge for government research and extension agencies, therefore, is to tap this source of knowledge to best advantage. An effective farming systems research approach is usually a good step in this direction.

The agricultural research approach adopted: commodity-based versus a farming systems research approach. Ideally, research and development work needs to be tailored to specific agroecological

environments through use of a farming systems approach to research and extension. Location-specific constraints and the opportunities of different groups of farmers should become the focus of attention, such as the needs in an atoll environment compared with those in a mountainous area. There is much that other farmers, extension workers and researchers can learn from the best farmers, who may be able to contribute substantially to the formulation and general uptake of improved farming methods (Jones, Fleming and Hardaker 1986).

‘Indigenous technical knowledge can be a very substantial resource to support, and help in the adaptation of, introduced technologies.’

In practice, this approach, at least as advanced by some of the international agricultural research centres, is probably difficult to achieve in Melanesia: it involves intensive use of resources that are in short supply, notably skilled farming systems personnel and recurrent resources for travel expenses. Therefore, the greater the involvement of farmers and private enterprise in this sort of research and development work the better.

A farming systems approach has the advantage of encouraging farmer participation in experimentation, thereby inducing them to share their land for on-farm trials in the expectation of benefits from the research work undertaken. Biggs (1989) suggested a useful classification of farmer participation in research based on the degree of farmer involvement. This classification is useful in contemplating the willingness of farm households on customary land to permit that land to be used for research purposes. Biggs identified four modes of participation in farming systems research. First, the contract mode of farmer participation has minimal involvement of farm households, whose main role is to provide resources for on-farm research, especially land. Second, the consultative mode comprises a sequence of research stages during which households are consulted about their problems, and are involved in technology evaluation. Third, the collaborative mode involves continuous interaction between researchers and farmers. Finally, the collegial mode puts greater emphasis on the capacity of informal research and

development processes, and uses the formal research system to strengthen these informal processes at the farm-household, village and community levels.

The contract mode is probably the most commonly used approach in Melanesian countries, and it is hardly surprising that farm households have been reluctant to lend their land. They are unlikely to benefit greatly as their involvement is minimal. The greater is farmer involvement, the higher will be the likelihood that households will be prepared to have their land used for research purposes. Ideally, the collegial mode should be used by researchers to ensure land access for trials.

Funding of research and extension

Overall funding levels of agricultural research and extension. Research organisations in Melanesia generally suffer from a lack of long-term adequate funding. It is easy to blame a lack of political will for such underfunding. It is not so much lack of political will which is at fault, however, as the number of competing demands for the recurrent budget of governments. It is incumbent on research managers, therefore, to ensure they put a compelling case for increased funding. This means carrying out evaluations of past research work which has yielded high returns (for example, Antony and Parton (1991) in Papua New Guinea), and impressing on key government decision-makers the evidence from throughout the developing world which shows consistently high returns to agricultural research.

Given the chronic problem of lack of secure long-term funding from national government sources, it is difficult for researchers to tackle some of the more challenging research issues, such as those relating to sustainability of farming systems. It would seem that there is an opportunity for some of the major bilateral donors to recognise the importance of long-term research and to extend considerably the short time horizons that seem to be normal in other project-based grants and loans.

Allocation of funds between agricultural research and extension. Melanesian agricultural extension services appear not to be paying their way, implying an over-investment of resources. This contention is based particularly on observations that there are so few

well-adapted technologies to extend. If this view is sustained, it seems that too little is being spent on research relative to expenditure on extension. There needs to be evidence of a demand by farmers for extension. A project mooted by the Coffee Industry Corporation in Papua New Guinea to assess the effectiveness of extension in the coffee industry (D. Overfield, personal communication, 1993) is an example of the sort of evaluation that is long overdue.

A useful experiment would be for governments to get rural communities to organise their own extension help and to monitor the progress of such a scheme. This should provide some indication of farmers' revealed demand for extension advice.

The choice between internal and external sources of funds for agricultural research and extension. The problem of limited funding of agricultural research from domestic sources has already been noted. In consequence, Melanesian countries have to rely to varying extents on aid to fill the gaps. This reliance, however, places its own constraints on the effectiveness of research activities.

- The ability to formulate long-term research programs is restricted by the unwillingness of aid donors and other external research funding agencies to support long-term projects.
- Funding sources are uncertain and capricious, again limiting the ability of research managers to prepare cohesive long-term research programs.

As for the goal of eventual sole reliance on indigenous research personnel, Melanesian governments ideally should be able to generate adequate internal research funding in the long run, and restrict external funding to special research assignments. Again as for personnel, this ideal situation is not likely to be reached much before 2010. Along the path towards self-reliance in funding, governments need to give much thought as to how they can get best value out of external funding, chiefly by mitigating as much as possible the limitations imposed by the two constraints outlined above.

Staffing of agricultural research and extension

The mix of indigenous and expatriate scientists in agricultural research. Virtually all research organisations in Melanesia currently have a mix of nationals and expatriates on their staff. Deciding on the

long-term mix is fairly straightforward, in that all governments are working towards being able to employ mostly indigenous researchers. The rate at which governments should approach this goal is contentious, not least because nationalist feelings can fuel resentment towards a continuing dominant influence of expatriate scientists.

Numerous factors are involved in deciding upon the right pace of localisation, and it is difficult to generalise about this decision (see Hardaker and Fleming (1989) for a discussion of the issues involved). Perhaps the only generalisations that might be made are as follows. First, governments should not expect the ideal situation of totally indigenous research staff to be reached much before 2010. The second generalisation concerns the research roles assigned to the two groups. For a given mix of expatriates and local researchers, governments should try to ensure that local researchers have as broad as possible a set of research skills and knowledge to provide a continuous capability to handle most research needs. Specialist short-term research can then be assigned to visiting expatriate experts who have acquired some familiarity with Melanesian farming systems.

The role of women in agricultural research and extension. Women in Melanesian farm households spend more time on economic activities than men, contributing to both food and cash crop production, and farm produce marketing. They also make significant contributions to the nutritional status of children through breast feeding and general child care. Yet their role in rural areas has, by and large, been neglected by agricultural researchers, and insufficient effort has been made to target women in research projects and extension efforts.

Further, women too often occupy a disadvantaged place in society. The level of education attainment of women is generally poorer than that of men. This, together with other social forces, cuts women off from opportunities for advancement. Extension officers are almost always men, even where most of the farm work is done by women.

Three reforms are needed:

- greater employment of female researchers and extension officers, and improvements in their education

- greater use of women 'contact farmers' in villages who would be given some basic training and encouraged to pass useful agricultural information on to other women in their villages
- an active search for and support of viable income-generating projects for rural women.

Given the great difficulties often involved in expanding the female extension workforce, and the risks inherent in creating such a workforce distinct from the mainstream extension workforce, it is appropriate to concentrate on the second reform in the short term, and work towards the first reform in the long term. In respect of the third reform, it is crucial that the income-generating projects are not imposed on rural women in such a way as to over-tax their labour (their days are already usually fully occupied), and to ensure that the projects have demonstrable long-term potential.

“Women in Melanesian farm households spend more time on economic activities than men, contributing to both food and cash crop production, and farm produce marketing.”

Improving the impact of agricultural research and extension activities

Organisation of research and extension activities. Three issues are analysed in this section:

- research focus
- the merits of integrating agricultural research and extension divisions
- the organisation of research and extension activities into individual projects or grouping them into a small number of long-term programs.

Should research and extension divisions be more closely integrated? There is a need to ensure extension services effectively complement research activities related to smallholder production. In the long term, this means better research-extension links than usually exist at present, although the prerequisites for effective integration of research and extension activities have seldom been attained. This is particularly true as provincial extension services are forced to spread their limited resources very thinly. So, while the

long-term aim should be integration, often it is prudent not to overemphasise this in the short term if closer links will not enhance overall research and development performance.

In respect of more effective extension services, it is useful to divide the task of extending new production technology into two parts. First, the 'quantum leaps' that might arise in technology from research work (for example, new varieties) probably do not require much extension work. Smallholders are not stupid and have shown themselves quick to respond to new technologies which obviously work. The duller, but perhaps more relevant, job for extension officers is regular advice to smallholders on what could be termed fine tuning the production system. Here, a number of minor gains in productivity can have a significant impact on smallholder farming systems. Often, these gains (or, possibly, the prevention of deterioration) are not easily seen by producers and so are not quickly taken up by them. The lessons of good production technique need constant reinforcement, and require good extension skills to be effective.

While an integrated approach to research and extension in agricultural production and marketing is desirable, it is more urgent in some export industries than other farming activities. If, for instance, a Melanesian agricultural industry should decide to develop export market niches based on an organically grown product, the whole chain of production, marketing and processing would have to satisfy strict technology restrictions. Such a development would not be achievable without very closely integrated research and extension activities in both production and marketing. The term organically grown usually implies conformation to certain regulations on production standards and practices which differ between countries. It is not certain that Melanesian smallholders can meet the strictures of the organically grown label at reasonable cost. For the bulk of smallholder output, an alternative label, such as naturally grown, might need to be used. Before any such strategy is followed, the benefits and costs need to be carefully considered. Any attempt to tap the market for chemical-free produce will require cooperation between researchers and extension agents in relation to production and accreditation aspects, probably combined with some private sector involvement in marketing.

What are the relative merits of short-term projects versus long-term programs? Not all Melanesian agricultural problems will yield easily to research efforts. In many parts of Melanesia, for example, the restorative bush fallows are being drastically shortened, thus raising concerns about the sustainability of existing farming systems. Applied agricultural research is needed to find cropping systems (and, perhaps, improved fallowing methods) that are both productive, in line with increasing aspirations of rural people, and sustainable. Given the long-term nature of investigations along these lines, it is vital that a start be made now, and that the need for a long-term planning horizon in agricultural research in Melanesian countries be recognised.

But this does not mean long-term research programs should exclude short-term projects. The two should not be seen as mutually exclusive. They should be complementary in the sense that a few key long-term research programs should be established, each comprising a number of more specific and internally consistent set of short-term projects.

The above comments are based on the assumption that long-term research will not be too expensive for Melanesian countries. This is doubtful, especially for the smaller countries, Vanuatu and Solomon Islands. More of an 'engineering design' approach to technology development may be needed in this case. The necessary starting point for such an approach is vastly improved environmental monitoring of existing systems.

Closing the adoption gap. Improved agricultural research performance can help raise productivity through the development and introduction of improved production technologies. As indicated earlier, strategies in this area need reviewing to achieve the desired improvement. But there are three supporting approaches which may be more easily attainable

- better promotion of the use of known technologies
- better procedures to investigate the reason for non-adoption of purchased inputs embodying known improved technologies
- more reliance on private sector marketing of agricultural inputs.

Large differences in technical efficiency can be observed between smallholdings in Melanesia (Jones, Fleming and Hardaker

1988), and sometimes between farmers in different provinces growing the same commodity (Gimbol, Battese and Fleming 1993). There is *prima facie* evidence, then, that the less efficient farmers have much to learn from the best. Greater use in agricultural extension of field days involving visits to good farms and of farmer discussion groups offer scope for achieving these goals.

The adoption of better procedures to investigate why farm households do not take up improved technologies, or take up only part of a package, should be part of a farming systems approach to solving agricultural research problems.

If more agricultural marketing were privatised, it is likely that commercial input suppliers and buyers would be more effective in transmitting improved technologies to farmers purchasing inputs and supplying output, respectively. Input suppliers would have an economic incentive to provide farmers with inputs that raise productivity and farm profitability, thereby increasing derived demand for these inputs. Buyers of farm produce would have an economic incentive to get increased amounts of higher quality produce.

“The adoption of better procedures to investigate why farm households do not take up improved technologies, or take up only part of a package, should be part of a farming systems approach to solving agricultural research problems.”

Degree of farm-level, regional and national specialisation

The strategic issue addressed in this section is the extent to which a government should encourage concentration or diversification of agricultural production, in particular, and rural economic activities, generally. This issue cannot be studied in isolation from that of export concentration, because any major strategic expansion in agricultural production almost inevitably involves an expansion of export-oriented activities. Four questions are especially important.

- In so far as it has a proper role, should the government encourage farmers to concentrate on industries in which they have a comparative advantage, in order to maximise the economic surplus of the nation?

- In so far as it has a proper role, should the government encourage diversification into less profitable agricultural industries in order to spread farming risks?
- Can diversification of agricultural production help to conserve the agroecosystem?
- How best can governments help in diversifying rural regional economies?

Diversification and the comparative advantage of agricultural export industries

Agricultural diversification can be either horizontal or vertical. Horizontal diversification takes place across commodities or market destinations. Vertical diversification is a deepening of the range of exports of a particular commodity, usually through value-adding activities.

Justifying horizontal diversification

A strategy of horizontal diversification of agricultural commodities is usually justified on one or both of two possible outcomes:

- strengthening the economic base of the agricultural sector
- improving the welfare of rural households.

Given the limited scope for expansion of agricultural industries supplying the domestic market in Melanesia, decision-making about agricultural commodity specialisation revolves predominantly around the issue of specialisation or concentration in the export sector. Agricultural export diversification can take place in two main ways: adding new agricultural export industries or supporting the continuation of existing industries. The former offers the most promise of contributing to agricultural development.

The introduction of new high-value export production industries implies that the additional output from these new activities provides national benefits greater than the opportunity costs of that change. That is, the new activities must satisfy two conditions: they should increase utility of farm households and add to economic surplus.

Assessing the merits of horizontal diversification

Does government have a role here? Unfortunately, largely because

of the difficulties faced in assembling the necessary data for such a task, there is little evidence available to guide governments in making decisions about which agricultural export industries to encourage and which to discourage to maximise national economic welfare. Where data are available, there is no undisputed analytical method that can give the answers sought. Governments world-wide, but especially in developing economies, do not have a good record in 'picking winners' among potential new industries.

In the case of a progressive move to new commodities, governments can possibly play a role through joint ventures with foreign corporations in industries with substantial scale economies. There are almost certainly size economies in agricultural exporting which would be diluted if diversification is encouraged. This issue is taken up in more detail later.

Some diversification may help reduce risk, but individuals facing that risk are in the best position to decide on the extent to which they should spread their activities.

It is therefore not obvious from the fragmentary evidence available that agricultural export diversification is necessarily a good thing. First, exporters presumably choose the mix of exports that is the most profitable. Thus, induced or forced diversification of exports (for example through subsidisation of new export industries or existing industries such as copra that would otherwise be overtaken by other export activities) is likely to cause efficiency losses. If horizontal diversification is profitable, it should emerge naturally.

Second, there is some evidence that commodity diversification efforts by Melanesian countries might be achieved at the expense of market diversity. This has occurred primarily because the markets for new exports have been more geographically concentrated than those for traditional export commodities. Such an outcome could conceivably mean that one form of concentration risk is replaced by another. At the same time, some of the benefits of economies of size in marketing delivered by commodity specialisation could be lost and might not be fully offset by economies from country specialisation.

For these reasons a strategy of horizontal diversification appears to be unwise unless more convincing evidence for it becomes available. Ignoring risk considerations for the moment,

commodity specialisation appears inevitable for Melanesian countries, although not necessarily in traditional exports. It is likely that new export industries will realise higher returns to producers and gradually replace traditional industries.

The most appealing new industries at this stage appear to be those unconstrained by onerous quarantine restrictions imposed by importing nations. In this respect, the tendency of some importing countries to change quarantine conditions frequently and sometimes seemingly capriciously creates severe risks for would-be niche exporters. For such reasons, the long-term prospects of some fresh produce export markets that are currently being pursued may not be as good as South Pacific island nation governments apparently believe. Being able to deal with capricious actions of importing countries requires considerable attention to detail, in two main respects. First, strong cases need to be prepared in government-to-government negotiations about market access. Second, in order to limit the scope for excuses that governments of importing countries can use to restrict access, attention to detail, including proper in-country quarantine standards, is important in ensuring quality guidelines are met. In both instances, specialisation assists the exporting country to give this attention to detail.

For which commodities is there comparative advantage?

In deciding on its strategy about the range of commodities in its export commodity mix, the logical approach is for a country to include all commodities in which it has a comparative advantage. Since all Melanesian countries export coconut products (mainly either copra or coconut oil), for example, it would seem that they have a comparative advantage in these products. Yet comparative advantage changes over time, depending on production and market conditions.

As a result of some World Bank (1992) estimates of domestic resource cost ratios, doubts have recently been cast over the comparative advantage that a country such as Papua New Guinea has in its principal export cash crops such as coffee, copra and cocoa. Admittedly the World Bank offered some degree of support for these industries in its general statements, but these statements were largely at odds with its quantitative analysis. The issue facing

Melanesian governments, such as that in Papua New Guinea, is whether it accepts the World Bank figures and ceases to support such industries or whether it has no alternative but to treat these industries as integral parts of the agricultural economy. The World Bank figures were challenged by Fleming and Antony (1993) and Millett (1992) and the nature of these challenges has important implications for any other attempts to estimate domestic resource cost ratios. Correct valuation of the opportunity costs of labour and land (the two main factors of agricultural production) is at the heart of this issue and, in particular, it would appear that the World Bank overestimated the economic and social opportunity costs of labour in these industries. Perhaps the lesson is that, provided prices are not too distorted, the best measure of comparative advantage is not obtained from calculations but by observing the relative profitability of producers.

Diversification of farm production and risk

There appear to have been few formal empirical studies of risk attitudes of Melanesian smallholders. However, there is every reason to suppose that, like farmers in other developing economies, Melanesian smallholders are only moderately risk-averse.

Fundamental to governments' ideas about the need for them to intervene to reduce the risks faced by smallholders is an assumption that the smallholders are unable to adopt adequate risk-minimising strategies themselves. This concern about reduced welfare for smallholders from exposure to risk has so far been spectacularly unmatched by any official attempt to identify, measure and study the risky environment of smallholders or the measures adopted by them to reduce this risk.

Risk aversion among smallholders dissuades them from undertaking potentially high-yielding but risky activities. They trade off lower yielding activities against lower risk. Smallholders are nevertheless quite capable of developing risk-minimising strategies, usually containing an element of diversification. Diversification of farming activities is preferred by smallholders on two principal grounds. First, a mixed cash crop/food system can provide the smallholder with higher net returns to labour than cash

monocropping. Second, a portfolio of carefully selected farming activities provides smallholders with the ability to reduce risks.

In Becker's (1990) view, the smallholder household's objective function typically contains two goals:

- a survival goal, which is to produce a minimum quantity of staple food (predominantly root crops in Melanesia) that protects the family against the failure of the fresh produce market to supply these staples at a price that the household can afford to pay
- a monetary safety-first goal, which is to ensure minimum earnings to meet basic cash needs, such as school fees.

Becker opined that smallholders will seldom adopt modern technologies, the risks of which they subjectively perceive to be relatively high, to their potential level. Subjective risk is high when information is imperfect.

In adopting recommended practices, smallholders must purchase inputs such as fertilisers and chemicals, with the risk that cash earnings may be too low in bad times to recover the investment. This risk influences their selection of production strategies.

It is nevertheless easy to overstate the aversion to risk by Melanesian farm households. First, the short-term possibilities of starvation are much less than in other parts of the developing world. Second, there is plenty of evidence that smallholders are quite willing to try new production activities and technologies. It is conceivable that the greatest risk they face is not having enough to eat by 2010 if they do not experiment with new methods and crops now.

In any event, most Melanesian smallholders already diversify their sources of income to minimise risk by complementing food production with cash cropping. This strategy of maintaining a degree of flexibility gives them resilience in times of economic hardship. While some shift towards specialised production may occur with increased commercialisation, smallholders are likely to continue to favour a degree of diversification in production.

The strategic options for governments on diversification and risk are limited (although governments can at least do something to reduce imperfect information). The first question to ask is what gains to date, if any, smallholders have obtained from official programs to

encourage diversification, and what gains they can hope for in future. Any such gains from government action should be distinguished from those that smallholders can achieve through their own resource-allocation and risk-minimising actions. The rationale for intervention rests on the proposition that smallholders will act quite differently with an official program in place from the way they would behave without such a program — a proposition which might be regarded as dubious. A related issue is whether governments should act to alter the mix between products marketed in the domestic market and those exported, to reduce exposure to risky world markets.

Diversification and conservation of the agroecosystem

The issue of diversification and conservation of the agroecosystems should be considered in conjunction with the agricultural research and extension issues earlier. Also, the extent to which governments in Melanesian countries should push for agroecological conservation through diversification depends to a large extent on other decisions about the use of agroecosystem resources, discussed later.

A crucial issue is the relative merits of monocropping versus diversified cropping systems. Diversified, risk-spreading strategies are already practised by Melanesian farmers in a sophisticated manner, not only in response to market and yield uncertainties but also in response to ecological problems of farming systems. While some of these systems are showing signs of breakdown under pressures of population growth and increased commercialisation of production, the inherent ecological and other advantages of diversification should not be overlooked. There are dangers in basing recommendations for 'improved' cropping systems on just one or two seemingly well-adapted crops. It is more likely that successful and sustainable systems will be based on crop mixes and rotations developed from existing practices but integrated with appropriate ecological controls such as soil conservation. Moreover, as already noted, the diversity of circumstances from place to place in Melanesia makes it impossible to suppose that these improved systems will be evolved and evaluated by agricultural researchers using conventional experimental methods. Mostly, they will be the

product of innovations by smallholders themselves, perhaps with some advice from research and extension personnel. Thus, the capacity of governments to influence the outcomes, in terms of diversification *vis à vis* monocropping, is probably minimal.

There is a strong case for investigating the feasibility of diversification by members of farm households into non-agricultural sources of income. This can help ease the pressure on agroecosystems by limiting intensification of land use, and still enable farm households to increase their standards of living. The ability to do this depends on the potential for non-agricultural income-generating activities in rural areas, an issue that is taken up in the following section.

Diversification of rural regional economies: exploiting comparative advantage and the scope for specialisation in rural production

Farm households will make their own decisions about what degree of specialisation is appropriate, tempered by the strategic need to minimise the production and market risks they face. Households which allocate most of their resources to cash crop production are rational in using some of their cash income to purchase part of their food needs rather than grow their own food. This creates an opportunity for households not so well placed for cash crops to grow food crops in excess of their own needs to sell to the

cash croppers. In fact, there are various forms and degrees of specialisation in rural villages whereby households can exploit their comparative advantage in certain productive enterprises.

It makes sense not just for households but also for regions and villages to direct their efforts to some degree of specialised productive rural activities — agricultural or non-agricultural. A degree of specialisation in production enhances the use of scarce resources and benefits those who specialise as well as the country as a whole. This contrasts with the notion of encouraging self-sufficiency at the household, village and national levels. The strategic approach of Melanesian governments should be to encourage, through agricultural and other ministries, all types of rural income-earning and food-producing activities that rural people consider appropriate to their needs and circumstances. This implies

that a growing need for specialisation by some farm households as commercialisation expands is to be expected and encouraged, rather than discouraged.

It was noted earlier that quite considerable degrees of economic inequality exist between households in the same villages. As access to land becomes more difficult, increasing numbers will seek employment outside agriculture, and it is unlikely that employment opportunities in the urban areas will grow quickly enough to absorb those work entrants looking for jobs.

The threat faced by Melanesian countries, therefore, and especially by those where the workforce will grow very rapidly due to past and current high rates of population growth, is of emerging serious inequity. Unless something is done, large numbers of young people will be unable to find productive work in their villages or in the urban areas. Implications for welfare, and for law and order, are serious.

‘The strategic approach of Melanesian governments should be to encourage, through agricultural and other ministries, all types of rural income-earning and food-producing activities that rural people consider appropriate to their needs and circumstances.’

Clearly, a large part of the solution to the problem must be sought by encouragement of economic diversification in rural areas, entailing a program to expand rural employment. Potential problems abound with attempts to encourage rural industries, but governments can and must create a climate conducive to investment, including foreign investment. Domestic and aid sources of capital will be inadequate. We suggest the establishment of more industrial parks, strategically located, with secure land tenure and utility services available. Similar land tenure and other arrangements need to be set in place to promote tourist-based developments. Even with the right policies in place, we must expect real wages in these countries to fall, making some forms of investment more attractive.

There is scope for parallel investments by government and the private sector. For example, the injection of foreign capital into a tourist development or a factory may be possible only if government

assists by upgrading transport and communications infrastructure in the area. Given the massive investments that will also be needed in social services, such as education and health, to accommodate the growing numbers of people, it will be vital to maximise foreign aid to finance the necessary government spending.

It is urgent for population growth to be curbed, but the impact on the growth of the workforce of any measures that might be put in place now will not be felt until after 2010. Meanwhile, governments should encourage out-migration for employment.

Use and conservation of agroecosystem resources

Strategic decisions about the rate at which agroecosystem resources are used are taking on increasing importance in the developing world. There is already evidence of declining productivity of some agricultural land in Melanesia, a consequence of the gradual breakdown of the traditional bush fallowing system. Pressures for land intensification are becoming greater in many rural villages as cash cropping increases in importance.

It would be simplistic and misleading, however, to place the blame for any negative effects of the pressures on land on cash cropping. Cash cropping need not be a cause of degradation of an agroecosystem. Hence, any strategy to solve a country's ecological problem by replacing cash cropping with food production is likely to be based on a false premise.

The more difficult problem concerns the way in which cash crop expansion takes place. Cash cropping has often taken place on the best lands, relegating food production to less fertile lands. This is essentially what has happened in Solomon Islands, for example (Jones, Fleming and Hardaker 1988). Consequently, ecological problems result from lack of a suitable natural resource management program and land tenure arrangements rather than the destination of the crop output.

What possible solutions exist for ensuring a sustainable agriculture in Melanesia in the future? One solution would be to open up suitable lands not currently used for agriculture by improving the rural transport network, particularly in areas where people have rights to under-used land in currently inaccessible areas. There is a risk with this solution that feeder roads might not

be built to an adequate standard to minimise ecological damage. Provision should be made for maintenance of the roads, perhaps putting some responsibility onto local community groups to minimise demands on limited central and provincial government revenues in this period of fiscal stringency.

Extension into new lands is a limited option, however. The best long-term option is to establish a sound natural resource management program. This program should tackle the major causes of market failure causing degradation of the agroecosystem, and encompass a variety of measures, including tenure reform, price inducements, targeted economic instruments, regulation and extension (see Hardaker, Nu and Fleming 1993). Another option is to strengthen the research capacity of agricultural, lands and resources ministries to establish more intensive but sustainable farming systems but, as indicated earlier, this capacity may be limited, even with some strengthening.

Can national governments work out solutions to problems of agroecosystem degradation by 2010?

Solutions to agroecosystem degradation are hard to find, essentially because not enough is yet understood about the complex relationships in Melanesian farming systems.

High population growth rates and growing aspirations of rural people which encourage greater commercialisation surely place additional pressures on the agroecosystem.

Yet, while more could be done to slow population growth, governments and international agencies tend to shy away from so sensitive an issue. And rather than denying poor rural people the opportunity to raise their living standards through expanded commercial production, Melanesian governments are understandably to the forefront in promoting commercial production.

In view of these difficulties, it is hardly surprising to find some unduly simplistic remedies being advanced for the ecological problems of Melanesian agriculture. The most common is the nostalgic notion that traditional Pacific farming systems were ecologically sound. Farmers should therefore return to their old ways of doing things, with a drastically reduced reliance on external

inputs. The fallacy of this view lies in the fact that these systems are no longer well adapted to modern circumstances and needs. In particular, traditional systems practised in Melanesia, and the Pacific islands as a whole, are seldom sustainable in the face of population growth and the entailed increased commercial pressure on resources.

In many circumstances in Melanesian agriculture where reliance on external inputs is negligible, it may be lack of, rather than too much use of, external inputs that is the major threat to sustainable agricultural development. In particular, failure to replace soil nutrients from even modest crop yields has been found to lead to declining soil fertility. Lack of plant protection and animal health inputs can depress outputs and force farmers to encroach yet further on fragile lands by expanding the area cultivated or grazed.

Traditional shifting cultivation systems break down if the ratio of cropping to fallow becomes too high, as evidenced in much of Melanesian agriculture in the past two decades. Nor are many so-called 'traditional' Pacific farming systems necessarily very old — most agriculture has adapted considerably, especially in recent years, often in direct response to population pressures for given resource endowments. In these circumstances, a 'Luddite' mentality towards new farming methods is clearly misplaced.

On the other hand, neither is the 'technological fix' approach, which is also naively advocated by some, a panacea. As already noted, the research problems in seeking to develop more productive yet sustainable Melanesian farming systems are huge. Consequently, in capital-scarce Melanesian countries, the return on the research dollar may be higher if collaborative work with local people and international agencies is undertaken to develop ecologically sensitive improved farming methods. But, as warned earlier, this collaborative work will be effective only if the collaborators have something useful to offer. International collaboration might not be as cost-effective as ensuring that full use is made of existing local knowledge, and getting local people to do much of the monitoring work.

Agroforestry systems are often advocated as technical solutions to the agroecosystem problems of upland agriculture. For example, Jones, Fleming and Hardaker (1988:184) speculated that sustainable farming systems would involve some form of

agroforestry in Solomon Islands, probably with increased use of organic manures such as composts, changed crop rotations, and some use of chemical fertilisers. A number of innovations have been tried including, most notably in recent times, alley cropping. But doubts exist about the adaptability and sustainability of such systems. While many traditional systems were in fact forms of agroforestry, there are few documented economic appraisals that show modern agroforestry systems to be viable, and even fewer documented cases of their successful introduction to upland farmers. In most cases, many questions remain to be answered: Can farmers afford them? Do they really work in the long run? Are they sufficiently productive to support the increased populations? Are they socially adapted? Bearing in mind problems of mechanisation in Melanesian farming systems, can they, or indeed should they, be modified in future to larger-scale production with higher labour costs?

This is not to argue that such systems will not prove to be valuable for the sustainable development of some farming systems. They may well be, but the point is that these systems require thorough inquiry by farmers as well as public researchers, rather than unfounded advocacy with little regard to their suitability and profitability.

By themselves, technical solutions are unlikely to be adequate to resolve the problems of complex farming systems in which people are key components. Moreover, many Melanesian farming systems are beset with resource management problems that transcend both technical solution and solution by the local people acting alone. Yet, it is unrealistic to expect ever to have enough public knowledge to solve degradation problems throughout Melanesia. Other, more rapid approaches are needed in which the people within a particular farming system become more involved in collaborative inquiry with public researchers to solve the problems of resource degradation. Consequently, radical changes in resource management policies will usually be needed in terms of monitoring change in farming systems, collaborative research work and programs to raise local awareness of degradation and its causes.

Resource management strategies: a central government or local level responsibility?

The search for better resource management policies is based on recent emphasis on sustainability in development planning in Melanesian countries. This issue of improved resource management can be analysed clearly only by defining what it is that needs to be sustained. As described earlier, the overall well-being of a society should be the focus of sustainability, not preservation of certain, or all, natural resources. Sustainable development of a farming system is considered to be the appropriate concept to study in deciding on development strategies.

Attainment of sustainable development of Melanesian farming systems has micro, meso and macro-level dimensions, and depends on decisions and actions at all three levels. At the micro level, the greatest need is to educate people so that they understand the ecological consequences of their actions, and can work out better ways of doing things.

But there is also a need for rural people to be given (or given back) the power to control more of their own future, which means less government intervention. Farming communities the world over have vast accumulated wisdom in resource management, but too often they have little capacity to change their circumstances. Frequently, the power used to exist within communities, but has been largely lost, perhaps as a legacy of colonial domination, or simply because of the tendency of governments to take upon themselves powers they are not able to exercise effectively. Furthermore, governments have often been guilty of inappropriate forms of market intervention which have exacerbated, not improved, resource management practices.

Elsewhere in the developing world, nationalisation of the forests to limit access has been one intended solution to the problem of depleted forest resources (often situated adjacent to farmland in Melanesia). Such an action is more likely to have the opposite of the intended result in Melanesia where customarily owned common property resources would be converted to open access resources, loosening restrictions on exploitation unless the government is able to impose effective restrictions to access. Once people no longer see the forests as theirs, they lose the motivation to regulate their use of them.

Hence, there is certainly a need to find ways of promoting self-reliance and community responsibility for what are essentially local resource management issues. Not all resource management problems, though, are capable of solution at the micro level through education and empowerment. Market failure therefore requires some judicious intervention by Melanesian governments at the sectoral and macro levels.

**Types of
intervention**

Winpenny (1990:443–4) outlined five forms of government intervention to prevent ecological degradation through inappropriate resource use:

- regulation
- creating or altering property rights
- indirect economic measures
- targeted economic instruments, including development projects
- persuasion.

These are relevant to Melanesia.

The most commonly used form of government intervention to prevent ecological degradation is regulation, yet this is likely to be the least effective in rural areas of Melanesia because of difficulties in enforcement. Enforcement problems are likely to be especially acute in Melanesian countries because governments typically lack knowledge of the causes and extent of ecological degradation in rural areas, and the ways in which regulations should be framed to prevent such degradation. Also, they usually lack the trained and experienced labour and financial resources to enforce environmental regulations.

Government intervention may be needed to make property rights more suitable for sustainable development of farming systems, but direct intervention is full of pitfalls. Perhaps the best long-term influence that a government can have is indirect, by fostering the intensification of those land uses which hasten the evolution of specific property rights that improve incentives to conserve the agroecosystem. If governments can encourage this intensification, as 2010 approaches, desirable changes in land use may eventually be induced. But intensification brings with it

dangers of growing external costs of land use. Hence, the government must act on two fronts: to encourage intensification of land use while preventing agroecosystem deterioration.

Many of the things that governments should do to improve the situation in farming systems are not specific to activities and decisions in these systems. Better education should give local villagers a better understanding of ecological matters; better roads and other infrastructure will improve the local terms of trade, easing pressure on resources and promoting the development of other forms of economic development that may be less ecologically damaging.

One long-term measure that offers possible gains is 'aid for nature swaps' between industrial and Melanesian countries. Since some of the most vocal support for preservation of biological diversity comes from the industrial countries such as Australia, aid for nature swaps need to be promoted to enable those willing to pay to do so.

Two caveats made by Winpenny (1990) on the efficacy of targeted economic instruments are worth repeating because of their relevance in Melanesian farming systems. First, these measures may lack effectiveness if they are targeted at people who live and work largely outside the money economy, as many Melanesian rural inhabitants do. Second, targeted economic instruments depend heavily on sound planning and administration of public finances. If this sound planning and administration is not present, politically and economically less powerful sections of the economy are likely to lose out to stronger sections when it comes to effective collection of taxes and the granting of subsidies as conservation measures. This is because, relative to the latter, the former tend to be less able to avoid or manipulate tax collection procedures and benefit from subsidies.

As Winpenny observed, the use of persuasion as a tool of government intervention is often overlooked. It can reinforce a reliance on local community responsibility, which is itself a potentially strong vehicle of persuasion, in the sense that governments with little direct influence over people in upland farming systems can support local organisations in their role of influencing common property resource use in these systems. In particular, given the strength of Melanesian village systems, village-level participation can help internalise some externalities,

can potentially (but not certainly) also lead to better management of common property resources, and possibly even change some open access resources to common property. But more thought needs to be given to organisational forms to make this work. Handing power to the people does not solve the problems unless they are ready and able to use that power responsibly. Hence, there is a role for government in enabling these organisational forms to be put in place, or in co-opting existing rural and village community organisations and helping them to work effectively.

Governments can also play a facilitatory role through public research, as taken up in the following section. But strategists should be wary of placing too much faith in research. Strategies other than long research programs, outlined above, may well be more cost-effective.

Setting the research agenda for sustainable development of Melanesian agroecosystems

Seven strategic research decisions in agroecosystem resource conservation are identified in this section:

- the allocation of public funds between research and investment projects
- the length of time devoted to each research project
- emphasis on human inputs in solving resource degradation problems
- the role of technology in solving resource degradation problems
- research organisation for investigation of sustainable agricultural development
- deciding on the optimal level of knowledge of an agroecosystem
- deciding on the nature of technology transfer.

Agricultural research versus investment projects

Those making decisions about agricultural investment projects in Melanesia seldom know enough about the natural environments in which those projects are implemented to be sure that a development project outcome will not cause ecological harm. This harm may, in some circumstances, be sufficient to make a project undesirable from

a sustainable development viewpoint. It might be concluded that a fundamental change in emphasis is needed in the choice of agricultural development projects in Melanesia. More of the development project budget should be allocated to research and less to investment projects, at least until greater knowledge of the farming systems is accumulated. Yet there are problems with this notion. Even in the best of circumstances such research is difficult and costly and will yield substantial benefits only well into the future, while investment decisions need to be taken now. Circumstances in Melanesian agricultural research systems are far from ideal.

An alternative approach is to view agricultural investment projects more as experiments, with a much more prominent research component than is currently the case. An important aspect of planning such projects is to recognise the risks involved and to be cautious about implementing projects with potentially large downside risks, especially of major irreversible damage.

More emphasis on research within investment projects may help to overcome the constraints that national agricultural research institutions in Melanesian countries are under in carrying out inquiries into the sustainable development of farming systems. A diversion of public funds from investment to research would enable these institutions more adequately to meet the considerable demands on their resources, which are currently well beyond their capabilities. More attention to research organisation and management, however, is also going to be needed if institutions are to take significant steps towards satisfying these demands. In particular, attention needs to be given to how researchers work on resource conservation issues within the agricultural project planning and management process.

Time ordering of research priorities

It is apparent from the earlier analysis and discussion on degree of specialisation that much essential agricultural research into Melanesian farming systems will take a long time. Yet the pressing need for research results in these systems demands that at least some research be undertaken relatively quickly. Shorter-term research might also often be a prerequisite for planning the longer-term research activities.

Strategic thinking is therefore necessary in planning research in these types of farming systems. Yet, for two main reasons, it is difficult to achieve in practice. First, the political and policymaking masters of research personnel seldom if ever operate to such a long time frame, and demand quick results. Second, it also is difficult to get the paymasters of this research, including often international agencies, to countenance research investment with distant payoffs. Dovetailing shorter term research projects into longer-term programs is therefore essential, so that some coherence can be built up among the different projects that are implemented.

The case for thinking about people when researching sustainable agricultural development

Social, political and cultural factors can indirectly influence resource use in Melanesian farming systems, and thereby affect the ways in which resources in these systems are used. They are particularly important, for example, in influencing the rate of population growth. Their consideration should therefore be an integral part of research activities designed to achieve sustainable development in these systems.

Whatever policies are put in place to try to ensure sustainable development, their success depends on the local people who are the key to what can be done. Therefore, good understanding of the needs and circumstances of local people, and a willingness to work with them, are vital for success. For example, it is now well understood, though not always practised, that improved technologies need to be developed through research processes based on cooperation with the intended client group, as discussed earlier in this paper. Similarly, other policies at macro or meso levels need to be based on better analysis of the micro-level realities.

It is misleading to view the impending ecological problems of Melanesian farming systems simply as resource management issues: people, and their welfare, are at the core of these problems. Research into alternative solutions of these problems will therefore require an interdisciplinary approach considering not just farming technology and natural resource use, but also education, health, infrastructure and the like.

Linkages between technology and sustainable development

Research activities need to be undertaken mindful of two links between new agricultural technologies, poverty and agroecosystem degradation, namely those that are established by new agricultural technologies and those that occur in environments lacking technological change. In other words, the introduction of new technologies in Melanesian farming systems can positively or negatively affect sustainable development. Strategists in general, and research planners in particular, need to study new technologies with a mind to introduce those that help to break the link between poverty and degradation, and reject those that reinforce it. Naturally, this is easier said than done, as most technologies lie on a spectrum between good and bad and usually contain elements of both. But at least where it is considered necessary to introduce new technologies which have some bad effects, it should be possible to introduce complementary policies which might at least mitigate these effects.

As implied by the definition given in an earlier section, sustainable development in farming systems can often be best achieved by substituting capital produced by humans (for example, fertilisers and chemicals) for natural resource stocks. This has been the common development process experienced to date in farming systems in both the industrial and developing worlds. Such a process usually leads to an absolute reduction in natural resource stocks; indeed, the examples of fertiliser and chemicals demonstrate that capital produced by humans often contains components of non-renewable resources. It follows that research processes in upland farming systems leading to some destruction of natural resources should not be neglected out of hand.

“Research will require an interdisciplinary approach considering not just farming technology and natural resource use, but also education, health, infrastructure and the like.”

The work of researchers depends, therefore, on an ability to accumulate capital, in which can be embodied new technologies in Melanesian countries. Melanesian countries are beset by fairly stagnant agricultural systems in which levels of saving are low.

Hence, capital will need to be injected chiefly from outside. Domestic non-agricultural saving rates are also low. Overseas nationals are an important source of savings and investment in Polynesia, but not in Melanesia. Foreign aid is likely to decline as 2010 approaches, and cannot be relied upon for the bulk of agricultural investment in the future. The remaining option is foreign investment which holds out the greatest hope for future capital accumulation in Melanesian agriculture.

Research managers also need to be aware of the nature of relations between capital produced by humans and natural resource stocks in such farming systems. Three qualifications can be made to the contention that the former can be substituted for the latter indefinitely in Melanesian farming systems without causing welfare losses in either the current or future generations:

- Asymmetry in using and replacing natural resources compared with capital produced by humans means we should put some premium on the value of natural resource stocks; to date it is more likely that we have been wrongly discounting their value (Pearce, Barbier and Markandya 1990). At the extreme, of course, the cost of replacing a particular natural resource can be infinite if its degradation is irreversible. In particular, we have little knowledge of the value of many species in Melanesian farming systems, and especially in adjacent forests. The cost of their destruction is accordingly uncertain. Preservation of genetic diversity is the best reason for being cautious about development activities that might lead to the destruction of certain species.
- The substitution of capital produced by humans for natural resource capital typically involves the substitution of broadly available knowledge associated with manufactured capital for knowledge possessed by a limited (and, in Melanesia, frequently declining) number of people associated with natural resource stocks specific to particular farming systems. Once the latter knowledge is lost, it may never be recovered.
- The relations between capital produced by humans and natural resources may not be competitive but complementary, and may be changing over time. Specifically, the usefulness of

capital produced by humans might be severely or even totally impaired without a certain level of natural resources to provide life support to the farming system.

Researchers in Melanesian farming systems need to understand these relations, even if they consider that there is still considerable scope for substituting capital produced by humans for the natural resources which provide the bulk of the factors used in farming. Much of their work entails improving such systems through a reliance on the substitution of capital produced by humans, embodying improved technologies, for the natural resources of land, water and accompanying flora and fauna. This research is time-consuming, and needs to be commenced now if the emerging resource problems in farming systems by 2010 are to be met with sound solutions.

Finally, researchers should be wary of basing research processes leading to technology uptake for sustainable development on the selection of supposedly 'ecosystem-friendly' crops. The chief criterion on which to judge an ecologically sound research program is the production method (and often also the marketing method) used, not which crop or livestock commodity is produced. It has been surmised by some that certain crops in the South Pacific are ecologically bad. More likely, it is not crop selection itself which causes agroecosystem degradation and unsustainable cultivation practices but neglect of agroecological and economic considerations by policymakers in influencing that selection. The idea that food crops are inherently good and cash crops inherently bad for the environment should be dispelled.

Research organisation for research into sustainable agricultural development

Lynam and Herdt (1989:392-5) provide a useful summary of the steps needed to address sustainable development as an agricultural research goal. These steps are most applicable to research organisation for Melanesian farming systems. The five initial steps are to recognise the issue, stratify target areas according to their suitability for intensification, set in process a series of long-term farming system experiments in different agroecosystems, examine these systems with a view to identifying major externalities and,

finally, measuring and valuing these externalities. Then follows the most critical part: how to reorganise research programs to incorporate adequate and appropriate attention to sustainable farming systems development as a research goal. Lynam and Herdt (1989:393) settled on three alternative approaches, which they discussed in the context of the international agricultural research centres but which are relevant also to national and regional agricultural research in Melanesia:

- recasting existing commodity research programs to incorporate the above five steps
- organising research around resource management (for example, soils, trees, water)
- organising research around solutions, such as agroforestry.

Whichever approach, or combination of approaches, is adopted, Lynam and Herdt identified two major difficulties, namely, dealing with the specific nature of ecological problems and assuring a holistic approach to solving agroecosystem research problems — particularly, getting biologists to focus on the whole farming system rather than its components.

Improving knowledge of farming systems

We cannot hope to learn everything about each Melanesian farming system; there are many in each country. Some level approaching what Chambers (1980) called 'an optimal level of ignorance' is needed which, from the above discussion, is higher than current sub-optimal levels of knowledge about these systems (Fleming, Hardaker, Felemi and Delforce 1993). Agricultural research to encourage sustainable development of farming systems is badly constrained by our limited understanding of the dynamic relations between agriculture and agroecosystem degradation.

The indigenous technical knowledge of Melanesian farmers, as argued earlier, should not be underestimated nor undervalued. Yet, for four main reasons, the emerging ecological problems appear to be outside the capacity of local people to detect. First, early adverse changes tend to be slow, and difficult phenomena to detect and measure accurately. Second, the effect of humans in the degradation process is hard to separate from natural processes. Third, once detected, agroecosystem deterioration is difficult to

solve. Fourth, the people who are able to detect it (particularly women in rural Melanesia) are often not consulted. Agricultural research endeavours, therefore, should be directed towards complementing indigenous technical knowledge with accumulated scientific knowledge and the means of monitoring change that are beyond the capacity of local people.

Lynam and Herdt (1989:385–6) pointed to three processes of accumulating scientific knowledge that are vital to achieving sustainable development of a farming system:

- measuring total factor productivity of the farming system, so that changes in the ability of a system to sustain the current level of benefits can at least be detected
- gathering knowledge of factors that are likely to make the farming system unsustainable
- understanding the ways in which farm households adapt to a changing external environment.

The problem with the first of these is that it is almost impossible to collect the data needed to get an accurate picture over time of changes in total factor productivity. At best, some rough order-of-magnitude changes need to be observed by using what might be termed 'rapid agroecosystem appraisal' methods.

The second and third processes are made particularly difficult by the differences in agroecosystems from one Melanesian farming system to the next. In particular, 'some agroecologies are inherently more suitable for intense use while others can only be used sustainably at low levels of intensity' (Lynam and Herdt 1989:392). Also, it is difficult to identify and value particular externalities which can make a farming system unsustainable.

It is not just scientific knowledge that is needed. Among the most critical of all the different types of knowledge are the causes of market and institutional failure and how they lead to agroecosystem degradation. Knowledge is needed by agricultural sector decision-makers who may not foresee or appreciate the agroecosystem impacts of their endeavours to raise rural productivity, and who have an imperfect understanding of the complex social forces at work. Finally, planners and policymakers at the macro-level need a better understanding of what is happening in farming systems located in remote parts of their countries. Agricultural research is not

required to increase these sorts of knowledge, but a good system of accumulating institutional memory is essential.

The areas of greatest need for further knowledge of Melanesian farming systems are those having greatest effect on sustainable system development: genetic diversity; irreversibility; intergenerational transfer of resources; and relations between capital produced by humans and natural resource stocks over time. They are also the most difficult and time-consuming pieces of knowledge to obtain. The issue of intergenerational equity through transfer of resources is integral to the concept of sustainable development, making it a critical concept in research work. But it is also an elusive concept, not least because it concerns the utility functions of future generations.

Another large research problem is, of course, that no fail-safe method has yet been devised for valuing natural resource stocks, although economists have made considerable progress with contingency valuation of such stocks by assigning to them option and existence non-use values.

The appropriate nature of technology transfer

Ruttan (1982) classified agricultural technology transfer into three phases:

- Material transfer is characterised by the importation of new seeds, plants, animals, machines and so on. There will be some in-country selection by researchers or farmers.
- Design transfer is characterised by the transfer of information in the form of blueprints, formulae, journals etc. which permits overseas technology to be replicated locally. Again, some modification will occur to suit local conditions.
- Capacity transfer occurs through the transfer of scientific and technical knowledge and capacity. It provides the agricultural sector in the developing economy with an ability to develop technologies that are well adapted to local circumstances, with minimal reliance on overseas help.

Conventional wisdom is that substantial future increases in agricultural productivity are likely to need capacity transfer. Once research moves away from agricultural production which can be reasonably well controlled, the constraints on agricultural produc-

tion are so many and so diverse that local capacity for technological development is essential.

In the case of Melanesian countries — and South Pacific island nations in general — whether this conventional wisdom holds is doubtful. Instead, we favour some combination of material and design transfer in which overseas ideas and an engineering design are used to get 'best bet' technologies rather than relying predominantly on the research capacity of experts in-country. Public researchers still have a role to play in the adaptation of introduced materials and designs, but preferably in collaboration with other 'researchers' — farmers and foreign investors. Melanesian countries are too small to have fully fledged research processes which can undertake effective programs of capacity transfer, at least for the foreseeable future.

Level of factor intensity: focus on household labour use

The level of factor intensity in Melanesian farming systems is determined first and foremost by choice of production mode. Given our focus upon smallholder farming systems, factor intensity is then largely a result of the interplay of three sets of factors — choice of technology, resource exploitation rate and degree of specialisation in production — which, in turn, are influenced by the land tenure system, farm size and growth patterns. The three immediately preceding sections covered the likely impact on factor intensity, especially land use, of major strategic agricultural decisions. In this section, the focus is on specific strategic decisions relating to the use of one particular factor of production, smallholder household labour.

As already indicated, along with trees and land, smallholder household labour is currently one of the three dominant inputs in Melanesian agriculture. In the future, capital and land will become increasingly important. The efficient use of these factors is critical to rural development. Strategic decision-makers need to understand how households make decisions between domestic, production, marketing and off-farm employment division of labour, and the complementary relations between labour and capital. In these matters, they also need to understand how, and by whom, management decisions are made. While important, efficiency is not the only criterion by which to judge labour use: there are also key

rural employment and distributional issues. Before discussing these, the implications of intensification of agricultural production for household labour use are reviewed.

Intensification of agricultural production and use of household labour relative to other factors of production

Intensification of farming systems based on heavy reliance on imported inputs such as fertiliser often appears undesirable because of the foreign exchange costs involved, but the question of whether imported inputs are worth promoting is an empirical one based on economic and ecological criteria. Inputs are not bad simply because they have to be imported.

Melanesian countries are net exporters of nutrients such as potassium and phosphorus in export crops and logs, so some importation of fertilisers may be necessary. Use of purchased inputs for subsistence food crops is problematic because households often lack cash income from these crops to meet the costs. But neither is this necessarily a bad thing, because these households might be earning cash from other economic activities, enabling them to pay for the inputs. Again, the issue should be judged empirically on its merits.

Intensification through greater use of purchased inputs may or may not lead to a saving in labour use. It can lead to increased labour use, for example, where fertiliser and chemical usage requires the complementary use of labour in the application of those inputs and, possibly, harvesting and post-harvest labour time is increased if these measures increase yields. In these circumstances, it cannot be taken for granted that all smallholders would want to intensify production if labour demand is increased. The more time they must put into production, the higher they value their leisure time to do other things. On the other hand, they may substitute purchased inputs for land, and farm a smaller area more intensively. The important point is that, if they are to be effective in trying to influence these processes in the long term, governments must understand how smallholders make decisions when it comes to factor use and intensification of production.

Prescriptions such as the need for extension services to change the philosophy of smallholder low-input low-output production to

medium-input medium-output and higher should be avoided. It is best left to smallholders themselves to decide on the level of technology to which they aspire, depending on their needs and circumstances. The primary strategic functions of extension are to disseminate best known practices and to reinforce some minimum levels of management and field husbandry in a low-input production system, particularly to eliminate breeding grounds for pests and diseases. To re-emphasise a point made by Shaw (1985), the most pressing improvements in smallholder technologies, management practices and field husbandry methods are simple and mostly inexpensive in cash terms. They do not require some leap by smallholders into intermediate or high-input production regimes.

‘... the most pressing improvements in smallholder technologies, management practices and field husbandry methods are simple and mostly inexpensive in cash terms. They do not require some leap by smallholders into intermediate or high-input production regimes.’

Making best use of agricultural labour

While admiring the capabilities of smallholders to act entrepreneurially and in their own best interests, it is well not to be blind also to their shortcomings or to suggest that by leaving them to their own devices all will be well. For government agents to be effective in persuading smallholders to attend to simple tasks is also simple, but nonetheless challenging: to understand why smallholders choose, often quite deliberately, to neglect these tasks in the first place. Smallholders have been quick to ignore recommendations that do not suit them. They will not accept even the simplest advice, no matter how obvious it might seem to outsiders, if they do not feel it worth their while. Sometimes they are right to do so, while on other occasions their neglect could be caused by management deficiencies (highlighting the fact that management can also be an important factor of production — cash and personnel management training might be essential) and a more deep-seated inertia deriving from traditional pressures to conform to village social and cultural mores and obligations, which clash with the discharge of modern agricultural methods.

This dissonance is often closely related to land tenure matters. As for land tenure strategies, it is not for outsiders to dictate the terms of the trade-offs between modern agriculture and traditional village life and values. It is nevertheless important that government strategists at least recognise that such trade-offs exist, and decide which parts of the traditional way of life must be kept and which can be discarded in the pursuit of economic development. This is perhaps one of the most important sets of strategic decisions a Melanesian government must make in coming years — one which cannot be avoided if smallholder agriculture is to spearhead economic development.

There are strongly competing demands on labour time for food and cash cropping in Melanesian countries. This is especially true in respect of the time of women, who also usually have onerous domestic duties. Add the generally low productivity of labour in smallholder agriculture, reflected in low levels of incomes, and clearly any recommendation that more work be done, or that any agricultural development project which requires considerable labour input be initiated, needs to be closely examined. As a complementary initiative to these recommendations or projects, it might be necessary to identify and promote labour-saving techniques, whether in production, the home or marketing. Clearly, the techniques must be appropriate to the needs and circumstances of the target groups, which means that they must be embodied in inexpensive inputs.

A corollary is the recommendation that returns to both land and labour be considered when planning and evaluating research on improved farming methods. Researchers must be sure to record the labour use in trials to evaluate alternative techniques so that such comparisons can be made. The oft-observed differentiation of agricultural tasks by gender implies that returns to labour might need to be calculated for both males and females. Caution is needed, however, as the stereotype of women working in the food gardens and men in cash crop plantations, for example, is often violated. Evidence shows that high percentages of female household-heads work in cash cropping as well as food gardens (for example, Jones, Fleming and Hardaker 1988; Shrestha 1993).

Agricultural production and rural employment

It is hard to overstate the importance of agricultural industries as employers of labour in the rural regional economies in Melanesia. If Melanesian governments are serious about providing rural employment opportunities, support for the smallholder agricultural sector has to be a vital plank of their employment strategies.

That said, the proviso should be added that decisions on encouraging employment in agriculture need to take a long-term view — that is, they need to be strategic — and not be ruled by immediate employment considerations. The point is to ensure that agricultural industries which are currently or potentially large employers of rural labour are not disadvantaged by government policies or by short-term non-agricultural export booms or temporary recessions which damage their long-term economic prospects.

At least in some export-oriented agricultural industries, blockholdings and plantations use proportionately more labour. This is principally because of more intensive production methods, and higher yields requiring more labour for harvesting. However, the limited scope for expansion of these two modes of production, as discussed earlier indicates that the smallholder sector is the sole appropriate means by which agricultural production can help to absorb the growing rural workforce in Melanesia.

‘If Melanesian governments are serious about providing rural employment opportunities, support for the smallholder agricultural sector has to be a vital plank of their employment strategies.’

Summary

The overall thrust of the suggestions made about appropriate production strategies has been for a unimodal approach concentrated on smallholder development. This thrust is largely one of breaking down the dualistic structure in Melanesian agricultural production systems, referred to in Chapter 2, by concentrating development in the most populous production sub-system, namely the smallhold-

ings, which suffer most from the existence of a dualistic structure within the agricultural production system.

This approach does not preclude a continued presence of production modes other than smallholdings. Land tenure arrangements should be made flexible and market-governed to allow other modes to emerge should they be desired and successful.

With a view to achieving the desired state of Melanesian agricultural production systems by 2010, eight strategic issues considered important to such development are outlined in this chapter. They are presented in a four-tier hierarchical structure, headed by choice of production mode. This choice guides a further set of strategic decisions about land tenure, farm size and growth patterns. No major long-term structural changes are envisaged in any of these strategic choices, with the favoured growth pattern being adaptive growth while accommodating those smallholders who are strongly entrepreneurial. Strategic decisions in these three areas in turn determine possible paths of technological development, rates of resource exploitation and specialisation/diversification in production. The latter three sets of strategic factors interact to determine the degree of factor intensity in production, but there are also specific strategic questions which need to be tackled on factor intensity in respect of household labour use.

It is insufficient to examine strategic production options in isolation from marketing issues. Indeed, some of the deep-rooted causes of dualism in production systems originate in agricultural factor and product markets. Too often in the past, governments in the South Pacific have failed to give adequate attention to strategic marketing issues. The next chapter discusses the potential for redressing this imbalance.

5

Agricultural marketing strategies

Preoccupation with agricultural production issues has often led governments to neglect agricultural marketing strategies, which are equally important. The heavy production orientation of most agricultural research, for example, has meant a failure to consider adequately the possibilities for improving farm household incomes by raising farm-level output prices. It is typical to find the blame for sluggish performance in smallholder farming systems in Melanesian countries being almost solely attributed to deficiencies in the production system. This reaction exposes an almost complete neglect of the (usually considerable) marketing constraints under which these producers operate.

Given the primacy in agricultural production strategy accorded to smallholders, the focus in this chapter is on the improvement of marketing of products from, and inputs to, smallholdings. Nevertheless, most of the discussion applies with equal force to the marketing of outputs from, and inputs to, other production modes.

Melanesian countries have developed dualistic agricultural marketing systems. To a large extent, this dualism mirrors that present in the production systems. Again, an underlying theme in this chapter is the selection of strategies that can help break down this dualistic structure. This does not mean that the agricultural

marketing system should, or can, be treated as a unified whole for strategic analysis. Structural differences dictate separate consideration of separate parts of the overall system. The concern is more with the analytical emphasis, which to date has tended to be almost exclusively on the export marketing sub-system.

Melanesian governments have concerned themselves much more with the export marketing sub-system than with the domestic marketing sub-system. Until very recently, much of this concern has been about the organisational and market structure for traditional cash export crops in Melanesian countries, particularly the granting of a monopolistic position to statutory commodity boards. Some governments are rethinking the wisdom of strong market intervention through these boards, but the boards are still a dominant force in agricultural export marketing in virtually all Melanesian countries.

For newer, niche export crops, government strategies have been less clear. Some of the more successful niche export industries have been developed by private firms with little or no assistance from, or participation by, governments. In some instances, the operations of these firms were initially concentrated in the domestic marketing sub-sector. Where government has been involved in niche marketing, initial success has often been quickly followed by substantial marketing difficulties and eventually complete or at least substantial withdrawal from the market by both the government and producers.

Another dimension of government attitudes towards private export marketing, where it exists, has been in setting the regulatory environment. Governments have generally given commodity boards considerable powers in regulating export markets, especially in terms of licensing private exporters where they are allowed to operate.

In a way, the bias towards the export marketing sub-systems is understandable. Commercialisation of agriculture has been most conspicuous through exports, and there are special strategic problems with exporting agricultural commodities. Participants in agricultural export industries in Melanesia rely on world markets, with virtually no ability to influence events in them. Three main events are of particular importance:

- long-term trends in major factors influencing world demand and supply
- short-term fluctuations in world prices deriving from large and unexpected changes in demand and supply
- institutional decisions, especially those made by international commodity institutions and institutions in the major exporting and importing countries.

While agricultural strategists in Melanesian countries can do little to influence these events, they can influence responses to them and also the efficiency with which marketing functions are performed in the domestic sectors of the agricultural export marketing sub-systems. Three sub-sectors within the domestic sector of an export marketing sub-system are important:

- exporting
- processing
- village and roadside trading.

Despite little effort to improve its operations, the domestic marketing sub-system is also strategically important for agricultural development. Two major sub-sectors dominate within it:

- fresh produce markets
- village and roadside trading.

Gains in marketing efficiency in both marketing sub-systems can flow from a variety of sources. Eight agricultural marketing strategies to achieve these efficiency gains which primarily involve government decision-making are considered in this section. As for production strategies, a hierarchy of strategies has been developed, as follows:

Tier 1

- Marketing modes, especially in the export marketing sub-system.

Tier 2

- Mix between facilitation and regulation of agricultural marketing activities
- Appropriate public role in marketing research and dissemination of information to promote improved agricultural marketing performance

- Influencing the destination of agricultural output, particularly between the export and domestic marketing sub-systems.

Tier 3

- Improving quality standards
- Assisting the competitive international marketing strategies of marketing firms in the export marketing sub-system
- Influencing the value-adding component by altering the form in which agricultural commodities are exported
- Stabilising agricultural commodity prices.

Two of these strategies involve decisions on mix: between regulation and facilitation, and between domestic and export destinations. But marketing research, assistance to private marketers in implementing international marketing strategies, intervention to improve quality standards and encourage value-adding activities, and stabilisation schemes all have implications for the level of resource use by government institutions.

As for production strategies, intra-tier strategic relationships exist, and have to be taken into account. There is, however, one significant difference from production in that there is a one-way causal relationship between some of the marketing strategies. Choice of destination mix, for example, might influence the intervention mix between regulation and facilitation, but shifts in the latter are unlikely to influence the former except under a few specific circumstances.

Modes of agricultural marketing

The appropriate agricultural marketing mode (for both inputs and products) depends to a significant degree upon the choice of appropriate mode of agricultural production. Given our choice in respect of the latter, two suggestions follow for selection of marketing mode. First, smallholder production of fresh produce items for the domestic market can be efficiently marketed only by the private sector. A variety of possible marketing modes could be considered, including the producers themselves. Our view on this matter is that these markets are sufficiently competitive for governments to abstain from trying to dictate domestic marketing modes. Second, in determining the appropriate marketing mode for

agricultural exports, governments would be well reminded of the role they have played in both creating a dualistic marketing structure between domestic and export markets and reinforcing this structure through their interventions. They now should be intent on aiding the dismantling of this dualistic structure.

Three sub-sections follow in this section. Given that mode of marketing within the domestic market is relatively uncontroversial, the first sub-section is devoted to the merits of government participation in export marketing. Second, the scope for marketing modes other than public export marketing is considered. The alternatives contemplated are private and group marketers, but special attention is given to alternative modes of private marketing. Some implications are drawn in the final sub-section.

Deciding on the extent of government market participation in agricultural export marketing: the role of statutory marketing authorities

Five criteria have been used by Melanesian and other South Pacific island nation governments to justify the establishment of monopolistic commodity boards (Fleming and Coulter 1992). From these criteria, five propositions have emerged concerning government marketing institutions: their ability to operate with lower marketing margins than private marketers; their central role in stabilisation; the need for market regulation; the argument that only boards will discharge some key facilitatory functions; and

that boards are best placed to exploit economies of size in export marketing.

Following an assessment of each of these propositions, Fleming (1992) concluded that government marketing institutions are unlikely to meet these criteria better than private marketers, yet governments still appear to favour the retention of the boards in most South Pacific island nations. Our main suggestion here is that Melanesian governments withdraw completely from direct participation in agricultural export marketing. The implication is that their role in agricultural marketing in the run-up to 2010 should more appropriately be some mix of regulation and facilitation.

Nevertheless, government can still play a role in influencing the sort of non-government marketing organisations that operate in

both the domestic and export marketing sub-systems. The main option in this respect is in encouraging either private or group marketing. This issue is taken up in the next section.

In the short term, the transition to competitive marketing could cost more in terms of damage to existing export industries than the benefits of increased competition. A way to avoid such an outcome is to employ flanking strategies to remove the boards' monopolistic powers, and allow entry of private marketers.

‘Our main suggestion here is that Melanesian governments withdraw completely from direct participation in agricultural export marketing.’

Encouragement of private and group marketers

Group marketing usually entails a cooperative marketing venture involving producers, and supported by government but it is a dubious option. Its record throughout the developing world has been poor, principally because of management problems that have plagued such organisations, a mismatch between involvement and returns to individual members, and lack of knowledge by members about the marketing functions involved. A further problem has commonly been the nature of government encouragement, where the government personnel supposedly assisting group marketing have neither the disposition nor entrepreneurship to be useful.

Initiatives to establish group marketing often originate from a faulty premise which tends to doom the venture from the start. Typically it is assumed that private marketers are taking supernormal profits for the services they offer and that these profits could be appropriated were producers to do their own marketing. Such a belief betrays a lack of understanding of what is involved in marketing a particular product. The establishment of group marketing for the wrong reasons will almost surely condemn the venture to failure. It is best for government to leave decisions on group marketing ventures to private individuals or organisations wishing to establish them, and let them survive or fail on their own merits.

The group coffee marketing and processing project in Papua

New Guinea is a useful example of the limited scope for promoting group marketing. On the surface, it appears a constructive project, aimed at equipping coffee growers with marketing skills and thereby providing them with an alternative to private marketing firms as an outlet for their produce. It is unlikely to succeed, however, for the same reasons that have caused efforts to introduce group marketing elsewhere in the world in more favourable environments to fail. The principal reasons are lack of marketing and general management skills among those operating the scheme, and differences in levels of interest, inputs and benefits among members of the group.

The appropriate forms of private marketing will depend on the marketing system in question. Domestic marketing sub-systems may be better served by a large number of individual marketers, and export marketing sub-systems by a small number of larger domestic or transnational corporations. However, our view is that the choice of form of private marketing is not an issue for Melanesian governments to be concerned with, as long as their regulatory functions are appropriate to the market structure and ownership structure of the marketing firms in a particular marketing system.

Implications

A number of strategic issues flow from the finding that Melanesian governments should largely refrain from direct participation in agricultural marketing systems.

First, three key issues flow directly:

- How does the government then decide on the mix of regulatory and facilitatory intervention?
- What role, if any, does the government have in agricultural marketing research if it is not to be a direct participant in agricultural marketing *per se*?
- Given that it would no longer have a direct role in agricultural export marketing, should the government still try to influence the destination mix between the export and domestic markets?

Once these three issues have been resolved, other strategic concerns for governments are about their role in encouraging value-adding activities and improvements in product quality for

export commodities, stabilising export commodity prices paid to producers, and helping to make private marketers more competitive in export markets.

Mix between facilitation and regulation

Facilitation and regulation are alternative means by which governments could play a significant role in marketing. This section considers the appropriate mix of these and, in particular, what regulatory and facilitatory functions should be undertaken by governments. This is the most fundamental strategic decision a government has to make in planning agricultural marketing development, because it can have a profound influence upon competition and efficiency.

Regulatory role The regulatory role of government is to shape the behaviour of marketers to develop an agricultural marketing system that maximises the contribution to agricultural development goals. An underlying presumption is that the private goals of marketers will not always be consistent with social goals. The main subjects of market regulation are the competitive behaviour of market participants, including the monitoring of pricing behaviour by marketers, and product quality. There are also facilitatory dimensions to these two aspects. The dissemination of market information bears on pricing behaviour and quality control, as discussed earlier.

The two most salient issues in regulating agricultural product marketing are whether:

- inducement is better than intervention with its threat of punitive measures
- the regulatory role should be one of government acting as an umpire in managing the rules of market capitalism, or intervening in the market place to get a particular economic and/or social outcome (Gray 1993).

Inducement versus coercion

A distinction can be drawn between minimalist and interventionist approaches to market regulation. The minimalist approach is to regulate with a light touch. It is the approach we suggest should

characterise government regulation in agricultural marketing in Melanesia. The role of the government through its regulatory arms is to set the institutional culture, and where possible encourage growers, traders, processors and exporters to work towards objectives that are consistent with the development objectives of the relevant agricultural industry.

The view is commonly expressed in Melanesian countries that agricultural marketing systems should be subject to a more prominent regulatory role, implying coercive powers, particularly to protect producers from the dangers of market failure from industry concentration and vertical integration. There is little evidence to suggest that such powers are either needed or desirable, and a strategically minimalist approach to regulating market structure and operations is preferable.

Reduction of workable competition from vertical integration is admittedly an ever-present danger in relatively small agricultural economies such as those in Melanesia, but bureaucratic solutions tend to be more damaging than the lack of competition. For instance, the dangers of restricting operating licences to some small number to control the nature of competition are far greater than are the dangers of embracing a minimalist approach to regulation. While limiting numbers appears a neat solution, it betrays an unjustified lack of confidence in market competition. This lack of confidence is the basis of much dubious advice given on agricultural marketing in South Pacific countries, and is frequently a characteristic of commentators with bureaucratic backgrounds.

The relationship between market structure and efficiency is another regulatory concern. It is most commonly voiced in respect of roadside and village trading in the marketing system. The problem here is that it is very easy to formulate admirable legislation on marketing activities to ensure efficient trading, but well-nigh impossible to police any laws effectively. Furthermore, such legislation relies heavily on some administrator's perception of marketing efficiency, which is most likely to be faulty and arbitrary, and particularly biased against marketers.

Fleming and Antony (1993:203) raise the issue of complaints by some exporters and processors that aggressive market entry strategies by new firms to capture market share in the coffee

industry in Papua New Guinea were continually forcing their margins down to unsustainable levels. Fleming and Antony were unable to find any evidence to verify these complaints, although some instability in market share over time was observed. Perhaps it is an issue that needs further investigation, but the key is probably the ability of a regulatory organisation to prevent those who have lost licences for anti-social or unethical practices getting back into the industry by some indirect means. Legal support for the regulatory organisation is crucial if it is to have that ability.

The trouble with an interventionist approach is that it is almost inevitably a self-fulfilling prophecy. That is, it leads to the sort of anti-social marketing behaviour that it is aimed at preventing. Fleming and Hardaker (1992a:23–4) outlined four potential shortcomings of the interventionist approach:

- There is a risk of arbitrary public decision-making, with regulators becoming out of touch with economic realities, leading to inefficiencies in market resource use. This arbitrariness affects, among other things, allocation of licences, what constitutes anti-social and/or illegal marketing behaviour, decisions on the desirability of discharging certain types of marketing functions, and decisions on what are economically desirable grading and quality control activities.
- A danger of institutional failure is always present. Control over licences enables politicians to distort the criteria on who gets a licence and how the licensing system is operated. Political interference can also dilute the role of the statutory authority as an industry 'policeman'.
- Short-term political expedience can override the commercial judgment of statutory authorities.
- Rent seeking is encouraged when artificial quotas are placed on participation in processing and marketing. The allocation of licences provides an opportunity for marketers to seek rents by acquiring a licence. Resource misallocation, corruption and inequities can eventuate.

In addition to these adverse impacts, a strongly interventionist approach is likely to be less effective than a minimalist approach in four respects:

- It entails a heavy reliance on personalities within regulatory agencies rather than a reliance upon the regulatory process.
- It is almost impossible to police the very large numbers of marketing activities involved, especially at stages close to the producer such as roadside and village buying and selling.
- Bureaucrats often have a poor appreciation of what services are offered by marketers and the risks that they bear.
- Even for experienced observers, some forms of pricing behaviour, such as the policy of price levelling, are easy to misinterpret.

Where a licensing system is in place, a key question is what constitutes satisfactory marketing behaviour and who should be granted, or be relieved of, an export licence. Judgment is inevitably called upon in making such decisions. It is most severely tested in response to claims of anti-social pricing behaviour by marketers, especially their oft-alleged practices of underpaying farmers for produce, and predatory price-cutting behaviour for short-term market share in niche export markets in which a Melanesian country has some price-making capability. Specialist marketing institutions tend to be best placed to oversee regulations on these matters because of their knowledge of the industry.

An umpire or a fixer?

A crucially desirable attribute of a market which features sustainable and workable competition is a clear set of ground rules for participation, and consistent enforcement of those rules. Here, the role of the regulator is that of enforcing the rules of agricultural marketing (including more general commercial laws) by which private firms must abide. Free from political interference and able to enforce its rules, a statutory authority, supported by the existing legislative system, should be in a sound position to administer a healthily competitive industry. With such a guarantee of freedom from political interference, and a limited but clear mandate for enforcing legislation, a statutory authority can act independently.

Once that regulatory role changes to one of influencing economic and social outcomes in agricultural markets, the independence of the authority becomes precarious. Without independence, an authority's role is undermined, and its effectiveness in ensuring

a competitive and fair marketing system is impaired. An authority required to use regulatory intervention to seek out particular market solutions would be very prone to the dangers of political interference, and the regulations set would be difficult to enforce in the legal system.

Facilitation

Six major facilitatory functions can be performed by statutory authorities:

- helping to exploit economies of size in marketing and processing
- upgrading marketing skills among market participants
- market analysis and the dissemination of market information
- agricultural marketing research and promotion
- quality grading
- intermediation.

The first three of these functions are briefly discussed here. Marketing research and promotional strategies are discussed in the next section. Grading for quality is a facilitatory, as well as a regulatory, function of statutory authorities, and is also discussed in a later section. Intermediation entails an involvement by government in helping marketers, especially export marketers, expand their marketing operations through new trade contacts, access to new funding sources, and the like. This role is discussed later in relation to ways in which the government can support the competitive marketing strategies of private marketers in export markets.

Exploiting economies of size

There has been a tendency among planners — and their advisers — in Melanesian countries to seek advantages from increasing the size of operations beyond the farm gate. At first glance, the view that large potential benefits exist from exploiting economies of large size (or avoiding diseconomies of small size) is quite plausible: Melanesian agricultural economies are small by world standards, and the possibility of diseconomies of small size is strong. Encouraging the evolution of large firms in agricultural marketing and processing would appear a sound strategy. Unfortunately, those holding this view have not supported it with any empirical evidence.

Substantial diseconomies of very small size are undoubtedly present in the export marketing systems of commodities such as copra which are bulky and do not lend themselves greatly to product differentiation. Yet even in this case there is a limit to these diseconomies, especially since containerisation. This is because the minimum unit costs of copra export marketing can be reached at reasonably low levels of throughput and there is little evidence of any further substantial economies of still larger size. For other export commodities, diseconomies of small size can be expected to be even less binding, and economies of large size even smaller. For domestically marketed crops, it is most unlikely that economies of size would exist, given the structure of the marketing systems.

It is worth distinguishing between size and scale economies, as they imply different things. Scale economies refer to reductions in the total cost per unit of throughput that can be achieved by increasing that throughput, input shares remaining constant. Size economies are the same except that input shares can vary at different levels of throughput. The distinction is important in agricultural marketing in Melanesia. Small firms can avoid many diseconomies of small size by being labour intensive — labour is a fairly divisible input — and using less capital — which often is not very divisible.

In Melanesian agricultural marketing, it appears that industry structure is flexible enough to enable firms to adjust their organisational designs to suit their size and to minimise any potential diseconomies of small size. Small export marketing firms — and probably also small processing factories — are more flexible and better able to adapt to an economic downturn than are larger firms with high overhead costs. Hence, diversity among the organisational structures of marketing firms may well be an important factor guaranteeing the long-term viability of the whole marketing system in the long run.

While diseconomies of small scale do not appear to be a strong influence on agricultural marketing activities, they may possibly be so in processing sectors. This is because processing firms may have to commit themselves to substantial investment in discrete units of processing capital — large items of equipment and machinery. Yet even here it is difficult to generalise. As pointed out by Fleming and Antony (1993) in respect of the coffee industry in Papua New

Guinea, smaller processing factories appear to be more resilient to the present economic downturn in the industry than are large firms, offsetting at least part of the scale advantages of the latter.

Upgrading marketing skills

The wisdom of statutory authorities becoming involved in upgrading marketing skills of producers and private marketers must also be questioned. These authorities do not have a good record of demonstrating marketing skills, and are hardly the repository of skilled and experienced marketers who can impart insights to others. It is not surprising, therefore, to find little evidence of this facilitatory function. There has been one recent initiative in upgrading marketing skills. This was carried out by the extension services division of the Coffee Industry Corporation (CIC), and the Coffee Development Agency (CDA) before it, as part of a group coffee marketing and processing project in Papua New Guinea. As pointed out earlier, however, this initiative does not appear to have been very successful.

Market analysis and the dissemination of market information

There is a need for market analysis which aids the flow of information between producers and potential buyers about what is needed in an agricultural product. This requirement is most obvious in export markets. For example, the trend in higher income countries to 'gourmet' consumption, wherein 'different' and special foods are in strong demand, creates market niches that Melanesian smallholders might fill quite profitably. Yet at present they generally do not fill them because the information about opportunities does not filter back to them.

There is imperfect flow of information in local agricultural produce markets too. Knowing what the buyers want, and when they want it, can allow producers to match production more closely to demand, and so reap higher prices.

The crux of the problem, though, is the extent to which governments should intervene in the market to carry out market analyses and provide market information. They might well be part of the solution, but they also might be part of the problem of imperfect market information. This affliction appears at times to be related to the absence of marketing intermediaries to fulfil the role of

linking producers and consumers. These have been either officially discouraged or crowded out by statutory marketing authorities which have not been particularly innovative in the areas of marketing analysis and information flow. The major part of any solution, therefore, may be the reform of marketing institutions.

The quality of market analysis and the provision of market information vary widely among statutory authorities in Melanesia. The various reports published by CIC and the Cocoa Board of Papua New Guinea, and the inputs from the various sections of their industries to policy discussion in the past decade, reveal quite a reasonable level of analytical skills and adequate provision of market information. Performance by other authorities in Papua New Guinea and in other countries is less impressive.

If statutory authorities are to play a major facilitatory role in the provision of information in agricultural marketing in the future, more will need to be done on training and technical assistance for the long-term development of analytical skills, and appropriate organisational structures and rewards to encourage staff who attain these skills. Upgrading of skills and ability to provide salient market information is closely related to the next topic which is about government role in agricultural marketing research.

Identifying the government's role in marketing research

Need for marketing research Accusations against marketers and the implementation of expensive market development projects will not solve the problem of poor agricultural marketing performance. A preferred approach is to upgrade agricultural marketing research capacity, palpably weak in Melanesia, so that marketing problems become better understood and more easily resolved.

The heavy production orientation of most agricultural research in developing economies generally, and in Melanesia in particular, has led to neglect of the possibilities for improving farm-household incomes by raising farm-level output prices. Higher prices to farmers can be achieved through marketing systems research (Fleming 1989a), permitting reduced marketing margins and/or promoting rightward shifts in primary demand for the output of those farmers.

Marketing systems research can be especially important for Melanesian farming systems, for two main reasons. First, these systems contain dispersed production units disposing of small surpluses, and are frequently located in remote areas. Consequently, marketing margins are high relative to output price, either because the costs of marketing are high or because there is inadequate competition among marketers, enabling them to earn supernormal profits. In both circumstances, market development arising from research can help by reducing marketing costs and profits, thereby lowering marketing margins.

Second, higher farm-level prices achieved through marketing systems research can help to reduce pressure on farm land by raising farm household incomes and creating off-farm employment opportunities.

Should Melanesian governments play a research role?

This discussion is predicated on the view that governments should cut back their direct participation in agricultural marketing activities. In these circumstances, the importance of marketing research in developing Melanesian agricultural marketing systems does not automatically mean a key role for government in research activities. Many of the benefits of marketing research can be captured by private marketing firms and, in these cases, it is better to leave the market to determine the appropriate level of research activity. In any case, the record of statutory marketing authorities in undertaking marketing research in the South Pacific has been poor (Fleming 1992). It encourages little optimism that governments or their agencies will suddenly become major and effective contributors to the marketing research effort.

There are nevertheless areas of marketing research which have a strong public-good nature. An example is research which leads to an improvement in the overall quality of export product. The country's reputation as a supplier of that product improves, and all exporters benefit from higher average export prices. It may not be in the interest of an individual participant in that market to undertake marketing research to the level needed to maximise social gains, and there is hence a role for government to ensure this

research is carried out to its optimal level. (Of course, public research is just one means of achieving this; other options also exist.) Another example is where marketing systems research reveals serious infrastructural deficiencies that only government can remedy.

A quite substantial level of such public marketing research may be desirable. The steps a government should take to ascertain this level are as follows:

- decide which research activities will be sub-optimally invested in by private marketers
- estimate the internal social rate of return on these research investments
- undertake them in descending order of social profitability until the internal rate of return is equal to the discount rate on public capital invested
- if funds are limited (as, typically, agricultural research funds are in Melanesia), undertake as many marketing research projects as will equate the marginal return on investment in agricultural production research projects.

Influencing the destination of agricultural output

In examining agricultural development strategies, a major issue to resolve is the extent to which government efforts should go into expanding the output of export, as opposed to domestic (mainly food), industries. It is not uncommon to find members of Melanesian governments extolling the virtues of both export expansion and import substitution. Agricultural commodities feature strongly in export-expansion strategies while food-import strategies are prominent in import-substitution strategies. Governments wish, at the very least, to maintain the real value of export earnings from agricultural exports at or above their existing levels. They also wish to maintain food imports at or below their existing levels.

These two strategies are, to a large degree, incompatible. The protection and support given to an import-substituting industry disadvantages the export industry mainly through its competition for resources and through exchange rate effects (or through cost inflation if exchange rates are held fixed). Support for the import-

substituting industries will lead to lower welfare for the population of that country, other things being equal.

In any case, it is debatable how far the government should become involved in bringing about a change in the export base and the relative shares of domestic and international destinations of agricultural output. It is desirable that governments leave export decision-making as much as possible to the private sector. Nevertheless, governments inevitably become involved in one way or another, especially in terms of their research and extension strategies, which promote certain export-production activities over others. And, despite data and analytical difficulties, they do make decisions to intervene and influence the export mix.

Leading industries in the quest for agricultural and rural development in Melanesia have almost exclusively been those with an export orientation. This has implications for strategic planning, in that the commitment of human resources and capital, and time taken, to succeed in world markets is generally greater than is required for domestic production. Hence, getting new export industries to their full potential takes a long time. Governments of Melanesian countries, looking into the next century, have to be planning the development of those types of industries that will have a long-term future.

Three examples follow which demonstrate how difficult it is for governments to make correct decisions when trying to alter the agricultural export base. First, a study of recent events in the coffee industry in Papua New Guinea in the light of an extended period of low prices in the world coffee market demonstrates how difficult it is for governments to carry out medium to long-term forecasts of world prices. These have a substantial effect on the relative profitability of different export-production activities and the overall comparative advantage a country has in exporting a particular commodity. Second, recent copra and coconut oil export price forecasts, which have been badly astray, also demonstrate the problems of examining the economic worth of an export industry in that the key price variable in recent analyses would have been over-optimistic. However, there is another complicating factor here. In Melanesia, coconuts are also an integral part of traditional farming systems and the provider of staple food to the rural

population. It is impossible to come to a verdict on the future viability of coconut export crops without also considering the full value of derivative products of the coconut in the domestic economy. Third, recent research efforts to introduce a higher yielding version of an existing export crop, cocoa, in Papua New Guinea demonstrate the difficulties in predicting the physiological performance of new crops before their introduction on farms. Some alarm has been expressed at the unexpected declines in yields occurring with some of the recently planted trees as they approach maturity (Gimbol, Battese and Fleming 1993).

It would be ideal if the agricultural sector were to have a comparative advantage in a wide range of industries. But the nature of these sectors, with their fairly narrow resource bases and often severe marketing constraints, limits the number of economically viable industries.

The case for considering food security and self-sufficiency in the South Pacific has been put by Foy (1992) in respect of Vanuatu. Foy acknowledged that such an approach can be costly if not carried out effectively. By this he particularly meant the need to reduce prices of domestically produced and marketed foodstuffs. The alternative view put by Parton and Fleming (1992) and in work undertaken by Gibson (1992) and Peter (1993) supports the case for greater concentration on agricultural export production rather than on import-substituting food production. When examining the relative profitability of growing export and import-substituting crops, price ratios between cash export crops and rice provide an interesting comparison. Gibson found that rice price has been declining relative to the prices of the major Melanesian exports of coffee, cocoa, copra and palm oil (Gibson 1992). Furthermore, he argued persuasively that this trend in favour of the export crops is likely to continue. Therefore, these crops are more than maintaining their purchasing power with the most dominant grain consumed in Melanesia. Peter (1993) found extremely high domestic resource cost ratios for import-substituting sugar production in Papua New Guinea. While these studies related specifically to the situation in Papua New Guinea, this finding has general relevance to Melanesia.

A variant of the criticism that a shift to export crops away from

food crop production for the domestic market is deleterious concerns its nutritional impact. A shift to cash crop production, so the argument goes, has negative effects because people are being forced to eat nutritionally inferior imported foods. The truth is that some imported foods can be as healthy as local foods, perhaps more so, if consumed as part of well-balanced diets. There is nothing nutritionally damaging about rice or canned fish, the main food imports. Moreover, evidence indicates that a shift to greater consumption of imported foods in Melanesia is associated with an improvement in, or at least maintenance of, nutritional status of children (Jones, Fleming and Hardaker 1988; Finlayson, McComb, Hardaker and Heywood 1991). Bourke (1988) found that cash cropping was not a cause of greater food insecurity in the Highlands of Papua New Guinea.

Improving quality standards

Improving and maintaining the quality of agricultural products is very much a long-term process. Grading according to quality standards is undertaken by marketers to increase net returns by providing customers with a product that yields greater utility or satisfaction. In this sense, whether or not to grade is a commercial issue. Yet, where the ultimate consumers are typically out of contact with producers and participants in the domestic sector of an export marketing system, it is a difficult commercial decision to get right.

Two aspects of product quality stand out: ensuring that knowledge of quality requirements is disseminated to all in the industry, and preventing those trying to violate established quality guidelines from doing so. As mentioned earlier, it can be seen that influencing quality standards depends on both facilitatory and regulatory actions by government authorities.

The extent to which a government authority should exert control over product quality is contentious, but there is a *prima facie* case for assuming it has some role in minimising transaction costs in the search for quality during the different phases of export marketing. These costs arise largely because of the need to disseminate information about product quality among participants in the industry.

The strategic issue of quality control by government regulation revolves around three key questions:

- Is it purely a commercial issue, or does neglect of quality by one person or company impose external costs on other members of the industry?
- If controls need to be imposed, at which level or levels in the marketing system should this be and what are the most appropriate forms of control?
- How much potential for improvement in quality exists?

Is quality control purely a commercial issue?

In dealing with this question in relation to long-standing export industries in Melanesia, one is tempted to ask how, if quality is considered a major problem, these industries, most of which are widely believed to be low-quality producers, have survived, given that export markets are usually very competitive. Surely, the culprits responsible for poor-quality exports would have been identified and forced out of the industries by now. In this respect, grading is essentially a commercial concern, and in that respect governments, usually through statutory authorities, should adopt as much as possible a facilitatory role in improving and maintaining export grading systems. However, the presence of external costs of poor-quality product means that grading and quality control are interlinked, and go beyond purely commercial considerations to include trade policy. Reputation for quality of the exporting country has as much to do with reputation for reliability of quality as it does with the physical quality of a grade of a particular consignment. Some regulation might therefore be required in implementing trade policy in respect of export quality.

Evidence of the possibility of increased external costs lies not so much in the gulf between best and worst of the product exported as to what is recognised as an export-grade product. A poor-quality product sold overseas as 'export grade' can damage reputation, whereas produce exported explicitly as 'non-export quality' is unlikely to cause such damage.

What is the appropriate strategy for quality control?

There are, in general terms, three stages in the export marketing

system when quality control can be imposed: at the roadside/village buying stage; at the factory door (where some processing is involved); and at the point of export. Roadside/village is a popular level at which observers believe action should be concentrated, but the most popular control point advocated by those in the industry appears to be the factory door (Fleming and Antony 1993).

A case can be made that the best approach to quality regulation is to concentrate the regulatory role of inspection at the point of export. The main reason is the sheer difficulty of quality inspection elsewhere in the system. Experience indicates that, in general, regulating for quality through inspection in Melanesia has thus far been of only limited effectiveness. It is especially difficult at earlier stages of export marketing because sources of inferior-quality products are so disparate. At least at the export level, these sources are much more concentrated geographically, and their activities easier to police. The alternative is to spend a lot of money on inspection and adopt punitive measures for enforcement at all levels in the industry. This is unlikely to be cost-effective, will almost certainly fail for roadside and village buyers, and is most unlikely to work at the factory door.

The imposition of severe price penalties on poor-quality produce (beyond those reflected in market price differentials for different grades) is frequently advocated, but the merits of doing so are seldom clear-cut. Decisions about what quality grades to accept are commercial ones which government agencies are usually not well placed to make. Hence, any action to impose penalties is fraught with difficulties, and, before being undertaken, would need to be carefully weighed up and supported by evidence.

The penalty issue turns on whether or not external costs are imposed on others in the marketing system (including producers) if one participant accepts poor-quality produce from an earlier marketing stage. This was the case when all Tongan fruit exports to New Zealand were banned when fruit fly were found on delivery of one consignment of water melons (Fleming and Hardaker 1992a). If no external costs are imposed, well-established discounts on poor-quality produce in line with f.o.b. price differentials should be sufficient disincentive. If external costs are imposed, and outweigh the costs of mitigating or removing their

source, then the government has a more interventionist role to play.

The key is to make the punishment of poor-quality at the export level commensurate with the damage it causes to the rest of the industry. Admittedly, this damage can be difficult to estimate.

Is there potential for quality improvement?

The potential for quality improvement in commodity exports is considerable, but this potential is not uniformly great among major agricultural exports. Vanilla and cardamom exports (from Tonga and Papua New Guinea, respectively) are examples where considerable potential has existed for quality improvements. The potential for gains from improving coffee quality in Papua New Guinea, for example, exists at least as much within grades as between them because prices vary widely within grades (Fleming and Antony 1993). Opportunities for gain from improved quality of copra exports, on the other hand, are less promising, as this product does not lend itself greatly to product differentiation.

The improvement of quality standards is of particular importance in agricultural marketing in Melanesia, for three main reasons. First, a significant proportion of the agricultural output — and, especially, a large share of future increases in output — is destined for export markets which quite often demand the attainment of minimum quality levels. Second, Melanesian wage rates compare unfavourably to those in most developing economies which are competitors in world markets, making it difficult to compete on cost. Quality is often an effective way of gaining a competitive advantage and circumventing that difficulty. Finally, the quality of Melanesian produce reaching the final consumers is often 'unsatisfactory'. By unsatisfactory, it is meant that the returns to the industry from exports could be increased by an amount in excess of the costs of improving quality.

In these circumstances, institutions in Melanesia that are responsible for the quality of agricultural exports have two options which are not mutually exclusive. First, they can change the grading scheme better to suit the needs of the industry: the recent introduction of two Y grades of coffee exports from Papua New Guinea is a case in point (Fleming and Antony 1993:214). Second,

people and firms at all stages in the industry can be helped in their efforts to produce higher grade produce. The dictum holds, however, that it is eventually a commercial decision to be made by that person or firm as to whether or not to attempt to achieve higher grades. In other words, the most powerful weapon to influence market participants and producers to upgrade quality is incentives, without which no amount of coercion and inspection will be effective. The more a system relies on incentives to bring about socially desirable behaviour by participants, the fewer the inspection resources needed to monitor adherence to quality control guidelines, as there should be fewer transgressors.

It is worth repeating the warning that not all attempts to achieve quality improvement are necessarily good for the industry, for two main reasons. First, the outcomes from attempts to improve quality are uncertain. Monetary gains from quality improvement are difficult to forecast, and can sometimes be illusory. Second, attainment of top quality is not always the most economic solution. The pursuit of quality improvement demands careful financial (from the grower/processor/exporter viewpoint) and economic (government) appraisal before being undertaken, and a well-thought-out way of achieving the necessary quality gains.

An integrated approach to quality improvement is recommended, and implies some combination of four forms of action (Fleming and Antony 1993:308–10):

- Adopt a pricing scheme at the export level which discriminates between grades, rewarding high grades and penalising low grades to a greater extent than is dictated by market price differentials between grades. This should have the desired effect of increasing the price premiums for higher quality grades. The purpose of this action should be to reduce any divergence between private costs and benefits of individual firms on one hand and social costs and benefits to the export industry on the other.
- Two mutually exclusive regulatory approaches could be adopted at the export level. The first is to penalise exporters whose export quality lies outside established guidelines. The second is self-regulation, where the export industry itself

provides a seal of approval for commodity exports which meet minimum export standards. Product and promotional strategies are often useful supplementary measures to enable the export commodity to be differentiated from sub-standard exports. In this way, a country's international reputation can be quarantined from the adverse price effects of poor-quality exports without a seal of approval.

- The third prong to an integrated approach should be a facilitatory function performed by the government, through its line agencies, to educate various sections of the export industry about the benefits of higher quality, and how to achieve these benefits. Regulation of the quality of commodity exports is likely to be effective only if it is complemented by facilitatory measures which make quality improvement relatively easy and not too costly to achieve.
- Fourth, carefully targeted input subsidies may help raise product quality by complementing the above measures.

The main advantage of an integrated approach is that it can help to reduce the difficulty, and hence the cost, of the regulatory task. By inducing — through a light regulatory approach — and facilitating the majority of an industry to act in a way that leads to an improved quality of exports, the coercive regulatory role can be focused on that small section of the industry which continues to violate established quality guidelines. Unfortunately, such an approach has seldom if ever been properly followed in Melanesian agricultural export industries, so a major change in thinking will be needed if this recommendation is to be accepted. Moreover, the recommended approach is not without problems.

First, it is difficult to ascertain the extent of divergence between private and social costs and benefits, let alone to calibrate the necessary price changes to make them converge. Who in Melanesian governments has the skills to judge whether a quality improvement is in the public interest? Second, regulation by government has proved to be fraught with political and practical difficulties of enforcement, and self-regulation is constrained by lack of well-established and cohesive exporter associations. Third, the facilitatory process is usually easier said than done: Melanesian governments lack experience of the finer points of export marketing

and probably have few lessons they can impart to export industry participants on how to improve and maintain quality. Finally, any input subsidies must be carefully targeted: governments need to be sure of what they are trying to achieve through subsidisation, and over what period.

In summary, endeavours to improve quality standards are unlikely to be effective if isolated to one stage in the production and marketing processes, or if confined only to regulation or facilitation. Once a decision has been made to improve export product quality, an integrated approach is recommended, encompassing a mix of regulation focused at the export level, and facilitation of production, roadside and village buying, processing and exporting.

Government support for competitive marketing strategies in export markets

Melanesian governments can mediate between agricultural marketers and other market participants to improve marketing performance. In the domestic marketing sub-system, marketers with assured access to reasonably-priced financial facilities might be able to perform better, for example, but it is difficult to make a case as to why agricultural marketers should be treated differently from other businesses. The main supporting role that governments are likely to play is in the export marketing sub-system.

Agricultural export markets are usually hostile environments in which to operate, and export marketers can benefit from government support in gaining a competitive edge in these markets. Governments can help in financing, as in the domestic market (this may mean mediating on loans from international organisations), networking (by bringing exporters into closer contact with overseas buyers and customers), promotion (trade fairs and the like), and in gaining foreign market access through government-to-government negotiations.

To fulfil this role, governments must understand the competitive export marketing strategies adopted by agricultural exporters in the international arena. For example, there is no sense in a government undertaking international promotion of a commodity which the country exports if the promotional campaign does not suit the export marketing strategies adopted by firms in the industry. In

the following section, the nature of Melanesian export marketing strategies is broadly described.

Nature of competitive export marketing strategies

Competitive export marketing strategies practised in the international sector of Melanesian agricultural export marketing systems fall into two categories:

- market-follower strategies
- niche marketing strategies.

Market-follower strategies are associated mainly with the traditional agricultural export commodities, such as copra, coconut oil, coffee and cocoa. For these commodities, Melanesian countries supply very small shares of world market trade, which means they are essentially price-takers in the world market. Commodities such as copra and coconut oil are largely undifferentiated products, and so little opportunity exists for product differentiation on the basis of quality. Further, there are no seasonal or locational opportunities for product differentiation. Therefore, export firms compete in world markets predominantly on cost, and so are forced to follow a cost-minimisation strategy.

Three alternative market-follower strategies can be used (Fleming and Antony 1993:86): close following (that is, following the marketing strategies of market leaders almost exactly); following at a distance (that is, following the marketing strategies of market leaders generally, but with specific variations); and following selectively (that is, following an independent set of marketing strategies but with selective imitation of marketing strategies of market leaders). Copra and coconut oil export marketing firms have little option but to be close followers. Cocoa and coffee export marketing provides greater strategic scope for firms to follow at a distance by differentiating their product on quality grounds, and thereby achieve premiums.

Selection of niche export marketing strategies is done mostly by firms in industries which have recently entered export markets. Niche marketing strategies are employed by small exporters seeking to find specialised market segments that are unattractive to major exporting countries and large international trading corporations.

Following Porter (1980), Fleming and Antony (1993) identified three types of niche agricultural export growth strategies used by

exporting firms in South Pacific island nations. The first, Porter's focus marketing strategies, is used to target a specific group of consumers in nearby importing countries. The best example of this type of strategy in South Pacific island nations is the export of root crops by firms in Western Samoa and Tonga to Polynesian populations in New Zealand, Australia and the United States. It is a type of export marketing strategy not pursued much in Melanesia to date.

Second, commodity differentiation strategies (a type of Porter's product differentiation strategy) are used by exporters to establish and maintain export market share by differentiating their exports from the commodities of competing export nations. Quality control has been the most common way of doing this, by being able to meet the expectations of importers in respect of the uses to which the exported commodity can be put, as well as its dependability and appearance. Other ways in which exporters can ensure commodity differentiation, such as the creation of brand image, promotion and service back-up, have not featured in strategies so far put in place. Generally, Melanesian export firms have so far had little success in establishing commodity differentiation.

Quality improvement clearly looms as a major factor enabling exporting firms to follow a clearly defined path in both of the above strategies. The imperative of providing high-quality exports is growing as quality consciousness among consumers world-wide feeds back to overseas buyers. Governments may therefore have a major role of strengthening quality control to enable exporters to benefit from premiums gained by exporting consistently higher grades. However, current circumstances indicate that many Melanesian exporters are not well placed to take advantage of quality differences in adopting either market follower or product differentiation strategies. Nor to date have they been in a good position to take advantage of other product differentiation strategies which demand further processing of the agricultural raw material.

Third, a seasonal/locational differentiation strategy (another variation on Porter's product differentiation strategy) is where production conditions limit the supplies of a commodity from rival exporting countries in an import market. The ability to follow this strategy in Melanesia is enhanced by two factors: geographical

isolation, which gives these countries advantages in absence of pests and diseases; and climatic conditions favourable to production of most crops for most of the year. The most common use of seasonal/locational strategies by firms in South Pacific island nations has been where seasonality in production makes a nation the only supplier of those commodities at a certain time of the year. The supply of ginger by Fiji to the Hawaiian market in the United States is a good recent example of this approach.

Governments in the South Pacific appear to assume that entry into new agricultural export markets is a fairly straightforward undertaking, and they do little to review the success of their diversification campaigns. In reality, breaking into new niche export markets, or establishing downstream value-adding niche processes for existing export industries, and sustaining a profitable market share, are very difficult and risky ventures. As the following six observations demonstrate, they require careful research and usually much perseverance and effort, often mixed with a little flair and luck.

- South Pacific island nations have experienced a fairly long history of initial success in exporting agricultural niche products, followed by failure and the virtual disappearance of the export industry. Too often, this boom–bust syndrome is attributed to the naivety and hot–cold attitudes of producers. More realistically, it occurs because of two other factors. First, it can be a feature of certain types of niche markets that exporters from other nations cannot be excluded from some of the benefits of a niche market, thereby destroying the niche. Second, government actions have hardly alleviated the difficulties of niche exporting activities with which they could help, and in many cases have made these difficulties greater. More government inquiry into why niche export ventures fail (especially in spectacular boom–bust fashion) would be invaluable in revealing to governments how they can best support exporters and thereby improve niche agricultural export performance.
- Niche exports have so far made little impression in diversifying exports in Melanesia (Fleming and Hardaker 1992b).

- The most appealing new industries at this stage appear to be those that will not be constrained by onerous quarantine restrictions imposed by importing nations. In this respect, the tendency, already mentioned, of some importing countries to change quarantine conditions frequently and sometimes seemingly capriciously creates severe risks for would-be niche exporters. For such reasons, the long-term prospects of some fresh produce export markets that are being pursued may not be as good as South Pacific island nation governments apparently believe at present.
- Successful niche agricultural export relies heavily on the integration of production and marketing activities. The maintenance of attributes that enable a niche export market to be defended requires consistent effort from everybody in the marketing channel from the producer to the overseas distributors. Difficulties encountered in agricultural niche exporting in Melanesian countries come from both the production and marketing side, with the latter usually the most neglected. Some of the more important attributes of agricultural export marketing disregarded in South Pacific island nations have been management-related. They include the establishment of an efficient market information and dealer network (with adequate feedback of the needs and responses of users elsewhere in the marketing channel), enforcement of quarantine regulations, packaging, and formulating and implementing appropriate product grading and quality control.
- Production can be a stumbling block where feasible export industries are simply unprofitable to producers (usually smallholders in the South Pacific), given their circumstances, knowledge and skills. The suitability of export crops for smallholder production varies. It has been shown that some relatively new export crops, such as ginger in Fiji (McGregor 1990), *ngali* nuts in Solomon Islands (Jones, Fleming and Hardaker 1988), taro in Western Samoa (Fleming 1988) and vanilla in Tonga (Menz and Fleming 1989), are well suited to smallholder production.
- Grave doubts exist for those niche export crops where

requirements for product and market characteristics are very stringent. This tends to make the integration of production and marketing activities very exacting. Small numbers of medium and large-scale growers operating under formal contractual arrangements or in a nuclear estate system are preferable alternatives to large numbers of smallholders for these sorts of crops. Governments are probably better off leaving such initiatives to private enterprise, and responding to the specific export needs of private marketers where it is thought to involve some public as well as private gain. The use of subsidies as a form of assistance, though, should be eschewed.

“More government inquiry into why niche export ventures fail (especially in spectacular boom-bust fashion) would be invaluable in revealing to governments how they can best support exporters and thereby improve niche agricultural export performance.”

Melanesian countries have particular characteristics that might satisfy the requirements of niche export markets.

First, focus marketing strategies appear the most viable, but may be limited in extent. Polynesian countries have been successful, for example, in securing strong export markets for expatriate Polynesian populations where they have expert knowledge of the tastes of the consumers, a strong in-country distribution network, and comparative advantage in production of the commodities concerned.

Commodity differentiation is potentially a useful niche export marketing strategy, but major improvements on current performance are essential. Quality advantages apparent in growing crops can be dissipated in post-harvest and marketing processes. Even favourable crop attributes can be cancelled out by inappropriate production practices. Also, some quality advantages may be insignificant in influencing user preferences for most uses of the commodity. Other forms of commodity differentiation by South Pacific island nation exporters have not been very apparent. Brand image and promotion, and the provision of service support, have

generally not been strong features of export marketing activities. Furthermore, success in these areas is likely to be severely limited by the small scale of operations of exporting firms in Melanesian countries. Even where a niche market is established by exporters through commodity differentiation, there is no guarantee it will not be eroded over time by new entrants.

Some scope exists for supplying horticultural crops at specific times of the year to export markets. However, three paradoxes exist here (Fleming and Hardaker 1992b):

- These exports are usually very demanding in terms of quality, reliability and timeliness, and their establishment and maintenance require large amounts of effort, resources and expertise. Horticultural exporting particularly requires specialisation in order to succeed. For small developing nations such as Melanesian countries, without a long history of exporting horticultural crops, it is likely that only a very small number of such commodities can be successfully exported. Yet, ironically, this requires a strategy of export concentration that is the opposite of diversification based on these sorts of commodities which South Pacific governments seem intent on pursuing.
- Niche marketing by its nature requires flexibility, especially the capacity to withdraw from a market quickly if competitive advantage is suddenly eroded. The sudden loss of competitive advantage is a real possibility for niche agricultural exporters from Melanesian countries. Factors such as technological change, market entry by new competitors, changing demands by importers and institutional actions in importing countries can make it difficult or impossible for the niche exporters to defend their market share. Yet flexibility and ease of market withdrawal are unlikely attributes of niche agricultural export industries. Considerable resources are often invested in the niche industry by farmers, marketing firms and the government, and expectations of secure long-term market prospects are often unrealistically built up by public bodies.
- Multiple niching is preferable to single niching, because this reduces the risks associated with losing that single niche. This

idea is consistent with the plans of Melanesian and other South Pacific governments to diversify their agricultural export base. Yet the nature of many of the export niches so far exploited makes multiple niching difficult. Further, small countries such as those of Melanesia cannot effectively penetrate many niche markets at the same time.

Returning to the issue of government support for agricultural exporting, Melanesian governments need to question carefully their strategic role, if any, in bringing about or facilitating the diversification of agricultural exports through niche products. The difficulties involved reinforce the conclusion reached earlier that governments should not be active participants in the agricultural export sector, through direct involvement in marketing or investment in development projects based on export crops. Producers and private marketers, acting autonomously, are able and willing to develop niche (and other) export industries if the long-term economic prospects are good.

Governments should do what they must do, and no more. They should, for example, enforce fair trading rules, such as weights and measures regulations, and enforce proper quarantine control. Governments also have potentially valuable contributions to make by facilitating the integration of production and marketing activities in new export industries. Even here, it is doubtful whether governments can help simply by providing particular services. They currently do not have sufficient well-trained and experienced staff and the financial resources to provide useful services to producers and marketers endeavouring to establish a niche agricultural export industry. Government role should perhaps be that of an aid broker, arranging for aid funds to employ private marketing specialists to provide export marketing assistance, or to set up joint ventures with transnational agricultural production and marketing firms with knowledge of the export markets that have been targeted.

The need to be able to defend an export market niche is paramount. Therefore, a sustained period of sound marketing research is vital for long-term success in defending a niche. Temporary success in niche export markets with little research is possible, but long-term success is more elusive.

Many niche markets are risky ventures, and are unlikely to be permanent in that they cannot be defended indefinitely. Governments may be doing an agricultural industry a disservice by encouraging it into a niche market which the industry is able to defend for only a brief time. The high risk is the major reason governments should keep out. When the window of opportunity closes, those producers and marketers who face losses may turn to the government for help. If the government helped them in, perhaps there is an obligation to help them out. Worse, governments may be tempted to prop up a failing industry, at considerable cost, in the hope that things will improve. Such risky business should be left to the private sector, ideally to off-shore investors.

Finally, the key to government role in niche export marketing is in getting the 'institutional framework conditions' right. In particular, public institutions need to learn from their mistakes, and niche export marketing is especially an area where participants need to learn quickly from errors made if the niche is to be adequately defended.

A summary of ways governments can support firm export strategies

To date, the strategies adopted by South Pacific island nation governments to promote agricultural export development have not been very successful (Fleming and Hardaker 1992b). Despite their declaration of support for the mainly smallholder agricultural export producers in development planning documents, government actions have generally impeded this development. The sorts of strategies which have been in place over the past three decades have led to policies unhelpful to agricultural development.

Government marketing strategies are currently holding back agricultural export market development in a number of ways. As a result, agricultural export marketing has not been as effective as it might have been: we have witnessed stagnant agricultural exports in real terms for over two decades now. This leads to the following five suggested changes:

- **Reduce direct intervention.** An urgent need exists to reduce the interventionist role of the government in agricultural export marketing through commodity boards. Liberalisation

of the domestic sector of agricultural export markets is essential to encourage agricultural export development.

- **Aid the integration of production and marketing.** Governments have a potential role in aiding the integration or coordination of production and marketing activities. Underdeveloped domestic sectors in agricultural export marketing sectors can make value-adding marketing strategies difficult for private marketers to achieve. The task might be made easier by judicious government assistance.
- **Facilitate product development.** The emergence of new agricultural export products through government marketing initiatives has been disappointing; these initiatives have been much less successful than private initiatives. Government contributions to new export product development should be confined to aid intermediation and assisting marketers gain better access to international trade advisory services.
- **Support measures to reduce marketing costs.** Higher farm-household incomes through marketing changes can best be achieved by South Pacific island nation governments helping to reduce the domestic marketing costs of exports. Governments should generally follow a supportive strategy for private marketers in the provision of public goods, such as transport, communication and specialised training, which are crucial for effective and efficient exporting.
- **Assist in technical research where market failure is prevalent.** A conspicuous example is research into shipping technologies. There is a case for government involvement in, for example, research on the best way of storing and shipping perishable commodities such as tropical roots and fruit. At the very least, there is a case for government to be involved in bringing in technical knowledge from overseas to take advantage of any scale economies.

Influencing the form of exported commodities

Melanesian governments are keen to promote the substitution of downstream value-adding economic activity for the export of raw agricultural export commodities. Evidence about value-adding opportunities sponsored by Melanesian governments is scanty, but

that which exists is mostly negative. Downstream processing to add value to agricultural raw materials is unlikely to be the panacea for Melanesian countries facing depressed world prices for their major exports. Nevertheless, modest opportunities for gains are probably there if a realistic approach is taken to the obstacles that exist (Mitio and Smith 1991).

The potential for simple value-adding processes is much greater than those which are complex. By and large, Melanesian countries do not have a comparative advantage in either complex capital-intensive or labour-intensive processing operations.

There is a formidable list of potentially negative factors that have to be taken into account:

- the existence of diseconomies of small size in processing
- bulkiness of the final export product
- high cost of packaging
- concentration of processing industries in consuming countries which makes market entry difficult
- market power of international competitors who are closer to the final consumers
- difficulty in gaining access to key inputs needed for processing
- frequent changes in market conditions which are more easily monitored closer to the consumers
- problems in ensuring regular supply within a given quality range
- relatively high wage rates in Melanesian countries which make labour-intensive processing uncompetitive with low-income countries which have workers with at least equal skills
- import restrictions and duties in importing countries, especially for processed or semi-processed products.

“Downstream processing to add value to agricultural raw materials is unlikely to be the panacea for Melanesian countries facing depressed world prices for their major exports.”

The limited economic potential of most forms of further processing of agricultural products in Melanesian countries makes their subsidisation unwise. This applies even to seemingly logical (but almost certainly uneconomical) developments in value-adding such as coconut oil milling (Wall 1986). As a general strategy, subsidisation of processing activities makes little sense unless there are particular difficulties faced by firms doing it in the short term only. Any contribution by the government should satisfy three criteria:

- Assistance should be temporary, with clear sunset clauses according to the principles of the so-called infant industry argument. Also, the period of assistance must be clearly established when initially given. As many countries have discovered, it is difficult for governments to cut the apron strings to the infant.
- Any tax incentives have to be offered in a consistent manner, and be based on clear development goals rather than industry lobbying.
- The government should respond to carefully specified difficulties rather than trying to 'pick winners' among firms attempting to begin or expand production and export. The latter approach seems almost inevitably to lead to inefficiency, favouritism and the creation of rent-seeking by value-adding firms. Consistent with the emergent strategy approach outlined earlier, the government should respond to emerging patterns of agricultural export development by moulding and fashioning them in the public interest rather than by attempting to create them.

A step-by-step approach is recommended for expanding value-adding in agricultural export industries, commencing with a niche market-focus strategy of concentrating on comparatively small specialty segments. A particular set of advantages conferred upon Melanesian countries are their location, image abroad and freedom from many pests and diseases. They also provide opportunities to play upon, for example, their natural production methods and image of the natural wilderness to support the export of specialty products. The attractiveness of such options is that they fit into a niche export marketing strategy in which the exporters can defend themselves better against foreign competitive forces. It should be possible to keep

capital requirements to a minimum and differentiate the production environment from that found elsewhere in the world for the product in question. Major challenges nevertheless lie ahead, as indicated in the earlier discussion of firm niche export marketing strategies.

Stabilising agricultural commodity prices

Agricultural economies in Melanesian countries are relatively open, in that a significant proportion of output is destined for export outside the domestic agricultural sector. Hence, events elsewhere in the domestic and international economies can have a major impact on the welfare of people who earn their livelihoods from agriculture.

Among the environmental forces influencing agricultural export industries, unstable world prices have possibly been the major factor of concern to Melanesian governments. The periodic instability that occurs in the world markets for major Melanesian agricultural exports, combined with a heavy reliance for foreign exchange earnings on these commodities, has resulted in long-standing programs of export commodity price stabilisation. This concern about export instability has been difficult to separate from concern about extended periods of depressed world commodity prices. As a result, the two occurrences have often been confused when governments have considered solutions to instability.

Do rural people benefit from commodity price stabilisation?

Whether commodity export instability has had a negative impact in domestic Melanesian economies — and agricultural economies, in particular — is difficult to say. There is no empirical evidence to answer this question. The evidence surveyed by Jarrett and Anderson (1989) for Papua New Guinea, Fleming (1992) for Solomon Islands and Onchoke, Fleming and In (1993) for Papua New Guinea, Solomon Islands and Fiji offers no definitive answers to the questions of whether:

- the major forces of instability in the domestic economies derive from domestic or foreign sources
- rural people in particular, and the population of a Melanesian country at large, benefit from stabilisation measures.

Certainly, sufficient doubt exists to question whether it is worthwhile for a Melanesian government to use valuable resources to stabilise the domestic economy and rural incomes, in particular.

If a government were to ignore the warning about the possible ineffectiveness of macroeconomic stabilisation efforts, what alternative approach to price stabilisation schemes is likely to be best? A potentially useful approach is for the government to set up a system of export taxes graduated for high commodity prices and, if fiscal fairness is at issue, subsidies in periods of low commodity prices, with sterilisation of funds accumulated in periods of high prices.

Overall assessment

Overall, it appears that market failure in Melanesian agricultural marketing systems is less persistent and has fewer negative impacts than certain types of market failure in the agricultural production systems. This does not imply that governments have no major role to play in the formulation and implementation of agricultural marketing strategies in either the domestic or export agricultural marketing sub-system. Agricultural marketing strategies have held a prominent position in general agricultural development strategies of Melanesian governments, even if this position has not been explicitly spelt out in development plans. Notably, considerable government resources have been invested in trying to improve agricultural marketing performance through direct market participation.

The main message to come from the discussion here is that reduced effort should go into direct market participation with a major reorientation towards facilitation and limited regulation of private marketing activities. Furthermore, it is argued that governments should research more thoroughly their planned interventions in the market place. Because so many interventions in agricultural markets to date have been poorly thought through, governments have been a major source of market failure as well as a means for mitigating or removing it.

In recommending greater investigation, however, it is recognised that the domestic capacity to do research is limited. Rather than have governments do full-scale research, a preferred approach would be for them to process existing information on the

effectiveness of various sorts of marketing policy interventions overseas (Eyzaguirre and Okello 1993). In this way, they could learn quickly, and in a cost-effective way, which interventions will probably have positive effects on marketing operations and which are most likely doomed to failure.

Where specialised research activities are needed, continuous and self-replicating sisterhood relationships with overseas institutions could be a good way of tackling specific research tasks.

6

Government capacity to implement agricultural development strategies

Organisational strategies of governments

Governments require a set of organisational strategies to implement their development plans. The various strategic decisions referred to in the previous two chapters provide the material to be crafted, to follow Mintzberg's (1987) analogy, discussed in Chapter 2, in designing this set of organisational strategies. The next step is to work out the appropriate way to go about the crafting.

It is tempting to follow the tradition of an omnipotent government being able to dictate to its populace what should be done to achieve agricultural development. In truth, this has always been a fiction, not just in the South Pacific but throughout the developing world. Government influence in rural areas is limited, its knowledge of the best way to develop deficient, and its effectiveness weak when directing strategic actions to be taken by people.

Having identified crucial areas for strategic decision-making and suggested appropriate strategies to be followed (the material to be crafted), what is the best way for government to effect these strategies? We would argue strongly that governments should not try to dictate these strategic directions — they have limited powers and influence in this respect. Rather, they must craft agricultural development strategy and get away from a *dirigiste* planning approach, except where it involves the creation of economic infrastructure.

The most urgent need is for government strategists to learn more about the agricultural sector and, in particular, about what is, and what is not, working in this sector. Through this knowledge, agricultural strategists have two complementary and important roles to play in crafting strategy:

- They must learn what the most promising and sustainable advances already occurring in the agricultural sector are, and support them (or, in some cases, remove existing constraints which are quite often government-made) through effective use of their available resources. The key word here is support, as distinct from trying to take them over. Governments in developing economies have a poor record in taking over successful agricultural activities. Most strategic advances in Melanesian agriculture will come from agriculturalists and marketers, not from governments.
- They need also to identify the most critical areas in which to intervene to control development activities. Their own resource constraints are severely limiting, so control must of necessity be limited to a small number of interventions. This is at the heart of crafting a strategy: recognition that one's own resources are limited, and appraisal of how to make best use of them and the materials with which to work.

A corollary of the above two prescriptions is that there is an urgent need for training and institutional upgrading if government strategists are to make a significant and positive contribution to effective agricultural strategic decision-making by 2010.

It is not the purpose here to give a categorical set of strategic priorities, although some indicative strategies are suggested in Chapters 4 and 5. Nevertheless, three firm directions are proposed:

- The greatest strategic priority for Melanesian government resources is to develop a program to deal with the problems of degradation of the agroecosystem, as these will surely increase as 2010 approaches. There are two main reasons why these problems are more important than those associated with imperfections in the agricultural marketing system. First, the market failure associated with degradation of the agroecosystem is much greater than that associated with agricultural marketing activities. Second, the implications of resource

degradation for sustainable agricultural development are much more profound than any other forms of market failure in the marketing system.

- Overall, institutional resources used by governments in the formulation and implementation of agricultural development strategies need to be reallocated away from agricultural production to agricultural marketing issues. This change does not imply an absolute decrease in resources devoted to strategic agricultural production issues, providing governments redress the current imbalance in budgetary matters and focus against the agricultural sector.
- Most of the current strategic interventions are unproductive or even counterproductive. Indirect interventions to raise agricultural marketing performance (that is, those other than direct participation by government in marketing activities) are likely to be much more productive than direct intervention, especially facilitatory strategic measures.

‘The most urgent need is for government strategists to learn more about the agricultural sector and, in particular, about what is, and what is not, working in this sector.’

Private and government sector balance

The best balance between government and private sector in Melanesian countries depends on circumstances within each country at a particular time. Considerations include:

- administrative capacity: related to country size and stage of development
- entrepreneurial capacity: related to culture, ethnic background, stage of development, openness of the economy
- the ‘temper’ of the people: how much direction from the centre they will be prepared to tolerate, and not try to undermine or circumvent
- the political system: how representative and robust it is
- the social system: the extent to which opportunities exist to extract private rents through government actions.

One ever-present risk in respect of the last consideration is that the optimal balance between public and private enterprise in Melanesian agriculture might be unattainable.

It is not so much the level of government resources applied to Melanesian farming systems that is of strategic concern, although it is argued that more resources be directed to the agricultural sector. Rather, it is the quality of those interventions. The main thrust has been to outline a general agricultural strategic approach, and a number of specific strategies, that should raise the quality of government intervention in agriculture and ensure that, in 2010, agriculture remains a profitable and valuable economic sector in Melanesia.

We would argue strongly that governments should not try to dictate these strategic directions – they have limited powers and influence in this respect. Rather, they must craft agricultural development strategy and get away from a dirigiste planning approach, except where it involves the creation of economic infrastructure.

References

- Antony, G. and Fleming, E.M., 1991. 'Statutory marketing authorities in the Third World: recent changes and conclusions', *Journal of International Food and Agribusiness Marketing* 3(3):43-54.
- Antony, G. and Parton, K.A., 1991. 'Papua New Guinea's export-crop research: past returns and expected economic effects', *Prometheus* 9(1):62-80.
- Becker, H., 1990. 'Labour input decisions of subsistence farm households in Southern Malawi', *Journal of Agricultural Economics* 41(2):162-71.
- Bourke, R.M., 1988. *Taim hangre: variation in subsistence food supply in the Papua New Guinea Highlands*, PhD thesis, The Australian National University, Canberra.
- Biggs, S.D., 1989. *Resource-Poor Farmer Participation in Research: a synthesis of experiences from nine national agricultural research systems*, OFCOR Comparative Study Paper No. 3, International Service for National Agricultural Research, The Hague.
- Binswanger, H.P. and Pingali, P.L., 1987. 'The evolution of farming systems and agricultural technology in sub-Saharan Africa', in V.W. Ruttan and C.E. Pray (eds), *Policy for Agricultural Research*, Westview, Boulder.
- Carrad, B., 1982. 'Food strategies in arabica coffee management', *Coffee Industry Board Research Newsletter* 2(1):6-11.
- Chambers, R., 1980. *Rapid Rural Appraisal: rationale and repertoire*, Discussion Paper 155, Institute of Development Studies, Brighton.
- Cole, R.V. (ed.), 1993. *Pacific 2010: Challenging the Future*, National Centre for Development Studies, Canberra.
- Eyzaguirre, P.B., 1992. 'Developing appropriate strategies and organizations for agricultural research in small countries', in K. Dvorak (ed.), *Social Science Research for Agricultural Technology Development: Spatial and Temporal Dimensions*, CAB International, Wallingford.

- Eyzaguirre, P.B. and Okello, A.E., 1993. 'Agricultural research systems in small countries: implications for public policy and administration', *Public Administration and Development* 13:233-47.
- Finlayson, M., McComb, J., Hardaker, B. and Heywood, P., 1991. *Commercialisation of Agriculture at Karimui, Papua New Guinea: Effects on Household Production, Consumption and the Growth of Children*, Report of a Joint Project of the PNG Institute of Medical Research, Madang, and the Department of Agricultural Economics and Business Management, University of New England, Armidale.
- Fleming, E.M., 1988. 'Agricultural marketing and price policy: choosing the correct incentives', in K.M. Menz (ed.), *Smallholder Agricultural Development in Tonga*, ACIAR Proceedings No. 24, Australian Centre for International Agricultural Research, Canberra, 35-7.
- Fleming, E.M., 1989a. *Agricultural Market Development in the South Pacific*, Agricultural Economics Bulletin No. 34, Department of Agricultural Economics and Business Management, University of New England, Armidale.
- Fleming, E.M. (ed), 1989b. *The Economics of Smallholder Tree Crop Production in Melanesia: Selected Case Studies*, Occasional Paper 13, South Pacific Smallholder Project, University of New England, Armidale.
- Fleming, E.M., 1989c. *Resource Use and Consumption in Smallholder Households in Solomon Islands: Analysis of Some Key Relationships*, Occasional Paper 14, South Pacific Smallholder Project, University of New England, Armidale.
- Fleming, E.M., 1990. 'Proposal for a marketing systems research approach in agricultural development planning', *Agricultural Systems* 32(2):97-111.
- Fleming, E.M., 1991. 'Statutory marketing authorities in South Pacific island nations', *Pacific Economic Bulletin* 6(1):23-7.
- Fleming, E.M., 1992. 'Privatization of statutory marketing authorities and the regulatory role of government in developing countries: modifying McGregor's theories X and Y', *Journal of International Food and Agribusiness Marketing* 3(4):41-54.
- Fleming, E.M., 1993. 'Strategic agricultural export marketing in South Pacific island nations: some implications for strategy selection in small developing countries', *Journal of International Food and Agribusiness Marketing* 4(3):77-105.
- Fleming, E.M. and Antony, G., 1991. 'Statutory marketing authorities in the Third World: background and assessment', *Journal of International Food and Agribusiness Marketing* 3(1):65-91.
- Fleming, E.M. and Antony, G., 1993. *The Coffee Economy in Papua New Guinea: Analysis and Prospects*, Discussion Paper No. 55, Volume 2, Institute of National Affairs, Port Moresby.

- Fleming, E.M. and Coulter, H. (eds), 1992. *Agricultural Export Marketing in the South Pacific: The Future Role of Marketing Authorities*, Pacific Policy Paper No. 8, National Centre for Development Studies, Canberra.
- Fleming, E.M. and Hardaker, J.B., 1986. 'Agricultural supply response in the South Pacific', *Pacific Economic Bulletin* 1(1):25-6.
- Fleming, E.M. and Hardaker, J.B., 1992a. 'Prospects for niche marketing in South Pacific island nations', *Pacific Economic Bulletin* 7(1):21-6.
- Fleming, E.M. and Hardaker, J.B., 1992b. 'Diversification of agricultural exports and the prospects for niche marketing in South Pacific island nations', in *Proceedings of a Conference on 'Islands 2000'*, UNESCO, Paris.
- Fleming, E.M. and Hardaker, J.B., 1993. 'Integrating farming and marketing systems approaches in agricultural development project planning', *Agricultural Systems* 42(3):227-44.
- Fleming, E.M., Hardaker, J.B. and Delforce, J.C., 1991. 'Smallholder agricultural economy at the crossroads: policy priorities for sustainable agricultural development in South Pacific island nations', *Journal de la Société des Océanistes* 92-93:119-26.
- Fleming, E.M., Hardaker, J.B., Felemi, M. and Delforce, J.C., 1993. 'Agricultural development and planning in South Pacific island nations: prescribing improvements', in *Development and Planning in Small Island Nations of the Pacific*, United Nations Centre for Regional Development, Nagoya, 187-202.
- Fleming, E.M. and Piggott, R.R., 1989. 'Assessment of policy options for agricultural stabilization in the South Pacific', *Journal of Developing Areas* 23(2):271-90.
- Foy, T., 1992. 'Food security in a South Pacific context: the case of rice in Vanuatu', *Pacific Economic Bulletin* 7(1):32-8.
- Frazer, I., 1986. *Growth and Change in Village Agriculture: Manakwai, North Malaita*, Occasional Paper 11, South Pacific Smallholder Project, University of New England, Armidale.
- Gannicott, K., 1993. 'Population, development and growth', in R.V. Cole (ed.), *Pacific 2010: Challenging the Future*, National Centre for Development Studies, Canberra, 12-42.
- Gibson, J., 1992. *Rice Self-Sufficiency and the Terms of Trade: Why Rice Is a Good Thing to Import*, Food Policy Discussion Paper, Department of Agriculture and Livestock, Konedobu.
- Gillbanks, R.A., 1985. 'Commentary on recent INA agricultural research', in *Issues in Agricultural Policy: Papers Submitted at INA Agricultural Seminars*, Institute of National Affairs, Port Moresby, 17-21.
- Gimbol, K.C., 1988. *Group Coffee Development Projects: A Preliminary Survey of the 20 Hectare Blocks*, Discussion Paper 88/3, Department of Agriculture and Livestock, Konedobu.

- Gimbol, K.C., Battese, G.E. and Fleming, E.M., 1993. Technical efficiencies of smallholder cocoa producers in Papua New Guinea: a stochastic frontier analysis, Unpublished Paper, Department of Agricultural and Resource Economics and Department of Econometrics, University of New England, Armidale.
- Gray, J., 1993. *Beyond the New Right*, Routledge, London.
- Hardaker, J.B. and Fleming, E.M., 1989. 'Agricultural research problems in small developing countries: case studies from the South Pacific island nations', *Agricultural Economics* 3:279-92.
- Hardaker, J.B., Fleming, E.M. and Harris, G.T., 1984a. 'Smallholder modes of agricultural production in the South Pacific: prospects for development', *Pacific Viewpoint* 25(2):196-211.
- Hardaker, J.B., Fleming, E.M. and Harris, G.T., 1984b. 'Smallholder modes of agricultural production in the South Pacific: reply', *Pacific Viewpoint* 25(2):223-6.
- Hardaker, J.B., Fleming, E.M. and Delforce, J.C., 1986. *Prospects for Smallholder Development in the South Pacific: Background to a Research Project*, Occasional Paper 1, South Pacific Smallholder Project, University of New England, Armidale.
- Hardaker, J.B., Nu, T.H. and Fleming, E.M., 1993. Economic aspects of environmentally endangered upland farming systems in the Asia-Pacific region, Invited Paper to the Regional Seminar on Upland Agriculture in Asia, ESCAP Regional Coordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific, Bogor, April.
- Harding, P.E., Bleeker, P. and Freyne, D.F., 1987. *Land Suitability Evaluation for Rainfed Arabica Coffee Production: Western Highlands Province, Papua New Guinea*, Coffee Research Report No. 4, PNG Coffee Research Institute, Aiyura.
- Jarrett, F.G. and Anderson, K., 1989. *Growth, Structural Change and Economic Policy in Papua New Guinea: Implications for Agriculture*, Pacific Policy Paper No. 5, National Centre for Development Studies, Canberra.
- Johnston, B.F. and Tomich, T.P., 1985. Agricultural strategies and agrarian structure', *Asian Development Review* 3(2):1-37.
- Jones, S.C., Fleming, E.M. and Hardaker, J.B., 1986. *Perspectives on Agricultural Research: A Potential Role for Economics and Social Science*, Working Note 10, South Pacific Smallholder Project, Ministry of Agriculture and Lands, Honiara, and University of New England, Armidale.
- Jones, S.C., Fleming, E.M. and Hardaker, J.B., 1988. *Smallholder Agriculture in Solomon Islands*, South Pacific Smallholder Project, University of New England, Armidale.

- Launder, J., 1987. 'Communal farm development in the Solomon Islands', *Pacific Economic Bulletin* 2(1):11-16.
- Lynam, J. and Herdt, R., 1989. 'Sense and sustainability: sustainability as an objective in international agricultural research', *Agricultural Economics* 3:381-98.
- McGregor, A., 1990. *Marketing Horticultural and Niche Export Commodities from Pacific Islands: Opportunities and Constraints*, Pacific Islands Development Program, East-West Center, Honolulu.
- Maeaba, F.L. 1993. 'Sources of inequality in rural Solomon Islands: decomposition and sensitivity analysis using the extended Gini inequality index', unpublished MEd dissertation, University of New England, Armidale.
- Menz, K.M. and Fleming, E.M., 1989. 'Vanilla in the South Pacific', *Pacific Economic Bulletin* 4(1):26-30.
- Millett, J., 1992. 'Devaluation talk a worry', *Post-Courier*, 20 March, 11.
- Mintzberg, H., 1987. 'Crafting strategy', *Harvard Business Review*, July/August, 66-75.
- Mitio, R. and Smith, D., 1991. Tax and specific sectors — coffee, Paper presented at an Institute of National Affairs Seminar on Taxation, October, Port Moresby.
- Onchoke, S., Fleming, E.M. and In, F., 1993. An economic analysis of commodity export variability in the South Pacific island nations, Paper presented at the 37th Australian Agricultural Economics Society Conference, Canberra, February.
- Overfield, D. and Irog, L., 1992. *Smallholder Research and Monitoring: Methodological Considerations and Preliminary Results*, Coffee Discussion Paper No. 8, Coffee Industry Corporation, Goroka.
- Parton, K.A. and Fleming, E.M., 1992. 'Food security: a comment', *Pacific Economic Bulletin* 7(1):39-40.
- Pearce, D., Barbier, E. and Markandya, A., 1990. *Sustainable Development: Economics and Environment in the Third World*, Elgar, Aldershot.
- Peter, R., 1993. Evaluation of comparative advantage in producing sugar under current industry structure in Papua New Guinea, MEd dissertation, University of New England, Armidale.
- Porter, M.E., 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Free Press, New York.
- Ruttan, V.W., 1982. *Agricultural Research Policy*, University of Minnesota Press, Minneapolis.
- Shaw, B., 1985. *Agriculture in the Papua New Guinea Economy*, Occasional Paper No. 20, Institute of National Affairs, Port Moresby.

- Shrestha, S., 1993. The impact of cash crop production on women's time allocation: a case study in Solomon Islands, MEC dissertation, University of New England, Armidale.
- Smith, D.V.G., 1992. 'Coffee marketing margins in Papua New Guinea', in E.M. Fleming and H.C. Coulter (eds), *Agricultural Export Marketing in the South Pacific: The Future Role of Marketing Authorities*, Pacific Policy Paper No. 8, National Centre for Development Studies, Canberra, 148-60.
- Smith, P., 1992. 'Policy generating systems: market forces and agriculture and rural development and research', *Agricultural Systems* 40(4):311-32.
- Stein, L., 1991. *Papua New Guinea: Economic Situation and Outlook*, International Development Issues No. 16, Australian International Development Assistance Bureau, Canberra.
- Treadgold, M., 1987. 'Interprovincial income inequality in Papua New Guinea', *Pacific Economic Bulletin* 2(1):34-7.
- Treadgold, M., 1992. *The Economy of Fiji: Performance, Management and Prospects*, International Development Issues No. 25, Australian International Development Assistance Bureau, Canberra.
- Wall, D., 1986. *Coconut Processing in the Pacific Islands*, Working Paper 86/16, Islands/Australia Project, National Centre for Development Studies, Canberra.
- Ward, R.G. and Proctor, A. (eds), 1980. *South Pacific Agriculture: Choices and Constraints*, Asian Development Bank, Manila.
- Winpenny, J.T., 1990. 'Introduction: national environmental policies: the scope for government intervention', *Journal of International Development* 2 (4):441-8.
- World Bank, 1992. *Papua New Guinea: Revitalizing Agriculture — Issues and Options*, World Bank, Washington, D.C.

Index

- adaptive growth strategy, 27, 48, 49, 50, 51, 102
 adoption, 49, 51, 53, 55, 71, 72
 agricultural development, 3, 5, 9, 10, 11, 12, 13, 19, 27, 29, 31, 32, 34, 35, 38, 41, 43, 45, 53, 56, 57, 73, 83, 88, 89, 90, 93, 100, 105, 110, 119, 136, 141, 143, 145
 agricultural exports, 2, 4, 11, 13, 17, 19, 23, 24, 29, 30, 32, 33, 35, 36, 37, 38, 48, 59, 60, 70, 73, 74, 75, 78, 101, 104, 105, 106, 107, 109, 110, 111, 113, 114, 115, 116, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141
 agricultural inputs, 2, 10, 18, 20, 21, 27, 30, 32, 34, 39, 40, 41, 47, 49, 50, 51, 53, 54, 55, 61, 63, 71, 72, 77, 82, 83, 88, 97, 98, 99, 100, 101, 103, 106, 109, 115, 117, 127, 128, 138
 agricultural marketing strategies, 16, 19, 105, 141
 agricultural marketing system, 17, 103, 109, 110, 111, 118
 agricultural output, 2, 10, 13, 106, 119, 120, 125
 agricultural performance, 2, 16, 19, 20, 50, 52, 141, 145
 agricultural sector strategies, 19, 27
 agricultural sectors, 1, 2, 3, 14, 15, 21, 31, 52
 agriculture, 1, 2, 3, 4, 5, 6, 8, 10, 13, 14, 16, 18, 21, 23, 24, 29, 31, 32, 34, 35, 44, 47, 49, 50, 51, 53, 54, 56, 57, 61, 64, 80, 81, 82, 83, 92, 94, 97, 99, 101, 104, 140, 144, 146
 agroecosystem, 28, 29, 45, 52, 60, 62, 73, 78, 79, 81, 82, 83, 86, 87, 88, 91, 93, 94, 95, 144
 agroforestry, 83, 84, 94
 banking, 4, 51
 bimodal agricultural production, 27, 31
 blockholdings, 30, 37, 39, 40, 41, 51, 58, 101
 capacity transfer, 96, 97
 capital, 4, 5, 18, 21, 22, 28, 32, 34, 48, 51, 55, 80, 83, 91, 92, 93, 96, 97, 110, 115, 119, 120, 138, 140
 cash crops, 2, 17, 19, 23, 24, 25, 32, 33, 34, 36, 47, 48, 53, 68, 75, 76, 77, 79, 81, 93, 100, 122
 central planning, 7, 8, 9, 10, 12
 cocoa, 17, 32, 33, 34, 51, 75, 117, 121, 129
 coconut oil, 75, 120, 129, 139
 coffee, 11, 17, 24, 32, 33, 34, 39, 40, 41, 67, 75, 108, 109, 111, 115, 116, 120, 121, 125, 129
 commercialisation, 2, 35, 51, 77, 78, 80, 82, 104
 common property resource, 45, 46, 85, 87, 88
 competition, 45, 108, 110, 111, 113, 118, 119
 copra, 11, 17, 74, 75, 115, 120, 121, 125, 129
 costs, 4, 6, 36, 37, 40, 41, 52, 70, 73, 76, 84, 98, 115, 118, 122, 125, 126, 127, 137
 customary land ownership, 39, 42, 43, 44, 45, 46, 65
 degradation, 28, 42, 45, 46, 52, 62, 81, 82, 84, 86, 88, 91, 92, 93, 94, 95, 144, 145
 design transfer, 96, 97
 development planning, 2, 7, 12, 85, 136
 diversification, 28, 50, 72, 73, 74, 76, 77, 78, 79, 80, 102, 131, 134, 135

- dualism, 18, 19, 22, 31, 101, 102, 103, 107
- economic development, 2, 3, 13, 15, 16, 23, 24, 64, 87, 100
- economic growth, 3, 4, 7, 8, 9, 13, 23, 24
- economic sector, 1, 146
- economic transformation, 2
- economics of size, 38, 39, 47, 60, 74, 107, 114, 115, 138
- education, 14, 18, 21, 68, 81, 86, 87, 90
- emergent strategies, 11, 12, 143
- employment, 4, 5, 13, 15, 23, 31, 39, 68, 80, 81, 97, 100, 101, 118
- entrepreneurial growth strategy, 27, 48, 49, 50, 51, 102
- entrepreneurship, 12, 51, 55, 108, 145
- equity, 2, 8, 14, 15, 22, 24, 25, 50, 80, 96
- exchange rate, 21, 119
- expenditure, 2, 67
- export industries, 2, 21, 36, 70, 73, 74, 104, 108, 120, 123, 127, 131, 132, 134, 135, 139, 140
- export licence, 111, 112, 113
- extension, 10, 27, 48, 52, 56, 57, 62, 64, 65, 66, 67, 68, 69, 70, 72, 78, 79, 82, 98, 116, 120
- external costs, 61, 86, 123, 124
- facilitation, 105, 106, 107, 110, 114, 128, 137, 141
- factor intensity, 28, 52, 97, 102
- farm household, 10, 13, 15, 16, 48, 49, 52, 65, 68, 72, 73, 77, 79, 80, 95, 103, 117, 118, 137
- farm size, 27, 28, 42, 47, 97, 102
- farm-household strategies, 19
- farmer, 6, 8, 10, 11, 17, 21, 24, 34, 40, 43, 48, 49, 54, 55, 61, 62, 63, 65, 67, 69, 71, 72, 76, 78, 82, 83, 84, 94, 96, 97, 113, 117, 134
- farming system, 5, 6, 16, 29, 30, 32, 33, 34, 35, 41, 43, 46, 47, 48, 49, 50, 51, 52, 54, 55, 58, 61, 62, 64, 65, 66, 68, 70, 71, 72, 78, 82, 83, 84, 85, 86, 87, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 103, 118, 121, 146
- farming systems research, 65, 94
- Fiji, 1, 4, 33, 39, 131, 132, 140
- fishing, 3, 23
- food, 2, 4, 13, 14, 17, 19, 23, 31, 32, 33, 47, 52, 54, 59, 68, 76, 77, 79, 81, 93, 98, 100, 116, 119, 121, 122
- food security, 59, 121, 122
- foreign exchange, 1, 13, 98, 140
- fresh produce market, 4, 77, 105
- future generations, 3, 28, 92, 96
- goals, 5, 10, 12, 13, 14, 15, 19, 33, 34, 42, 53, 54, 72, 77, 110, 111, 139
- government, 2, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 29, 32, 33, 35, 39, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 53, 54, 55, 58, 59, 60, 63, 64, 66, 67, 68, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 84, 86, 87, 88, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 114, 116, 117, 118, 119, 120, 122, 123, 124, 125, 126, 127, 128, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 143, 144, 145, 146
- government intervention, 7, 8, 9, 10, 20, 24, 44, 85, 86, 87, 141, 144, 146
- gross domestic product, 2
- group marketing, 107, 108, 109
- growth pattern, 27, 28, 48, 61, 97, 102
- health, 14, 18, 21, 81, 83, 90, 122
- import, 4, 31, 59, 75, 96, 98, 105, 119, 120, 121, 122, 130, 132, 134, 138
- income, 3, 4, 13, 14, 15, 17, 21, 22, 23, 24, 25, 31, 51, 52, 54, 59, 60, 61, 69, 77, 79, 98, 100, 103, 116, 117, 118, 137, 138, 141
- indigenous technical knowledge, 64, 94
- inducement, 39, 82, 110
- industrial, 5, 21, 31, 80
- inequalities, 2, 15, 22, 24, 26
- infrastructure, 20, 21, 23, 26, 47, 81, 87, 90, 143
- innovation, 34, 48, 49, 55, 56, 63, 79, 84, 117
- intensification, 61, 79, 81, 86, 87, 93, 97, 98
- inter-sectoral strategies, 19, 20

- interventionist, 8, 110, 112, 125, 137
 investment, 4, 5, 10, 23, 25, 26, 34, 38, 40, 41, 43, 51, 64, 66, 77, 80, 81, 88, 89, 90, 92, 115, 119, 135
 labour, 1, 4, 5, 8, 13, 15, 18, 20, 28, 32, 34, 35, 51, 52, 53, 54, 55, 69, 76, 84, 97, 99, 100, 101, 102, 115, 138
 land tenure, 27, 28, 42, 43, 44, 45, 46, 49, 80, 81, 97, 99, 102
 macroeconomic, 3, 19, 20, 21, 141
 manufacturing, 1, 15
 market access, 14, 18, 22, 23, 75, 128, 137, 138
 market destination, 73, 81, 106, 109, 119, 120
 market failure, 7, 8, 9, 26, 82, 86, 111, 137, 141, 144, 145
 market forces, 7, 9, 20
 market information, 110, 114, 116, 117, 132
 marketing, 10, 15, 16, 17, 18, 19, 20, 22, 38, 39, 47, 50, 54, 63, 68, 70, 71, 72, 74, 93, 97, 100, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 125, 127, 128, 129, 130, 132, 133, 134, 135, 136, 137, 139, 140, 141, 144, 145
 marketing margin, 18, 107, 117, 118
 marketing systems research, 117, 118
 material transfer, 96
 Melanesian economies, 1, 4, 5, 8, 16, 22, 140
 micro level, 15, 85, 86
 migration, 5, 15, 24, 26, 81
 minimalist, 110, 111, 112
 modes of production, 5, 18, 29, 34, 35, 38, 41, 58, 101
 monopoly, 18, 22, 63, 104, 107, 108
 multimodal research, 58
 niche, 38, 54, 60, 63, 70, 75, 104, 113, 116, 129, 131, 132, 133, 134, 135, 136, 139, 140
 non-renewable resources, 28, 91
 North Malaita, 6, 44
 nucleus estate, 27, 30, 34, 36, 37, 38, 39, 40, 41, 58
 nutrition, 68, 122
 Papua New Guinea, 1, 4, 8, 11, 14, 23, 24, 32, 33, 34, 39, 40, 41, 50, 66, 67, 75, 76, 108, 112, 115, 116, 117, 120, 121, 122, 125, 140
 planners, 2, 8, 10, 15, 16, 29, 49, 55, 91, 95, 114
 planning decisions, 8, 15
 plantation, 18, 20, 24, 29, 30, 34, 35, 36, 37, 38, 40, 41, 48, 58, 100, 101
 political difficulties, 43, 46, 90, 127
 political failure, 8, 9
 political interference, 112, 113, 114
 political support, 36, 66
 political system, 146
 population, 2, 4, 6, 8, 9, 13, 14, 15, 21, 22, 27, 51, 52, 78, 80, 81, 82, 83, 84, 90, 120, 121, 130, 133, 140
 poverty, 8, 9, 14, 91
 private marketers, 17, 106, 107, 108, 110, 114, 116, 119, 133, 135, 137
 processing, 23, 38, 39, 47, 50, 70, 105, 108, 112, 114, 115, 116, 124, 128, 130, 138, 139
 product differentiation, 115, 125, 129, 130, 133, 134
 product quality, 37, 38, 40, 52, 54, 72, 75, 106, 109, 110, 112, 114, 118, 122, 123, 124, 125, 126, 127, 128, 129, 130, 132, 133, 134, 138
 production practices, 10, 52, 56, 133
 productivity, 13, 15, 31, 43, 47, 52, 53, 54, 59, 60, 61, 63, 64, 70, 71, 72, 81, 95, 96, 100
 property rights, 46, 86
 quarantine, 60, 64, 75, 132, 135
 radical growth strategy, 27, 48, 50
 regional balance, 22
 regional development, 20, 25
 regional economies, 22, 23, 73, 79, 100
 regional equality, 15
 regional research, 56, 58, 63, 64, 94
 regions, 2, 14, 22, 23, 24, 25, 35, 36, 79
 regulation, 70, 82, 86, 105, 106, 107, 110, 111, 113, 114, 123, 124, 126, 127, 128, 132, 135, 141
 renewable resources, 5, 28

- research, 10, 17, 27, 37, 42, 48, 51, 52, 53, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 78, 79, 82, 83, 84, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 100, 103, 105, 106, 109, 114, 117, 118, 119, 120, 121, 131, 135, 136, 137, 141, 142
- research portfolio, 57, 58, 59
- resource availability, 4
- resource use, 12, 28, 39, 46, 86, 87, 90, 106, 112
- risk, 3, 14, 38, 48, 49, 50, 51, 54, 55, 59, 60, 69, 72, 74, 75, 76, 77, 78, 79, 82, 89, 112, 113, 131, 132, 135, 136, 146
- roadside trading, 105, 111, 113, 124, 128
- root crops, 2, 47, 77, 130
- rural villages, 2, 79, 81
- saving, 4, 5, 21, 51, 62, 91, 92, 98, 100
- self-sufficiency, 79, 121
- service, 1, 5, 15, 23
- services, 4, 14, 18, 22, 38, 40, 47, 57, 66, 69, 70, 80, 81, 98, 108, 113, 116, 135, 137
- smallholders, 2, 3, 4, 10, 16, 17, 18, 20, 22, 24, 29, 30, 32, 33, 34, 35, 36, 37, 40, 41, 47, 49, 50, 51, 52, 53, 54, 55, 56, 58, 61, 69, 70, 76, 77, 78, 79, 97, 98, 99, 100, 101, 102, 103, 116, 132, 133, 136
- smallholdings, 18, 30, 31, 33, 35, 36, 38, 41, 42, 48, 52, 53, 54, 58, 72, 101, 103
- social benefits, 5, 14, 25, 37, 43, 49, 59, 70, 73, 79, 89, 126, 127, 140
- socioeconomic differentiation, 2
- Solomon Islands, 1, 2, 4, 8, 33, 39, 44, 45, 71, 81, 84, 132, 140
- South Pacific countries, 1, 2, 111
- spatial, 2, 23, 24, 25
- specialisation, 28, 72, 73, 74, 75, 79, 80, 97, 102, 129, 134
- stabilisation, 106, 107, 110, 140, 141
- statutory authorities, 10, 18, 63, 104, 107, 112, 113, 114, 116, 117, 118, 123
- strategies, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 25, 27, 28, 29, 32, 35, 38, 41, 42, 46, 49, 50, 51, 52, 53, 54, 57, 71, 72, 76, 77, 78, 79, 81, 84, 85, 88, 90, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 108, 109, 111, 114, 119, 120, 123, 127, 128, 129, 130, 131, 133, 135, 136, 137, 140, 141, 143, 144, 145, 146
- subsidies, 20, 39, 87, 127, 128, 133, 139, 141
- subsistence, 2, 18, 23, 32, 33, 48, 98
- sustainability, 5, 6, 13, 21, 43, 46, 52, 60, 62, 66, 71, 78, 81, 82, 83, 84, 85, 86, 88, 89, 90, 91, 93, 94, 95, 96, 112, 144, 145
- technological change, 52, 91, 134
- technologies, 14, 18, 19, 27, 28, 31, 37, 41, 47, 49, 51, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 70, 71, 72, 77, 88, 90, 91, 93, 96, 97, 98, 99, 137
- terms of trade, 20, 21, 61, 87
- tiers of strategies, 3, 27, 28, 29, 102, 105, 106
- total factor productivity, 6, 61, 95
- transaction costs, 7, 122
- unimodal agricultural production, 27
- unimodal research, 58, 59
- unimodal strategy, 31, 48, 58, 101
- value-adding, 38, 73, 106, 109, 131, 137, 138, 139
- Vanuatu, 1, 4, 33, 71, 121
- wage, 4, 18, 80, 125, 138
- women, 68, 69, 94, 100
- World Bank, 3, 75, 76
- world markets, 4, 21, 78, 104, 120, 125, 129, 140

A majority of the people in Melanesian countries depend on agriculture for at least a part of their livelihood. In the long-term development of these economies, agriculture will decline in relative importance. Notwithstanding this, by 2010 agriculture must provide the fundamental driving force for long-run economic transformation.

'Although employment will need to be expanded in all major productive sectors in Melanesian economies, only agriculture has the potential for increases in employment on the scale required, and within the cost constraints prevailing in these capital scarce countries.'

'If Melanesian governments are serious about providing rural employment opportunities, support for the smallholder agricultural sector has to be a vital plank of their employment strategies.'

J. Brian Hardaker is Professor and Head of the Department of Agricultural Economics and Business Management at the University of New England. He has undertaken research and consultancies in Australia, the South Pacific, India and Indonesia on problems of farm economics as they relate to both industrial and developing economies. He works on issues in rural development policy.

Euan Fleming is a lecturer in agricultural economies at the University of New England and has lectured in agricultural economies and farm management in the School of Agriculture, Alafua Campus. He has undertaken consultancies and research work in Western Samoa, Tonga, Solomon Islands, Vanuatu and Fiji, specialising in agricultural marketing and rural development policymaking.

ISSN 0817-0444

ISBN 0 7315 1931 0