

PART 1

ASSESSMENT OF AGRICULTURAL MARKET DEVELOPMENT

IN THE SOUTH PACIFIC

## Chapter 1

### INTRODUCTION

#### 1.1 RATIONALE FOR THE STUDY

##### 1.1.1 Performance of South Pacific Agriculture

It is generally accepted that sustained economic development requires sectoral diversification featuring a decline in relative importance of the agricultural sector as development takes place (Ghatak and Ingersent 1984). Nevertheless, over the past two decades policy makers and analysts in developing countries have gradually realised that an increased agricultural marketed surplus is a precondition for the attainment of such diversification. This has led to greater emphasis on improving performance in the agricultural sector in order to achieve a satisfactory rate of economic development, an emphasis duly reflected in the plan documents of most developing countries in the South Pacific region.

This change in policy emphasis has been accompanied by a more critical evaluation by policy makers of the performance of agricultural sectors in contributing to economic development. There is a good deal of evidence that policy makers have not been satisfied that agricultural growth has taken place fast enough to meet development needs in the region. Many examples of expressions of dissatisfaction can be found in the plan documents.

Despite its focus on the promotion of rapid economic growth [in Western Samoa] ... the [third] plan's actual performance was somewhat disappointing ... in terms of volume, cocoa and banana exports continued to decline, copra exports fluctuated about a slowly rising trend while the production of beef, pigmeat, poultry and fish remained well below potential. The consequence has been a deterioration in the balance of payments and increased dependence on foreign aid, imported goods and expatriate staff.

Economic growth [in Tonga] did not reach target levels. This was due primarily to the effects of the drought on agricultural output and the failure of export agriculture to grow at the rate forecast in the Plan (p. 2) ... A major constraint to the development of a cash economy is the difficulty experienced in attempting to transform agriculture from a traditional, mainly subsistence industry into one oriented toward the market (p. 121).

Central Planning Department 1981

Agriculture [in Fiji] did not perform to expectation during the Sixth Plan period ... the agriculture sector continued to fall behind most other sectors in the economy and ... Plan targets had become difficult to reach.

Government of Fiji 1975, p. 65

There is no single or simple explanation for the mixed performance of [the agricultural] sector during DP7 ... Given Fiji's limited natural resource endowments, small size of the domestic market and the limited scope for industrialisation, Government realises that the country will have to depend heavily on increased agricultural production to sustain a livelihood for large sections of the population. It is therefore necessary to identify and tackle the bottlenecks facing agricultural development in order to achieve better results in and beyond this plan period.

Government of Fiji 1980, p. 99

It is evident that regeneration of [PNG's] agricultural base in tree crops for export requires urgent attention ... In this sector as in others, it is recognised that the aim of combining increased national involvement with increased production and new development is still to be achieved (p. 52) ... It is extremely difficult for rural producers to produce enough food using existing production methods to meet the urban demand, and at the same time meet their own food needs. Unless these demands are met by a rapid increase in domestic production, large increases in the importation of foodstuffs are inevitable (p. 56).

National Planning Office 1980

As the major employer and contributor to Gross Domestic Product in virtually all countries in the South Pacific (Sevele 1979), the agricultural sector is seen by policy makers as a leading sector. Because agricultural development is a process subsumed in the broader process of economic growth, the agricultural sector is expected to be predominant in contributing to (a) increases in production; (b) the

creation of employment opportunities; (c) the satisfaction of demand for non-agricultural goods and services; and (d) the accumulation of capital.

Primarily because of the paucity of data, it is difficult to ascertain the contribution of agriculture in the latter three areas and the complementarities or trade-offs between types of contribution. Governments in the region, however, are principally concerned with the first form of contribution when setting development goals. There are three avenues by which increased production can contribute to economic growth: provision of food for domestic consumption; supply of products that are used as inputs in related processing industries; and, especially important given the small and open nature of South Pacific economies, the supply of exports as a major source of foreign exchange earnings.

#### 1.1.2 The Asian Development Bank Diagnosis and Prescriptions

In its South Pacific Agricultural Survey, 1979 (SPAS) (Ward and Proctor 1980), a team from the Asian Development Bank (ADB) reviewed the current performance and future prospects of the agricultural sectors in countries throughout the South Pacific. Their main conclusion, supported by other observers, was that the agricultural sectors had not performed satisfactorily and consequently had not fulfilled the expectations of policy makers and planners in South Pacific governments. The ADB team diagnosed the main problem as a lack of capacity of smallholders to meet the agricultural development goals set by countries in the region. The ADB prescription was to move towards an agricultural development strategy in which the role of the smallholders would no longer be the main focus of agricultural development effort.

The validity of the conclusion that agricultural sectors have performed poorly over the past 20 years hardly seems in doubt. The policy prescription is more contentious and has been criticised by Hardaker, Fleming and Harris (1984) as being unsubstantiated. By attributing the poor performance of agricultural sectors to inadequacies in smallholder production, the ADB team virtually ignored other contributing causes, among them deficiencies in the agricultural marketing system (other than transportation problems which were

considered) and, perhaps crucially, the implementation of inappropriate economic policies the impacts of which have been spread primarily via activities in the agricultural marketing system.

## 1.2 CONTRIBUTION OF THE AGRICULTURAL MARKETING SYSTEM TO ECONOMIC DEVELOPMENT

### 1.2.1 Definition of an Agricultural Marketing System

An agricultural marketing system can be viewed for analytical purposes from two levels: macro and micro (Hunt and Burnett 1982). The macro definition adopted in this study conforms to the structural approach of, among others, Shaffer (1968) and Rhodes (1978). The micro definition is focused upon market response, reflecting the ways in which market participants make decisions about resource use within the bounds imposed by the structure of the system in which they operate.

The macro view of an agricultural marketing system, according to Rhodes, requires the consideration of 'the total system of economic activities concerned with the flow of agricultural products from producer to consumer; the kinds of institutions and the price-making mechanisms that guide those flows; the interactions among consumers, agribusiness firms, farmers, and even governments [which] determine the levels of expenditures; and the sharing of those expenditures as income to the market participants' (p. 6). Shaffer's more terse definition quoted by Breimyer (1976, p.7) has a similar theme: the 'system of markets and related institutions which organize the economic activity of the food and fibre sector of the economy'.

Reflecting on this structural approach to the definition of an agricultural marketing system, Breimyer has pointed to difficulties in defining the boundaries of such a system. In this study, the boundaries will be defined broadly in two respects, and narrowly in two other respects. First, the agricultural marketing system will be drawn broadly to cover (a) all those institutions that fulfil supporting or indirect roles in the flow of goods from producer to consumer, and (b) the agricultural producers as the initial suppliers of an agricultural

surplus. The first stage in the agricultural marketing process is thus the decision-making activities of those (usually producers) who have control over the volume, form and destination of produce that has just been harvested and who thereby instigate a considerable amount of activity that takes place in the agricultural marketing system.

The two respects in which the boundaries of the agricultural marketing system are drawn narrowly are in terms of (a) agricultural input marketing, and (b) the marketing of imported food and agricultural commodities. Neither is regarded as part of the agricultural marketing system for the purposes of this study. In this sense, the agricultural marketing system is seen as encompassing facilities and services concerned solely with the transfer to consumers of output that originates from domestic production processes.

While agricultural input marketing activities can be legitimately viewed as part of an agricultural marketing system, they are excluded from analysis simply to place some reasonable bounds on the size of the study. Specific agricultural inputs such as credit, labour and land would each warrant a separate study in their own right. The exclusion of food import marketing reflects a focus on activities promoting the agricultural economy rather than on provision of alternatives to locally-produced products.

The micro view of the agricultural marketing system is directed towards understanding the motivation that drives agricultural market participants at various stages in the system to perform marketing functions that contribute to the flow of agricultural output from the producer to the point of final demand by the consumer. This motivation is revealed in market response which enables utility maximisation by agricultural producers on one hand and consumers of agricultural products on the other. The agricultural market participants make this possible by using resources to enable the provision of services demanded: by consumers, in the satisfaction of time, place and form utility; and by producers, in keeping down marketing costs and maximising farm-gate prices received for produce sold (assuming they adopt profit-maximising behaviour).

### 1.2.2 Factors Influencing Agricultural Market Development

There are three categories of factors which determine the potential for development of an agricultural marketing system. These are: (a) the relationships between participants involved in the marketing of agricultural products; (b) their values and attitudes; and (c) the stage of overall economic development reached in the country concerned. In the first category, relations are determined by the structure of the agricultural marketing system itself: the infrastructure available for market participation, organisational structure, and interactions between institutions that participate in, control or facilitate marketing activities. In the simplest case, these relations reduce to the transactions between the producers and consumers of an agricultural output. The situation is typically more complex with much intermediation between producers and final consumers.

The values and attitudes of market participants determine in particular the nature and extent of market response of various market participants to incentives. Given the limits placed on actions that they may take arising from market relations and the facilities and services available to them, market participants would be expected to respond positively to improved prospects for earning revenue by raising the level of economic activity they undertake. This response involves not merely the suppliers of raw agricultural products but all profit-oriented participants between the original supplier and the final consumer.

With regard to the stage of overall development, a reciprocal relationship exists between agricultural market development and general economic development. On one hand, the level of general economic development affects the scale and nature of economic activity, thereby influencing the level of services and facilities available to agricultural market participants. On the other hand, agricultural market development is a prerequisite to economic development in most developing countries, such as the South Pacific countries, where the agricultural sector typically is the source of most economic activities.

The main thrust of policies for agricultural market development is to alter the nexus between agricultural market and general economic development, in the sense that the former depends on the latter. Policies for agricultural market development are formulated with a view to making the agricultural marketing system the catalyst of economic development. The formulation of such policies requires first that factors influencing agricultural market development are identified and their causal effects quantified. With the implementation of appropriate policies, agricultural market development will then promote general economic development through advances made in the disposal of an agricultural surplus. These advances can be in terms of both an increased volume of surplus and additional services associated with the transfer of the surplus from producers to consumers.

The crucial role of an agricultural surplus in economic development has been recognised by many development analysts. Some early writers on the subject of economic development (e.g. Nurkse 1953; Lewis 1954; Fei and Ranis 1964) focused on the possibilities of extracting an agricultural surplus for industrial development. Others, such as Jorgenson (1961) and Hayami and Ruttan (1971), recognised the need also to invest in the agricultural sector to promote the generation of a larger agricultural surplus in the future.

There have been almost as many definitions of agricultural surplus as there have been writers on the concept. The most common definition, which is adopted in this study, refers to the value of the physical amount of agricultural produce traded in markets (Malassis 1975, p. 173). This is termed the 'agricultural marketed surplus', and is equivalent to the value of agricultural output not consumed within the agricultural sector. An alternative term, 'agricultural marketable surplus' (Mellor 1966; Griffin 1979), is regarded as synonymous with agricultural marketed surplus.

### 1.3 PROBLEM DEFINITION AND HYPOTHESES

#### 1.3.1 Problem Definition

The general problem is to identify constraints and opportunities existing in marketing systems in the agricultural sectors of developing countries in the South Pacific region with a view to suggesting policies or actions for improvement. Within this general problem, many sub-problems or issues are to be addressed, each with different attributes and requiring recourse to different analytical approaches.

The general approach adopted is based on a recognition and exploitation of opportunities to break or ease marketing constraints on increasing agricultural marketed surplus and involves the application of the theory of X-efficiency (Leibenstein 1978, Ch. 3). Leibenstein argued that an analytical framework based on neo-classical economic theory is unsuitable for studying development problems. Given gross market imperfections, a lack of 'inter-market operators' leads to a neglect of the entrepreneurial role in the early stages of economic growth. These conditions are exemplified in agricultural marketing systems in South Pacific countries. The problem, then, becomes one of creating a marketing system in which producers and market participants are better able to meet changing development needs.

An illustration of the approach to the general problem stated above is given in Figure 1.1 in which  $D_1$  and  $S_1$  represent demand and supply functions in the existing marketing system. Research into agricultural production-household systems in the region would be directed towards identifying the constraints on production limiting the supply of agricultural produce onto the market. Supply shifts at the market level, however, can also be brought about by improvements in the marketing system which create new opportunities to producers to earn profits from supplying produce to markets. The way in which new opportunities to supply are created is illustrated in Figure 1.2. At village gate price  $OP_1$ , profit-maximising conditions are satisfied by marketing  $OQ_1$ . However, it is unprofitable for producers to supply any marketed surplus because average variable cost (AVC) is greater than price. An increase

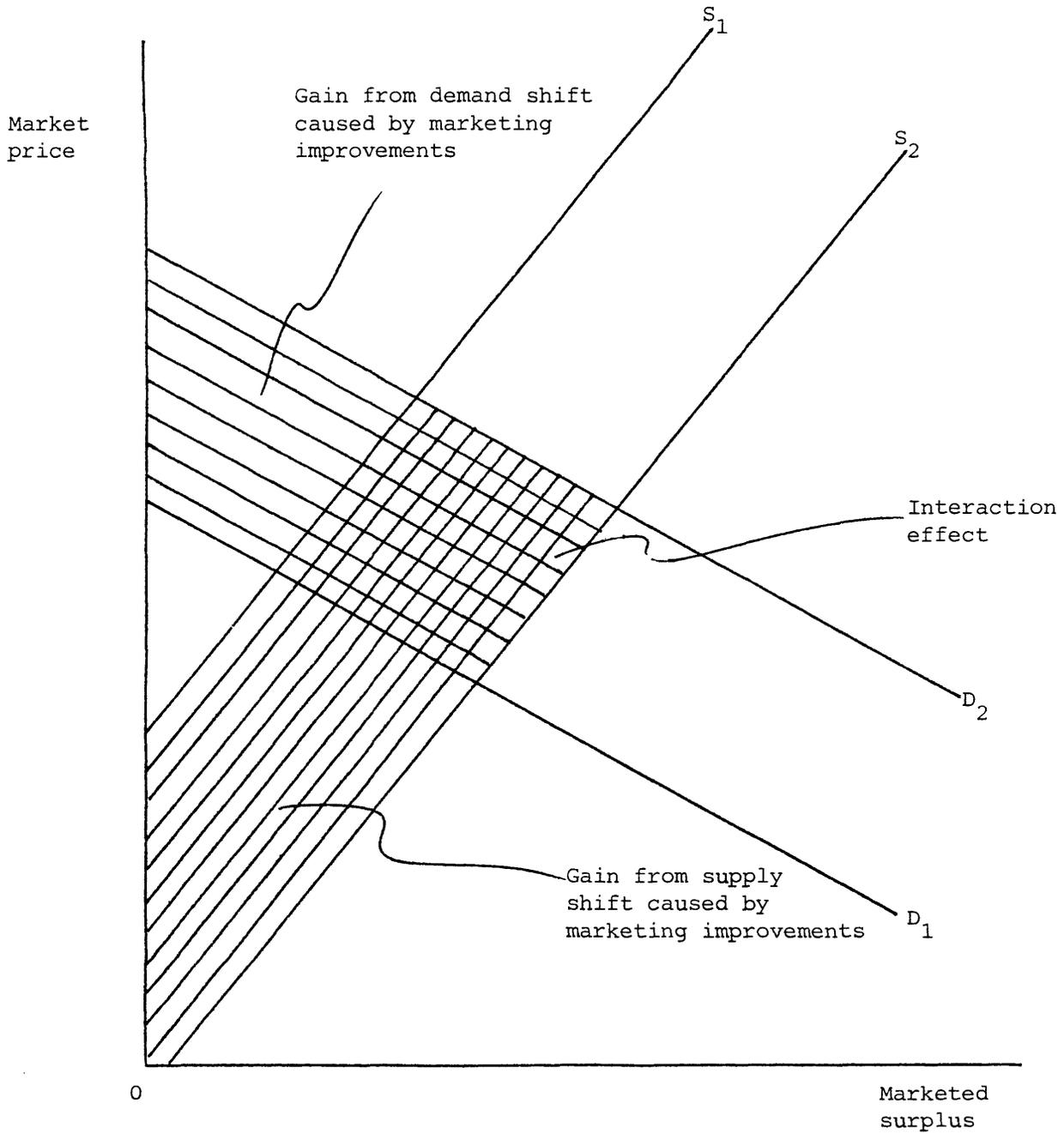


Figure 1.1 Gains in economic surplus from improvements in the agricultural marketing system.

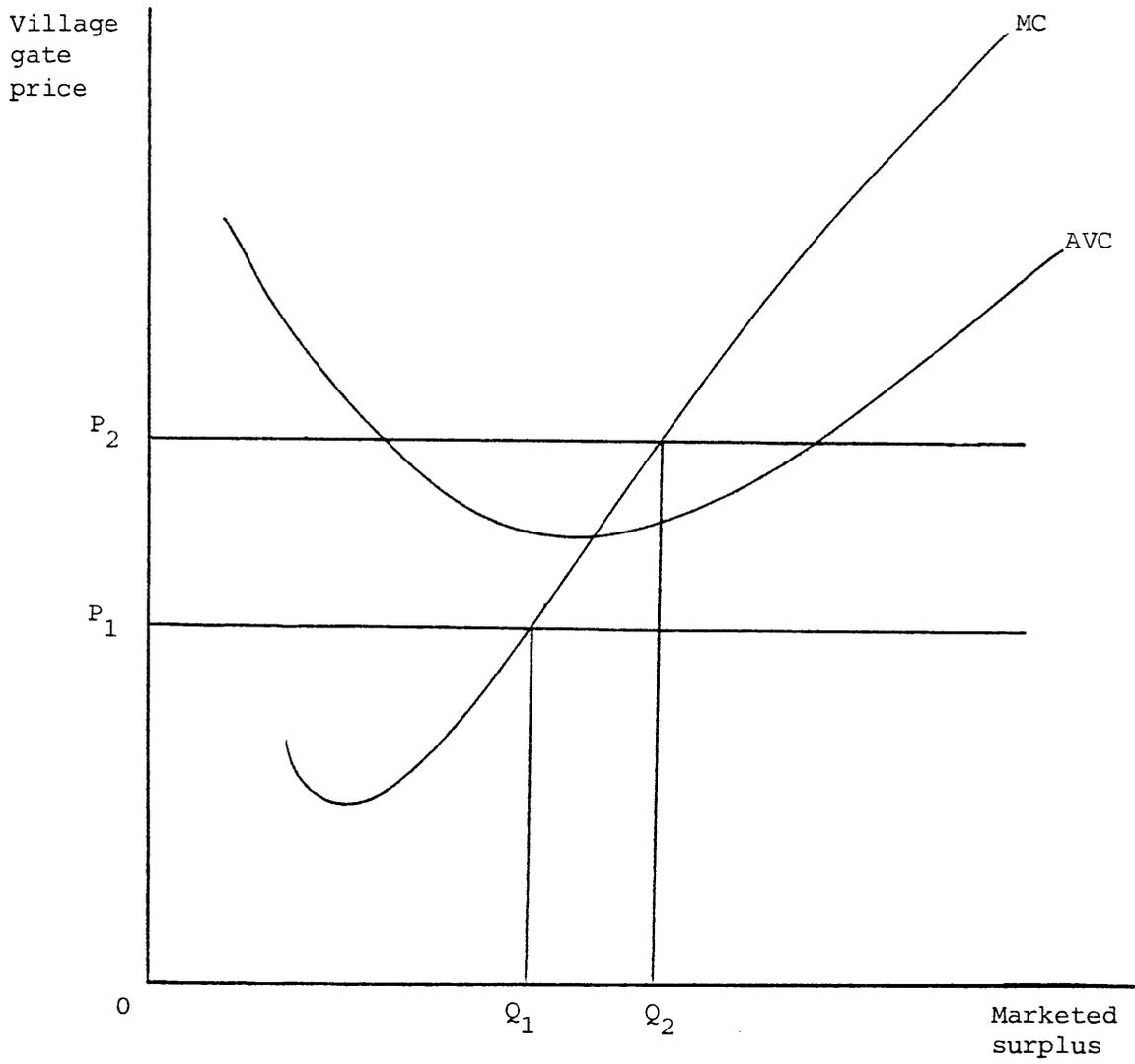


Figure 1.2 Effects of an increase in village gate price on levels of marketed surplus.

in village gate price from  $OP_1$  to  $OP_2$ , brought about by improvements in existing facilities and services or the creation of new ones, would make it profitable to expand marketed surplus from zero to  $OQ_2$  as price is no longer less than AVC.

Shifts in the demand functions for agricultural products can also be brought about by the introduction or improvement of services associated with the marketing of agricultural raw materials. These services increase time, form and place utilities of consumers, enabling them to move onto higher indifference curves as a result of their participation as buyers in the agricultural marketing system.

Analysis in this study involves the identification of opportunities for agricultural market participants to create and exploit shifts to the right of supply functions and demand functions of indigenously-produced agricultural commodities. These shifts enhance the product contribution of the agricultural sector to economic growth. This enhancement is illustrated in Figure 1.1 by the increase in economic surplus (the shaded areas) derived from either the demand or the supply shifts.

### 1.3.2 Hypotheses

Consistent with a policy-oriented approach to the study, hypotheses will be formulated at two levels.

#### (1) Diagnostic hypothesis.

The principal hypothesis of the study is set in the framework of the general problem outlined above. It is a tentative hypothesis about the causes of poor agricultural performance in the region and provides general guidelines to the research. It is stated as follows:

The productivity and incomes of South Pacific smallholders can be appreciably increased through feasible improvements in agricultural marketing.

The alternative hypothesis is:

Smallholders in the region are so constrained by deficiencies in agricultural marketing that cannot economically be overcome that this mode of production has no potential for meeting the income aspirations and production needs of the people concerned.

(2) Remedial hypotheses.

Remedial hypotheses are means of testing potential solutions to the problem that has been diagnosed and follow logically from the diagnostic hypothesis. They are often not quantifiable and not amenable to testing by statistical inference. They 'may, however, be "tested" less formally by weight of evidence' (Tweeten 1983, p. 551).

Numerous such hypotheses will be formulated and tested throughout the study in analyses of the marketing systems in agricultural sectors of South Pacific countries. The tests will be directed towards improving the understanding of causal factors influencing marketing performance. The results of these hypothesis tests should provide guidance as to the appropriateness of alternative policies or actions to be taken in promoting agricultural market development.

#### 1.4 SELECTION OF A STRATEGY FOR AGRICULTURAL DEVELOPMENT IN THE SOUTH PACIFIC

##### 1.4.1 Agriculture in South Pacific Economic Development

The agricultural sectors in South Pacific economies remain very important, in terms of both employment and contribution to gross domestic product. Consequently, agricultural activities continue to have a major impact on the effectiveness of planning processes for general economic development.

Planning processes must account for the types of agriculture that exist in South Pacific countries. These can be categorised into three

main systems, based on the development that has taken place over the past 150 years:

- (a) the integral subsistence system, now virtually disappeared in its pure form;
- (b) the plantation system, a legacy of the period of colonisation by imperial powers; and
- (c) the mixed subsistence-cash cropping system, an outcome of changing pressures within the original subsistence system and influenced both by the introduction of the plantation system and general growth processes in the predominantly mixed economies.

The integral subsistence system is conceptualised in terms of the traditional methods of agricultural production encountered by the colonising powers. The plantation system has been described as a 'large-scale mode of production ... characterized by foreign capital (and often, ownership), expatriate and centralized management, land alienation, wage employment of labour, and export of virtually the total production' (Yen 1980, p. 74). The mixed subsistence-cash cropping system commonly found in South Pacific countries is a smallholder system based on village societies (Watters 1984). The influence of the plantation system on the mixed subsistence-cash cropping system is exemplified by the existence of 'a degree of specialisation in the production of a particular cash crop, frequently for export' (Hardaker et al. 1984, p. 196).

Given the polar differentiation of the two predominant types of agricultural system in the region, questions of priority and emphasis arise in planning to increase agricultural production. In other words, each government must select an agricultural development strategy suited to the agricultural system or systems existing in that country, and reflecting the development ideology that is adopted. The agricultural development strategy followed influences the rate and nature of change in agriculture and so in the economy generally.

The recent history of agricultural development in the South Pacific is typified by stagnant or declining production of export crops coupled with decreasing national self-sufficiency in food production (Ward and Proctor 1980; Sevele 1983; Hardaker et al. 1984). Such disappointing results from past efforts to promote agricultural development show that the choice of an appropriate strategy remains unresolved for most governments in the region.

#### 1.4.2 Policy Making and Agricultural Market Development

Success in achieving agricultural market development for a given level of economic activity and national product reflects an ability of market participants to loosen their reliance on the general state of the economy. Only then can the agricultural marketing system provide the necessary mechanisms to bring forth a significant impetus to further economic development. This occurs through increases in the level of agricultural marketed surplus.

The prospects of success in relaxing the dependence of agricultural market development on general economic development processes depend upon agricultural planning decisions. Specifically, success is linked to the implementation of effective agricultural policies which, in turn, are governed by the selection of an agricultural development strategy. Policies that encourage producers to expand their agricultural marketed surplus are primarily in the domain of the agricultural marketing system.

It follows that any policy analysis for agricultural market development must be framed in terms of an appropriate agricultural development strategy. The recommendation on such a strategy is made after an assessment of alternatives available to governments of South Pacific countries.

#### 1.4.3 Alternative Strategies for Agricultural Development in the South Pacific

A fundamental distinction in the SPAS is between 'smallholder' and 'plantation' modes of production and management. These 'modes'

correspond to the mixed subsistence-cash cropping and the plantation agricultural systems outlined at the beginning of Section 1.4.1. Three combinations are possible: (a) smallholder mode of production and management; (b) smallholder production under a plantation mode of management; and (c) plantation modes of both production and management. These three production/management combinations are labelled as follows: (a) village-based semi-subsistence improvement (VSI) approach; (b) smallholder nucleus estate transformation (SNET) approach; and (c) plantation transformation (PT) approach. The authors of the SPAS advocate the last two strategies, but their arguments have been criticised by Hardaker et al. (1984). In the remainder of this section, the key attributes of each of the three strategies are described. These attributes are summarised in Table 1.1 and are discussed further in the assessment that follows.

As described by Yen (1980), the most prevalent primary production system in the region today is the smallholder mixed subsistence-cash cropping system. Local staples such as cassava, taro and yam are grown alongside or intercropped with specialised cash crops such as coconuts, oil palm, cocoa, coffee, vanilla and exotic vegetables. The VSI strategy is aimed at the strengthening and development of this sector through the provision of economic incentives and improved infrastructure and by making available improved technologies and their associated inputs.

The second strategy, based on smallholder nucleus estates, has been discussed in the SPAS with reference to cocoa projects in Solomon Islands, a citrus project in Fiji and oil palm production in PNG. Under this strategy, smallholder farms must be brought into association with nucleus estates. 'Production remains disaggregated but management decisions emanate from a single source and are applied to the smallholders as a group' (Ward and Proctor 1980, p. 439).

The third strategy involves transforming a rural agrarian structure into a plantation system of production and management, as was initiated in many South Pacific countries in colonial times. The plantation mode was concentrated on a small number of cash crops but 'was later extended to timber extraction, coffee and cocoa, and more recent

Table 1.1

List of Attributes for the Assessment of Alternative  
Agricultural Development Strategies

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(a) Goal-related attributes

(i) Growth goals

1. Types of technological changes facilitated or needed.
2. Extent to which improvements in management are promoted.
3. Scope for exploiting size economies.
4. Demands for infrastructural improvements.
5. Orientation to particular types of production.
6. Strengths of linkages with other sectors.
7. Importance of production-household relations.
8. Provision of and likely response to incentives.

(ii) Equity goals

9. Employment effects.
10. Consequences for interpersonal wealth distribution.
11. Consequences of interregional wealth distribution.
12. Congruence with traditional social values and obligations.

(b) Effectiveness-related attributes

13. Managerial inputs required.
  14. Time to achieve results.
  15. Ease in establishing lines of communication between planners and planned.
  16. Scope for participation in plan decision making.
  17. Degree of co-ordination with rural and regional development programs and projects.
  18. Consistency with existing development goals.
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developments have added rubber, tea, rice, oil palm, cattle and ... industrial-scale fisheries ...' (Yen 1980, p. 74). In post-colonial times, some plantations remain in foreign ownership, some are owned, directly or indirectly, by national governments, and some have passed into the hands of the traditional owners of the lands.

Having defined these three strategies, the purpose is to identify the best strategy to accomplish agricultural development in the future. The assessment of past performances of agricultural systems that closely resemble conditions under these alternative strategies is not a relevant concern, except insofar as it aids in the elicitation of attributes of the different strategies.

#### 1.4.4 Assessment of Attributes

Assessment of the three alternative agricultural development strategies enumerated in the previous section is based on the attributes of the strategies listed in Table 1.1. The attributes can be divided into two groups: (a) those which influence the contribution of strategies to development goals, classed as (i) mainly growth goals (attributes 1 to 8) and (ii) equity goals (attributes 9 to 12); and (b) those which influence the effectiveness of strategies in agricultural sector plan implementation (attributes 13 to 17). This categorisation of attributes of strategy, unsurprisingly, is not always clearcut and there will be some overlap in the discussion of them. Production household relations, for example, influence not only growth goals; the understanding of them by planners also influences the effectiveness of plan implementation. Social obligations do not have only equity implications; they also may affect the attainment of growth goals. Assessments of three agricultural development strategies, in terms of each of the 18 attributes listed in Table 1.1, are provided in detail by Hardaker, Fleming and Delforce (1986). The judgment drawn in this study follows closely the lines of argument developed by these authors. After commenting on the relative merits of the strategies for each attribute, Hardaker et al. (1986) made an overall judgment as to the strategy that appears to be most appropriate in the South Pacific in general. Some possible compromises that might suit the circumstances of individual countries are also discussed.

If the last criterion were to be disregarded, there is still no clear case for accepting either the SNET or PT strategies on any of the grounds of growth, equity or organisation and management of implementation. The continued application a VSI strategy in South Pacific countries is favoured. Major factors influencing this judgment are that (a) any consideration of alternative agricultural development strategies would necessarily entail a revision of existing development goals, and (b) there would be high social costs of replacing the existing smallholder systems. However, it is not likely to be easy to apply. Nor are all existing policies currently employed under this strategy satisfactory. There is undoubtedly scope for much policy improvement, particularly in the area of marketing which has been largely ignored (e.g. price policies, infrastructure, institutional operations), and research and extension of new technologies.

So far, each strategy has been treated as mutually exclusive. It is conceivable that two strategies could be combined by adopting a mixed approach to strategy selection. Such an approach is not equivalent to the bimodal strategy which would concentrate on developing a modern commercial agricultural sector at the expense of traditional agriculture. Rather, the suggestion is that a predominantly VSI strategy could be supplemented by either the SNET or PT strategies, applied to a limited extent. Where a plantation sector already exists in a country, its place in an overall VSI strategy needs careful consideration. If there is no serious land shortage, little would appear to be gained (and perhaps much could be lost) by resuming plantation land to permit its transfer to smallholder production. Similarly, some existing plantations might best serve national development goals if they are utilised as nuclear estates as foci for local implementation of a SNET strategy. Land presently unused, and not likely to be needed for smallholder production in the mid-term future, might best be brought quickly into production (so contributing to a growth goal) following a PT strategy. Finally, where production of commodities for which scale economies or coordination problems are important (e.g., oil palm and bananas for export), the development strategy, even if based on smallholdings, will certainly need to embody some elements of a 'plantation mode of management' (Ward and Proctor 1980), probably via use of some type of SNET strategy.

In other words, the selection of the VSI strategy does not necessarily deny a place for nucleus estates and plantations in South Pacific agricultural sectors. Their continued survival, however, should depend on the abilities of participants in these systems to respond to changing market conditions and social needs. If these abilities are present, their continued contribution to agricultural development should be secured with little need for public support. Their existence, and perhaps expansion, may help in obtaining substantial short-term increases in agricultural production unachievable from village-based semi-subsistence producers. This approach would appear to have been adopted with some success in Solomon Islands where expatriate management has been used in the copra and palm oil industries in joint ventures between the government and multinational institutions.

What needs to be avoided is a 'bimodal' development strategy (Johnston and Tomich 1985) wherein efforts are focused on what will inevitably be a small number of large plantations or estates to the neglect of the great mass of smallholders. As Johnston and Tomich argue (p. 10), 'If ... priority is given to focus strategies that stress the "crash modernization" of a small subsector of farm enterprises, this will to a considerable extent preempt the possibility of achieving significant and widespread increases among the great majority of small farm units.' The reason is that such focus strategies occupy a disproportionate share of scarce resources (chiefly capital and administrative capacity in the South Pacific).

#### 1.4.5 Conclusion and Implications

Three alternative agricultural development strategies have been assessed on a number of criteria outlined above in the analysis. The detailed assessment has been reported in Hardaker et al. (1986). Although these criteria are quite difficult to test empirically because of a lack of data, the weight of evidence favours the continuance of an agricultural development strategy founded on the village-based semi-subsistence smallholders that currently prevails in most South Pacific countries.

At issue in the foregoing analysis is the future role, and not past performance, of these producers. The poor performance of agricultural sectors in the South Pacific over the past two decades is not queried. It is doubtful, however, that this performance can be attributed chiefly to the inherent shortcomings of the small semi-subsistence producers. An alternative explanation is the adverse effects of government intervention in the past. It is argued that serious failures might have occurred in policy making, particularly the introduction of policies which are inconsistent with a VSI strategy.

Flexibility and resilience are inherent features in the village-based mixed subsistence-cash cropping system which makes its participants well suited to survive and adapt to changing circumstances dictated by unpredictable exogenous events and long-term trends that lead to altered structural relationships facing the agricultural sectors. Their ability to do so will depend, of course, on the formulation of a set of agricultural policies consistent with the strategy selected. Especially important in this respect is the formulation of appropriate policies for:

- (a) The identification, development, assessment and adoption of improved techniques of production for smallholders; and
- (b) the creation of an economic environment that encourages smallholders to expand their agricultural marketed surplus to satisfy increased input needs of processing industries, meet changing domestic food demand and contribute further to foreign exchange earnings through exports.

The selection of a VSI strategy will influence the structure and operations of the agricultural marketing system, with implications for policy making for agricultural market development. The influence on market structure will be felt by changes in two sets of factors: (a) the availability and attributes of agricultural marketing infrastructure; and (b) institutional factors, affecting internal organisational structures and relations between market participants. Marketing operations for a given market structure will be influenced by policies that alter market

response to (a) incentives to vary supply of products, facilities and services, and to innovate; and (b) risks.

In devising appropriate marketing policies, analysis is directed towards understanding the ways in which market structure and marketing operations affect agricultural marketing performance. This calls for the identification and quantification of a suitable indicator of performance that reflects the outcomes of the behaviour of market participants in sum and takes into account the integration of agricultural production and the marketing of output from that production. The next step would be to explain changes in the selected indicator. These are the tasks taken up in the next chapter.

#### 1.5 RESEARCH METHODS

The diverse activities in an agricultural marketing system make it virtually impossible to settle upon a single analytical method to test the variety of hypotheses to be formulated in the study. Each problem will be tackled by the application of what is judged to be the most appropriate technique available.

The task of analysing agricultural marketing is undertaken with a view to providing policy prescriptions applicable to numerous small independent countries. Each area of policy analysis clearly cannot be undertaken by empirical studies in every South Pacific country. The best solution is considered to be a case study approach. For each empirical study, one country (or, if necessary, a small number of countries) is selected which is considered to possess the key attributes of the problem being addressed. Providing the common elements among South Pacific countries are strong enough to outweigh the disparate forces, general policy prescriptions should apply to most if not all countries in which the agricultural sector provides the main economic base. Such prescriptions are attempted in Chapter 10 (see next section).

### 1.6 OUTLINE OF THE STUDY

The study is divided into four parts. The first part comprises the groundwork for analysing agricultural market development and providing a framework for policy analysis in agricultural marketing systems in the South Pacific.

Agricultural marketing performance is defined in Chapter 2 and an indicator of performance is chosen. Trends in the indicator over the past two decades are examined and explanatory variables are selected in an attempt to determine the major factors that influence agricultural marketing performance. The nature and relative importance of each marketing activity vary between agricultural marketing systems in developing countries. This makes it particularly difficult to formulate a consistent and bounded analytical framework. Regression analysis is used to identify the most important problem areas to study. It enables a consistent link to be established between factors influencing agricultural marketing performance and the formulation of policies for agricultural market development.

The study topics identified in Chapter 2 are the subject of analysis in the second and third parts of the study. Part 2 comprises analysis of structural factors influencing agricultural marketing performance while operational factors influencing performance are analysed in Part 3. Within Part 2, a modified structure-conduct-performance analysis is undertaken of South Pacific agricultural marketing systems in Chapter 3. The purpose of this analysis is to understand the relations between different marketing institutions and the effects of these relations on market structure and conduct.

An outcome of the study of marketing institutions in Chapter 3 leads to a specific topic of investigation described in Chapter 4: the influence of village organisation on agricultural marketing activities. This is recognised in Chapter 3 as a crucial factor that might constrain the ability of village market participants to respond to economic incentives and increase agricultural marketed surplus.

Part 3 is concerned with the behaviour of agricultural market participants - their response to changes in economic and social conditions in the agricultural marketing system. Emphasis is placed on response to economic conditions reflected by price changes and changes in levels of market throughput. Two types of market response are identified: price response and risk response. In Chapters 5 and 6, analysis is centred on market response to price changes in domestic and export markets. Market response is analysed in Chapter 5 for a perennial crop, coconuts (copra), which is sold in both export and domestic markets but which is predominantly an export crop. There is a distinct difference in the product being sold in each market, with the export commodity being subject to some simple processing.

Chapter 6 is devoted to an analysis of market response to price changes of short-term crops. The commodities selected - bananas and root crops - have been primarily staple foods and only secondarily cash crops as export markets have been developed. There is little processing of the export commodity to distinguish it from the domestically-sold product. Nevertheless, the marketing functions differ according to the destination of the product. Analyses are undertaken of both export and domestic market response to price.

Market response to risk is also analysed in both the export and domestic markets. Studies reported in Chapters 7 to 9 determine the possible effects on performance in an agricultural marketing system when participants are operating in a risky environment. First, causes of export revenue instability are ascertained in Chapter 7. The importance of export demand (price) effects on instability relative to supply effects is confirmed, leading to an assessment of the impact of export price risk on agricultural marketed surplus and on stability in the domestic food marketing system in Chapter 8. Finally, the influence of institutional risk on the generation of an agricultural marketed surplus is analysed in Chapter 9.

The directions taken in the analyses of factors influencing agricultural marketing performance are quite disparate, necessarily so because activities in the agricultural marketing system are diverse, with

considerable variations in their characteristics. It is the main goal in the final part of the study to draw together some findings in the previous parts that will enable the framing of a set of policies to relax the major constraints on agricultural market development. In Chapter 10, a review is made of the likely effectiveness of alternative policy initiatives aimed at releasing these constraints. The review draws heavily on the analyses undertaken in Parts 2 and 3. The most promising policy options surveyed are deemed to be those aimed at the mitigation or removal of constraints endogenous to the agricultural marketing system which can be influenced by economic policy makers. The worth of the various policy alternatives is assessed. The final chapter comprises some conclusions drawn from the assessment of policy options, and some recommendations of areas in which future marketing policy research would be best directed.

## Chapter 2

AGRICULTURAL MARKETING PERFORMANCE  
IN THE SOUTH PACIFIC

## 2.1 PURPOSE OF EVALUATING PERFORMANCE

The purpose of this chapter is to quantify agricultural market development in a sample of South Pacific countries since 1961. A suitable measure of agricultural marketing performance is chosen to reflect development or deterioration in any agricultural marketing system over time. The indicator of agricultural marketing performance is then regressed upon a number of variables which are expected to explain variations in performance.

## 2.2 MEASURING AGRICULTURAL MARKETING PERFORMANCE

The most intractable problem that has troubled analysts of agricultural marketing performance has been the lack of a suitable benchmark against which to compare market structure and conduct and against which to measure performance. Most attention has been paid to the latter problem. Economists (such as Cochrane (1957) and Bressler and King (1978, Ch. 21) among the notable early contributors) have typically suggested or adopted a 'normative' approach, based on the premise that the extent to which operations in the agricultural marketing system approximate perfectly competitive behaviour is also a reflection of marketing efficiency. (A survey of normative analytical techniques for measurement of marketing efficiency can be found in Timmer, Falcon and Pearson (1983, pp. 173-88).) This analytical approach has its counterpart in prescriptive policy making: improved marketing performance dictates that 'everything possible [be] done to encourage competition' (Simpson 1970, p. 47). In assessing the performance of agricultural marketing systems in developing countries such as those in the South Pacific region, perfect competition is inadequate as a norm against which to measure performance. Where agricultural systems are in

an early stage of development, all of the assumptions of perfect competition are violated to such an extent as to render this concept virtually meaningless as a norm against which to measure marketing performance.

An alternative approach is to separate the study of agricultural marketing performance into four steps: measurement of outcome, analysis, evaluation and policy decisions. A 'positive' approach to measurement can be adopted by setting an actual indicator as the norm and observing changes in this indicator over time. Such a measure used in the context of developing countries ought to reflect the contribution expected from an agricultural marketing system towards the attainment of development goals.

To enhance the analysis phase, it should be possible to explain changes in market structure and conduct over time in terms of market behaviour: specifically (a) why divergences from an hypothesised benchmark process of agricultural market development have occurred, (b) what the effects of these divergences have been on the measure of marketing performance, and (c) what the effects of these divergences are expected to be on the ability of a country to achieve its development goals (the evaluation phase). Performance measurement is thus a building block for evaluating effects and recommending remedies (the policy phase).

As Helmberger, Campbell and Dobson (1981) observed, Bain (1968) appears to get into a muddle when attempting to specify what is meant by marketing performance, which he regards as the economic outcome of conduct (and, indirectly, structure). Helmberger et al. (pp. 509-10) pointed out that the definition of performance employed by Bain is akin to the grade received in an examination rather than the answers given. There is a need, they asserted, to distinguish between the 'definition and measurement of performance, on the one hand, and its evaluation, on the other ...'. They proceeded to cite a number of the norms of performance suggested by Bain and argued that these are results rather than norms. The problem with this criticism by Helmberger et al. is that it is much easier in theory than in practice to define marketing performance in terms of 'operational norms' (p. 510). The difficulties

in measuring 'operational norms' stem from the myriad of heterogeneous activities undertaken in the agricultural marketing system.

Marion and Mueller (1983, p. 18) have hypothesised a link between market conduct and performance in terms of 'X-efficiency' (Leibenstein 1978): as a consequence of market power, resource 'misallocation and lost innovation' are reflected in marketing performance. Their view of marketing performance (dictated, it would seem, largely by events in the agricultural marketing system in U.S.A.) is one of efficiency, both technical and economic, product desirability and equity. For the latter two concepts, they argue that no suitable surrogate measures have been developed (p. 25). Sosnick (1964) ambitiously attempted a more exhaustive treatment of performance indicators, suggesting no less than 12 separate criteria or 'normative standards'. As Helmberger et al. (1981, p. 511) pointed out, it is impossible to 'do justice to all twelve criteria in short compass'. A further problem is that the assignment of weights to be attributed to each criterion would be very difficult to achieve convincingly and would involve a good deal of judgment.

Martin (1980) went even further than Sosnick and identified 16 'performance indicators' that could be used to compare performance of alternative grain-marketing systems. No less than 42 'quantifiable measures' were then specified for the different performance indicators. The same criticisms made of Sosnick's (1964) approach apply to Martin's recommendations for performance measurement. In addition, the criticisms made by Helmberger et al. of Bain's (1968) performance indicators are also relevant for many of Martin's 'quantifiable measures'.

Following the criticisms they made of Bain's (1968) interpretation of marketing performance and of the 'perfect market' norm mentioned above, Helmberger et al. proposed an alternative definition: 'the total of performances of all [market] participants, buyers and sellers, including all prices that vary with the level of output' (p. 510). This definition is hardly an improvement on what has gone before. As the authors themselves concede, 'the development of operational norms is exceedingly difficult' (p. 512). Moreover, while price analysis is undoubtedly important in studying agricultural marketing performance in

terms of market response to changed social and economic conditions, an important behavioural facet of market conduct, such response scarcely deserves to be considered as the only norm against which to measure performance in poorly developed agricultural marketing systems.

HelMBERGER et al. considered that performance needs to be measured at the level of the marketing firm rather than at a more aggregated level. By performance of the firm, they meant 'the *ex post* values of the choice variables [of market participants] appearing in the profit function of a firm' (p. 510). If we regard the individual and corporate market participants as actors in the development process of a developing country, the focus is on the aggregate system, and not the firm level. The formulation of a measure of performance that would offer the most promising route is one that would be subsumed in the attainment of development goals.

Define welfare as a function of a set of development goals  $w = f(g_1, g_2 \dots g_n)$ , where the degree of attainment of any goal  $g_i$  is a function of the decisions of actors (including agricultural market participants) in the economy. That is,  $g_i = g_i(x_i)$ , where  $x_i$  is a vector of decision variables defined across people and decisions. The vector of decision variables  $x_i$  can be decomposed into two subsets,  $\bar{x}_i$  and  $x_i^e$ . Ideally, the contribution to the attainment of development goals of participants in the agricultural marketing system could be defined as the subset of the values of  $x_i$  denoted as  $\bar{x}_i$ . The  $x_i^e$  decision variables influence exogenous factors that affect marketing outcomes. The  $\bar{x}_i$  values could be described as the performance of the agricultural marketing system. A normative standard would be to compare actual  $\bar{x}_i$  with the values that maximise  $w$  (if these could be known), given the  $x_i^e$  values.

Given the relationships:

decisions  $\longrightarrow$  outcomes  $\longrightarrow$  goals

and given the imperfections that exist, we cannot know optimal decisions and outcomes. All we can aim to do is to understand the performance of

the system in the region of its present location (i.e. for marginal changes). We can hope to show how (somewhat) different decisions (especially policy decisions) can lead to different outcomes and so to better or worse attainment of goals.

Outcomes are multiattributed, but two that are important relative to development goals are food imports and agricultural export output. If performance were to be gauged in terms of the forms of contribution of the agricultural sector to economic development, the most important is the product contribution. Increased agricultural output contributes to economic development by way of increased foreign exchange earnings (through a higher value of agricultural exports or (mainly food) import substitution); increased use of agricultural raw materials in manufacturing and processing industries; and an increased, better quality, food supply to the non-agricultural population (Fearn 1984). In the South Pacific countries, most industries involved in the processing of agricultural raw materials are export-oriented. It is possible, therefore, to quantify approximately agricultural marketing in terms of the product contribution of the agricultural sector to economic development over time, encapsulated in terms of the value of agricultural raw material and processed agricultural exports to the value of food imports (Hardaker and Fleming 1986). This measure could be expressed either as the sum of the exports minus the imports or as a ratio of these two values. The latter has the advantage that it can be used for comparative purposes across countries. It is the surrogate measure of agricultural marketing performance that is assessed for South Pacific countries later in the chapter.

A feature of this broad measure of agricultural marketing performance is that it reflects the crucial nexus between agricultural production and marketing. In countries in an early stage of economic development, the ability of agricultural market participants to improve their performance depends to a substantial extent on increasing levels of marketed surplus emanating from the production system. (As economies develop, surplus generation as a means of market development becomes less important relative to the expansion of services attached to a fairly constant level of market throughput). In many circumstances, throughput

increases are likely to be a necessary but not sufficient condition for improved marketing performance. Later in this chapter when factors influencing agricultural marketing performance are analysed, the contribution of increased throughput to performance is assessed.

The indicator chosen in this study represents, then, the sum of choices made by individual participants in the agricultural marketing system in meeting the product needs of the society. While the choice of a single indicator admittedly ignores the multi-faceted nature of marketing performance, it has the virtue of being a measurable numeraire and of reflecting what is overwhelmingly the most important function of a marketing system: satisfying the material needs of society. An important condition of a measure of marketing performance, at least in the eyes of Helmberger et al. and to be tackled below, is that optimality is achieved in choosing an indicator. It is argued, however, that any measure of optimal resource use in marketing would be difficult (many marketing resource inputs, such as labour and infrastructure, are unpriced) and inadequate given the distortions present in the agricultural market systems being studied.

It is useful to express agricultural marketing outcomes as a function of time. Trends in outcomes can be analysed to determine factors that cause change over time that is the essence of development. A significant positive trend in the ratio over the study period, *ceteris paribus*, indicates that improved agricultural marketing performance has occurred, particularly with institutions in the agricultural marketing system acting to generate economic development. A constant ratio (neither significantly increasing nor decreasing in statistical terms) indicates that marketing institutions are responding adequately to changing development needs but are not acting as the 'leading edge' of development. A significant decline in the ratio indicates deteriorating agricultural marketing performance, a major cause of which is likely to be a decline in institutional performance.

Movements in the indicator of agricultural marketing performance in five major South Pacific countries are presented in Figure 2.1. The graphs displaying trend lines are derived from simple regression analyses

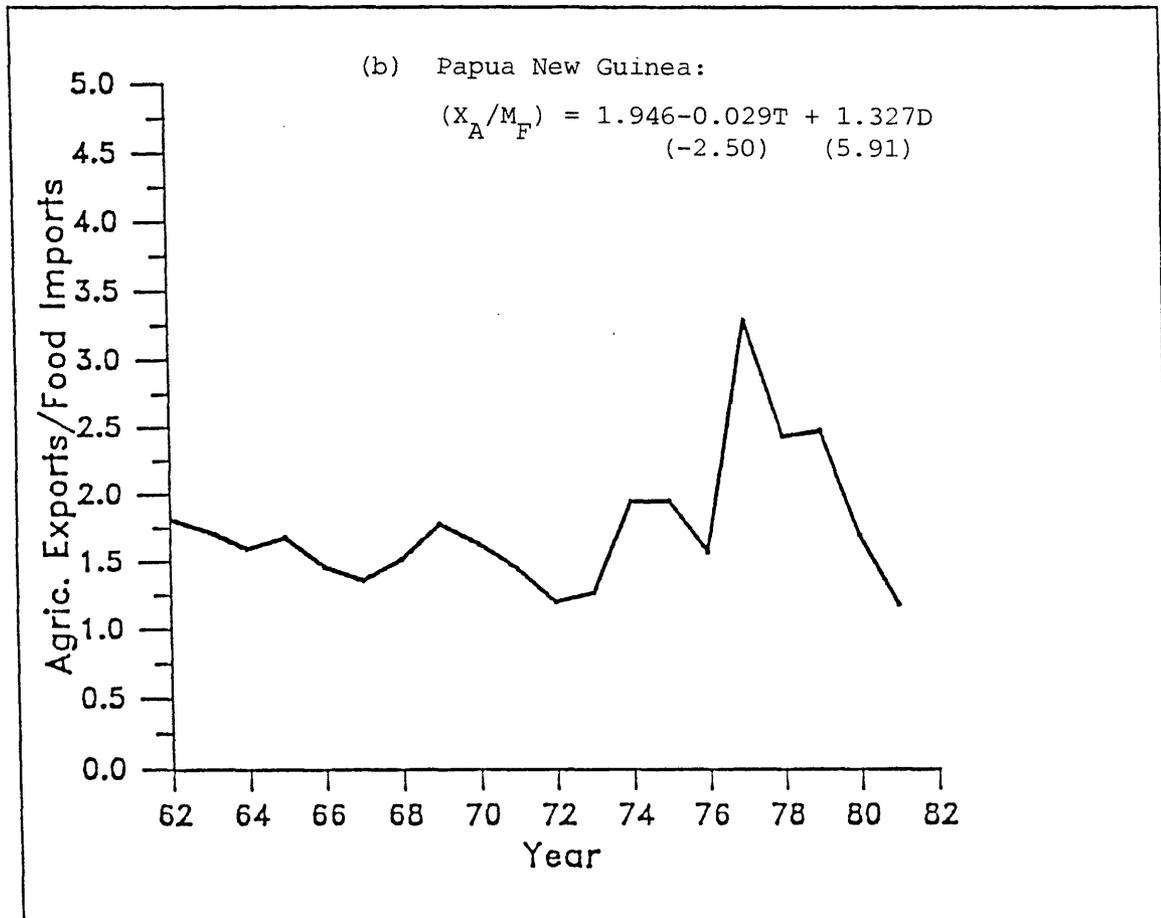
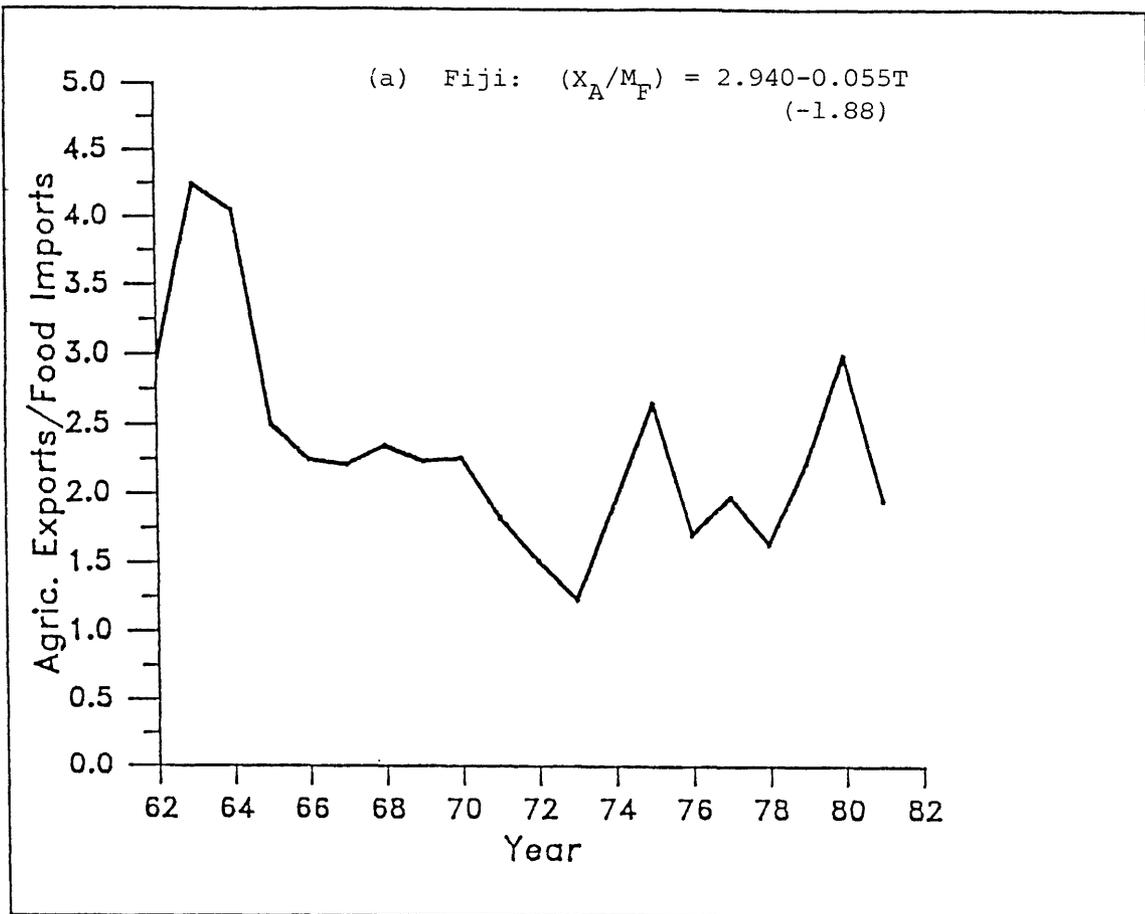


Figure 2.1 Agricultural marketing performance in four South Pacific countries.

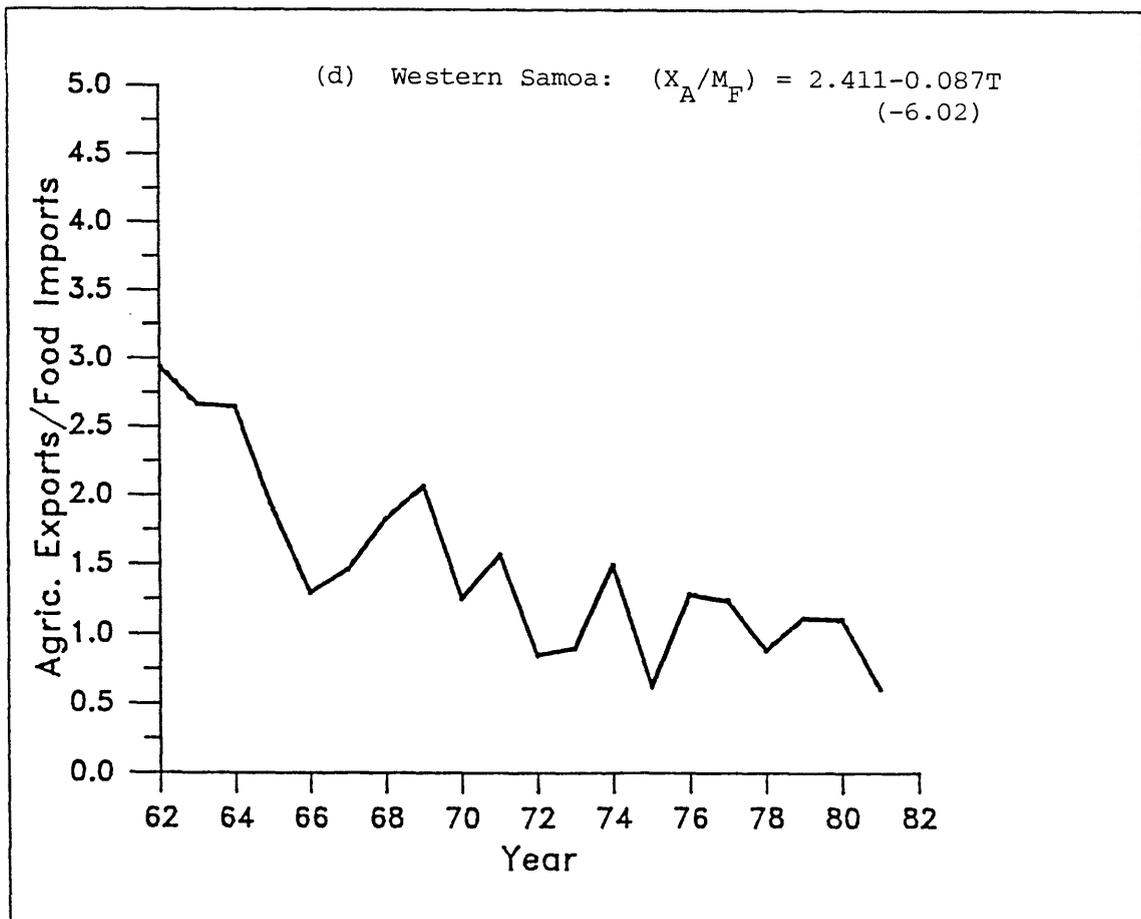
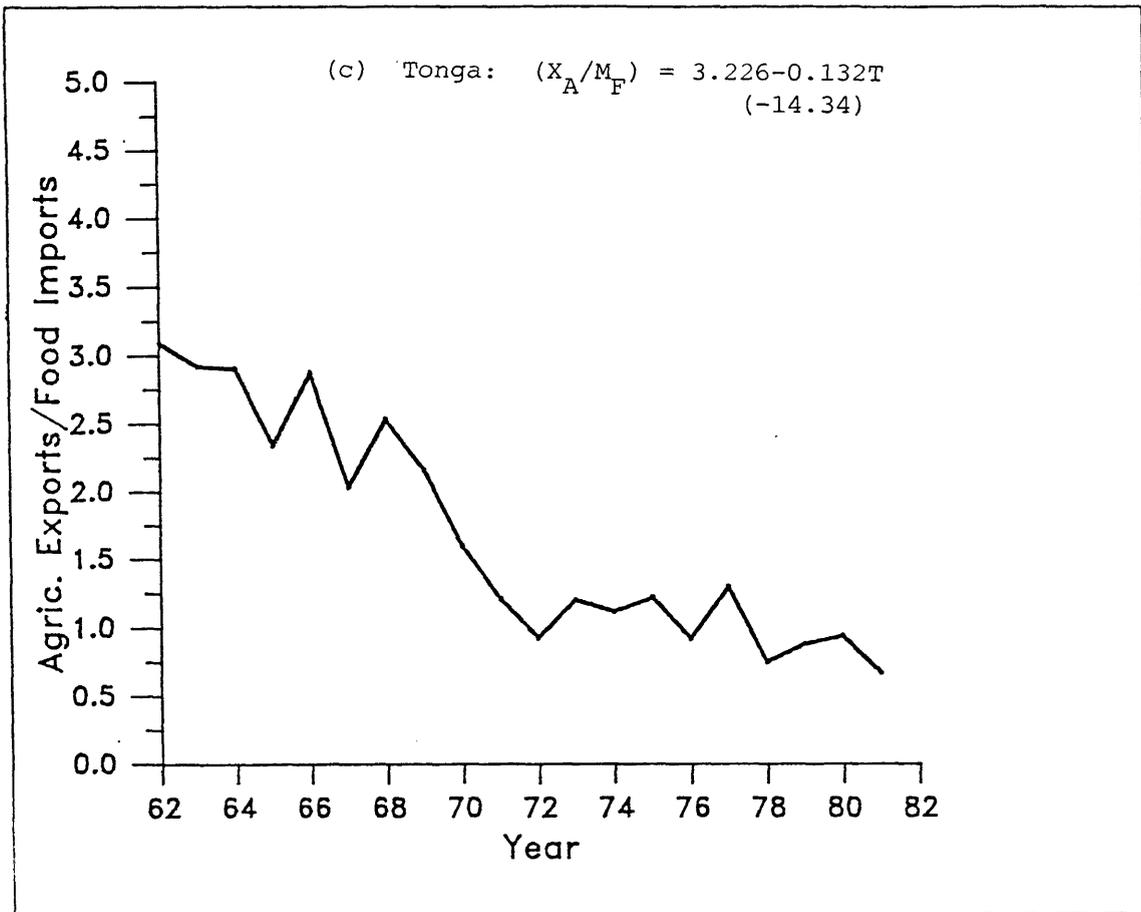


Figure 2.1 (continued).

of the performance ratio against time for the period 1961 to 1982. Because of the omission of relevant explanatory variables, serial correlation was found to exist in estimates for all countries. After correction for serial correlation, coefficients on the time trend variable were found to be significantly negative in four countries - PNG (after including a dummy variable for the effects of new estate plantings), Fiji, Tonga and Western Samoa. The coefficient for Solomon Islands was negative but insignificantly different from zero and it was not possible to obtain an unbiased estimate because of the persistence of autocorrelation after correction. (The time trend variable is retained in the full estimated model to be described below, but takes on a more specific meaning.)

A prominent difficulty in measuring marketing performance in the manner described above is the failure to consider changes in levels of resource use in the agricultural marketing systems. It has been commonly observed that intersectoral resource transfers take place with economic growth. In particular, it has been noted that the agricultural sector declines in relative importance as the economy grows. Hence, any deterioration in agricultural marketing performance, as defined, might be attributable to a shift towards comparative advantage of resource use in non-agricultural sectors. Unfortunately, there are no data on levels of resource use in the agricultural sectors (or, more specifically, the agricultural marketing systems) in the South Pacific countries under study.

There are, however, some circumstances in the current study that can be expected to mitigate the difficulties encountered by not being able to study changes in resource use efficiency in agricultural marketing systems. First, differences in stages of economic growth can be approximated by per caput GDP. The inclusion of this variable as a factor influencing the indicator of agricultural marketing performance makes it possible to test whether there are significant differences among countries in the effect of this variable on performance. Second, during the twelve-year period of the study, considerable emphasis was placed on developing agriculture as the leading sector by all governments in the countries being studied. There is therefore unlikely to be any substantial decline in levels of resource use in the agricultural sector

relative to other sectors of the economy. Further, any significant declines in the share of resources used in agricultural production (and hence in agriculture's share of GDP) were likely offset by increased post-harvest activities in the manufacturing and service industries within the agricultural marketing system.

It is assumed, because of the above points, that the agricultural marketing systems retained their shares of resources used in the economy during the study period. This assumption cannot be proved or disproved because of the lack of data on resource use in the countries concerned. The implications of this assumption being wrong are taken up again in Chapter 11.

## 2.3 METHODS USED

### 2.3.1 Model

Data on the dependent and explanatory variables were collected from secondary sources in five major countries in the South Pacific: Fiji, PNG, Solomon Islands, Tonga and Western Samoa. The period of study chosen was 12 years, from 1970 to 1981. The various sources of data are recorded in Appendix 1. The time series data for the five countries under study were pooled, providing 60 observations on each variable. Besides expanding the degrees of freedom available, the pooling of data enabled significant inter-country comparisons to be made of the impact of different explanatory variables on the performance indicator.

Three separate estimation procedures using regression analysis were followed in which explanatory variables were tested for their influence on the dependent variable. These tests were made on the basis of the significance of each variable (measured by t values); effects on the overall explanatory power of the equation (measured by the adjusted coefficient of multiple determination, designated by  $R^2$ ); and by the evidence of specification bias indicating the omission of relevant explanatory variables.

In the first estimation procedure, the Ordinary Least Squares (OLS) regression method was used and observations were assumed to be from a homogeneous group, with no account taken of different impacts of explanatory variables on the dependent variable among countries. This was followed by the insertion of dummy variables on the intercept and slope variables in an attempt to reflect differing impacts among countries. OLS regression analysis again was the method chosen. This model is termed the dummy variable model. The third phase involved an attempt to improve on the above two estimation procedures by recognising the likelihood of contemporaneous correlation among omitted variables from the estimated models for each country. The regressions of each country fit the description of 'seemingly unrelated regression equations' (Zellner 1962). Following Griffiths (1985, Ch. 2), these equations can be represented for five countries as

$$\begin{aligned}
 (2.1) \quad P_{1t} &= b_{10} + b_{11} M_t + b_{16} I + U_{1t} \\
 P_{2t} &= b_{20} + b_{22} M_t + b_{26} I + U_{2t} \\
 P_{3t} &= b_{30} + b_{33} M_t + b_{36} I + U_{3t} \\
 P_{4t} &= b_{40} + b_{44} M_t + b_{46} I + U_{4t} \\
 P_{5t} &= b_{50} + b_{55} M_t + b_{56} I + U_{5t}
 \end{aligned}$$

where  $P$  is the agricultural marketing performance indicator,  
 $M$  is an explanatory variable (for simplicity only one is specified),  
 $I$  is the time trend, and  
 $U$  is the disturbance term.

The first subscript on the  $b$  coefficients refers to the equation for a particular country and the second subscript denotes the explanatory variable.

These equations can be expressed in matrix form as follows:

$$(2.2) \quad y_i = x_i a_i + u_i$$

where

$$y_i = \begin{bmatrix} P_{i1} \\ P_{i2} \\ \vdots \\ P_{iT} \end{bmatrix} \quad x_i = \begin{bmatrix} 1 & M_{i1} & I_1 \\ 1 & M_{i2} & I_2 \\ \vdots & \vdots & \vdots \\ 1 & M_{iT} & I_T \end{bmatrix}$$

$$i = 1, \dots, 5$$

$$T = 12$$

$$a_i = \begin{bmatrix} b_{i0} \\ b_{i1} \\ \vdots \\ b_{i6} \end{bmatrix} \quad i = 1, \dots, 5$$

and

$$u_i = \begin{bmatrix} U_{i1} \\ U_{i2} \\ \vdots \\ U_{iT} \end{bmatrix}$$

Four assumptions are fundamental for estimating Zellner's seemingly unrelated regression equations: zero mean for all disturbances; constant disturbance variance over time; contemporaneous correlation among disturbances; and no autocorrelation (Griffiths 1985, p. 51).

The full form of the model, with matrix dimensions specified above, is derived from equation (2.2) and written as

$$(2.3) \quad Y = Xa + u.$$

Estimation of equation (2.3) using OLS provides exactly the same results as would be obtained if each equation were estimated separately using OLS. On the other hand, estimation using Generalised Least Squares (GLS) regression analysis provides better estimates than those obtained using OLS. This is because, by taking into consideration any contemporaneous correlation among disturbances in the equations of different countries, a lower variance is obtained (Griffiths 1985, p. 53), thus leading to greater efficiency in estimation. Results obtained by using OLS will only match those obtained by using GLS, therefore, when there is no contemporaneous correlation among disturbances.

Two functional forms were considered: linear and logarithmic. The selection of form was based on the statistical quality of the alternative forms as there was no *a priori* information which supported the use of one form over another.

#### 2.3.2 Selection of Explanatory Variables

Analysts of agricultural marketing systems inevitably are faced with a choice between macro- and micro-analytical techniques in the analysis phase of studying agricultural marketing performance. There is a need to consider the system both in terms of the macro-economy and at the micro-level of individual market participants (including agricultural producers) (Rhodes 1978, pp. 6-7). In assessing and explaining changes in agricultural marketing performance, analysis has been set predominantly at the macro-level, dictated by the choice of performance indicator. Some of the further analyses which stem from the results of the measurement of agricultural marketing performance, however, are placed decisively in the domain of micro-analysis.

A major problem in explaining agricultural marketing performance stems from the amorphous and multi-attributed nature of any agricultural marketing system which contains a variety of economic activities. There is no clearly-defined theoretical structure that dictates the choice of explanatory variables in the analysis. This probably explains the chronic lack of effective studies of performance, observed above. The system can be affected from a variety of sources - not all of them

economic in nature. Each variable considered for inclusion in the estimated models is now described and the case put for its inclusion.

Categories. In order to help define policy research and formulation in agricultural market development, factors expected to influence agricultural marketing performance are allocated into three categories: endogenous intrinsic (NI), exogenous intrinsic (XI), and exogenous extrinsic (XE). Endogenous factors are defined as those which originate from within the agricultural marketing system whereas exogenous factors are those originating outside the system (i.e. those that distinguish marketing outcome from performance in the opinion of Helmberger et al.; see Figure 2.2). Intrinsic factors are defined as those which can be influenced by policies addressed directly to the activities of participants in the agricultural marketing system; extrinsic factors are those which can only be influenced by policies put into effect outside the sphere of the system.

The NI factors clearly fall within the sphere of economic policy makers enjoined with the brief of accelerating agricultural market development. XI factors also can be influenced by policies of agricultural market development, albeit indirectly. The values taken by these factors over time cannot be influenced but the response of market participants to change in these values can. The values of XE factors are not only independently determined but, also, policies cannot be invoked to alter the response of market participants to changes in these factors.

As indicated above, marketing outcomes are much more readily measured than marketing performance. The relationships between marketing performance, marketing outcomes and the degree of attainment of development goals are represented in Figure 2.2. In practice, what distinguishes marketing performance from marketing outcome is the influence of a set of exogenous factors upon marketing activities.

(a) NI factors.

There are four NI factors considered in this study which illustrate both structural and behavioural effects of an agricultural marketing system on performance:

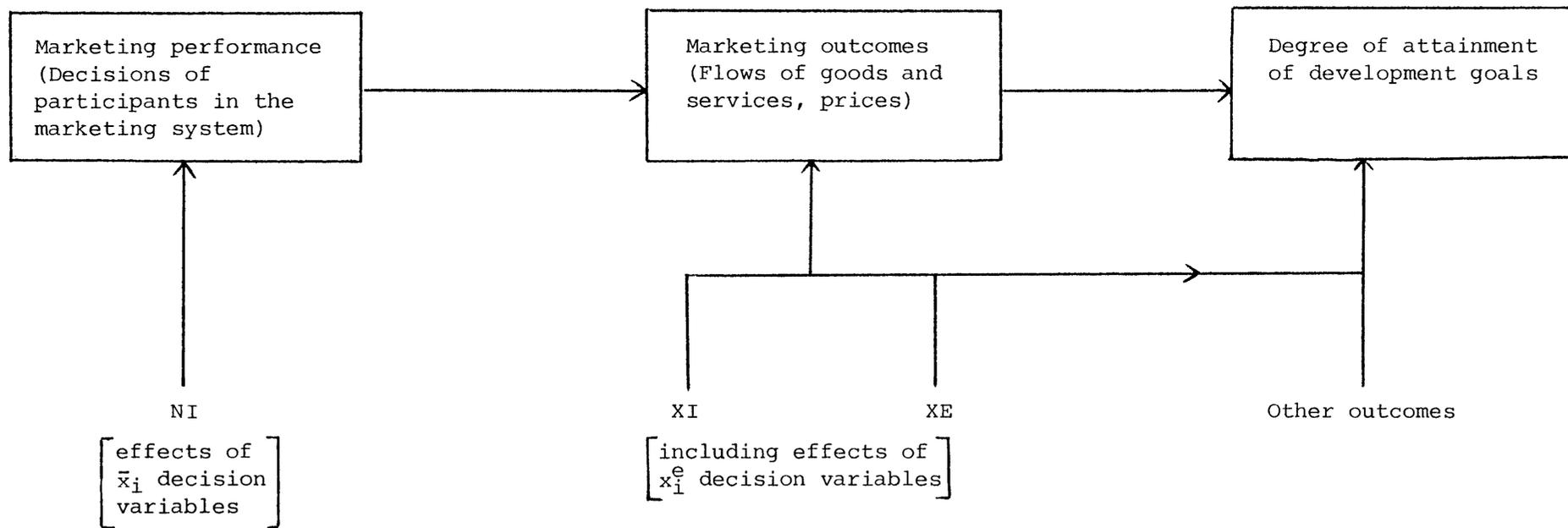


Figure 2.2 Relationships between marketing performance, marketing outcomes and attainment of development goals.

- (1) Institutional adjustments are based on perceived opportunities for profit-taking or, especially in the case of public institutions, opportunities to attain non-profit goals, and modified by internal organisational structure, inter-firm relations, the availability of marketing technology, the degree of risk and transaction costs.
- (2) Infrastructural change alters incentives to agricultural market participants to perform marketing functions and to producers to supply an agricultural marketed surplus.
- (3) Changes in levels of efficiency in marketing resource allocation affect the profitability of market operations; this would be expected to modify agricultural marketing performance.
- (4) Introduction of new technologies in certain marketing functions should improve the technical efficiency with which marketing activities are undertaken.

There is expected to be a positive association between the levels of allocative efficiency and institutional, infrastructural and technological development on one hand, and agricultural marketing performance on the other.

(b) XI factors.

Most of the remaining factors which were appraised for inclusion as explanators of agricultural marketing performance fit in the XI category. Three XI factors which also befit the XE category are mentioned below in the latter category. There are ten factors to be considered solely in the XI category: population; migration; tourists; energy intake; protein intake; remittances; education; foreign aid; income; and export price variance. For all but the last factor, a zero, positive or negative coefficient could be expected.

All of these variables are, *inter alia*, domestic food demand shifters except export price variance. An increase in any one of them would be expected either to shift the domestic demand functions for food

products to the right or to alter the relative consumption levels of food items. (There might also be some opposite effects from any leftward demand shifts, such as reduced population as a result of out-migration.) In a domestic agricultural marketing system in which food price mechanisms are operating effectively, any rightward shift in the demand for a food item or category would be accompanied, other things being equal, by a rise in domestic food prices (except under conditions of extreme demand elasticities). This would have any of three consequences, illustrated in Figure 2.3. It might result, first, in the encouragement of the marketing of food products surplus to subsistence requirements or, second, the diversion of agricultural exports onto the domestic food market. Two factors might impede these processes: (a) a lack of market response (see XE category); and (b) imperfect price formation and ineffective or incomplete transmission of price information. Third, because of physiological constraints, lack of comparative advantage in domestic production or marketing, or because of the two impeding factors mentioned above, it might result in increased food imports.

The most likely effect of a rightward shift in food demand is a negative impact on the performance indicator as either exports are diverted onto the domestic market or food imports are increased. In that either of these two events worsens the performance indicator, the assessment of performance of the marketing system might be a little harsh. There can be good reasons for increasing food imports, for example, if there are physiological barriers to producing food for which there is increased domestic demand. However, in predominantly agrarian societies, expanded agricultural exports are the major means of paying for these increased imports such that the appropriate mechanisms to enable increases in food imports and maintain balanced foreign trade should include incentives to expand agricultural export supply.

It is conceivable also that these nine variables might have a positive effect on performance. Besides leading to shifts of the food demand functions, income, remittances and foreign aid can assist in the development of the agricultural marketing system by enabling investment in marketing capital - both private and social. Education can also have

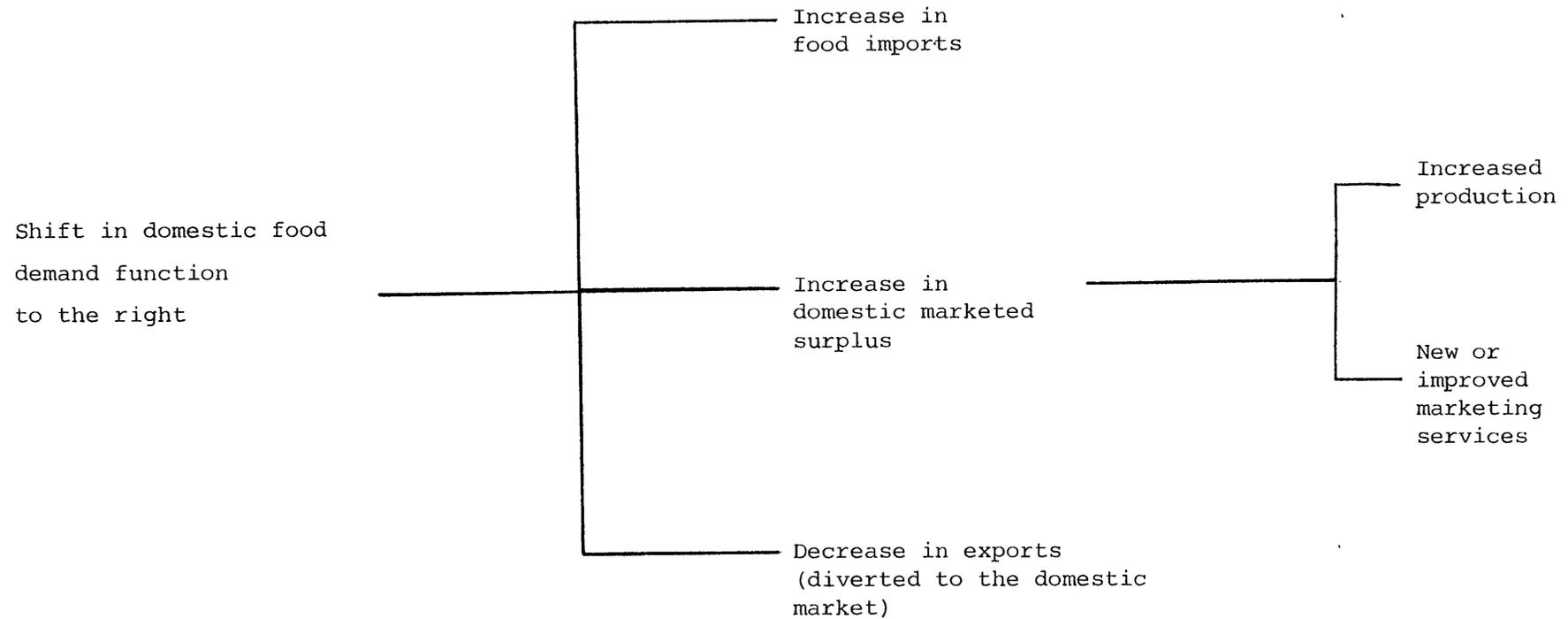


Figure 2.3 Possible responses to rightward shifts in a domestic food demand function.

a beneficial effect by improving the capabilities of market participants. Finally, rightward shifts in the food demand functions would be expected to promote agricultural market development by promoting the expansion of the domestic food market, thereby improving the prospects for market participants to benefit from economies of size. In sum, the signs on the coefficients of the nine XI variables described above depend on the response of market participants to a variety of exogenous influences on the agricultural marketing system (and, crucially, on the food marketing sub-system). This response is, in turn, shaped by the structure of the agricultural marketing system.

Finally, instability in agricultural export markets is a factor influencing the level and nature of participation by producers and market participants in export marketing activities. An export price variance variable is included in an attempt to capture this effect. A negative sign is expected on its coefficient.

There are obviously non-economic XI factors likely to influence agricultural market development which have been excluded from the estimated models. Of particular concern are omitted 'sociopsychological' and 'social structure' factors. Some of these may be crucial in explaining the rate of agricultural market development, such as (one suspects) social sanctions against an entrepreneurial role (Moulik 1973, p. 217). The deleterious impact of their omissions on the quality of the model estimates is difficult to predict. The only guide is to examine the quality of the estimated models in terms of their explanatory power, efficiency in estimation and the detection of any biases.

(c) XE factors.

Agricultural export prices, import prices and the exchange rate influence the performance indicator directly through the price effects on the value of agricultural exports and the value of food imports and so fall into the XE category. However, the ability of market participants to respond to changes in these exogenously-determined variables also makes them comparable to variables included in the XI category.

A further two XE variables are agricultural production potential and variability in the level of market throughput. Changes in the level of agricultural production can indirectly affect the level of agricultural marketed surplus, as illustrated in Figure 2.3. These changes can occur for numerous reasons, such as introduction of new production technologies, land reform and better credit facilities for producers. The level of export market throughput, in particular, may be quite uncertain. Agricultural market throughput available to both domestic and export market participants is thereby varied by factors outside their control.

Description of variables. A brief description follows of each explanatory variable considered for inclusion in the models to be estimated. The description includes an outline of the attributes of the variable and the method used for measuring observations.

(1) Institutional adjustment.

The institutional adjustment variable reflects the sum of activities of market participants in generating changes in agricultural market conditions: modifications to values and attitudes; changes in organisation and management procedures; fostering the adoption of new technologies; and altered relations between market participants. Institution-building, the espousal of more commercial attitudes, the adoption of improved marketing technologies and a more competitive marketing environment all can bring about improved agricultural marketing performance. Emphasis is on structural change rather than merely short-run market response to specific exogenous changes dealt with below in the discussion of XI variables. The impetus to institutional change, while generated within the agricultural marketing system, nevertheless may be brought about by external pressures and opportunities.

The tasks of specifying and quantifying institutional adjustments and relating them to changes in performance proved overwhelmingly difficult. First, there is the problem of accounting for a variety of institutions which perform different functions and conduct their activities in different ways. The quantification of the impacts of those

institutions (such as legal and political organisations and village councils) which indirectly affect marketing operations is well nigh impossible. Second, most adjustments which take place are likely to be imperceptible. Third, few time series data exist on institutional parameters and, where they exist, are seldom made available. Instead of specifying directly an institutional adjustment variable, a proxy variable was chosen: time trend. Given the likely imperceptible trends in institutional change, any significant change in the capabilities of institutions to influence agricultural marketing performance is likely to be captured in this way. As is always the case with the use of a time trend proxy variable, however, there is a danger that the variable is picking up one or more other undetected and relevant variables which change slowly over time.

There have occasionally been discrete changes in the 'stock' or nature of institutional resources in the agricultural marketing system, such as occurred in Vanuatu in 1982 with the commencement of operations of a statutory body, the Vanuatu Commodities Marketing Board (Fowler 1986, p. 56). The use of period dummy variables for before/after such major institutional changes could be an additional means of accounting for institutional change. No such changes during the study period were considered major enough to include any period dummy variables in the estimated model. The establishment of the National Marketing Authority in Fiji would have been such a change; however, the date of establishment, 18 March 1971 (Baxter 1980, p. 115), was considered sufficiently close to the beginning of the period (January 1970) not to require the use of a dummy.

The entrepreneurial role has never fitted neatly into an economic analysis of market response. The intermarket operations of entrepreneurs are not easy to categorise. They cover activities in areas that include: innovations in marketing methods; introduction of new marketing services; the search for new sources of marketing finance; the creation of pressures for changes in organisational structure; the assertion of market leadership; the development and use of market information systems; and dealing with market uncertainty (Kirzner 1984).

Entrepreneurial operations may influence institutional adjustment by altering market structure. They are, however, difficult to identify and quantify and, for convenience, are incorporated in the institutional adjustment variable. One problem with this approach is that it is not certain that entrepreneurial influences will be felt in smooth trends.

(2) Infrastructure.

Agricultural marketing infrastructure (which is primarily economic infrastructure) sets limits on the extent to which time, form and space utility can be satisfied. By making use of items of social overhead capital, agricultural market participants can facilitate the storage, handling, processing and transportation of an agricultural marketed surplus as well as enhance the negotiation processes which are fundamental to buying and selling activities. Infrastructure thereby enables integration of (a) the production and marketing systems, and (b) the various marketing operations between the 'farm gate' and the final consumer.

As for the specification and measurement of the institutional adjustment variable, there are considerable difficulties in quantifying an infrastructure variable. The major difficulty in doing so derives from the many different forms of infrastructure which can be used to facilitate market integration. A proxy variable again was used; it is, however, somewhat more specific than the proxy variable used for institutional adjustment. Five separate indexes were incorporated in a proxy composite variable to represent the major ways in which infrastructure aids marketing activities. Four indexes represent principal infrastructure facilities - road and sea transportation, electrification and telecommunications - while the fifth, recurrent expenditure on public works in real terms, was included to embrace the commitment to maintaining existing social overhead capital in efficient working order. The road transportation variable chosen was length of roads in kilometres; sea transportation was measured in tonnage capacity of vessels plying internal sea routes; electrification was denoted by electrical production capacity in kilowatts; and the telecommunications variable was thought to be mirrored best by the number of connected

telephones. No guide was available to decide on the weighting of each index. In the absence of a more plausible approach, equal weightings (.20) were applied to all indexes. Because the indexes are likely to be highly correlated, the choice of weights may not be very important.

There are some obvious shortcomings in the use of this proxy composite variable. To mention only a few, the formulation and construction of the index ignores the location of the infrastructure; money spent on public works does not necessarily reflect the quality of the work or the condition of the capital items; roads differ in quality depending on the materials used, site conditions and the date of construction; accessibility of multipurpose infrastructure may vary among users, including agricultural market participants; and some omitted infrastructural facilities (grading, handling, storage and shelter) are also likely to be of some importance. The index nevertheless should provide at least an approximate guide to the influence of infrastructural change on agricultural marketing performance.

(3) Allocative efficiency.

The argument was put forward earlier that market imperfections make it virtually impossible to apply neoclassical economic theory to an analysis of agricultural marketing performance. There should be scope, nevertheless, for improved performance where market participants allocate their resources more efficiently in those circumstances where actual input and output prices approximate their true economic value. The difficulty lies in calculating an index of allocative efficiency in marketing over 12 years in 5 countries. This proved to be insurmountable and the only solution was to omit this variable from the model of estimation.

(4) Technological change.

The introduction of new marketing technologies brings with it obvious benefits, for a given level of available resources, in (a) expanding levels of agricultural marketed surplus; (b) the variation of product mix available to consumers of agricultural products; (c) the

offer of new marketing services with agricultural products being traded; or (d) the reduction of costs for given marketing functions. The advent of technological change in agricultural marketing is likely to be closely aligned to institutional development, discussed above.

The ideal indicator of technological change in agricultural marketing would be an index of marketing technology available to market participants for each year of the study. No such index can be constructed because of virtually a complete lack of data. The only way in which technological change can be reflected in the model of estimation is through the inclusion of a proxy variable. A quite common approach is to use a time trend variable but this option has already been taken up to account for institutional change. In light of the lack of an alternative and given the expected close link between institutional and technological change in agricultural marketing, the time trend variable will serve as a proxy for both of these factors.

(5) Population.

Population influences agricultural marketing performance mainly through its role as a food demand shifter. Changes in population are unlikely to bring about any major changes in the mix of food products consumed. As stated earlier, the influence of population on agricultural marketing performance depends on the relative importance of two conflicting factors. An expanding domestic market can promote development. On the other hand, a lack of efficacy in the food market pricing mechanisms to provide signals to producers to expand food production, and to market participants to provide marketing services in transferring an increased agricultural marketed surplus to final consumers, deters development because of failures to meet the increasing food needs of the population. The variable was measured in units of 1000.

(6) Migration.

Changes in the location of the population can alter habits in food consumption and the availability of labour to undertake economic activities. Three main changes which have taken place in South Pacific

countries are (a) the migration of people from the outer, more remote islands to the main island, (b) rural-urban drift, and (c) emigration (including overseas temporary work). The third change is taken up in the remittances variable to be discussed below. The influence of the first two changes rests mainly on the altered consumption patterns of migrants, especially changes away from traditional foods. There is also the prospect of labour shortages to undertake agricultural production and marketing activities in rural areas (particularly on the outer islands) as a result of these shifts in population. A lack of annual data over the study period for both urbanisation and resettlement unfortunately precluded their use as explanatory variables in the estimated model.

(7) Tourists.

Those South Pacific countries which possess a substantial tourist industry (most notably Fiji) would be expected to be sensitive to the changing levels and categories of food demanded by tourists. The variable was measured as the number of tourists (in units of 10 000) entering the country in any given year. This could yield two shortcomings. First, it is conceivable that there might be variations in food items demanded depending on the type of tourist. This and other qualitative effects of tourists on food demand were ignored in the selection of the tourists variable. A second possible shortcoming of the variable used is the neglect of the length of stay of tourists. It would have been preferable to measure the variable as the number of days spent by tourists in the country in a particular year. It was not possible to overcome either shortcoming because of a lack of the more detailed information required across all countries, which would make consistent interpretation difficult. The more detailed information was available only for some countries. For instance, average length of stay of tourists could be determined in Fiji but not in all other countries for all the period.

(8) Nutritional requirements.

Three factors influence nutritional status: food availability, its distribution and use (Wickstrom 1971, p. 3). Two explanatory

variables were specified to account for changing per caput nutritional intake over time: energy intake and protein intake. High energy foods tend to predominate in the early stages of economic development. A switch then takes place to more protein-rich foods as development proceeds.

The inclusion of these two variables is an attempt to gauge the flexibility in an agricultural marketing system as participants alter the mix of food items included in market throughput to meet changing nutritional demand. Hence, they are used as surrogate measures of shifts in consumer tastes and preferences among food categories. The impact of changes in protein intake is likely to be more difficult for market participants to deal with than increases in energy intake because it is more likely to require a change in the mix of agricultural products being marketed. As Wickstrom (1971, p. 5) pointed out, 'in the case of [protein-rich] food products an active distribution system is necessary for success'.

(9) Remittances.

Remittances are measured in constant price terms (in \$000), with nominal values deflated by the consumer price index in each country. Their effect on agricultural marketing performance may be positive or negative depending on the relative strengths of three factors:

- (a) the use made of remittances to invest in agricultural production and marketing capital, leading to increased throughput and the improved supply of marketing services;
- (b) a substitute for funds derived from the disposal of an agricultural marketed surplus, thereby acting as a disincentive to farmers to produce a surplus; and
- (c) a source of funds which expands consumers' budgets, leading (i) to a rightward shift of the food demand functions; or (ii) a change in the mix of food products demanded.

(10) Education.

The education variable was included as the numbers enrolled in primary education as a proportion of the population in the 1-15 age group. The effect of changing educational standards on agricultural marketing performance again depends on the relative strengths of opposing sets of factors.

A rise in educational standards would be expected to lead to improved capabilities of agricultural market participants, in three ways. It enables them, first, to develop an awareness, and greater ability to take advantage, of new marketing techniques. Second, more educated participants are likely to understand better commercial law codes, improving communication and negotiating skills. Third, it enables participants to gain a broader understanding of the workings of the agricultural marketing system, thus promoting better co-ordination of marketing activities and greater responsiveness to marketing opportunities.

On the other hand, more comprehensive educational coverage might be associated with changing food tastes and preferences, especially away from village diets to more Western food items. (This variable may be correlated with, and serve as a proxy for, increased urbanisation which leads to similar outcomes.)

Primary enrolments might not be a perfect measure of overall educational standards, particularly technical education. The positive effects of the variable may not be picked up as a result. Data inadequacies, however, prevented the use of a more suitable measure.

(11) Foreign aid.

This variable, measured in \$m, was deflated by the consumer price indexes to express it in real terms. Foreign aid directed towards the improvements of operations in the agricultural marketing system should lead to improved performance. Most aid in the agricultural sectors of South Pacific countries, however, has been concentrated on increasing

agricultural production rather than improved marketing. An alternative effect could be that the activities associated with foreign aid will lead to greater penetration of Western living styles with similar results in changing the composition of food demand to those outlined above for the education variable.

(12) Income.

Gross domestic product per caput was used as a proxy variable for income. All observations were expressed in US\$ to achieve a comparison among the countries included in the study. Apart from the demand shifter effect, income changes are expected to be associated with a changing composition of food market throughput as more food items with high income elasticities of demand replace those with low elasticities.

The positive effects of the income variable stem from two sources. First, as for the remittances variable, increased opportunities for investment may occur with increased real incomes per head as long as marginal propensities to save are positive and there is not a net flow of savings out of the agricultural sector. Second, general increases in per caput real income levels usually herald greater prosperity with an improved capacity of the economy to provide a wide range of facilities and services. Many such facilities and services, while not directly used in operations in the agricultural marketing system, might nevertheless benefit market participants indirectly.

(13) Monetisation of the economy.

Another demand shifter variable is expected to be the extent to which the economic activities in a country are based on money transactions. With increased monetisation, greater potential for increased purchasing power is realised, increasing the effective demand for a wide range of commodities, including agricultural produce. Monetisation is likely to vary from changes in per caput GDP in that the latter includes estimates of subsistence income.

Two approaches were attempted to measure levels of monetisation. First, a ratio of subsistence income to money GDP was considered. Unfortunately, not all countries have reported the decomposition of GDP between money and subsistence components. Second, money supply in real terms was considered as a suitable proxy for monetisation of the economy. Again, consistent series of money supply were not available for the whole period in two of the five countries. Where series were available for individual countries using either of these methods, it was found that the data were strongly and positively trended.

The decision was made to exclude this variable from the model to be estimated because of inconsistencies and gaps in the data series. Given the trends in the data available, however, it is likely that the influence of the variable will be taken up in the time trend variable that was included.

(14) Export demand variance.

An export demand variance variable is included to capture the effects of unanticipated changes in demand in agricultural export markets. In examining the effects of demand risk on the abilities and willingness of participants to change their levels of marketing activities, the focus is on market response to changes in economic conditions over which market participants have no control. Because of the relatively small size of the South Pacific economies, it is safe to assume that their agricultural exporters are price takers in the world markets for the products they sell. Export demand is hence the equivalent of export price (i.e. demand is perfectly elastic). The allocation of the effects of export price (demand) risk between agricultural market participants and producers is difficult to judge. Much will depend on the abilities of market participants to vary marketing margins as export prices change and to alter the mix of export commodities they handle.

The variable was computed by calculating export price (demand) variance for each year from monthly world price data for relevant commodities. An export price index was compiled for each year for each

country by weighting export commodities on the basis of their contributions to export value in that year.

It would have been useful to include a domestic price variance variable in the estimated models (as an endogenous, intrinsic factor). Lack of data on such a variable in all countries for the period of study, however, prevented its use.

(15) Agricultural terms of trade.

Exogenously-determined prices of agricultural exports and food imports have direct effects on the performance indicator as well as providing market signals to which participants and producers can respond (Jones 1970, p. 187). There is little that can be done in the agricultural marketing system about short-run changes in export and import prices as they affect the denominator and numerator of the performance ratio. In this respect, the prices are XE factors. Market response to price changes, however, is also a crucial aspect of market performance, reflecting the attitudes, flexibility in operations and skills of agricultural market participants and producers as well as the relationships between market participants. A positive response to agricultural export prices (as dictated by economic theory) leads to an improvement in the performance indicator as the numerator (export prices) rises and the level of agricultural marketed surplus increases. Changes in food import prices can have a negative effect on the denominator (food imports) of the performance indicator: increases in food import prices encourage the substitution of locally-produced food output for imported items. Increases in food import prices therefore can be expected indirectly to improve the agricultural marketing performance indicator, thus providing a counterbalance to the direct effects wherein increased food import prices automatically inflate the value of food imports and reduce the value of the indicator.

The world prices of agricultural and food products exported from and imported into the marketing system are represented by a variable termed the agricultural terms of trade. It is measured as  $(PX_A/PM_F)$  in domestic currency units (where  $PX_A$  is the index of agricultural export prices and  $PM_F$  the index of food import prices).

(16) Exchange rate.

Changes in the exchange rate act directly on the prices of food imports and agricultural exports, influencing the mechanism by which world prices are converted into local prices. An appreciation of the exchange rate reduces the amount of domestic currency units needed to purchase any given number of foreign currency units (and vice versa for exchange rate depreciation). It makes exporters less competitive on world markets for the commodities they sell, thereby decreasing the performance indicator. The analogous effects on food imports of devaluation of the domestic currency are, directly, to make food imports more expensive thus decreasing the performance indicator and, indirectly, to make locally-produced food commodities more competitive with imports, leading to an improvement in performance.

Exchange rate variables were measured as local currency units to US\$1. The U.S. currency was therefore a proxy for the currencies of all trading partners of each South Pacific country under study. Use of Australian currency offered an alternative proxy because of Australia's position as the major trading partner of most South Pacific countries. However, the usefulness of this currency is reduced by the alignment to it of some South Pacific countries (e.g. Solomon Islands and Tonga) during at least some parts of the study period.

(17) Agricultural production potential.

The effects of changes in the levels of agricultural production on the agricultural marketing performance indicator are transmitted through the production effects on levels of agricultural marketed surplus. Growth of an agricultural marketing system can occur in two ways: (a) by an increase in the volume of market throughput; and (b) by the performance of additional marketing services to a given level of throughput. The effects of production changes operate on the first route. A positive association is expected between the level of agricultural production and the performance indicator.

The quantification of the agricultural production potential variable presents a challenging task. Potential for production is

influenced by changes in total agricultural factor productivity, by changes in the availability and prices of agricultural resources, by changes in exogenous factors such as climate, pests and diseases, and by conditions in agricultural product markets. Following Leibenstein (1978), actual production may be less than potential production not only because of the dictates of economic efficiency in resource use (whereby the optimal level of production may be less than the maximum attainable production level) but also because of the existence of X-inefficiency. A major cause of X-inefficiency is imperfections in product markets. Ideally, the variable needed in this study is that which reflects actual production plus the slack which results from X-inefficiency in production created by imperfections in (both domestic and export) agricultural commodity markets. Such a variable is not observable, however, and an actual agricultural production index was used in its stead. The implications of this less than optimal choice of a production variable are taken up below in Chapter 11.

(18) Export supply variance.

An export supply variance variable was included to account for the risks facing agricultural market participants in handling, transferring and processing unanticipated levels of market throughput. Where gluts or shortages of throughput occur, efficiency or profitability - or both - of participants who are geared to handle some expected levels of export supply might suffer. The variable was measured as the variance of the quotient of the value of agricultural exports divided by the agricultural export price index. While this variable may be important in both domestic and export marketing, lack of data on throughput in the domestic markets confines analysis to export market operations.

## 2.4 RESULTS

Results of the estimation of factors influencing agricultural marketing performance are presented in Table 2.1. Numerous models were estimated and compared, and many models exhibited similar results and were of similar statistical quality. For ease of interpretation, however, the only results presented in Table 2.1 are those from the model considered most suitable for analysis.

#### 2.4.1 Choice of Model

Of the three modelling procedures followed, only two warranted serious consideration in discussing results. The results from the simple model involving the application of OLS to an assumed homogeneous population proved far inferior to those obtained by estimating the other two models. It is concluded that differences in economic structure among the five countries studied cause variations in the response of agricultural marketing performance to changes in different explanatory factors. A test for the existence of contemporaneous correlation was then undertaken, using the Lagrange multiplier statistic (Breusch and Pagan 1980). The null hypothesis set was that there was no significant contemporaneous correlation and that OLS applied separately to each country's equation was equally efficient as the seemingly unrelated regression estimator. The null hypothesis - that there are no contemporaneous covariances significantly greater than zero - was not rejected. Consequently, it was accepted that the model incorporating dummy variables using OLS estimation (the dummy variable model) provided results of equal efficiency to those employing the seemingly unrelated regression estimator. There is therefore no need to employ the latter estimator and the results presented in Table 2.1 are those obtained in the dummy variable model, using OLS.

#### 2.4.2 Omitted Variables

Of the 18 possible explanatory variables outlined in Section 2.2 above, 11 were included in the selected model. The omitted variables were the allocative efficiency index (not measurable), technology index (incorporated with institutional adjustment in the time trend proxy variable), and per caput protein intake, education, export demand variance and export supply variance (all insignificant).

#### 2.4.3 General Features of the Selected Model

The explanatory power of the model is considered to be quite satisfactory, with an  $R^2$  value of 0.85. The 15 per cent of changes in the performance indicator unexplained by included variables is probably

Table 2.1

Factors Influencing Agricultural Marketing Performance in the  
South Pacific: Fiji, PNG, Solomon Islands, Tonga and Western Samoa

Explanatory Variable <sup>a</sup>	Coefficient <sup>b</sup>	t value <sup>c</sup>
0 Constant	9.791	4.06+
X1 GPD per caput	-0.004	-2.17**
X2 Foreign aid (F,P)	2.345	2.63**
X3 Foreign aid (S)	-0.042	-1.18
X4 Foreign aid (T)	0.164	0.47
X5 Foreign aid (W)	-1.329	-2.88+
X6 Population	-0.006	-5.07+
X7 Remittances	-0.021	-1.27
X8 Tourists (F,P, W)	-0.626	-5.12+
X9 Tourists (S)	2.450	1.59
X10 Tourists (T)	0.322	1.89*
X11 Agricultural production index(F,P,S,T)	0.022	2.84+
X12 Agricultural production index (W)	-0.124	-4.73+
X13 Exchange rate (F,P, T, W)	0.019	0.02
X14 Exchange rate (S)	6.228	2.77+
X15 Per caput energy intake (F,P,W)	0.002	1.93*
X16 Per caput energy intake (S)	-0.007	-3.72+
X17 Per caput energy intake (T)	-0.004	-2.84+
X18 Institutional adjustment (F)	1.632	3.73+
X19 Institutional adjustment (P)	0.568	3.73+
X20 Institutional adjustment (S)	0.148	7.61+
X21 Institutional adjustment (T)	0.131	0.85
X22 Institutional adjustment (W)	0.194	2.18**
X23 Agricultural terms of trade	0.438	-8.00+
X24 Economic infrastructure (F)	-0.090	-3.87+
X25 Economic infrastructure (P)	-0.003	-0.07
X26 Economic infrastructure (S)	0.003	0.30
X27 Economic infrastructure (T)	0.009	0.74
X28 Economic infrastructure (W)	0.009	0.93

- a Letters in parentheses are countries: F = Fiji; P = PNG; S = Solomon Islands; T = Tonga; and W = Western Samoa.
- b Coefficients of variables for non-base countries have been adjusted to actual values from differences from base coefficient.
- c The t values are for a one-tail test except for variables for which signs are uncertain.
- + Significant at one per cent level.
- \*\* Significant at five per cent level.
- \* Significant at ten per cent level.

attributable to the influence of omitted variables (allocative efficiency and technological change) and to the suspected imperfect specification and quantification of certain included variables (particularly monetisation, infrastructure and institutional adjustment).

The computed Durbin-Watson statistic ( $d$ ) is 2.31 which indicates that no serial correlation is present in the estimated model. However, this estimate is not a good indicator of serial correlation. Because the model was based on pooled time series and cross-sectional data, data are not from a single series but from five separate series. It is possible to obtain separate estimates of  $d$ , each pertaining to one series. The low number of observations in each series (12), however, means that the estimates obtained are most unlikely to be a reliable guide to the existence of serial correlation.

The  $t$  values of the included variables are generally high. The only included variable of doubtful significance is remittances which narrowly fails the significance test based on the  $t$  distribution at ten per cent level. This variable is scrutinised below when  $F$  tests are carried out to determine which variables are relevant in explaining changes in agricultural marketing performance. A number of variables for specific countries are included in the estimated model despite low  $t$  values. The reason why they are included is that their coefficients are significantly different from those for the base country (Fiji). They are nevertheless not different from zero at ten per cent significance level (see variables X3, X4, X9, X21, X25, X26, X27 and X28). In the case of the exchange rate variable, the coefficient for the base country (and three others) is not significantly different from zero. The variable has to be included, nevertheless, because the coefficient for one non-base country (Solomon Islands) is significantly greater than zero at one per cent level.

The intercept term is common to all countries. The inclusion of four dummy variables on the intercept term proved insignificant in every case and added nothing to the explanatory power of the model.

#### 2.4.4 Relevance of Explanatory Variables

The relevance of each explanatory factor included in the estimated model was assessed by analysis of variance. The unrestricted model in each test was taken to be that reported in Table 2.1. Each restricted model was the unrestricted model without all variables associated with a particular explanatory factor. Results are reported in Table 2.2. They were based on the use of F tests at five per cent level of significance. The null hypothesis in each case was

$$H_0: a_j = 0, \quad j = 1, 2, \dots, 11,$$

where  $j$  is the factor being tested for relevance,  
 $a$  is the coefficient of the  $j$ th factor.

In all cases but one, the null hypothesis was rejected and the alternative hypothesis - the factor concerned is relevant in explaining changes in the dependent variable - was accepted. The exception was the remittances variable. As mentioned in the previous section, the coefficient of this variable was insignificant at ten per cent level using a two-tailed t test, so its exclusion from the list of relevant variables using an F test is unsurprising.

The signs on the coefficient of the included variables were for the most part to be expected. Food demand shifters tended to have a significantly negative effect on the performance indicator, with the exceptions of foreign aid in Fiji and PNG (significantly positive), foreign aid in Solomon Islands and Tonga (insignificant) and tourists in Solomon Islands and Tonga. In the latter case, the coefficient of the variable for Solomon Islands is insignificant while that for Tonga is positive but only weakly significant. A mixed set of results was obtained for the per caput energy intake factor. In three countries, a positive association was detected between the explanatory and dependent variables; in the other two cases, there was a significantly negative association.

Table 2.2

F Test Results on Relevance  
of Factors Explaining  
Agricultural Marketing Performance

Factor Excluded	F Value	F <sub>0.05</sub>	Decision
Per caput GDP	4.88	4.17	Reject
Foreign aid	5.92	2.65	Reject
Population	26.49	4.17	Reject
Remittances	1.66	4.17	Accept
Tourists	10.30	2.92	Reject
Agricultural production index	13.66	3.32	Reject
Exchange rate	4.24	3.32	Reject
Per caput energy intake	11.62	2.92	Reject
Time trend	4.31	2.45	Reject
Agricultural terms of trade	66.01	4.17	Reject
Economic infrastructure	4.52	2.45	Reject

As expected, both the agricultural production index and terms of trade proved to be highly significant explanators of performance, with one exception. A significantly negative coefficient value is attached to the Western Samoan variable for agricultural production. In all countries except Tonga, a positive and significant coefficient was estimated for the time trend variable. The coefficient for the Tongan variable was found to be insignificantly different from zero. The unexpected result for the Western Samoan variable might be linked to the quality of data used. No agricultural production data are gathered by the Statistics Department (1982) so the data reported by ADB (1984) could well be guesses or approximations.

The results for the exchange rate variables indicate that only in Solomon Islands were movements in the exchange rate found to have been important in explaining changes in the performance indicator. In all other countries, the variable proved to be an insignificant explainer.

Finally, the results for the economic infrastructure variable were the least easy to explain. For four countries (all except the base, Fiji), the variable would not appear to explain changes in agricultural marketing performance, contrary to expectations. The use of t-tests showed that there is no significant difference between coefficients of these countries. The result for Fiji is mystifying: a negative association between the explanatory and dependent variables.

#### 2.4.5 Inter-Country Differences

A study of the results in Table 2.1 demonstrates that there is no country in the study for which the explanatory variables widely diverge from those in other countries. Some variations nevertheless exist. Solomon Islands and Tonga are the odd countries out for a couple of factors while for at least one factor, every country has a coefficient significantly different from those for the other countries. In five

cases, there was no significant difference between countries in coefficient value.

It is interesting to note that no dummy variables on the per caput GDP variable were significant. This result indicates that differences in stages of economic growth (assumed to be measured by per caput GDP) do not influence the indicator of agricultural marketing performance. It might have been expected that the indicator of agricultural marketing performance was significantly less for Fiji and PNG, countries with relatively high levels of per caput GDP. This was not the case.

#### 2.4.6 Elasticities of Performance Response

A summary of point elasticities of performance response to changes in some relevant explanatory variables is presented in Table 2.3. Variables with coefficients of unexpected signs or insignificantly different from zero and the time trend variable have not been reported.

Quite a few explanatory variables appear to bring about a substantial negative response in agricultural marketing performance as changes occur in their values. This is particularly so for food demand shifter variables: per caput GDP (-1.06); population (-2.78), tourists in Fiji, PNG and Western Samoa (-2.07) and energy intake in Tonga (-1.21). Two variables to which performance responds in a positive and elastic manner are agricultural production potential (1.32) and the exchange rate (currency devaluation) in Solomon Islands (2.35).

### 2.5 DISCUSSION OF RESULTS

The results reported above indicate that there is quite considerable homogeneity in the sets of factors influencing agricultural marketing performance among countries in the South Pacific. While differences in magnitude of effects are obviously present, the fact that there are common forces in play means that any policy recommendations can be broadly based. The few contrasting results observed are most likely to be caused by data problems in specific series on economic conditions which are peculiar to a particular country. The observations on the results made below are conveniently grouped under eight headings.

Table 2.3

Elasticity of Response of Agricultural  
Marketing Performance to Changes  
in Explanatory Variables

Explanatory Variable	Elasticity
Per caput GDP	-1.06
Foreign aid (Fiji and PNG)	0.76
Foreign aid (Western Samoa)	-0.89
Population	-2.78
Tourists (Fiji, PNG and Western Samoa)	-2.07
Agricultural production potential (exc. Western Samoa)	1.32
Exchange rate (Solomon Islands)	2.35
Energy intake (Fiji, PNG and Western Samoa)	0.27
Energy intake (Solomon Islands)	-0.68
Energy intake (Tonga)	-1.21
Agricultural terms of trade	0.38

### 2.5.1 Food Demand Shifters

One of the most striking results to emerge from the evaluation of factors influencing agricultural marketing performance is the lack of ability of participants in South Pacific agricultural marketing systems to respond adequately to changing domestic food demands. Inadequate response to changing needs induced by income and population changes was experienced in all countries included in the study. In both instances, the negative elasticity of performance was greater than unity and was especially high in the case of income. Experiences were mixed in the cases of foreign aid, tourists and energy intake with these variables showing a negative association with the performance indicator in some of the countries. The positive effects of foreign aid on marketing performance outweighed any negative effects in Fiji and PNG while in three countries - Fiji, PNG and Western Samoa - observed increases in energy intake led to improved marketing performance. Because additional per caput energy needs are satisfied mainly through the provision of starchy vegetables, particularly root crops which in turn are consumed in the household or marketed through the local produce market, it would appear that the traditional smallholder marketing channels in these three countries have operated effectively to meet increased demand for starchy vegetables. The negative effects of tourists in three countries were notable for the high elasticity of response of the performance indicator to changes in number of tourists.

The remittances and per caput protein intake variables both proved insignificant explanators of agricultural marketing performance (at ten per cent level of significance). Two explanations are plausible for the lack of significance of the remittances variable. First, remittances may not be an important factor in influencing agricultural marketing performance. Second, the negative influences of remittances on performance may be offset by the likely positive effects previously outlined. In all countries, changes in per caput protein intake would appear to be met adequately by participants in the food marketing systems. One possible explanation for this result is a statistical one: the existence of collinearity between the protein intake variable and other explanatory variables, notably income, education and remittances.

A search for collinearity between the protein intake and other explanatory variables, however, proved fruitless. An alternative explanation is that participants in the food marketing system respond adequately to changing nutritional intake. This task may possibly have been relatively simple during the study period because a high proportion of protein requirements of the population has been provided within the villages (especially from fish, poultry and pigmeat produce), without resort to the development of more complex marketing channels.

The results showing the mainly negative association between performance and food demand shifters are similar to those observed by Fearn (1984) for three Asian countries: the Philippines, South Korea and Thailand. They indicate an inability of market participants to adjust fully to food demand shifts, a problem most likely faced in varying degrees by all developing countries and not just small ones with a very limited industrial base.

#### 2.5.2 Agricultural Production Potential

The strong positive influence of agricultural production on marketing performance in South Pacific countries conforms with expectations. It stands, however, in contrast to the findings of Fearn (1984) in relation to the three Asian countries he studied. Fearn found that in only one of the three countries he studied did agricultural production influence agricultural marketing performance. It would be prudent to be circumspect about any conclusions to be derived from these results because of the limitations associated with the construction of the data series used in estimation. A plausible explanation exists nevertheless. The major yield-increasing innovations in Asian agricultural production over the past two decades associated with the 'Green Revolution' have likely outstripped advances made in agricultural marketing. The major constraints on agricultural market development have come from within the agricultural marketing system as a consequence, and not from changes in levels of agricultural surplus entering the system. No such technological breakthroughs in production have occurred in the South Pacific. As a result, marketing performance still remains sensitive to changes in the levels of surplus entering the marketing systems which result from area or yield increase in production.

### 2.5.3 Agricultural Terms of Trade

The strong significance of the agricultural terms of trade variable reflects the direct effects of agricultural export and food import prices on the performance indicator. These effects, together with any positive short-run export supply response effects, clearly outweigh any short-run food import demand effects which were expected to have a negative effect on the performance indicator. The two components of the variable were run as separate explanatory variables to determine the relative strengths of the opposing direct and indirect effects of food import prices on performance. Results demonstrated that there was little to choose between the model with the ratio or the model with separate variables. The coefficient on the food import price variable in the latter model was negative and significant at five per cent level, indicating that the direct negative effects outweigh the indirect positive effects.

The insensitivity of the performance indicator to the exchange rate variable in all countries but Solomon Islands contrasts with the findings of Fearn (1984). It is difficult to explain why this is so. One possible explanation is that the US\$ is not the appropriate standard against which to value the domestic currency unit. A further partial explanation operating on the level of food imports is that exchange rate effects might be offset by other protectionist measures affecting capacity to import. A weighted basket of currencies of trading partners is likely to have been a better measure. This basket, however, would vary among countries and over time.

It was impossible to separate the reinforcing direct and indirect effects of export price changes on performance. To achieve this, it is necessary to estimate independently export supply response for individual commodities. Such analyses are undertaken in Chapters 5 and 6.

### 2.5.4 Infrastructure

The disappointing results for the infrastructure variable could be due to a number of reasons. If the variable has been properly specified

and quantified, the first explanation would be that infrastructure does not influence agricultural marketing performance in the South Pacific. As this finding would contradict the beliefs of most people involved in promoting agricultural market development in developing countries in general and the South Pacific in particular, alternative possible explanations should be sought before accepting it. Three such explanations are presented. First, there were considerable difficulties in representing fully all forms of infrastructure which might be of importance in providing facilities for undertaking agricultural marketing activities. These difficulties were alluded to earlier in the chapter. Second, there were practical difficulties encountered in obtaining full sets of data for all five countries. When gaps in any one series occurred, the index was constructed by ignoring that variable for the period in which data were unavailable. This may have led to a distorted index because relevant infrastructural items were omitted from parts of the composite index. A third reason for the failure to obtain significant and positive associations is the inability to specify exactly the nature of the causal relationships, particularly the appropriate functional form and the nature of lagged response.

To test the importance of these possible shortcomings, two further steps were taken. First, different forms of the infrastructure variable were used by altering the weightings applied to the five different components in the index. This change had no effects on the insignificance of the variable for the four countries other than Fiji and also rendered the coefficient of the Fiji variable insignificant. Another change that was attempted was to lag the variable. The reasoning behind this move was that it might take time for the effects of infrastructural change to filter through to marketing performance. Again, no improvement in results was achieved and again the coefficient of the variable for Fiji became insignificant. Two conclusions are drawn from this analysis. First, the lack of robustness of the infrastructure variable for Fiji when the form of the variable is slightly changed confirms suspicions that the significantly negative association reported is specious. Second, it is likely that the effects of infrastructural change on agricultural marketing performance are complex and not easily represented in a simple linear correlation. Any recommendation to the

effect that infrastructure is unimportant in agricultural market development would be a radical departure from conventional wisdom, although some analysts (e.g. Harriss 1979) have warned against too simplistic an approach to the expectations of benefits for marketing from infrastructure. It may be a necessary but not sufficient element of improved agricultural marketing performance.

Much depends on the nature of the infrastructure and the way in which it is used by market participants. The first step is to determine whether or not it promotes market integration, thereby providing the framework for better satisfying the utility of consumers. The second step is to ascertain whether participants are able to take advantage of market integration by expanding agricultural marketed surplus, and improving the quality of market throughput and the services associated with this throughput. These two steps are followed through in Chapters 3 and 10 respectively.

#### 2.5.5 Export Demand and Supply Variances

A similar situation prevails for the export demand and supply variance variables to that described above for the infrastructure variable. The failure to obtain significant coefficient estimates in any countries might be attributable to a failure to specify correctly the relationships between dependent and explanatory variables. Before dismissing risk as a factor influencing agricultural marketing performance, therefore, it will be prudent to explore further the nature of market risk and its effects on performance.

Export price risk effects are likely to be better discerned by disaggregation of data, leading to individual commodity studies. Effects can be traced by studying market response to changing degrees of price risk which leads to changes in the levels of commodities offered for sale in export markets. A second area of interest is the prospects for transfer of export demand instability onto the domestic commodity markets, particularly those markets for major foodstuffs.

Export supply variance effects also are more likely to be observed by studies undertaken at more disaggregated levels. Risks associated

with these effects are generally caused by the interaction of infrastructural and institutional defects. Suppliers of export commodities are exposed to the vagaries of supply of marketing services which discourage their market participation and suppress levels of agricultural marketed surplus.

#### 2.5.6 Education

The insignificance of the education variable in explaining agricultural marketing performance casts doubt on the usefulness of improvements in general educational standards as a means of improving market performance. While the factors enumerated earlier in the chapter may well be operating to improve the efficiency of marketing operations in South Pacific countries, it appears that countervailing influences on performance are set in motion by educational changes. These influences are expected to be associated with factors such as urbanisation and income levels which lead to changes in tastes for foodstuffs. The degree of collinearity was examined between the education variable and other variables included in the estimated model. Results indicated that there was high collinearity with the population, remittance and income variables. The particularly high correlation between the education and population variables (0.954) reflects increasing proportions of young children attending primary school as populations increase and a higher percentage of primary enrolments among children in the larger countries in the sample.

In the outline of each variable given earlier in the chapter, it was mentioned in relation to the education variable that its measurement - primary enrolments as a proportion of the 1-15 age group - might not be defined sharply enough to reflect fully the impact of education in improving marketing knowledge and ability. Concentration on the learning of particular skills - particularly technical and commercial ones - in defining an education variable were thought more likely to yield tangible results in specifying the positive effects of education on performance (data permitting). If this were so, it would be concluded that the raising of general educational standards is not sufficient to improve agricultural marketing performance unless it is accompanied by better

commercial and technical education. Further, there might be long lags in the effects on performance of improvements in educational standards. Because of the short period of analysis, it was not possible to test for any lag structure in the relationship between education and performance.

#### 2.5.7 Institutional Adjustment

A cursory glance at the generally downward trends in the indicator of agricultural marketing performance over the past two decades in Figure 2.1 might lead the observer to conclude that the performance of marketing institutions has been becoming progressively worse. It may come as somewhat of a surprise to learn, then, that there are positive coefficients on the time trend variable after other influences on the performance indicator have been taken into account. All of the coefficients are significantly greater than zero except for the Tongan case.

Some differences between countries were observed in the rate of institutional adjustment. It was clearly most rapid in Fiji with PNG having the next highest rate. The rates were much lower in Solomon Islands and Western Samoa, and negligible in Tonga.

This variable is purported to represent not simply the effects of institutional adjustment (in this instance, institutional improvement), but also technological change introduced by marketing institutions and monetisation. Because a time trend variable cannot easily be used to isolate one particular trend from others, the variable might also be picking up at least one more trend.

Fearn (1984) also included a time trend variable in an attempt to capture the effects of institutional change on agricultural marketing performance in the Philippines, South Korea and Thailand. His findings were similar to those obtained in this study: coefficients of the time trend variable were all significantly greater than zero. Institutional progress, including the introduction of improved marketing technologies, would thus appear to be a feature of most developing countries. Judging by the trends in performance in Figure 2.1, however, such advances in the

South Pacific countries have not been sufficient to offset other factors that have caused a decline over time in the indicator of agricultural marketing performance.

The major uncertainty in this finding is the unknown influence of monetisation of the economies as a demand shifter. In those economies for which data are available, there has been an upward trend in money supply in real terms, or in estimates of monetary GDP relative to subsistence income. This factor may help explain to a considerable extent the significantly positive coefficients on the trend variables.

## 2.6 CONCLUSION

The results obtained in this chapter shed considerable light on factors that influence agricultural marketing performance. Their usefulness, however, is limited in the cases of factors for which there is a complex association between their levels and performance. In seeking to explain in more detail the effects of such factors on agricultural marketing performance, specific analyses based on micromodelling procedures are undertaken that go beyond single associations between dependent and independent variables. Following Perroux (1983, p. 98), these factors are classified as either structural or operational. Structural factors change slowly over time and their effects are not easily captured in regression analysis. The two major structural variables are (a) infrastructure and (b) institutional relations.

Infrastructure serves to integrate marketing activities, thereby leading to the satisfaction of place, time and form utilities in the agricultural marketing system. Analysis is based, therefore, on the integrating role of infrastructure. Market integration can be measured by price correlations between products and markets over time. Unfortunately, there are no sufficiently accurate sets of market price data available for long enough periods to test for market integration. The effects of infrastructure on levels of agricultural marketed surplus are analysed to a limited extent in Chapters 5, 6 and 9.

Institutional relations concern 'the "rules of the game" in society relating to the constitution of corporate economic bodies ... and the norms governing their relationships ...' (Perroux 1983, p. 96). A modified 'structure-conduct-performance' study is made of institutional development in agricultural marketing systems throughout the South Pacific region. This is complemented by an analysis of village organisations and their influences on agricultural marketing activities. The analysis of village organisations reflects their considerable influence on all forms of rural economic activities in South Pacific countries.

For a given market structure, it is useful to learn how participants respond to changes in economic conditions in both domestic and export markets. They do so by altering their marketing operations in the short run within the confines imposed by market structure. Product prices are taken as the best guides to changes in market conditions. Because of indications (shown in the results reported in this chapter) that there has been inadequate market response to food demand shifters, analysis is concentrated on market response to changes in food product prices. However, response to changes in prices of export products is also studied. A second step in analysing market response is added to assess the effects of market risk on the behaviour of agricultural producers and market participants. Because they operate in an environment with less than full knowledge of market conditions, instability in the marketing system may affect the decisions of producers and market participants to supply agricultural products and services.

Finally, there are two areas of interest in assessing agricultural marketing performance that are omitted from this study. Changes in market technology affect, and are brought about by, both structural and operational factors. As mentioned previously, however, a study of the nature and effects of these changes is not pursued in this study despite their possible importance in determining agricultural market development. Technological change in an agricultural marketing system would be a topic large enough to be carried out in its own right. Similarly, the study of another possibly important omitted factor, allocative efficiency, is a large and difficult topic to pursue. Changes in levels of economic

efficiency in resource use in an agricultural marketing system emanate to a large extent from operational factors. Causes of market imperfections which make a study of allocative efficiency so difficult, however, are mainly a function of structural factors at work in the system.

PART 2

STRUCTURAL FACTORS INFLUENCING AGRICULTURAL MARKETING PERFORMANCE