

ECONOMIC AND SOCIAL ANALYSIS OF PROJECTS
A CASE STUDY OF THE YALAVOU PROJECT IN FIJI

by

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D E C L A R A T I O N

Except where otherwise indicated, this dissertation is my own work.

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ABSTRACT

This study explores the relative merits of incorporating equity (income distributional) considerations into the appraisal of projects within a specific project-country context.

The Squire and van der Tak method of social cost benefit analysis is applied to the Yalavou Project (an integrated rural development project) in Fiji to ascertain whether or not project selection and design based on economic analysis would be significantly affected by social analysis. The usefulness and limitations of integrating into the appraisal the distributional impact of projects and the practical relevance of such methods to Fiji are discussed.

Developments in project appraisal methodologies designed specifically for developing countries are reviewed and a detailed outline of the Squire and van der Tak approach is presented.

The major features of the macro-economic environment of the Fijian economy are identified and provide the background to the estimation of the national economic and social parameters. These national parameters are estimated in accordance with the general approach of the Squire and van der Tak methodology and studies by the World Bank. An outline of the project is presented and the project specific parameters estimated.

The results of this study showed that the Yalavou Project was an economically inefficient use of resources but was acceptable on social grounds. Allowance for a greater redistribution of income to poorer families increased the social rate of return.

The study concludes that social analysis is useful in terms of: allowing for the incorporation of and tradeoff between various government objectives in project analysis; and the selection and design of projects, particularly those oriented towards the poorer income groups. Moreover, the proper specification of the distributional impact of a project can be vital to its acceptability and design. The correct specification is relatively more important with projects where a large proportion of benefits go to the private sector and when the project is on the borderline of the accept/reject decision.

The study further concludes that the Squire and van der Tak method is practically relevant to countries: where the government has not only adopted income distribution as a national objective but has made deliberate efforts to implement projects contributing to this objective; where the government has a controlling rather than a supporting role in the process of capital accumulation and growth; where the government's investment programme is project oriented rather than programme oriented; and which have open economies. In most developing countries the administrative capacity of the government may place severe limitations on the practical relevance of the methodology in terms of the availability and reliability of data and the availability of time and manpower resources.

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CHAPTER 1

THE PROBLEM

1.1 Introduction

Development projects¹ are crucial components of the overall development process of all less developed countries. Projects have been described as the 'cutting edge' of development (Gittinger, 1972, p.2) and as 'privileged particles of the development process' (Hirschman, 1967, p.1). These projects represent the translation of national and sectoral plans into implementable working units of activities.² Therefore, projects are not ends in themselves but a means of achieving the development goals of the country.

The two most commonly stated objectives of developing countries are to increase national income, the growth objective and to improve the distribution of national income, the equity objective. Traditionally, project appraisal³ methods have been primarily concerned with the growth objective in the sense of the efficiency of resource use in assessing the relative

1 Gittinger (1972, p.2) defines a project as an activity on which money is spent in expectation of returns and which lends itself to planning, financing and implementation as a unit. It is a specific activity with specific commencement and completion points intended to accomplish a specific objective.

2 Development projects also provide data and information to the overall formulation and adjustment of sectoral and national plans. This inter-relationship between project, sectoral and national planning is discussed in Sen (1970, pp.66-76).

3 In this study project *appraisal* refers to *ex ante* analysis of projects and is distinguished from project *evaluation* or *ex post* project analysis.

Project appraisal is the application of benefit-cost analysis to projects to determine whether or not they should be implemented and whether a particular project is to be given priority over alternative uses of scarce resources. In addition, variations in project design, such as the timing of implementation, the form of technology etc., can be included in project appraisal.

merits of projects and have virtually excluded the equity objective. Recently, however, integrated methods of project appraisal have been developed to assess the impact of projects on both the growth and equity objectives of the country.¹ These integrated methodologies of social cost benefit analysis include an economic efficiency and social analysis of projects. Whereas the distributive impact of the project, both between consumption and investment and between contemporary income groups, is ignored in economic analysis, explicit account is taken in the social analysis by introducing distributive weights for private costs and benefits.

The most common integrated methods of project appraisal have been developed by Little and Mirrlees (1968 and 1974), Dasgupta, Marglin and Sen (1972) and Squire and van der Tak (1975),² with the latter being a synthesis of the former methods. The relevance of these integrated methodologies is currently being debated in the literature.³ The purpose of this study is to explore, in the context of a specific country, the application and relevance of the Squire and van der Tak method for economic and social analysis.⁴ More specifically, the objectives of this study are:

- a. To explore the relative merits of incorporating equity (income distributional) considerations into project appraisal, by applying the Squire and van der Tak approach to a specific project

1 A review of developments in the project appraisal methodology is presented in Section 2.1.

2 Hereafter these methods are referred to as the Little and Mirrlees method, the UNIDO method and the Squire and van der Tak method respectively.

3 For example see MacArthur and Amin (1978).

4 The operational significance of the Squire and van der Tak method is currently the subject of research by the World Bank.

in Fiji to ascertain whether or not project selection and design based on economic analysis would be significantly affected by social analysis and vice versa; and

- b. to highlight the usefulness and limitations of introducing equity considerations into project appraisal and the practical relevance of such methods to Fiji.

1.2 The Project

This study examines the Yalavou Project in Fiji, an integrated rural development project financed partly by the Australian Government's aid programme. The project is designed primarily to raise the livestock and agricultural productivity of approximately 62,000 acres in and around the Sigatoka Valley in the South West of Viti Levu, the largest island of Fiji. In addition, it is a land development project in which the necessary prerequisites include the social development of the people, farmer training and supervision and the construction of roads, a community centre and other infrastructural facilities.

The total cost of the project over a commitment period of 10 years is estimated to be about \$F6.728 million, of which 65 per cent or \$F4.409 million is to be contributed by the Australian Government. Implementation of the project is the responsibility of a specifically constituted Yalavou Rural Development Board.

Essentially the project has six major components:

1. The development of individual commercial farms: this includes the development of 64 new livestock farms and 5 new horticultural farms and the rehabilitation of 34 existing livestock farms. The livestock farms are

based on cattle breeding and fattening, with diversification into goats, commercial horticulture and woodlots.

2. The establishment and development of a Focal Farm as an administrative and training centre and cattle stud.
3. The development of a rural community centre.
4. The provision of a road construction plant and the construction of 56 miles (90 kilometres) of feeder roads with access to the boundaries of most individual farms.
5. The development and management of about 7,800 acres of watershed protection reserves outside the farm area to control erosion including reafforestation and fire control; and
6. The provision of technical and management services and the training of farmers and Fijian staff.

The projected economic life of the project is 30 years.

1.3 Data

This study utilises the original feasibility report on the Yalavou Project in Fiji prepared by the Consultants (McGowan and Associates, 1976 - hereafter referred to as the Consultants Report). The application of the Squire and van der Tak methodology requires the estimation of national parameters which are based mainly on the national accounts and trade statistics of Fiji.

As a desk study, this analysis suffers from shortcomings. Detailed project information and national statistics were not readily

available. Therefore, this study does not purport to be a complete reappraisal of the project to show whether or not the Yalavou Project was socially justified. Rather, it is a crude application of the Squire and van der Tak methodology and an explanation of its usefulness and relevance for the appraisal of projects in Fiji.

1.4 Outline of the Study

Chapter 2 briefly reviews developments in the project appraisal methodology and compares the alternative methods. The Squire and van der Tak approach is then outlined in detail.

The Fijian economy is examined in Chapter 3 and the major features of the macro-economic environment in which investment activity is undertaken are highlighted. This chapter provides an essential background to the estimation of the national economic (efficiency) and social (distributional) parameters in Chapter 4. Chapter 5 describes the details of the Yalavou Project and presents the estimates of the project specific parameters.

In Chapter 6, the results of the application of the national and project specific parameters to the Yalavou Project are presented. The results and the implications for the relative usefulness of conducting a social analysis as well as an economic analysis of projects and the relevance of such a methodology to Fiji is discussed in Chapter 7.

CHAPTER 2

PROJECT APPRAISAL METHODS: A REVIEW

This chapter briefly reviews the development of project appraisal methodologies designed specifically for use in the developing countries. The salient features and essential differences of the alternative methods are summarised. Comprehensive details are presented for the Squire and van der Tak method selected for application to a project in Fiji.

2.1 Development of Project Appraisal Methods

In the 1930's cost benefit analysis was applied to public investment decision making in water resource developments in the United States. The literature in the 1950's and 1960's was primarily concerned with the theory of public sector investment decisions in developed capitalist economies and provided no practical guidance for use in the developing countries. The need for a realistic appraisal methodology appropriate to developing countries and the substantial increases in project aid during the 1950's and 1960's created a demand, particularly by the aid donor agencies.

In developing an appropriate social cost benefit methodology the market prices used in calculating private (financial) profitability were considered to have little or no relation with the real costs and benefits to the nation. Techniques were therefore developed to introduce shadow or accounting prices for the calculation of social profitability.¹ In

1 The calculation of private and social profitability differ not only in respect to the valuation but also in the nature of costs and benefits included. For private and social profit to coincide several assumptions regarding employment, profit maximisation, marginality, external effects, etc. would have to be satisfied. See Little and Mirrlees (1974, pp.19-24).

particular, accounting prices for labour and foreign exchange were calculated. If the alternative to wage employment was either unemployment or underemployment it was argued that labour should be valued below the market wage-rate. Unskilled labour was valued at an accounting price equivalent to the marginal product of labour. As most governments in developing countries valued a dollar of foreign exchange more highly than its equivalent in local currency, foreign exchange earnings or savings were revalued using a shadow exchange rate. These developments formed the framework of the project appraisal methodologies in the 1960s and remain as essential constituents of the more recently developed methods.

In the 1950's and 1960's the principal emphasis in the strategies for development was the growth of national income. Consequently, project appraisal methods assessed projects in terms of their contribution to the growth of the economy. By the early 1970's, it was realised that this emphasis on growth had little, if any, impact on the welfare of the poorest. In spite of the substantial increases in per capita income the distribution of income had not necessarily improved and in some countries may have even become worse (Chenery, *et al*, 1974). As a result, there has been a shift away from the preoccupation with growth towards a greater concern with the distribution of income. Even more recently this change in emphasis has been extended so that development should satisfy the 'basic needs' of the poorest. Social cost benefit methods have subsequently incorporated the distribution objective in addition to the growth objective in assessing the relative merits of investment projects.

The development of social cost benefit analysis can be separated into two stages: economic analysis and social analysis. Economic analysis relates to the traditional project appraisal methods in that it is primarily concerned with maximising national income through the efficient allocation

of resources. Costs and benefits are valued at economic/efficiency (accounting) prices. Two implicit but significant assumptions of economic analysis are that both growth and income distribution are optimal. Specifically, optimal growth means that the government is able to ensure sufficient savings to achieve the desired rate of growth such that all units of project-generated income, whether accruing in the form of investment (savings) or consumption, is equally valuable in its contribution to growth. Optimal income distribution means that the government can redistribute project-generated income in any direction through fiscal devices like taxes and subsidies, and therefore the value of income accruing to all income groups, either rich or poor, is equal. However, the recognition that governments of developing countries are constrained in their ability to generate adequate savings and investment and secure the desired distribution of income between different income groups led to the extension of benefit cost analysis to include social analysis. Social analysis incorporates a system of weights for both the inter-temporal distribution of income, whereby project income in the form of savings is more valuable than the generation of additional consumption and the intra-temporal distribution, where income accruing to the poor is more valuable than income received by the rich. The valuation of costs and benefits is at social/distributional (accounting) prices.

2.2 Modern Methods of Project Appraisal

The developments outlined above have culminated in integrated systems of social cost benefit analysis of which the main methods in use, especially in aid agencies, are Little and Mirrlees (1968 and 1974), UNIDO (1972) and Squire and van der Tak (1975).¹

1 The Domestic Resource Cost Method (Bruno, 1967 and 1972) and the Effective Rate of Protection Method (Balassa and Schydrowsky, 1968 and 1972) are considered to be short-cuts of the more integrated methods (Little and Mirrlees, 1974, p.363). Other approaches include the Effects Method which emphasises indirect effects (Cherval, 1974 and 1977; Balassa, 1976)

A comprehensive review of these three methods is beyond the scope of this study.² In essence, they have the same underlying theoretical framework, viz. applied welfare economics.³ Moreover, they generally agree on the costs and benefits to be included, the need for accounting prices, the use of discounted cash flow techniques and the incorporation of the efficiency, growth and income distribution objectives. However, there are several differences relating to the numeraire (or common unit of account), the methods of estimating accounting prices, the role of the project analyst in the central planning office, the discount rate, the decision criteria and the method, whether explicit and identifiable, or implicit, of incorporating intra - and inter-temporal distribution objectives. Table 2.1 presents a summary of the salient features of each method.⁴

The Little and Mirrlees and UNIDO methods have been shown to provide similar results if the same assumptions are made about the economic environment (Dasgupta, 1972 and Lal, 1974). The Squire and van der Tak method is to a large extent a synthesis of these two methods. The two stages of social cost benefit analysis, viz. economic analysis and social analysis, are more explicit and easily identifiable in the Squire and

1 (continued)

and the conventional efficiency approach (Gittinger, 1975). Several authors have compared and contrasted the various methods and these include among others Bussery (1973); Schneider (1975); Little and Mirrlees (1974) and Dasgupta (1972).

2 All methods, but in particular the LM method, have been summarised, applied and criticised by many authors and all such literature is referenced in the bibliography to this study.

3 It is beyond the scope of this study to consider these theoretical welfare foundations of cost benefit analysis. They have been comprehensively covered in the literature in welfare economics texts such as Winch (1971) and Little (1957), in texts on cost benefit analysis such as Dasgupta and Pearce (1972) and Mishan (1972) and articles such as Harberger (1971) and Boadway (1974).

4 For further details of the theoretical differences of the three methods see Potts (1978) and Weiss (1978a). Weiss (1978a) also examines the practical implications of these methods in an application to a dam project in Nepal.

TABLE 2.1

SUMMARY OF SALIENT FEATURES OF THE MAIN PROJECT APPRAISAL METHODS

Parameter	Dasgupta (et al) Method	Little and Mirrlees Method	Squire and van der Tak Method
Sponsoring Agency Originally Designed For	UNIDO Industrial Projects	OECD Industrial Projects	IBRD Both Agricultural and Industrial Projects
Numeraire	Present aggregate consumption benefits at domestic prices	Present uncommitted social (government) income measured in terms of convertible foreign exchange at constant purchasing power.	Freely available public income of constant purchasing power in terms of convertible foreign exchange in domestic currency.
Valuation of Traded Commodities	Based on the principle of consumer's willingness to pay	World prices: that is, c.i.f. or f.o.b. for perfectly inelastic supply and demand. Otherwise marginal import cost or marginal export revenue for less than perfectly inelastic supply and demand.	World prices: that is, c.i.f. or f.o.b. for perfectly inelastic supply and demand. Otherwise marginal import cost or marginal export revenue for less than perfectly inelastic supply and demand.
Valuation of Non- traded Commodities	Domestic prices.	(1) Decompose into traded commodities and labour and value traded commodities as above and labour as below. (2) Apply Standard Conversion Factor (SCF) to minor non-traded commodities: $SCF = \frac{OER}{SER}$ where SER = shadow exchange rate OER = official exchange rate	(1) Decompose into traded commodities and labour and value traded commodities as above and labour as below. (2) Apply Standard Conversion Factor (SCF) to minor non- traded commodities: $SCF = \frac{OER}{SER}$ where SER = shadow exchange rate OER = official exchange rate
Accounting (Shadow) Price of Unskilled Labour	Net loss of productive services to the rest of the economy.	Additional resources devoted to consumption MINUS social value of the increase in the workers own consumption and the consumption accruing to others as a result of the workers movement into the new employment.	Labours forgone marginal product at accounting prices PLUS Net social cost of increased consumption PLUS Social cost of reduced leisure.
Discount Rate	Social time preference rate.	Accounting rate of interest.	Accounting rate of interest.
Decision Criteria	Net present value.	Net present value.	Internal rate of return.
Efficiency Objective	Explicit	Explicit	Explicit
Growth Objective	Present savings more valuable than present consumption. Explicit.	Present savings more valuable than present consumption. Explicit.	Present savings more valuable than present consumption. Explicit.
Income Distribution Objective	Implicitly considered.	Implicitly considered.	Explicitly considered.
Role of Project Evaluator	Analysis of project only.	Significant and can influence changes in the policy of the government.	Not clear, probably small.

van der Tak method than in either the UNIDO or Little and Mirrlees methods.¹ In fact, the major feature of the Squire and van der Tak methodology is that they 'take explicit account of the impact of the project on the distribution of income both between investment and consumption and between rich and poor' (Squire and van der Tak, 1975, p.3). As the purpose of this study is to explore the relative merits of incorporating income distributional objectives explicitly into project appraisal the method of Squire and van der Tak is selected for further application. The remainder of this chapter is concerned with the details of this methodology for application in the following chapters.

2.3 Squire and van der Tak Method²

2.3.1 Numeraire³

The *numeraire* or unit of account is fundamental in determining the weights to be attached to the growth and equity objectives. Following Little and Mirrlees the numeraire adopted is 'freely available public sector income of constant purchasing power measured in units of local currency' (SVT, 1975, p.29).⁴ This numeraire is assumed to remain constant over time and is expressed in terms of 'border' or 'world' prices by converting into local currency using the official exchange rate.

2.3.2 Valuation and Accounting Prices⁵

Squire and van der Tak define accounting prices as 'the value of

-
- 1 Both the Little and Mirrlees and UNIDO methods explicitly take account of the distribution of income between consumption and investment, but are less explicit about the income distribution amongst contemporaries.
 - 2 This section is based on Squire and van der Tak (1975) and Bruce (1976). Hereafter Squire and van der Tak will be abbreviated to SVT.
 - 3 See SVT (1975, pp.53-4, 57-8).
 - 4 The rationale for this numeraire can be found in Little and Mirrlees (1974, pp.145-51).
 - 5 See SVT (1975, pp.26-7, 49-50).

the contribution to the countrys basic socio-economic objectives made by any marginal change in the availability of commodities or factors of production' (SVT, 1975, p.26).

Therefore, the values estimated for the various economic accounting and social accounting prices are dependent upon both the objectives of the country and the economic environment in which the marginal changes occur. This presupposes the existence of a social welfare function defining the countrys objectives in precise mathematical form and a thorough knowledge and understanding of the restraints determining the present and future development of the country. Consequently, changes in either the objectives or the constraints, hence the social welfare function, will require a change in the estimated accounting prices.

Squire and van der Tak adopt both the intra- and inter-temporal distribution of consumption as the basis of the social welfare function for this allows concentration on the tradeoff between growth and income distribution.

A significant implication of the above definition of accounting prices is that they do not remove the distortions created by resource and policy constraints. In other words, the accounting prices are not equilibrium prices that would result if perfect competition prevailed but rather are 'second best' prices relating to an economic environment in which distortions are prevalent. According to SVT (1975, p.50) the aim of estimating accounting prices is simply to provide a more accurate real value of the parameter.

2.3.3 Economic (Efficiency) Parameters

Valuation of Traded and Non-Traded Commodities¹

The methodology, like the Little-Mirrlees and UNIDO methods,

¹ See SVT (1975, pp.31-6, 88-97, 122-30).

distinguishes three main categories of commodities, viz. traded, potentially traded and non-traded commodities. Each category is separately defined and the method of valuation described below.

Traded Commodities

These are commodities which are either exported, that is, their 'free-on-board' (f.o.b.) value is greater than their domestic production cost; or imported, that is, their 'cost including freight' (c.i.f.) value is less than their domestic production cost.

Assuming infinite elasticities¹ of world supply (demand) for imports (exports) then traded commodities are valued directly at border prices; imports at the projected c.i.f. price and exports at the projected f.o.b. price plus or minus the relevant marketing margin revalued at accounting prices,² respectively.

In addition, some inputs to the project, though domestically produced, lead to increased imports because of production capacity constraints and some outputs from the project substitute for imports. These inputs and outputs would be valued at the c.i.f. import price. Similarly, for any input used in the project that would otherwise have been exported, and for any output that results in additional exports because local demand is satisfied from existing supplies, the correct measure is the f.o.b. export price.

In contrast, if the elasticities are less than perfectly elastic such that, at the margin, an increased demand (supply) for imports (exports) would affect the supply (foreign demand) price then the appropriate

1 The assumption of infinite elasticities makes certain that domestic prices and therefore domestic consumption and production remain unchanged.

2 The revaluation of the marketing margins is considered under the discussion of the non-traded commodities.

accounting prices are the projected marginal import cost (MIC) or projected marginal export revenue (MER) respectively. Expressed algebraically,¹

$$\text{MIC} = \text{c.i.f.} (1 + 1/\epsilon) \quad (2.1)$$

$$\text{MER} = \text{f.o.b.} (1 + 1/\eta) \quad (2.2)$$

where ϵ = price elasticity of foreign supply; and

η = price elasticity of foreign demand.

Potentially Traded Commodities

These are commodities which would be traded except for the imposition of the governments restrictive trade policies in the form of tariffs and quantitative restrictions.² The appropriate accounting price for these commodities depends upon the future likelihood of whether present trade policies are to continue or are to be changed. Potentially traded commodities are valued as traded goods if the restrictive policies are to be abandoned, otherwise this category of commodities is treated as non-traded commodities.

Non-Traded Commodities³ and Conversion Factors

Non-traded commodities have a domestic supply price, at the given level of local demand, below the c.i.f. price of imports but above the f.o.b. price of exports.⁴ For example electricity, transport, etc.

The accounting price for non-traded commodities depends on the

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- 1 These equations clearly illustrate that the magnitude to which the MIC and MER, and hence the accounting price for traded commodities, differs from the c.i.f. or f.o.b. prices depends on the price elasticities of world supply (or demand), respectively.
 - 2 Included in this category of commodities, for instance, would be the outputs of industries protected by tariffs or quotas to the extent that the marginal cost (at accounting prices) of increasing domestic production is greater than the c.i.f. price for equivalent imports.
 - 3 Labour is a non-traded commodity but is discussed separately as it is a project-specific parameter.
 - 4 This definition also includes potentially traded commodities that are not traded because of restrictive trade policies.

elasticities of demand and supply and the source of supply. If the commodities have less than perfectly elastic demand or supply then the appropriate accounting price is: (a) the foregone marginal social benefit (MSB) or demand price if the increased demand resulting from the project is satisfied by decreased consumption elsewhere in the economy; or (b) the marginal social cost (MSC) or supply price if the supply is met by increased local production; or (c) some weighted average of both the MSB and MSC if increased demand is satisfied by both reduced consumption and increased production with the weights determined by the elasticities of supply and demand.

On the other hand, if at the margin supply is perfectly elastic (inelastic) or demand perfectly inelastic (elastic) then the correct price is the marginal social cost or supply price (marginal social benefit or demand price).

To estimate the MSC, the non-traded commodity should be decomposed into its traded, non-traded and factor elements (land and labour) and the non-traded element successively decomposed until everything is reduced to traded goods which are valued at border prices and factor constituents such as labour and land which are valued at their respective accounting prices.¹

The MSB for intermediate goods necessitates an estimate of the social profit foregone while for final consumer goods it is desirable to estimate the loss in consumer surplus revalued in terms of the numeraire. In addition an allowance for the effect of the price increase on the re-allocation of expenditure is recommended.² Furthermore, the increase in

1 SVT recommend only a single decomposition in practice.

2 This effect will be zero if the elasticity of demand is unity, that is, total expenditure on the commodity is the same prior to and after the price increase. However, if the elasticity is less (greater) than unity, the price rise will increase (reduce) expenditure on the commodity, resulting in a reduction (increase) in the foreign exchange cost of expenditure on other commodities.

price will result in a transfer of income from consumers to producers which must be taken into account in the social analysis by weighting the consumer and producer groups appropriately.

The value of non-traded goods is measured above in terms of local currency. This is converted to border prices by the application of a conversion factor, the ratio of the estimated accounting price of the non-traded good to its domestic price. The cost will comprise the MSC and foregone MSB created by the increased demand or supply for the non-traded commodity.

In principle a *specific conversion factor* should be estimated for each non-traded commodity. SVT recommend the estimation of individual conversion factors for broad groups of commodities such as construction, transport, electricity, retailing, wholesaling, consumption etc. In addition a *standard conversion factor* is estimated for valuing minor non-traded commodities.

Standard Conversion Factor (SCF)

Estimates of conversion factors represent an average value of conversion factors of individual non-traded goods. Since these factors reflect the ratios between the domestic and border prices of traded goods entering into the valuation of the non-traded good, this value depends on the governments trade policy. For example, import restrictions and export restrictions (import subsidies and export taxes) result in the *shadow exchange rate* (SER) of local currency per unit of foreign currency being higher (lower) than the *official exchange rate* (OER). Estimates of the SER and hence the SCF are based on weighted averages of import tariffs and export subsidies, where the weights are given by the relative importance of traded goods in non-traded production. However, approximations to these weights is given by shares of imports and exports in total trade.

The standard conversion factor is closely related to the shadow exchange rate concept as follows:

$$SCF = \frac{OER}{SER} \quad (2.3)$$

where SCF = standard conversion factor;

OER = official exchange rate;

SER = shadow exchange rate.

The above accounting prices are dependent upon the assumptions concerning the future development of the economy in general and trade policy in particular. A discussion regarding the adjustment of accounting prices to changes in policy is presented by Squire and van der Tak for two extreme scenarios (SVT, 1975, pp.93-7).

Economic (Efficiency) Wage Rate¹

In contrast to the national parameters previously discussed the 'economic wage rate' is 'project-specific'.

The private demand and supply curves interact to determine the market price (wage) for labour. Private demand is determined by the marginal productivity of labour curve and private supply by the opportunities for alternative work, disutility of effort and sometimes by the private cost of any migration and job training.

Inter-temporal (growth) and intra-temporal (income distribution) objectives are ignored in economic/efficiency analysis of projects. Consequently, the *economic wage rate* (EWR) is the opportunity cost of labour (that is, the marginal output of labour foregone by its use in the project) valued at border prices. Hence,

$$EWR = m \alpha^2 \quad (2.4)$$

1 See SVT (1975, pp.78-9, 83, 118-19, 146-47).

2 This estimate for the EWR assumes an equality between foregone output and the marginal productivity of labour. However, if migration occurs as the result of the creation of one job in the project area then foregone

where EWR = economic wage rate;

m = foregone marginal product;

α = accounting ratio for labour.³

An economic wage rate is required for each type of labour and may vary according to both time and location.

For other factors involved in the project, such as land, the method of estimation is the opportunity cost in the next best alternative use.

Economic Accounting Rate of Interest⁴

The governments objectives relating to growth whether more rapid growth and higher savings and investments are preferred to current consumption, that is, savings are at a premium or alternatively consumption is at a discount, affects the discount rate to be used in making future benefits and costs commensurate with current benefits and costs. Moreover, the appropriate discount rate is determined by the numeraire. In general, the discount rate should indicate the rate of fall over time in the value of the numeraire. Thus, if consumption is the numeraire, as in the UNIDO methodology, the appropriate discount rate is the *consumption rate of interest* (CRI) which measures by how much a unit of consumption next year is less valuable than a unit of present consumption. If government income is the numeraire the discount rate is the *accounting rate of interest* (ARI), defined as the rate of fall over time in uncommitted public income measured in convertible foreign exchange.

SVT estimate the ARI based upon its purpose of allocating public investment funds to their socially most desirable uses. In principle, the

2 (continued)

output will exceed the marginal product of labour by a multiple of the marginal product of one worker. SVT (1975, p.79) suggest taking account of migration if it is excessive. This would probably be the case more in urban than rural projects.

3 If an appropriate accounting ratio cannot be identified for labour then SVT (1975, p.79, F.n.2) recommends the use of the standard conversion factor.

4 See SVT (1975, pp.27-9, 75-6, 113, 115).

ARI should be chosen such that the demand for public investment resources just exhausts the available supply. Hence it follows that the ARI is the internal social rate of return on the marginal project in the public sector.

Following Bruce (1976)¹ a distinction is made between the *economic accounting rate of interest* (EARI), and the *social accounting rate of interest* (SARI) (See Section 2.3.7).

The EARI is measured by the marginal product of capital (q) expressed in border prices. Hence the EARI can be expressed as:

$$\text{EARI} = q \alpha \quad (2.5)$$

where EARI = economic accounting rate of interest;

q = marginal product of capital (opportunity cost of capital);

α = standard conversion factor.

This concludes the presentation of the parameters required for undertaking an economic/efficiency analysis using the SVT method. Before proceeding with a similar exposition of the social pricing parameters a simple illustration of the essence of moving from economic to social analysis is presented.

2.3.4 Economic/Efficiency to Social Analysis²

According to Squire and van der Tak the *net social benefits* of a project is given by:

$$\text{NSB} = (E - C\beta) W_g + C W_c \quad (2.6)$$

1 SVT make reference solely to the accounting rate of interest. But since a clear distinction is being made to facilitate the application of this method the terminology of the economic accounting rate of interest is adopted from Bruce (1976, p.38). A similar explanation applies to the concept of the economic and social wage rate.

2 See SVT (1975, pp.53-6).

where NSB = net social benefits;

E = net economic efficiency benefits;

C = project benefits to the private sector;

β = summary consumption conversion factor;

Wg = marginal social value of foreign exchange in the
public sector;

Wc = marginal social value of private sector
consumption accruing to the particular income
group C.

Assume that as a result of the efficiency analysis the net benefits to society are denoted by E. Also assume the government is interested in the distribution of these real resources. In order to do this the distribution of financial net benefits have to be examined to determine who has control over the real resources. The financial benefits will accrue either to the private or public sector and within the former to the rich or poor. For example, as a result of the project assume that benefits to the private sector are increased by C and entirely consumed and the remaining net financial benefits accrue to the public sector and are completely re-invested. To adjust C to reflect its real value it is adjusted by β , *summary consumption conversion factor*. The increase in real resources to the private sector is CB and the public sector receives $(E - C\beta)$. The increase in social welfare resulting from a marginal increase in the availability of real resources to the public sector and of increased consumption to the particular private sector income group is Wg and Wc, respectively.¹

The net social benefits of equation (2.6) need to be expressed in a common unit of account or numeraire. Using the SVT numeraire the weight assigned to Wg is unity. Dividing equation (2.6) by Wg:

1 Wg is defined for real resources, Wc for consumption at market prices. This reflects the fact that the public sector is concerned primarily with increases in real resources, whereas the private sector derives its utility from consumption possibilities as determined by market prices.

$$NSB^* = (E - C\beta) + C\omega \quad (2.7)$$

where NSB^* = net social benefits in terms of government income at border prices;

$$\omega = \frac{W_c}{W_g} = \text{social welfare from increased private sector consumption.}$$

Thus a unit of private consumption C has to be revalued by ω to express it in terms of the numeraire.

Equation (2.7) can be rewritten as:

$$NSB^* = E - C(\beta - \omega) \quad (2.8)$$

$$\begin{bmatrix} \text{net social} \\ \text{benefits} \end{bmatrix} = \begin{bmatrix} \text{net economic} \\ \text{efficiency} \\ \text{benefits} \end{bmatrix} - \begin{bmatrix} \text{net social cost of} \\ \text{increased private} \\ \text{sector consumption} \end{bmatrix}$$

which clearly distinguishes the efficiency and social benefits.

Thus, to estimate the impact of the project on the objectives of growth and income distribution, measures of β , the summary consumption conversion factor and ω , the social value of private consumption relative to the numeraire, must be estimated. The necessary equations for their estimation are discussed below.

2.3.5 Social (Distribution) Parameters

Consumption Conversion Factor (β)¹

The estimate of β is determined by the increase in the value of consumption at domestic prices if one more unit of foreign exchange is committed to consumption. A separate β should be estimated for each income group but SVT recommend conversion factors for rich and poor as being sufficient.

1 See SVT (1975, pp.58-9, 128-29).

Social Value of Private Consumption (ω)¹

The social value of private consumption (ω) indicates the value of a marginal increase in the consumption of a particular income group in the private sector, W_c (measured at domestic prices) relative to the value of free foreign exchange or public income, W_g (the numeraire, measured at border prices). Hence,

$$\omega = \frac{W_c}{W_g} \quad (2.9)$$

where ω = value of private sector consumption at consumption

level c relative to the numeraire;

W_c = marginal social value of private sector consumption
at consumption level c ;

W_g = marginal social value of foreign exchange in the
public sector.

Squire and van der Tak recommend the estimation of ω as a two step process. First, the numerator W_c , the value of a marginal increase in private consumption at consumption level c , measured at domestic prices, is related to $\bar{W}_c$, the value of a marginal increase in consumption at domestic prices accruing to someone at the average level of consumption $\bar{c}$. This relationship is denoted by d and expressed as:

$$d = \frac{W_c}{\bar{W}_c} \quad (2.10)$$

where d = value of private sector consumption at consumption
level c relative to that at the average level of
consumption $\bar{c}$;

W_c = as defined above;

$\bar{W}_c$ = marginal social value of private sector consumption
at the average level of consumption $\bar{c}$.

¹ See SVT (1975, pp.60-3).

In other words, a marginal increase in consumption at domestic prices accruing to someone with an existing consumption level c is worth d times the marginal increase in consumption accruing to someone at the average level of consumption $\bar{c}$.

The second step in estimating ω is to define v as the social value of a marginal increase in public income measured in free foreign exchange, W_g , divided by the value of a marginal increase in consumption at domestic prices to someone at the average level of consumption, $W_{\bar{c}}$. That is,

$$v = \frac{W_g}{W_{\bar{c}}} \quad (2.11)$$

where v = value of the public income, the numeraire, relative to private sector consumption at the average level of consumption, $\bar{c}$;

$W_g, W_{\bar{c}}$ = as previously defined.

Thus, a marginal increase in private consumption at domestic prices relative to someone at the average level of consumption is equal to $1/v$ units of public income.

Combining equations (2.8) to (2.10) ω can be expressed as:

$$\begin{aligned} \omega &= \frac{W_c}{W_g} \\ \omega &= \left(\frac{W_c}{W_g} \right) / \left(\frac{W_{\bar{c}}}{W_g} \right) \\ \omega &= \frac{d}{v} \end{aligned} \quad (2.12)$$

where ω , d and v have been previously defined.

The weight, ω , for project generated private consumption benefits has two components, d and v . First, d is equal to unity if the government is not concerned with using project selection to improve income distribution, the assumption in economic efficiency analysis. If project selection is to

be used for income distribution purposes, the case in social analysis, d will be greater (less) than unity depending on whether project - generated income goes to those at a level of consumption c below or above the average consumption level $\bar{c}$. Hence,

$$d_i > 1 \text{ if } c < \bar{c}$$

$$d_i = 1 \text{ if } c = \bar{c}$$

$$d_i < 1 \text{ if } c > \bar{c}$$

where i refers to a specific income group.

Second, v is designed to allow different values to be assigned to public relative to private sector consumption. If public income (investment) is considered to be more valuable than average private consumption then v will be greater than unity. Thus, d relates to the intra-temporal and v the inter-temporal distributional impact of the project.

Returning to equation (2.7) and substituting for ω :

$$NSB^* = E + C(\beta - d/v) \quad (4.13)$$

where NSB^* = net social benefits;

E = efficiency benefits;

$C(\beta - d/v)$ = distributional impact.

Thus, the distributional impact, the increase in private sector consumption, reflects both the social cost of the reduction in public income measured in foreign exchange, β , and the social benefit of additional consumption in the private sector, d/v . Note v reflects the public revenue constraint and so the higher v , the scarcer public income, and the more likely that projects selected will involve insignificant transfer of resources from public to private sector consumption. That is, the higher v the more the government values future to present consumption. Finally, d will bias project

selection such that private sector consumption generated by the project will accrue mainly to the poor. Therefore, given the cost of the resource transfer, β , the social benefit is determined by the constraint on public income, v , and the value of providing additional consumption to a particular income class, d .

The following two sections discuss the derivations of d , the price distribution parameter, and v , the value of public income, respectively.

Consumption Distribution Weight (d)¹

The derivation of distribution weights requires the specification of a social welfare function. Squire and van der Tak recommend the use of a utility function with the underlying assumption that the marginal utility of consumption declines as the level of consumption increases. The specification of this function is:

$$U_c = c^{-n} \quad (2.14)$$

where U_c = marginal utility at consumption level c ;

c = level of consumption

n = elasticity of marginal utility with respect to consumption.

Total utility, U_c , is obtained by integrating equation (2.14);

hence,

$$U_c = \frac{1}{1-n} c^{1-n} \quad \text{if } n \neq 1 \quad (2.15)$$

$$U_c = \log_e c \quad \text{if } n = 1 \quad (2.16)$$

Other specifications of the utility function could have been used but the authors adopt equation (2.14) because n has a significant meaning: viz., the higher n , the more egalitarian the government's objectives.

1 See SVT (1975, pp.63-6, 102-03, 136-37).

The negative sign for n indicates a declining elasticity of marginal utility as income rises, in accordance with the theory of diminishing marginal utility.

The marginal utility of consumption at today's average level of consumption is selected as the point of comparison for values of the consumption of different people at different points of time. By setting the average level of consumption equal to unity then the distribution consumption weight, d , for marginal changes in consumption is derived as:

$$\begin{aligned} d &= U_c / U_{\bar{c}} \\ d &= (c^{-n}) / (\bar{c}^{-n}) \\ d &= (c/\bar{c})^{-n} \end{aligned} \tag{2.17}$$

where d = consumption distribution weight for marginal changes;

U_c = marginal utility at consumption level c ;

$U_{\bar{c}}$ = marginal utility at average level of consumption;

$\bar{c}$ = average level of consumption

c = consumption level c .

Note that n is a value judgement and has to be determined on the basis of the government's policy objectives. In efficiency/economic analysis n is set equal to zero such that all additional consumption is valued equally irrespective of the level of existing consumption of the recipient. As n is increased, so the egalitarian bias is increased: with a value of n set equal to unity implying a pronounced bias in favour of the poor, the weight of additional consumption decreasing proportionately with increases in the existing level of consumption. Note that for a particular income recipient the value of d may change over time if his consumption and the average level of consumption are changing at different rates.

Another formula is required for non-marginal changes in consumption.

This formula can be derived as follows. Suppose consumption increases from c_1 to c_2 , then the increase in utility is $U(c_2) - U(c_1)$ which, in terms of the marginal utility of consumption at the average level of consumption $\bar{c}^{-n}$ (the numeraire) is:

$$\frac{U(c_2) - U(c_1)}{\bar{c}^{-n}} \quad (2.18)$$

To find the value of d that equates the actual increase in consumption going to a specific income group to the marginal utility of someone at the average level of consumption then:

$$(c_2 - c_1) d = \frac{U(c_2) - U(c_1)}{\bar{c}^{-n}} \quad (2.19)$$

Dividing through by $(c_2 - c_1)$ the following derivation of d is obtained:

$$d = \frac{U(c_2) - U(c_1)}{(c_2 - c_1)} / \bar{c}^{-n} \quad (2.20)$$

where c_1 = consumption without the project;

c_2 = consumption with the project.

For estimating d for non marginal changes in consumption the following two equations are used, depending on the value of n :

$$d = \frac{\bar{c}^{-n} (c_2^{1-n} - c_1^{1-n})}{(1-n) (c_2 - c_1)} \quad \text{for } n \neq 1 \quad (2.21)$$

and

$$d = \frac{\bar{c} (\log_e c_2 - \log_e c_1)}{(c_2 - c_1)} \quad \text{for } n = 1 \quad (2.22)$$

The consumption distribution weight is derived partly from empirical data, c_1 , c_2 , $\bar{c}$, and partly from value judgements about the elasticity of the marginal utility of consumption, n , such that d itself is a value judgement.

Summary Distribution Measure (D)¹

In cases where the effects of the project on consumption are difficult to identify, very small or affect all income classes, then Squire and van der Tak recommend the use of a global distribution weight, D. *The parameter, D, is defined as the ratio of the social value of an increase in consumption distributed among the population in accordance with the existing income distribution pattern to the social value of an additional unit of private consumption of a person at the average level of consumption.* This parameter D is a national parameter not a project specific parameter and therefore does not depend on the income distribution impact of the project.

Given $0 < n \leq 1$ then,²

$$D = \frac{\sigma^n (\sigma-1)^{1-n}}{(n+\sigma-1)} \quad (2.23)$$

where CRI = i = consumption rate of interest;

n = the elasticity of marginal utility with respect
to consumption

σ = distribution of consumption parameter.

If n is equal to zero or one then D will be equal to one. If σ (sigma) is set equal to unity this means there is a perfectly egalitarian distribution of consumption, and as σ approaches zero, the distribution of consumption becomes increasingly inegalitarian. Now σ can be derived from the estimate of the Gini-coefficient of the distribution of income:

$$\text{GINI} = \frac{1}{(2\sigma-1)} \quad (2.24)$$

or

$$\sigma = \frac{1 + \text{GINI}}{2 \text{ GINI}} \quad (2.25)$$

1 See SVT (1975, pp.66-7, 104, 137-39).

2 The mathematical derivation of this equation is presented in SVT, Appendix 1, pp.137-39, where a formula is derived for changes in distribution.

where GINI = Gini-coefficient of income distribution.

Value of Public Income (v)¹

The authors argue that v may be interpreted as a weighted average of the different types of expenditure for which a marginal increase in public sector income is used, where the weights are determined by the proportion of each type of expenditure in the marginal unit of expenditure. Hence, v could be derived from:

$$v = \sum_j a_j v_j \quad (2.26)$$

and

$$\sum_j a_j = 1$$

where v = value of public income;

a_j = proportion of public expenditure allocated to j^{th} activity;

v_j = value of j^{th} activity relative to private sector consumption at the average level of consumption.

Squire and van der Tak claim that in principle, all v_j should equal v since a rational government could be expected to make certain that at the margin additional expenditure has the same value in all uses. If so, then it is only necessary to identify one v_j in order to know the value of v. The authors recognise that it is highly unlikely that the government could ensure equality at the margin of the value of additional expenditure for all purposes. But because of the difficulty of determining the value of each type of expenditure it is assumed that all v_j is approximately equal to v and the estimation of the value of public investment is recommended as a proxy for v, given that public investment may be the major component of marginal public expenditure.

1 See SVT (1975, pp.67-73, 104-13, 140-41).

Two formulae are given for the estimation of v . First,

$$v = (q/i)/\beta \quad (2.27)$$

where q = *marginal product of capital at border prices*;

i = *consumption rate of interest (CRI)*;

β = *consumption conversion factor*.

According to Squire and van der Tak equation (2.27) provides a minimal value for v . They therefore suggest the use of the following equation in addition to (2.27).

$$v = \left[\frac{q-sq}{i-sq} \right] / \beta \quad (2.28)$$

where s = *propensity of the public sector to reinvest out of q* .

The *consumption rate of interest*, CRI or i , is given by:

$$\text{CRI} = i = ng + p \quad (2.29)$$

where n = *elasticity of marginal utility with respect to consumption*;

g = *growth rate of per capita consumption*;

p = *rate of pure time preference*.

Because private savings may lead to private investment and associated benefits and costs the private savings should be similarly evaluated as public income.

There is a level of consumption where the government is indifferent between consumption and investment. This occurs where $d/v = \beta$ and is referred to as the *critical consumption level* (CCL) and is used as a check on the estimated values of v .

Social Wage Rate

The economic wage rate, although a major cost component, does not

represent the total cost to society of using labour on the project. To estimate the *social wage rate* adjustments have to be made for both growth and income distribution objectives and any other factors such as the disutility of effort and migration effect.

More specifically, as a result of the project, labour incomes may increase through wages exceeding subsistence incomes, more productive self-employment, creation of additional employment to low income groups, and so on. The incorporation of both growth and income distribution objectives requires an upward and downward adjustment respectively to the level of the economic wage rate.¹ Moreover, people may prefer to be unemployed than to undertake arduous work at low pay. This factor will tend to raise the social wage rate above the economic wage rate even if growth and distributional objectives were excluded.

Squire and van der Tak do not derive an explicit formula for the social wage rate as it depends specifically on the manner in which the relevant labour market works and is project specific. Nevertheless, they suggest that the following formula based on the situation of an unskilled worker drawn from a perfect labour market would appear to have fairly general application:

$$SWR = m\alpha + (w-m) (\beta-d/v) + (w-m) \phi e d/v^2 \quad (2.30)$$

where $m\alpha$ is the economic wage rate as defined previously;

w = wage in project employment;

m = foregone marginal product;

e = ratio of the private value of foregone leisure to the market value of increased consumption;

1 According to SVT this is not a contradiction but simply reflects the trade-off between current output and employment and the growth and income distribution objectives.

2 The effects of migration, if excessive should also be considered in this equation.

ϕ = ratio of the social to the private evaluation of
 foregone leisure (or disutility of effort); and
 $(w-m)$ = increase in consumption (in market prices)
 which is multiplied by β to express it in terms of foregone foreign
 exchange, and by the weights d/v and $\phi ed/v$ to reflect the social value of
 increased consumption and the social cost of reduced leisure.

Social Accounting Rate of Interest (SARI)

The *social accounting rate of interest* (SARI) differs from the
 economic accounting rate of interest (EARI) only in allowing for the
 distributional impact of public investment on the private sector (h). Thus,

$$SARI = q\alpha - h \quad (2.31)$$

where SARI = social accounting rate of interest;

$q\alpha$ = marginal product of capital at border prices;

h = distributional impact of the marginally
 acceptable public sector project

where

$$h = (1-s)q (1-l/v\beta) \quad (2.32)$$

Thus the social rate of discount can be expressed as:

$$SARI = \frac{sq + (1-s)q}{v\beta} \quad (2.33)$$

2.3.6 Summary

The application of the Squire and van der Tak methodology requires
 the following set of national and project specific parameters. The
 national parameters include:

- a. conversion factors for all major non-traded commodities
 (β/s) and the standard conversion factor (α).

- b. the values of public income relative to private consumption v ; the elasticity of marginal utility with respect to consumption n ; the average level of consumption $\bar{c}$ and equations (2.21) and (2.22) to estimate values of the consumption distribution parameter, d ; and
- c. the economic and the social accounting rates of interest.

The project specific parameters include:

- a. consumption without the project, c_1 , and consumption with the project c_2 ;
- b. the marginal product of labour, m and the market wage rate, w ; and
- c. the distribution of the project benefits among the beneficiaries.

This chapter has summarised the salient features of the Squire and van der Tak methodology and identified the national and project specific parameters required for its application. The following chapter outlines the characteristics of the Fijian economy as an essential background to the application and assessment of the methodology.

CHAPTER 3

THE FIJI ECONOMY: RECENT AND PLANNED DEVELOPMENT¹

The application and assessment of the relevance of a benefit cost methodology to a particular country requires that the salient features of the economy, both current and expected, be examined with a view to deriving national parameters for analytical purposes. This chapter outlines the characteristics of the Fiji economy and emphasises the macro-economic framework in which investment projects can be analysed.

3.1 Physical Characteristics

Fiji is a small island country in the South Pacific comprising over 300 islands with a total land area of 18,272 square kilometres (South Pacific Commission, 1978, Table 1).² The two main islands of Viti Levu and Vanua Levu cover about 90 per cent of the land area. Fiji is both highly fragmented and geographically isolated from neighbouring islands and major world markets.

These characteristics of small size, fragmentation and isolation are common to the South Pacific islands and distinguish them from the rest of the developing world (South Pacific Commission, 1978, Table 1). Among the small island countries of the South Pacific, Fiji has the largest population (excluding Papua and New Guinea) and the highest per capita income.³

- 1 This chapter is based largely on the following sources for general information: World Bank, 1977, *Economic Situation and Prospects of Fiji*. Asian Development Bank, 1978, *Economic Report on Fiji*. Fiji, 1975 Central Planning Office, *Fiji's Seventh Development Plan 1978-80*.
- 2 Fiji's closest neighbour is New Caledonia 1,350 kilometres and the closest continent is Australia 2,850 kilometres (South Pacific Commission, 1978, Table 1).
- 3 Some non independent islands, for example Guam and New Caledonia have per capita incomes about four times higher than Fiji (South Pacific Commission, 1978).

3.2 Demographic Characteristics

Fiji's rate of population growth has declined markedly from 3.0 per cent in 1971 to 1.7 per cent in 1976¹ (Table 3.1). This decline is due primarily to a reduction in the fertility rate and the growth of emigration.²

With a population of 588,000, Fiji has a low density of 32 persons per square kilometre.³

The majority of the population live in rural areas. However, there is an increasing movement to urban areas. In 1966 19.3 per cent of the population lived in urban areas (Fiji, Bureau of Statistics, 1976, p.10) and by 1973 this figure had risen to an estimated 33.8 per cent (Fiji, Central Planning Office, 1975, p.20).

The population is multi-racial (Table 3.1). Each ethnic group performs distinct economic activities: the Fijians are landowners and predominantly subsistence farmers with an increasing number becoming wage earners in recent years; the Indian population are engaged mainly in sugar farming on leased land and are predominant in the small and medium scale enterprises, the professions and services; and the European and Chinese are mostly in managerial and executive positions in large firms.

- 1 The annual percentage growth rate of population from 1974 to 1977 varied considerably among other South Pacific Islands: 8.3 in Tuvalu, 3.4 in Solomon Islands, 0.2 in Tonga and Western Samoa and -1.2 in the Cook Islands (South Pacific Commission, 1978, Table 2). These rates contrast with an annual growth rate of 2.5 for all less developed countries from 1970 to 1975 (UNCTAD, 1977, p.227).
- 2 The Gross Fertility Rate (per thousand of female population 15-44 years) was 133.0 in 1971 and declined to 125.9 in 1974 mainly as a result of a successful family planning programme. Net emigration per head of population increased from 0.4 per cent in 1971 to 0.9 per cent in 1974 (Fiji, Bureau of Statistics, 1976, *Social Indicators for Fiji*, Tables 1.6 and 1.7).
- 3 This compares with an average of 118 persons per square kilometre in South and South East Asia (UNCTAD, 1977, p.231); and 333 in Nauru, 129 in Tonga, 52 in Western Samoa and 7 in the Solomon Islands (South Pacific Commission, 1978, Table 2).

TABLE 3.1
DEMOGRAPHIC CHARACTERISTICS OF FIJI

	1970	1976
Total Population	521,000	588,000
Male Population (%)		50.5
Female Population (%)		49.5
Rate of Population Growth (% per annum)	3.0	1.7
Population Density (persons per Km ²)	28.5	32.3
Ethnic Populations (%):		
Fijian	43.0	44.0
Indian	51.0	50.0
Chinese	1.0	1.0
European	1.0	1.0
Other	4.0	4.0

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics* (October), Table 1.

3.3 Economic Characteristics

Fijis' small size, in land and population, and geographical location strongly influence its economic environment. Fiji has limited natural resources and a small domestic market which restricts the types of products produced and the scale of production that can be undertaken. Consequently, Fiji is largely dependent on imports to meet domestic demand for capital goods, manufactured products and food. The relative isolated position significantly raises transport costs for both imports and exports which constrains Fiji's ability to increase her participation in the world market.

3.3.1 Growth and Economic Structure

Fiji's rate of economic growth has been high but extremely variable. Table 3.2 shows that in the period 1971-77 real Gross Domestic Product (GDP) increased by an average of 5 per cent per annum and per capita GDP increased at 3 per cent per annum despite the energy crisis and worldwide recession.

TABLE 3.2
REAL GROSS DOMESTIC PRODUCT OF FIJI 1971-1977
AT CONSTANT 1968 PRICES

	1971	1972	1973	1974	1975	1976	1977
GDP (at factor cost) (\$F Million)	157.6	170.0	191.6	196.6	196.8	202.1	210.7
Annual Growth Rate (%)	6.0	7.9	12.7	2.6	0.1	2.7	4.3
GDP per Head of Population (\$F Million)	296.0	312.5	344.6	348.0	341.7	343.7	353.5
Annual Growth Rate (%)	4.0	5.6	10.3	1.0	-1.8	0.6	2.9

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October), Tables 1 and 6.

Fiji's rapid growth ended in 1973 and rates in the last four years have been substantially lower, averaging 2.4 per cent since 1974.

The economy of Fiji is mainly agricultural with a concentration on sugar as the major source of cash income and foreign exchange earnings.

The output of Agriculture, Forestry and Fishing grew at an annual rate of 2 per cent but its share of GDP declined from 24.0 per cent in 1971 to 20.5 per cent in 1977 (Table 3.3).¹ Fiji's major crops, sugar, coconuts, rice and bananas, with the exception of rice, declined in production. This decline has been attributed to low levels of investment, underutilisation of land, inadequate drainage, inadequate infrastructure and supporting services, and labour shortages due primarily to the attraction of high wages in non-agricultural employment (World Bank, 1977, pp.5-6).

Table 3.3 shows a declining share in GDP of the other productive sectors (mining, manufacturing, building and construction) and a relatively

¹ Agricultural output is probably underestimated given the large subsistence agriculture sector in Fiji. Of the total number of persons employed in agriculture subsistence employees represent about 40 per cent (Table 2.5).

TABLE 3.3
REAL GROSS DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN
AT CONSTANT 1968 PRICES
(percentage)

Industrial Group	1971	1972	1973	1974	1975	1976	1977 (p)
Agriculture, Forestry and Fishing	24.0	22.1	20.8	19.6	19.6	19.9	20.5
Mining and Quarrying	1.5	1.3	1.1	1.0	1.0	0.9	0.7
Manufacturing	11.1	10.8	9.9	10.0	10.0	10.6	10.9
Electricity, Gas and Water	1.5	1.5	1.5	1.5	1.6	1.8	1.7
Building and Construction	5.5	5.6	5.8	5.0	4.4	4.1	4.2
Distribution (including Tourism)	21.5	22.3	22.9	22.7	21.3	20.8	21.1
Transport and Communication	7.0	7.3	7.5	7.9	8.3	8.3	8.1
Finance and Insurance	12.9	13.9	14.3	15.0	16.1	16.1	15.7
Government Services	10.3	10.5	11.2	12.1	12.5	12.5	12.0
Other Services	4.7	4.7	5.0	5.1	5.3	5.2	5.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes: (p) Provisional

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October), Table 6.

marked increase in the Services sector¹ from 57.9 per cent in 1971 to 63.5 per cent in 1977. The average annual growth rate for the Service sector was 7 per cent and has been primarily due to the growth of tourism and related industries. These trends reflect the increasing importance of the Services sector and a change in structure from an economy based on agriculture to a services oriented economy.

¹ Services sector includes Electricity, Gas and Water, Distribution, Transport and Communication, Finance and Insurance, Government Services and Other Services.

While economic growth has been substantial the economic activities have been concentrated in the urban areas and tourist resorts.¹ This is expected to have widened the gap between the distribution of income in urban and rural areas.

Detailed income distribution statistics are not available for Fiji.² The main concern is with the distribution of income between the agricultural and non-agricultural sectors and the regional distribution of income. It has been estimated that in 1975 43 per cent of the population employed in agriculture received about 28 per cent of total personal income compared with 72 per cent of income received by the 57 per cent of the population employed in non-agricultural activities. The subsistence farmers, most of whom are Fijians are the poorest group in the economy with real incomes of \$F400 compared to an average national per capita income of \$F710.³ Also incomes in the interior of Viti Levu and Vanua Levu and in the outer islands are less than in the sugar growing areas, the tourist areas, and the urban areas (World Bank, 1977, pp.31-2).⁴

3.3.2 Inflation

Fiji has experienced relatively high levels of inflation, exceeding an average rate, as measured by the Consumer Price Index, of 10 per cent per annum from 1971 to 1975 (Table 3.4). Rising import prices, fuelled by the quadrupling of oil prices and the subsequent world economic recession,

- 1 Fiji has very weak inter-industry relationships with nearly 80 per cent of domestic production going to final demand (Murti, 1979).
- 2 The Central Planning Office used an estimate of the Gini Coefficient of 0.45 (Fiji, Central Planning Office, 1975, p.10) for planning purposes.
- 3 Subsistence farmers in Fiji are not impoverished as farmers in other developing countries. In fact, their status has been described as 'subsistence affluence' (Fisk, 1970).
- 4 Some income is redistributed through the extended family system which prevails in Fiji.

TABLE 3.4
AVERAGE ANNUAL INCREASE IN CONSUMER PRICE INDEX 1971-1977
(percentage)

	1971	1972	1973	1974	1975	1976	1977
CPI	6.5	9.1	11.2	14.4	13.1	11.4	7.0

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October), p.72.

substantial wage increases in excess of productivity gains and a large increase in domestic demand have been responsible for this high level of inflation. However, as Table 3.4 indicates the rate of inflation declined since 1974 due to the governments tax reforms and price control measures.¹

3.3.3 Labour Force, Employment and Unemployment²

The labour force grew at an average annual rate of 2.9 per cent between 1966 and 1975 (Table 3.5). This growth rate is higher than that for the population and is due mainly to an increased labour force participation by females³ and a changing age structure of the population.

Table 3.5 shows an annual growth of employment of 2.5 per cent between 1966 and 1975 and a divergence in employment between sectors. There has been a decline in the proportion of people employed in Agriculture, particularly income earners, and Mining and a substantial increase in the proportion employed in the Service sector. This change in the sectoral

1 Wages increased 22 per cent per annum between 1973 and 1976 (Fiji, Bureau of Statistics, 1978, Table 56).

2 The figures presented in this section will be underestimates because of the absence of reliable statistics on the subsistence sector of the economy. Employment statistics in Fiji generally relate to paid employees.

3 The most recent statistics available show the Labour Force Participation of females increased from 7.5 per cent in 1966 to 13.6 per cent in 1973. (Fiji, Bureau of Statistics, 1973, p.15).

TABLE 3.5
LABOUR FORCE, EMPLOYMENT DISTRIBUTION
AND UNEMPLOYMENT 1966, 1973, 1975
(percentage)

	1966	1973(d)	1975(e)
Agriculture: (a)	56.5	45.2	43.3
Mainly Cash	34.7	26.8	25.3
Mainly Subsistence	18.5	18.4	18.0
Mining and Quarrying	1.6	1.3	1.2
Manufacturing	7.3	6.8	7.2
Construction	6.1	10.5	8.7
Utilities	0.7	0.6	1.0
Transport and Communication	5.4	6.4	6.6
Commerce (b)	8.3	12.3	13.1
Other Services (c)	14.2	16.8	18.9
Total	100.0	100.0	100.0
Total Persons Employed ('000)	120.6	143.2	150.9
Unemployed (%)	4.1	6.2	7.1
Labour Force ('000)	125.8	152.6	162.4

- Notes:
- (a) Includes forestry and fishing.
 - (b) Includes wholesale and retail trade, hotels and restaurants.
 - (c) Includes finance, insurance, business services, government services and personal services.
 - (d) Adjusted by excluding 14 year olds for comparability with 1966 figures.
 - (e) Estimate by Central Planning Office.

Sources: Fiji, Bureau of Statistics, 1973, *Nation-wide Unemployment Survey*.

Fiji, Central Planning Office, 1975, *Fiji's Seventh Development Plan 1976-1980*.

Cited in World Bank, 1977, *Economic Situation and Prospects of Fiji*, Table 1.3.

composition of employment further reflects the changing economic structure of Fiji's economy.

The trend away from the agricultural sector has resulted in shortages of seasonal labour which has caused the average wage to increase. The average wage per day in agriculture increased about 13 per cent annually from \$F2.13 per day in 1971 to \$F5.03 per day in 1976.¹ (Fiji, Bureau of Statistics, 1978, Table 56.) However, wage and salary earners represent only 13.6 per cent of employed persons in agriculture. Self employed workers account for 66.7 per cent and unpaid family workers 19.7 per cent (Fiji, Bureau of Statistics, 1973, Table 13).

Because employment has grown at a lower rate than the labour force the unemployment rate has increased from 4.1 per cent in 1966 to an estimated 7.1 per cent in 1975 (Table 3.5). A survey in 1973 showed unemployment to be higher amongst females (7.4 per cent of the female labour force) than males (6.6 per cent) and higher in rural (7.2 per cent) than urban (5.9 per cent) areas (Fiji, Bureau of Statistics, 1973). In addition, the survey considered persons to be working less than 15 hours a week to be 'under-employed'. About 91 per cent of 8,034 underemployed persons were in the agricultural industry, and only 17 per cent received money wages (Fiji, Bureau of Statistics, 1973, p.42).

Fiji has a high literacy rate but suffers from a shortage of skilled and professional workers because these workers constitute most of the emigrants. Consequently, many professional positions in the civil service remain unfilled and expatriates occupy about 40 per cent of those positions that are filled (World Bank, 1977, p.20).

¹ Wages in other sectors are generally higher as indicated by the average daily wage of \$F6.68 for all industries in 1976 (Fiji, Bureau of Statistics, 1978, Table 56).

3.3.4 Investment Savings and Public Finance

Investment or Gross Fixed Capital Formation from 1971 to 1977 contributed an average 21 per cent to GDP (at current market prices) as shown in Table 3.6.

Private sector investment increased at an average annual rate of 15.3 per cent but its share in total domestic investment declined substantially from 62.7 per cent in 1971 to 49.9 per cent in 1977. In comparison, public sector investment at 17.1 per cent of total investment in 1971 increased at a rate of 26.5 per cent per annum to 50.1 per cent in 1977 to exceed private investment for the first time.

Consumption has not been diverted to finance investment, averaging a growth rate of 22 per cent per annum from 1971 to 1977 (Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, Table 5). In fact, a high proportion of gross fixed investment is financed from overseas.

The ability of the Fiji Government to mobilise savings is low. Up to 1973 the Government relied on fiscal measures for the management of the economy. The creation of the Central Monetary Authority in 1973 has given the Government wider economic management powers with the availability of the instruments of monetary policy. Nevertheless, domestic savings have primarily been raised by the government while personal and business savings have been relatively small. The Governments fiscal and monetary instruments are inadequate to ensure enough domestic savings to meet investment funds.

Retained earnings provide some finance for private sector investment but foreign borrowings and direct foreign investment are substantial because of the dominance of foreign firms in the sector. Foreign controlled companies are restricted in domestic borrowings, under the Exchange Control Ordinance, to the extent of the percentage of locally held equity in the enterprise (World Bank, 1977, p.61).

TABLE 3.6
GROSS FIXED CAPITAL FORMATION IN FIJI 1971-1977
(Current Prices \$F Millions)

	1971	1972	1973	1974	1975	1976	1977
Gross Fixed Capital Formation	45.9	53.1	65.7	74.2	103.4	119.5	133.7
Private Total	28.8	34.4	40.1	45.3	58.6	62.4	66.7
Proportion (%)	62.7	64.8	61.0	61.1	56.7	52.2	49.9
Public Total (a)	17.1	18.7	25.6	28.9	44.8	57.1	67.0
Proportion (%)	17.1	35.2	39.0	38.9	43.3	47.8	50.1
GFCF as a percentage of GDP (b)	24.9	23.0	21.9	18.6	20.6	21.4	21.0

Notes: (a) About 80 per cent is Central Government capital expenditure.
(b) Gross Domestic Product at current market prices.

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October), Table 5.

Central Government investment is financed from government savings (current budget deficits), local borrowings and foreign sources.¹

Government savings have generally declined since 1971 to a situation of a current budget deficit (dissaving) of an estimated \$F16.0 million in 1977 (Table 3.7). This decline can be traced to specific trends in both current revenues and expenditures.

Current revenues grew at an annual rate of 17.3 per cent and averaged about 21.4 per cent of GDP,² but this ratio has gradually declined since 1971. Revenue from income taxes has increased as a share of total revenue from 29 per cent in 1971 to 46 per cent in 1977, the result of a

1 Information is not readily available on other government investment. The Central Government accounted for an average 82.6 per cent of total public investment in the five years 1971-1976.

2 This compares with percentage ratios of 14.9 for Hong Kong; 17.3 for Korea; 21.0 for Malaysia; 20.8 for Singapore and 22.0 for Jamaica (World Bank, 1977, p.39).

TABLE 3.7
TRENDS IN CURRENT REVENUE AND EXPENDITURE
OF THE FIJIAN GOVERNMENT: 1971-1977
(\$F millions)

	1971	1972	1973	1974	1975	1976	1977 (b)
Current Revenues	53.0	59.1	72.5	80.9	113.3	128.8	134.3
Percentage of GDP	25.0	22.6	21.4	18.0	20.1	20.7	19.0
Current Expenditures	46.8	56.7	70.4	79.0	108.4	129.7	150.3
Percentage of GDP	22.1	21.7	20.8	17.6	19.3	20.8	21.3
Current Surplus/ Deficit (-) (a)	6.2	2.3	2.1	1.9	4.9	-0.9	-16.0

Notes: (a) Errors due to rounding.

(b) Estimate.

Source: Fiji, Ministry of Finance, *Operating Budget Estimates*, various issues.

widening of the income tax base and a reformed income tax structure in 1974. A restructuring of the tariff system together with reduced import duties and a smaller tax base has reduced the international trade taxes from 37 per cent to 30 per cent of total revenue in the same period.¹ (Fiji, Ministry of Finance, *Operating Budget Estimates*.)

The trend in current expenditure contrasts with current revenue. The average annual growth rate of current expenditure was 21.7 per cent (Table 3.7). Although averageing 20.5 per cent of GDP, the decline in the share of GDP from 1971 to 1977 has been less significant than in the case of current revenue (Table 3.7). Substantial salary increases have caused expenditures to rise at a faster rate than revenue, especially since 1974. The share of public debt charges in current expenditure increased from 7.5

¹ Import duties were removed for essential consumer goods such as food and textiles and allowances have been made for new industrial ventures to receive concessions on imported inputs of raw materials, plant and machinery.

per cent in 1971 to 21.6 per cent in 1977, a reflection of increased domestic and foreign borrowings by the Government (Fiji, Ministry of Finance, *Operating Budget Estimates*).

About 80 per cent of total public investment is contributed by central government capital expenditures. Government capital expenditure accounted for over 6 per cent of GDP in the period 1971-1975.¹

The composition of the governments capital expenditure in Table 3.8 shows 40 per cent being directed to infrastructure projects, particularly transport projects. In 1976 economic services, mainly agricultural projects, received an increased proportion of total funds whereas social services, especially health projects received a smaller proportion compared to 1971-75. In addition rural development projects received a greater share of total funds in 1976 compared to 1971-75.

Funding of the governments capital budget has changed significantly (Table 3.9). As a result of the current budget deficit the government has substantially increased the share of local borrowing and also increased borrowing from overseas in 1976. There has been an overall deficit on the capital budget as indicated in Table 3.9.

There are eight, including one government owned, commercial banks in Fiji. These banks are under the control of the newly created Central Monetary Authority which has the powers of a normal central bank. The loans and advances of the commercial banking system are mainly to the private sector except the government owned National Bank of Fiji which lends primarily to the public sector.

The non-bank financial institutions play a significant role in the provision of long term development finance. The Fiji Development Bank is

1 For other countries comparable figures are: Malaysia 6.5 per cent; Thailand 5.2 per cent; Indonesia 4.3 per cent; Philippines 2.9 per cent and Barbados 4.2 per cent (World Bank, 1977, p.44).

TABLE 3.8
GOVERNMENT CAPITAL EXPENDITURE 1971-1975, 1976
(\$F million)

	1971-1975		1976	
	Actual	Proportion	Actual	Proportion
Administrative Services	<u>9.94</u>	<u>8.9</u>	<u>3.91</u>	<u>9.6</u>
Economic Services	<u>15.37</u>	<u>13.8</u>	<u>8.02</u>	<u>19.7</u>
Agriculture	13.72	12.3	7.87	19.3
Other	1.65	1.5	0.15	0.4
Social Services	<u>20.05</u>	<u>18.0</u>	<u>5.15</u>	<u>12.6</u>
Education	6.14	5.5	2.91	7.1
Health	9.19	8.2	0.78	1.9
Housing	4.39	3.9	1.38	3.4
Other	0.33	0.3	0.08	0.2
Infrastructure	<u>44.15</u>	<u>39.6</u>	<u>17.06</u>	<u>41.9</u>
Electricity	0.05	(a)	0.14	0.3
Water/Sewerage	8.73	7.8	4.19	10.3
Transport	29.72	26.6	11.59	28.5
Communication	4.74	4.2	0.42	1.0
Other	0.09	(a)	0.72	1.8
Rural Development	<u>6.08</u>	<u>5.4</u>	<u>3.84</u>	<u>9.4</u>
Miscellaneous	<u>16.01</u>	<u>14.3</u>	<u>2.73</u>	<u>6.7</u>
Total	111.60	100.0	40.72	100.0

Note: (a) Less than 0.05 per cent.

Source: Fiji, Ministry of Finance, *Capital Budget Estimates*, various issues.

TABLE 3.9
CAPITAL EXPENDITURE FINANCE 1971-1975, 1976
(\$F million)

	1971-1975		1976	
	Actual	Proportion	Actual	Proportion
Appropriation from General Revenue	30.50	27.4	-	-
Local Loans	43.51	39.1	26.52	65.5
Overseas Loans	22.61	20.3	11.29	27.9
Grant Aid	12.22	11.0	1.36	3.4
Contributions for Capital Projects	1.36	1.2	0.25	0.6
Other Capital Revenue	1.20	1.1	1.07	2.6
Total	<u>111.39</u>	<u>100.0</u>	<u>40.49</u>	<u>100.0</u>
Capital Budget Deficit	0.09	-	0.23	-

Source: Fiji, Ministry of Finance, *Capital Budget Estimates*, 1978.

the only finance institution which lends to both the agricultural and industrial sectors. Borrowers in the agricultural sector are charged an interest rate of 4 to 6 per cent with the difference between the normal lending rate being subsidised by the government. Industrial sector borrowers are charged an interest rate of 10 to 11 per cent.

The largest source for long term credit is the Fiji National Provident Fund which provides funds to both the private and public sectors.

3.3.5 International Trade and the Balance of Payments

Fiji is an open economy dependent on international trade. This dependence on trade results from the limited resource base and small size of the domestic market.

Imports account for more than 40 per cent of GDP. Since 1971 imports have increased at an average growth rate of about 17 per cent per annum, despite an increase of only 0.75 in 1975 (Table 3.10). Food, mineral

TABLE 3.10
VALUE AND COMPOSITION OF IMPORTS 1971-1977
(\$F'000 c.i.f.)

SITC(a) SECTIONS	1971	1972	1973	1974	1975	1976	1977(p)
Food	20643	25013	33909	41302	38504	43330	53819
Beverages and Tobacco	2364	2240	2961	2943	2988	3286	4532
Crude Materials	1335	1924	2563	3341	1920	1783	2394
Mineral Fuels	11690	13068	15619	34490	38508	38205	54133
Oils and Fats	1599	1601	2408	3582	3604	3406	4203
Chemicals	6433	7684	10787	14641	16660	14639	20201
Manufactured Goods	21017	22857	32048	44812	39612	42728	51061
Machinery	24722	32671	41150	35220	44734	49421	51368
Miscellaneous Articles	17674	18549	25691	33890	28155	33009	30919
Miscellaneous Transactions	4073	5942	7508	5110	6282	8233	8330
Total	111550	131549	174645	219331	220967	238040	280960

Notes: (p) Provisional

(a) Standard Industrial Trade Classification

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, Table 39.

fuels, manufactured goods and machinery are the major import components. Among the food imports beef has risen significantly from \$F433,000 in 1971 to \$F2,831,000 in 1977 an average increase of 40 per cent per annum (Fiji, Bureau of Statistics, 1978, Table 40). There is also a high proportion of capital and intermediate goods imported reflecting a high import content of investment in Fiji.

Exports contrast with imports. Exports represent about 26 per cent of GDP. The total value of exports grew at a similar rate of 17 per cent in 1971-75 but was subject to severe fluctuations. Sugar is the major export commodity accounting for 76 per cent of domestic product exports in

1976 (Table 3.11) and is the primary cause of the fluctuations in the value of exports. The re-export trade, mainly petroleum, fish and textiles, increased at an average rate of 22 per cent per annum in the period 1971-77.

TABLE 3.11
VALUE AND COMPOSITION OF EXPORTS 1971-1977
(\$F'000 f.o.b.)

Commodity Group	1971	1972	1973	1974	1975	1976	1977 (p)
Sugar	32851	34423	34280	66952	94717	67704	93574
Coconut Products	4175	2631	6149	11091	5370	4835	9329
Gold	2678	3979	6125	8621	8584	7250	4936
Other	9151	10752	5819	8705	7277	9651	15209
Total Domestic Products	48855	51785	52373	95369	115948	89440	123048
Re-exports	12865	13797	22053	28371	26345	33083	39774
Total Exports	61720	65582	74426	123740	142293	122523	162822

Note: (p) Provisional

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, Tables 41 and 47.

The balance of payments account for Fiji are shown in Table 3.12. The balance of trade deficit has been increasing whereas the services account shows a substantial surplus. Overall, the balance of payments has added to foreign reserves due to the sustained but fluctuating capital inflows.

3.4 The Role of the Government

The private sector, with its high level of foreign participation has traditionally dominated the Fiji economy. Since independence in 1970 the government has increased its role in the development of the country through increased participation in economic activities and through the instrument of development planning.

TABLE 3.12
BALANCE OF PAYMENTS FOR FIJI 1974-1977
(\$F millions)

	1974	1975	1976	1977
Exports (f.o.b.)	123.8	142.2	122.5	144.3
Imports (f.o.b.)	188.8	190.3	203.1	241.0
Balance of Trade	<u>-65.0</u>	<u>-48.1</u>	<u>-80.6</u>	<u>-96.7</u>
Services (net)	48.8	54.3	45.2	63.2
Balance on Goods and Services	<u>-16.2</u>	<u>6.2</u>	<u>-35.4</u>	<u>-33.4</u>
Transfers: Government	3.2	3.7	3.0	2.7
Private	-1.8	-4.1	-1.3	-3.6
Net	1.3	-0.4	1.7	-0.9
Current Account Balance	<u>-14.9</u>	<u>5.8</u>	<u>-33.7</u>	<u>-34.3</u>
Non monetary Capital: Government	5.7	8.1	11.1	18.4
Private	31.9	12.6	0.4	8.0
Capital Account Balance	<u>37.6</u>	<u>20.7</u>	<u>11.5</u>	<u>26.4</u>
Other Items	7.3	9.1	-7.8	16.7
Overall Balance (= Foreign Reserves)	<u>30.0</u>	<u>35.6</u>	<u>-24.2(a)</u>	<u>15.2</u>

Note: (a) Deficit due mainly to decline in sugar receipts.

Source: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October), Table 36.

3.4.1 Government Intervention

The private sector¹ controls almost all the productive activities and the Government supports the private sector through the development of public utilities and infrastructure. Therefore, private investment has traditionally exceeded public sector investment but as previously mentioned this situation has been reversed. This increased importance of public investment is indicative of the Governments increasing role in the economy.

1 The private sector includes the industrial sector, commerce, banking, services industries and to a large extent primary education (Asian Development Bank, 1978, p.12).

The Government has directly intervened in the private sector and in the operations of the market economy. Following is a summary of some pertinent evidence illustrating this tendency for increased Government participation. From April 1973 until March 1975 the Government introduced price and income controls and the price controls still exist for twelve basic consumer items, rent and inter-island freight rates. Comprehensive foreign exchange controls are also in existence. The sugar industry, the single most important employment and foreign exchange earner, has been taken over by the Government controlled Fiji Sugar Corporation Ltd. The marketing of sugar exports is controlled by the Government owned Fiji Sugar Marketing Company.¹ Recently, the Government took over the operations of a mining company following industrial unrest (Asian Development Bank, 1978, p.20). The National Bank of Fiji is the only government owned bank of eight commercial banks in Fiji, the remainder being branches of overseas banking organisations.

The Government provides subsidies on agricultural inputs for non sugarcane farmers and subsidises interest rates at 4%-6% for agricultural credit.² Income tax concessions, accelerated depreciation allowances and tariff concessions on plant, equipment and raw materials are offered as incentives to promote industrial development. The Government also provides extended protection to some industries.

Market activity is also regulated by the Government mainly through tariffs, which were recently reduced, and also by excise taxes. A guaranteed minimum price on copra production was introduced in 1975 (Fiji, Central Planning Office, 1975, p.2).

1 Sugarcane production is mainly undertaken by Indian farmers and some Fijians. Only 1.5 per cent of the cane area is farmed on an estate basis (World Bank, 1977, p.12).

2 The normal bank lending rate of interest is 10 per cent.

The result of the governments increased participation has been increasing deficits not only in the capital budget, which has traditionally required loan finance, but also in the operating budget. This operating budget deficit has severe implications for the recurrent financing of public investment projects.

3.4.2 Development Planning

Development plans commenced in Fiji in 1951 with the First Five Year Plan. The Government uses development planning as an instrument for economic development. These development plans have become increasingly more sophisticated with the most recent, Fiji's Seventh Development Plan 1976-1980 (Fiji, Central Planning Office, 1975), formulated within an input-output model framework.

Development plans provide a useful framework for the cost benefit analysis of investment projects in providing an indication or prescription of the expected, or at least, planned developments in the economy. The remainder of this section discusses development planning in Fiji and presents the major features of the current Seventh Development Plan relevant to cost benefit appraisal and investment decision making.

In the absence of precise information it appears that development planning in Fiji is based on a 'top-down' approach. Once the macro-economic objectives and strategies are defined, projects are selected on the basis of their relative contribution to those goals. As an illustration of this procedure the Fiji Government in seeking and accepting foreign aid requires 'that every aid project should be relevant to overall development objectives, as laid down in the country's development plans' (Fiji, Central Planning Office, 1975, p.237).

The paucity of skilled manpower in Government Ministries requires the frequent use of foreign resources to assist in the identification,

formulation, appraisal, implementation, evaluation etc. of development projects. Consequently, the decision-making in regard to investment projects is subject to considerable foreign interests which may not necessarily comply with the Governments interests. The actual appraisal of projects by various donor agencies means the use of various methods which makes it difficult to select priority projects.

Development projects are often identified on an *ad hoc* basis.

Fiji's Seventh Development Plan (DP7) recognises the importance of the private sector and the need for the Government to facilitate its growth, but it is generally limited to public sector development activities. Because of the assumptions and uncertainty of the variables and parameters in planning, the development plans for Fiji are 'indicative' rather than prescriptive plans. Nevertheless, they provide a guide as to how socio-economic development is expected to proceed and also a guide to the Government's objectives and proposed means, through its capital expenditure programme, by which it aims to achieve them.

In the Seventh Development Plan the Governments objectives are broadly two: a growth rate of GDP of 7.3 per cent per annum; and a greater emphasis than previously 'on the broader and fundamental objectives of social and economic development' (Fiji, Central Planning Office, 1975, p.5). Simply, the government aims to distribute the benefits of growth more equitably while ensuring that growth is not substantially adversely affected.

The income distribution objective is to be achieved through a comprehensive system of regional planning primarily involving the decentralisation of economic activity to the rural areas, 'to enhance opportunities material living standards and the social and cultural amenities of the rural areas' (*Ibid*,). More emphasis than previously was placed on rural development programmes, which commenced in 1969. The main beneficiaries of

these policies will be the rural population in general and the Fijian population in particular.

The Government aims also to reduce unemployment and maintain a higher employment/labour force ratio through a continued higher rate of investment.

High priority is given to the agricultural sector to achieve both the growth and income distribution objectives. Agriculture is seen as the major means of increasing foreign exchange earnings, of reducing the growth of imports through import substitution activities, as a source of employment opportunities, and of reducing income inequalities by increasing farmers income mainly Fijian subsistence farmers, through increased commercialisation of farming including commercial forestry and fishing. Table 3.13 shows the Governments proposed capital expenditure programme for the plan period 1976-80. The high priority given to agriculture, rural development and infrastructure is clearly evident by a comparison with the Governments capital expenditure programme in Table 3.8. The government is investing resources in projects for the purpose of redistribution of income: 'Government resources will then be channelled to a greater extent in the Seventh Plan period to those areas which do not necessarily show the greatest growth potential' (*Ibid*, p.10).

Although the Seventh Plan has emphasised the importance of the income distribution objective the Government remains strongly growth oriented for it is stated:

'Continued growth is required to provide the resources for achieving more widespread participation in and enjoyment of the fruits of economic activity, policies will continue to be growth oriented for this reason' (*Ibid*, p.7).

This statement is supported by the Governments aim to finance an increasing proportion of both private and public investment requirements from domestic

TABLE 3.13
GOVERNMENT CAPITAL EXPENDITURE PROGRAMME 1976-1980
(\$F million)

	Value	Proportion (%)
Administrative Services	<u>29.55</u>	<u>8.6</u>
Economic Services	<u>60.30</u>	<u>17.6</u>
Agriculture	52.91	15.4
Other	7.39	2.2
Social Services	<u>49.38</u>	<u>14.4</u>
Education	17.78	5.2
Health	14.11	4.1
Housing	16.30	4.8
Other	1.19	0.3
Infrastructure	<u>174.98</u>	<u>51.1</u>
Electricity	59.80	17.5
Water/Sewerage	48.98	14.3
Communications	19.46	5.7
Transport	42.40	12.4
Other	4.34	1.3
Rural Development	<u>24.61</u>	<u>7.2</u>
Miscellaneous	<u>3.77</u>	<u>1.1</u>
Total	<u>342.50</u>	<u>100.0</u>

Source: Fiji, Central Planning Office, 1975.

savings and reduce the dependence on overseas capital. This planned increase in savings means that the benefits from growth will accrue in the form of communal consumption so that private (individual) consumption is consequently planned to increase at a reduced rate. Thus, a considerable amount of current consumption expenditure is to be directed toward investment.

The Yalavou rural development project is seen as contributing directly to the Governments objectives of: ameliorating the growing divergence of income and wealth between the rural and urban sectors;

encouraging the development of Fijian land; increasing Fijian participation in the commercial sector; attempting to ensure that social development keeps in step with the increase in national income; and the saving of foreign exchange through the creation of import substituting enterprises.¹ Thus, the Yalavou Project is expected to make a significant contribution to the achievement of the Governments objectives of increasing growth and improving income distribution.

This chapter has presented a summary of the major macro-economic features of Fiji and the objectives of the Government in pursuing development. Investments activities undertaken in Fiji must be appraised by cost benefit methods incorporating these features of the Fiji economy. The following chapters apply and assess the methodology within the context of the Fijian economy.

1 The project cannot be justified on employment grounds because only about 50 new jobs are expected to be created.

CHAPTER 4

ESTIMATION OF NATIONAL PARAMETERS FOR FIJI

Ideally, the national economic and social parameters for Fiji should be estimated and used by the Central Planning Office in project and national planning. This would ensure the application of consistent parameter estimates to all projects.¹ The national parameters are estimated below because Fiji like many developing countries does not explicitly estimate them.² The national parameters are estimated in accordance with the general approach of the Squire and van der Tak methodology presented in Chapter 2 and other case studies employing the same methodology, mainly Bruce (1976), Linn (1977) and Bruce and Kimaro (1978).³

The estimation of these parameters is based on data up to and including 1975 to coincide with the timing of the feasibility report on the Yalavou Project to be analysed in Chapter 6.

4.1 Economic (Efficiency) Pricing Parameters

4.1.1 Valuation of Traded Goods: Border Prices

Fiji is a small trading nation with no influence over the prices of exports and imports. That is, the elasticity of supply and demand of

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- 1 It may be necessary to make some allowance for regional differences.
 - 2 The project specific parameters such as income (consumption) distribution weights and economic and social wage rates are estimated in Chapter 6.
 - 3 It should be noted that this is a theoretical desk study. The estimation of the national parameters is somewhat crude due to the paucity of data readily available. Specifically, the paucity and inadequacy of national data created problems in attempting to calculate specific conversion factors and the marginal productivity of capital. More time and exposure to more detailed national data in Fiji would considerably improve the parameter estimates.

Fiji's imports and exports are infinitely elastic.¹ Therefore, all imported and import substitute (exported) commodities are valued at the c.i.f. (f.o.b.) border price plus (minus) the marketing margin revalued at the appropriate accounting price. This valuation procedure is also used to price the traded component of non-traded commodities.

4.1.2 Valuation of Non-Traded Goods: Conversion Factors

Ideally, conversion factors for each major non-traded good, such as transport, construction, electricity, as well as for consumer and producer goods etc., should be separately estimated to translate domestic prices into border prices or foreign exchange equivalent values. The *Standard Conversion Factor* (SCF) should only be used to revalue minor non-traded commodities.

Specific conversion factors could not be estimated. The necessary information on the breakdown of imports and exports into producer and consumer goods, the composition of the electricity, transport and construction sectors and their respective tariff rates was not readily available.² Nevertheless, in the absence of detailed information it seems reasonable to assume a value of unity for the *Consumption Conversion Factor* (β_c). Fiji

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- 1 A possible exception is in inter-island trade, where Fiji is the largest trader, accounting for about 47% of inter-island trade (excluding Papua-New Guinea) in 1975 (South Pacific Commission, 1978, Table 6). However, inter-island trade only represents approximately 5.5% of Fiji's trade (South Pacific Commission, 1978, Table 6 and Fiji, Bureau of Statistics, 1978, *Current Economic Statistics* (October), Tables 38 and 39).
 - 2 An input-output table for Fiji for 1972 was available to establish the composition of the non-traded sectors. Because of the level of aggregation it was difficult to identify and value the traded components of the non-traded goods sector. The information required for estimating these conversion factors would probably be available in Fiji. However, an attempt to obtain the information was not successful in the time available for this study.

is dependent upon imports for most of its consumer goods. Import duties on most consumer goods, particularly essential goods such as food which would comprise a large proportion of consumer expenditure, are very low or non existent.

Because specific conversion factors could not be estimated it was necessary to use the Standard Conversion Factor (SCF) to express non-traded commodities into their border price equivalents. The SCF is an average conversion factor expressing an average relationship between domestic and world prices.

The SCF should be calculated as a weighted average of specific conversion factors, the weight being the proportion of marginal expenditure devoted to each commodity (SVT, 1975, p.128). In the case where this information is not available an alternative formula for the SCF based on the average rate of import duty and export tax has been recommended and used (SVT, 1975; Bruce, 1976; Linn, 1977; Bruce and Kimaro, 1978; and Weiss, 1978b). The formula is:¹

$$SCF = \alpha = \frac{M + X}{(M + T_m) + (X - T_x)} \quad (4.1)$$

where α = Standard Conversion Factor;

M = c.i.f. value of visible imports;

1 If information on the average tax rates for imports and exports was available then this formula would be:

$$\alpha = \frac{M + X}{M(1 + t_m) + X(1 - t_x)}$$

where t_m = the weighted average tax on imports; and

t_x = the weighted average tax and subsidies on exports.

Thus, equation (4.1) implicitly assumes that the value of trade tax receipts is similar to the value derived from tax rates.

X = f.o.b. value of visible exports;

T_m = value of total import duties; and,

T_x = value of total export taxes minus export subsidies.

This equation has several inherent assumptions. These assumptions are:

- a. Export demand and import supply are infinitely elastic;
- b. marginal changes in expenditure on non-tradables can be neglected. This assumption is satisfied if the proportion of marginal expenditure on non-tradables is small, or if the ratio of accounting price to domestic price for non-tradables is approximated by the SCF;
- c. all income expenditure elasticities are unity; and
- d. the relative size of the average (or marginal) propensities to spend on importables and exportables are approximated by the relative size of imports and exports respectively.

For Fiji, assumption a. is reasonable because of the small size of the country in terms of trade, Fiji cannot influence the price of imports and exports. The remaining assumptions are necessary simplifying assumptions. They probably will not significantly affect the results of this study.

Because Fiji is only a marginal consumer of its own export commodities¹ and assuming income elasticities for import commodities to be

1 In 1975, 98 per cent of the production of sugar, coconut oil and gold (representing nearly 94 per cent of total exports) was exported (Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, pp.21, 50 and 54).

unity,¹ equation 4.1 can be simplified to:

$$SCF = \alpha = \frac{M}{M + T_m} \quad (4.2)$$

Like Fiji, the Ivory Coast has a low diversified export structure and specialises in primary products, the majority of which, are exported. Linn (1977, p.21) has demonstrated for the Ivory Coast that equation (4.2) is more accurate than equation (4.1) for estimating conversion factors, in that the former equation provides a closer estimate to that obtained using income elasticities and average propensities to spend on both importables and exportables. Equation (4.2) is used to estimate the SCF (α) for Fiji.

Table 4.1 presents the data and computation of the SCF for the period 1971-75.² Both export subsidies and quantitative trade restrictions are non existent in Fiji.³ There appears to be a fairly constant trend in the SCF giving an average value of 0.87 using equation 4.2.⁴ This value could diverge from the true value because the calculation was not based on the weights of specific conversion factors.⁵

For this study the SCF of 0.87 is used primarily to revalue non-traded commodities in terms of world prices. The Consumption Conversion

- 1 This is a reasonable assumption given that 'a high proportion of domestic demand is met by imports' (Fiji, Central Planning Office, 1975, p.38).
- 2 All estimates of the national parameters are for the period 1970-75. A five year period is a sufficient time series for estimating average values. The year 1975 is taken as the cut-off year because this represents the final year for which data would have been available if a social analysis had been conducted at the time of the feasibility study of the Yalavou Project which was completed in 1976.
- 3 The effect of substantial quantitative trade restrictions would lower the value of the SCF.
- 4 For comparison, an estimate of 0.92 for the SCF was obtained using equation 4.1. This higher value indicates the insignificance of export taxes.
- 5 The accuracy of this estimate cannot be verified and therefore it is assumed to reflect the true value for the purpose of this study. In the absence of reliable import and import tax projections the SCF is assumed to remain constant in the future.

TABLE 4.1
DATA AND COMPUTATION OF STANDARD CONVERSION FACTOR
(\$F'000)

	1971	1972	1973	1974	1975	Average 1971-75
Total Imports (M) (a)	111550	131549	174645	219331	220967	171608
Total Exports (X) (a)	61720	65582	74426	123740	142293	93552
Total Imports plus Exports (M+X)	173270	197131	249071	343071	363260	265161
Total Import Duty (T_m) (b)	19049	20910	26248	26324	29887	24484
Total Export Duty (T_x) (c)	769	780	741	1567	2181	1208
Total Import Less Export Duty ($T_m - T_x$)	18280	20130	25507	24757	27706	23276
Standard Conversion Factor (Eqn 4.2)	0.854	0.863	0.869	0.893	0.881	0.872
Standard Conversion Factor (Eqn 4.1)	0.905	0.907	0.907	0.933	0.929	0.916

Notes: (a) Total imports and total exports include unretained imports, re-exports, respectively, because information on refunds and drawbacks was not readily available.
(b) Excludes excise duties due to non-availability of data.
(c) Export subsidies do not exist.

Sources: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October), Tables 21, 39 and 47.
Fiji, Ministry of Finance, *Operating Budget Estimates*, various years.

Factor (β), assumed to be unity, is used mainly in the estimation of other national as well as project specific parameters.

The SCF is the inverse of the Shadow Exchange Rate (SER). It has been shown that the use of the SCF to value all non-traded goods to world prices with traded goods, as in this study, is equivalent to using the SER to revalue all traded goods to domestic prices with non-traded goods (Weiss, 1978b).

4.1.3 Economic Accounting Rate of Interest (EARI)

The *economic accounting rate of interest* (EARI) is the *marginal*

productivity (opportunity cost) of capital, q , measured at border prices by multiplying by the standard conversion factor (SCF), α (see equation 2.5).

The marginal productivity of capital, q , is, in principle, the rate of return on the marginal project in the economy. Different methods have been used to estimate q directly. One method is a macro approach. This procedure uses national income data to compute the incremental output-capital ratio (IOCR) and subtracts the product of the incremental employment capital ratio (IECR) and the marginal productivity of labour. An attempt to use this approach produced unrealistic estimates for both IECR and IOCR which resulted in an infeasible estimate of q .¹ This result supports the opinion that this approach produces unsatisfactory results (SVT, 1975, p.110; Linn, 1977, p.30). Micro estimates of q based on direct estimates of industry profits (or returns) have also been used (Linn, 1977, p.28). Industry profit data was not available for Fiji for this approach to be adopted. Thus, any direct estimation of q for Fiji was impossible.

To obtain an estimate of q for Fiji the common procedure of taking an average of the rates of return on other projects was adopted (see SVT, 1975, p.112; Bruce, 1976, p.38; and Linn, 1977, p.29).² Only one project was available and provided an economic internal rate of return of 13-20 per cent (World Bank, 1976). After allowance for the possible overestimation and consideration of the World Bank range for the opportunity cost of capital, 10-12 per cent (Linn, 1977, p.30) a central value of 12.5 per cent for q was adopted. For sensitivity analysis the values of 10.0 per cent and 15.0 per cent were selected. Table 4.2 shows the range of values for both q and the EARI.

1 An alternative macro approach is to use an aggregate production function (Yang, 1977, pp.14-5). The data available was insufficient to use this approach.

2 Bruce considers this method to be simple but 'probably the most practical way' to estimate q .

TABLE 4.2
ALTERNATIVE VALUES FOR THE MARGINAL PRODUCTIVITY
OF CAPITAL (q) AND ECONOMIC ACCOUNTING RATE
OF INTEREST (EARI)
(percent)

q	10.0	12.5	15.0
EARI=q [*] (a)	8.7	10.9	13.1

Note: (a) $EARI = q \cdot \alpha = q^*$

where $\alpha = 0.87$

4.2 Social (Distribution) Pricing Parameters

4.2.1 Elasticity of Marginal Utility (n)

Various methods have been used to directly estimate the *elasticity of marginal utility* (n) empirically. Models based on both consumer and government behaviour have been utilised.

The consumer behaviour models have included the linear expenditure demand systems of Fisher and Frisch (Fellner, 1967; Lal, 1972b cited in Lal, 1977; and Brown and Deaton, 1972), the von Neumann-Morgenstern framework of the individual attitude to risk and savings models (Stern, 1977).¹

The estimates of n on the basis of government behaviour have largely utilised marginal tax schedules (Mera, 1969; Stern, 1977). Weisbrod (1966) has proposed that values for n can be deduced implicitly from the pattern of government expenditure.

Empirical estimation of n for Fiji was precluded because of the paucity of data. The approach adopted is to derive estimates of n on the

¹ In the savings model n is the elasticity of marginal utility with respect to consumption and in both the linear expenditure and von Neumann-Morgenstern models n is estimated with respect to income.

basis of the recommended range of probable values suggested and used in other studies and on the basis of the Fijian Government's 'revealed preferences' concerning its objectives and policies as stated in the Seventh Development Plan 1976-80.

Little and Mirrlees (1974, p.240) believe n to be in the range 1.0 to 3.0 while both SVT (1975, p.63) and Bruce (1976, p.32) adopt a more conservative range of 0.5 to 1.5. SVT (1975, p.103) suggest that n should be set equal to its most probable value of unity and sensitivity analysis be conducted for values up to 1.5, for countries showing an obvious interest in the redistribution of income, and values down to 0.5 for countries indicating no real interest in redistribution.

The unequivocal estimation of a governments perceived value judgements concerning the intra- and inter-temporal distribution of income (consumption) is very difficult. The Government's declared and actual objectives and policies are often ambiguous because of the constraints under which the government must operate in implementing its various policy instruments. Nevertheless, despite the limitations there is no practical alternative to this qualitative approach.

In Section 3.4.2 the important features of Fiji's Seventh Development Plan 1976-80 were considered. Summarising, it was evident that the Fijian Government is concerned with a more equitable distribution of income particularly between rural and urban areas. However, despite the declared emphasis on improving income equality the Government is also ensuring that growth of the economy is not adversely affected. The importance of the growth objective is evident in the government's plan to finance increased investment largely from a reduction in the growth rate of domestic consumption expenditure.

On the basis of the preceding evidence it is reasonable to expect the value of n to be in the range 0.5 to 1.0. The government's dual commitment to both growth and equity objectives is reflected in the higher value of 1.0. The lower value of 0.5 allows for the possibility that the apparent balance between the two objectives may not be maintained, given the continued emphasis on growth. The value of 1.0 is adopted as the most probable value for n and the value of 0.5 is adopted as a minimum value and used mainly for sensitivity analysis.¹

4.2.2 Rate of Pure Time Preference (ρ)

The measurement of the *rate of pure time preference* (ρ) raises considerable difficulties. Consideration of these problems is beyond the scope of this study but they have been extensively examined in the literature (Layard, 1972).

SVT suggest that ρ should be determined simultaneously with n because of their relation to the *consumption rate of interest* (see Section 4.2.3). The probable range of values for ρ is between zero and 5.0 per cent (SVT, 1975, p.110).

Given the Fijian Government's balanced commitment to both growth and income distribution a reasonable probable value for ρ is 3.0 per cent. Mainly for sensitivity analysis, values for ρ of 2.0 and 3.0 per cent are also adopted.²

1 Values of n for other countries based on similar qualitative judgements are: 0.5 and 1.0 for Thailand (Bruce, 1976; Bruce and Kimaro, 1978); 1.0, 1.5 and 2.0 for Malaysia; 0.5, 1.0 and 1.5 for the Philippines (Bruce, 1976); and 0.5 and 1.0 for the Ivory Coast (Linn, 1977).

2 Bruce used a similar range of values in calculating estimates for the consumption rate of interest in Malaysia and Thailand (1976). An alternative to valuing ρ directly would be as a residual of the consumption rate of interest (Linn, 1977, p.32).

4.2.3 Consumption Rate of Interest (CRI, or i)

The *consumption rate of interest* (CRI or i) measures the rate at which the social value of consumption falls over time and is expressed as:

$$\text{CRI} = i = ng + \rho \quad (4.3)$$

where g = the growth rate of per capita consumption;

and the other variables have been previously defined.

Values for n and ρ have been determined. Both historical data and projections for 1976-80 in the Seventh Development Plan determine the estimate for g .

Historical data for 1971-75 show a substantial variability in the yearly values for g (Table 4.3). The average annual growth rate of 10.6 per cent is unrealistic.

Projected figures for 1976-80 provide an estimate for g of 4.5 per cent (Fiji, Central Planning Office, 1975, p.15). This lower value is a more realistic estimate of g and is used in deriving an estimate of the *consumption rate of interest* (CRI or i).

Table 4.4 presents a range of estimates for the CRI using the estimates selected for both ρ and n .

The values of CRI based on the probable value of ρ equal to 3.0 appear to provide plausible values in view of the governments objectives. The value of 7.5 indicates the Governments current concern for present consumption whereas the lower value of 5.25 reflects the Governments growth objective.¹

¹ Values between 5 per cent, for a growth conscious country and 10 per cent for a country more concerned with current consumption, is considered to be a reasonable range for the CRI. Values outside this range are possible but would be exceptional (SVT, 1975, p.110).

TABLE 4.3
GROWTH IN REAL PER CAPITA CONSUMPTION: 1971-1975
(\$F'000)

	1971	1972	1973	1974	1975	Average 1971-75
Private Consumption	147300	180500	261300	334400	382500	261200
Public Consumption	30700	37900	42400	54000	67500	46500
Total Consumption	178000	218400	303700	388400	450000	307700
Population ('000) (a)	533	544	556	565	576	555
Per Capita Consumption (\$F)	334	401	546	687	781	550
Index of Prices (b)	100.0	109.2	121.4	138.9	157.1	-
Real Per Capita Consumption (\$F)	334	367	450	495	497	-
Change in Real Per Capita Consumption (\$F)	33	83	45	2		
Growth in Real Per Capita Consumption (g,%)	9.9	22.6	10.0	0.004		10.6

Notes: (a) Mid year estimates.

(b) Derived from splicing two series 1968=100 and 1974=100.

Sources: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October) Tables 1, 5 and 51.

Fiji, Bureau of Statistics, 1975, *Current Economic Statistics*, (January) Table 51.

TABLE 4.4
ESTIMATED VALUES FOR CONSUMPTION
RATE OF INTEREST (i) (a)
(per cent)

	$\rho = 2.0\%$	$\rho = 3.0\%$	$\rho = 4.0\%$
$n = 0.5$	4.25	5.25	6.25
$n = 1.0$	6.5	7.5	8.5

Note: (a) $CRI = i = ng + \rho$

where $g = 4.5$ per cent.

For this study two combinations of value judgements are adopted for further consideration. These two cases are:

Case 1: CRI = 5.25 per cent, $n = 0.5$ and $\rho = 3.0$ per cent.

Case 2: CRI = 7.5 per cent, $n = 1.0$ and $\rho = 3.0$ per cent.

Given the preceding evidence, Case 2 is probably more representative of the Fiji Government's current value judgements. However, Case 1 is also used in this study primarily to provide a test of the sensitivity of variations in the value judgement parameters.

4.2.4 Income (Consumption) Distribution Weights (d, D)

Information on income distribution in Fiji is very scarce and may not be indicative of the extent of inequality present. As previously mentioned, the major income distributional problems relate to the regional distribution particularly between rural and urban areas and also between the agricultural and non-agricultural sectors (Section 3.3.1). An urban household survey in 1972 provided an estimate of inequality, measured by the Gini Coefficient, of 0.19 (Fiji, Bureau of Statistics, 1972).¹ No comparable estimate is available for the rural areas. However, a study of the outer island of Taveuni provided estimates of the Gini Coefficient of 0.436 and 0.326 for cash income and total income, respectively (Nankivell, 1978). These studies give some support to the possible extent of inequality and to the value of the Gini Coefficient of 0.45 assumed for planning purposes.

Reasonable estimates of the *income (consumption) distribution weight*, d , for the whole of Fiji requires data on the average per capita income (consumption) levels for population percentile groups. Such

¹ Only 397 households in the seven major urban centres were surveyed. The urban centres were Suva, Nausoi, Nadi, Labasa, Sigatoka, Ba and Lautoka.

information is not available for Fiji other than in the studies referred to above. This information is required for the estimation of the marginal income (consumption) distribution weights. However, in this study the Yalavou Project will give rise to *non-marginal* changes in per capita income (consumption) and therefore, d has to be estimated in the specific project context. The estimate of d is presented in Section 5.3.1.

In general, a summary distribution measure, D , is estimated for application to minor or non-attributable benefits. Adopting a value of 0.45 for the Gini coefficient and substituting in equation (3.23), D is estimated to be 0.89 for n equal to 0.5 and 1.0 for n equal to 1.0.

4.2.5 Value of Public Income (v)

In deriving an estimate of the *value of public income*, v , it is assumed that public consumption expenditure and public investment are equally more valuable than private consumption. This assumption is justified for Fiji because a large proportion of current expenditure is directed into social services and infrastructure which benefit the society as a whole. It is further assumed that private savings/investment is as valuable as public investment and expenditure. In Fiji both private and public saving/investment are crucial to the achievement of economic growth.

Two equations are used to estimate v and the plausibility of the results are checked against estimates of the *critical consumption level*, (CCL) the level at which both private consumption and public income are valued equally by the government.

The assumption that all public income is equally valuable and that private savings are as valuable as public investment, means the return from the public investment q^* is partly reinvested, s , and partly, $1-s$, assigned to private sector consumption either directly, through factor payments, or

indirectly, through public current expenditure. That is, s is a measure of the propensity of the public sector to reinvest out of q^* and $1-s$ is that proportion of q^* which is consumed in the private sector by a person at the average consumption level.

An estimate of $1-s$ can be approximated by measuring the value of the private sector's marginal propensity to consume out of total gross domestic product (GDP) (SVT, 1975; Bruce, 1976; and Linn, 1977). This approach assumes that both private and public investment have the same affect on private consumption. Therefore, $1-s$ can be measured by the ratio of the increase in private sector consumption to the increase in GDP, both variables being valued at constant border prices.¹

Historical data for the period 1971-75 shows that private consumption as a proportion of GDP has been relatively stable between 68-77 per cent (Table 4.5). In contrast, the private marginal propensity to consume has fluctuated widely giving an average of 0.66. Because the marginal propensity to consume does not vary in the short-run, at least in theory, this average value of 0.66 is accepted. The current 1976-80 Development Plan provided an estimate of 0.49 for the marginal propensity to consume reflecting the planned financing of investment out of private consumption (Fiji, Central Planning Office, 1975, p.15).

For this study an approximate intermediate value of 0.6 for the private marginal propensity to consume is adopted as a representative value. This implies a value of 0.4 for s . Thus, this value of 0.4 for s means that of the returns to public sector investment 40 per cent will be used for future investment or on expenditure for social services and infrastructure.

1 In this approach no allowance is made for fiscal policy changes but any effects may be smoothed out by adopting a five year average.

TABLE 4.5
PRIVATE SECTOR MARGINAL PROPENSITY TO CONSUME, 1971-1975
(\$F million)

	1971	1972	1973	1974	1975	Average 1971-75
Private Consumption (1971 prices)	147.3	165.3	215.2	240.7	243.5	
Gross Domestic Product (1971 prices)	211.9	239.3	278.7	324.0	358.0	
Change in Real Private Consumption	18.0	49.9	25.5	2.8		24.1
Change in Real Gross Domestic Product	27.4	39.4	45.3	34.0		36.5
Private Marginal Propensity to Consume (1-s)	0.66	1.27	0.56	0.08		0.66

Sources: Fiji, Bureau of Statistics, 1978, *Current Economic Statistics*, (October), Tables 5, 6 and 51.
Fiji, Bureau of Statistics, 1975, *Current Economic Statistics*, (January), Table 51.

Because of the Governments continued emphasis on future relative to present consumption, the growth objective, this proportion s will be given a higher weighting than the proportion $1-s$.

Assuming that 40 per cent of returns are reinvested, that is, s equals 0.4, an estimate of v can be computed from the following equation:

$$v = \left[\frac{q^* - sq^*}{i - sq^*} \right] / \beta \quad (4.4)$$

where β = consumption conversion factor of unity.

Table 4.6 presents the estimates of v for a range of values for both i and q^* .

The estimated values of v vary substantially with v being unrealistic for low values of i and high values of q^* implying a negligible value for consumption relative to public income. Selecting the most probable value of q^* equal to 10.9 per cent, and $i = 5.25$ per cent, indicates that public

TABLE 4.6

VALUE OF PUBLIC INCOME (INVESTMENT) WITH REINVESTMENT

	i = 5.25%	i = 7.5%
$q^* = 8.9\%$	2.95	1.30
$q^* = 10.9\%$	7.35	2.08
$q^* = 13.1\%$	78.6	3.48

income is valued 635 per cent higher than the value of consumption of a person at the average level of consumption ($\bar{c}$). More plausible results are derived for lower values of q^* and higher values of i . For q^* equal to 8.7 per cent and i equal to 7.5 per cent the premium on public income is only 30 per cent. Even a premium of 108 per cent for q^* equal to 10.9 per cent and i equal to 7.5 per cent are still plausible.

The estimates of v based on equation 4.4 may be biased upwards because of the assumed constancy of the parameters and the assumption that public investment and consumption are equally valuable. Specifically, it may be reasonable to expect that the divergence between q^* and i will decrease over time and therefore reduce the value of current investment (SVT, 1975, p.105). In addition, the Fijian Government cannot obtain all the public investment required as evidenced by its policy to increase public sector investment and also by its aims to increase domestic savings in the 1976-80 plan period, of which the government provides the major component. Therefore, the real value of public income could be below the value estimated by equation 4.4.

To provide an alternative and minimum estimate of v the following formula is used, which implies that there is no reinvestment, that is, s is

equal to zero. (SVT, 1975, p.106; Linn, 1977, p.37; Weiss, 1978(a)). This simplified formula is:

$$v = \left[\frac{q^*}{i} \right] / \beta \quad (4.5)$$

The estimated values for v for a range of values of both q^* and i are given in Table 4.7.

TABLE 4.7
VALUE OF PUBLIC INCOME (INVESTMENT)
WITHOUT REINVESTMENT

	$i = 5.25\%$	$i = 7.5\%$
$q^* = 8.7\%$	1.51	1.16
$q^* = 10.9\%$	2.08	1.45
$q^* = 13.1\%$	2.55	1.75

The estimates of v in Table 4.7 are more plausible than the estimates in Table 4.6. The premium on public income over average private consumption ranges from 16 per cent (for low q^* and high i) to 155 per cent (for high q^* and low i).

As a check on these estimated values of v , before adopting certain values for use in this study, their relation to the critical consumption level (CCL) is examined.

The CCL (c^*) is that level of consumption at which a marginal increase in consumption at domestic prices, is equal to a marginal increase in public income at border prices. That is, the CCL (c^*) is that level of

consumption at which $v = d/\beta$.¹

Implicit values for the CCL derived from the estimated values of v , for $s = 0.4$ (reinvestment) and $s = 0$ (no reinvestment) and for a probable value of $q^* = 10.9$ are shown in Table 4.8.

TABLE 4.8
CRITICAL CONSUMPTION LEVELS (c^*)
IMPLIED BY ALTERNATIVE VALUES OF v

	n (No.)	i (%)	v (No.)	c^* (%) (a)
No Reinvestment ($s = 0$)				
Case 1	0.5	5.25	2.08	115
Case 2	1.0	7.5	1.45	343
With Reinvestment ($s = 0.4$)				
Case 1	0.5	5.25	7.35	9
Case 2	1.0	7.5	2.08	239

Note: (a) $c^* = \bar{c} (v\beta)^{-1/n}$

where $\bar{c} = \$497$ (Table 4.3)

$\beta = 1.0$

Estimation of the CCL is generally based on such things as the level of income/consumption at which income tax is not payable or below which subsidies are payable (SVT, 1975; Yang, 1975; and Linn, 1977). However, in

1 Given that $d = (\bar{c}/c)^n$,
then for the CCL (c^*)
 $d = (\bar{c}/c^*)^n = v\beta$

or
 $c^* = \bar{c} (v\beta)^{-1/n}$.

See SVT (1975, p.107, f.n.12).

the case of Fiji, such evidence would not provide even a crude approximation to the CCL. Apart from the relatively large subsistence sector in Fiji the majority of farmers are not subject to income tax. Therefore an alternative measure of the CCL is required.

Subsistence farmers in Fiji represent the poorest group and their per capita income in 1975 was estimated to be \$F400 (World Bank, 1975, p.32). Assuming a marginal propensity to consume of 0.8 then subsistence per capita consumption is \$F320, approximately 64 per cent of the national average per capita consumption level. Bruce believes the CCL to be between 0.25 and 0.5 of the national per capita average (1976, p.27). As previously mentioned subsistence farmers in Fiji are regarded as enjoying a status of 'subsistence affluence'. On this basis, the CCL would probably be approximately 0.5 of the national average per capita consumption, that is, about \$F250. The CCL is probably in the range of \$F250-\$F320. Referring to Table 4.8 this range for the CCL falls between the values implied by the values of v of 1.45 and 2.08 computed from the two investment formulae above.

Since the CCL (c^*) is estimated to be 50-64 per cent of the average consumption level ($\bar{c}$) this means that an increase of \$F0.50 to \$F0.64 of consumption to a person at the CCL would have the same value to society as an increase of \$F1.00 to a person at the average consumption level. Alternatively, an increase of \$F1.00 to c^* would be 1.6 to 2.0 times more valuable than an increase of \$1.00 to $\bar{c}$.

Although a reliable estimate of the CCL could not be computed for Fiji the preceding evidence further supports the adoption of the parameter values in Case 2, viz. $n = 1.0$ and $i = 7.5$, as reflecting the Fijian

Governments current value judgements. Case 1, $n = 0.5$ and $i = 5.25$ represents a lower bound and implies a CCL that is not completely realistic and therefore the minimum value of v of 2.08 associated with Case 1 is adopted as an upper bound. The lower bound for v is taken to be 1.45.

The two sets of parameter values to be used in the remainder of this study are:¹

Case 1: $n = 0.5$, $i = 5.25$ per cent, $v = 2.08$.

Case 2: $n = 1.0$, $i = 7.5$ per cent, $v = 1.45$.

4.2.6 Social Accounting Rate of Interest (SARI)

The *social accounting rate of interest* (SARI) measures the fall in the value of an additional unit of government income over time and is computed from the formula:

$$\text{SARI} = sq^* + [(1-s)q^* / v] \quad (4.6)$$

Substituting in the values: $s = 0.4$, $q^* = 10.9$, the SARI is estimated for Case 1 and Case 2 and the results are given in Table 4.9.

TABLE 4.9

VALUES FOR THE SOCIAL ACCOUNTING RATE OF INTEREST

	v (No.)	SARI (%)
Case 1	2.08	7.50
Case 2	1.45	8.87

The SARI will exceed the EARI provided there is a premium on public income relative to the average consumption level. Although v could be

1 These values for v compare with values of v for the Ivory Coast, between 1.7 and 2.5 Linn (1977) and Thailand, between 1.35 and 2.19 (Bruce, 1976).

expected to decline as the Fiji economy grows and develops it is assumed to be constant and greater than unity so that the SARI will remain lower than the EARI.

Thus, the values for the SARI of 7.5 per cent and 8.87 per cent for Case 1 and Case 2, respectively, are adopted for the purposes of this study.

The complete set of national parameters estimated in this chapter and which will be applied to the analysis of the Yalavou Project in Chapter 6 are summarised in Table 4.10.

TABLE 4.10
SUMMARY OF NATIONAL PARAMETERS FOR FIJI

Parameter	Case 1	Case 2
Standard Conversion Factor (α)	0.87	0.87
Consumption Conversion Factor (β)	1.00	1.00
Economic Accounting Rate of Interest (q^* %)	10.9	10.9
Elasticity of Marginal Utility (n)	0.5	1.0
Consumption Rate of Interest (i %)	5.25	7.5
Rate of Pure Time Preference (ρ %)	3.0	3.0
Growth Rate of Per Capita Consumption (g %)	4.5	4.5
Summary Distribution Measure (D)	0.89	1.00
Marginal Propensity to Save (s)	0.4	0.4
Value of Public Income (v)	2.08	1.45
Social Accounting Rate of Interest (SARI %)	7.5	8.9

These parameter estimates are applicable to all projects and the Yalavou Project selected for this study is outlined in detail in the following chapter. Also the project specific parameters, the consumption distribution weights and economic wage rate are estimated.

CHAPTER 5

THE YALAVOU PROJECT AND THE ESTIMATION OF PROJECT SPECIFIC PARAMETERS

This chapter outlines the main features of the Yalavou Project and reports the estimated project specific parameters: the consumption distribution weights (d) and the economic wage rate, required for the social analysis of the project.

5.1 The Project¹

As previously mentioned the project is designed primarily to establish individual farms. Two separate areas are involved. Area I comprises 97,363 acres to be divided into 71 livestock and 5 crop farms occupying 46,765 acres. About 7,769 acres are to be used for watershed protection. A further 42,829 acres are not included in planned development, either because the land is densely timbered, intensively farmed or occupied by a village. Area II comprises 115,210 acres and although its full potential has not been fully evaluated 27 livestock farms will be located in this area.

5.1.1 Individual Farms

The Project involves the establishment of 64 new livestock farms, 34 rehabilitated livestock farms and 5 new crop farms.² The proposed

1 For complete details on all aspects of the project the Feasibility Study should be consulted. This Feasibility Study was prepared by an Australian Consultancy firm: McGowan and Associates Pty. Ltd., 1976 *Yalavou Project Fiji*, Feasibility Study for the Government of Fiji, Final Report. Henceforth, this report will be referred to as the 'Consultants Report'. Additional information on the pricing assumptions particularly the economic prices was provided in personal correspondence with the team leader.

2 Crop farms are of relatively minor importance in the overall project because of their small number.

development of the new and existing livestock farms is basically the same, differing only in emphasis and the stage of development at the commencement.

The representative livestock farm comprises an average 580 acres in area, with 350 acres suitable for development. On each farm, 87 acres are to be planted to legume based pastures and 260 acres sown to Nadi Blue grass. The fencing programme is to provide four main paddocks and one minor paddock. A set of cattle yards and a goat pen are to be constructed, and the chemical control of guava and other woody weeds is proposed.

Beef cattle production is the main farm enterprise. Initially 45 heifers and 2 bulls are to be imported and a herd of 60 breeders and a total herd of 122 cattle are envisaged.¹

A goat breeding programme has been designed to diversify the farm enterprises and produce an acceptable cash flow in the initial years of farm development. Twenty does which are to be imported and one buck, to be purchased locally, are to be run on a 5 acre paddock.

Each new livestock and crop farm is to build a *bure* (local house),² and a more modern house is to be constructed on all individual farms following initial development. The livestock farms include the establishment of 2.25 acres of subsistence garden and commercial cropping area. Erosion susceptible areas of the farm are to be planted to 20 acres of pine trees.

The representative crop farm includes 2.75 acres of subsistence garden and 3.0 acres of specialised crops and has a total area of 10 acres.

The Fiji Development Bank is to lend money directly to the farmer for on-farm development and the purchase of cattle, at a subsidised interest

1 For details of the herd projections for both new and existing livestock farms see McGowan and Associates, (1976), Annex 17, pp.20 and 25.

2 The *bure* on the existing livestock farms is assumed to be adequate.

rate, for the livestock farms and the construction of a more modern house.

The individual livestock farm development is to take about 9 years and crop farm development only one year. The number of farm openings in each year of Project development is shown in Table 5.1.

TABLE 5.1
FARM OPENINGS BY PROJECT YEAR

Farm Type	Project Year						Total Number of Farms
	1	2	3	4	5	6	
New Livestock Farm	-	7	8	20	11	18	64
Existing Livestock Farm	-	1	6	8	15	4	34
New Crop Farm	-	3	1	1			5

Source: McGowan and Associates, 1976, Annex 14, p.3.

Details of the investment projections and income and operating expenses, at constant market prices, of the individual farms are presented as appendix tables.¹ Specifically, Appendix Tables 5.1 and 5.2 show the projections for investment and income and operating expenses for new livestock farms, respectively. Similarly Appendix Tables 5.3 and 5.4 and 5.5 and 5.6 relate to the existing livestock farms and new crop farms, respectively.

5.1.2 The Focal Farm

An area of about 1,150 acres is set aside for the establishment of a focal farm in project year 2. This focal farm is to: provide the administrative centre for project management and to house project management

1 Inflation is assumed to be constant and all monetary benefits and costs are expressed in constant prices.
The actual figures contained in the Appendix Tables may differ from those contained in the Consultants Report due to minor corrections.

staff; provide a centre for farmer training through demonstrations of farm practices and management; run a cattle stud to provide high quality bulls for purchase by project farmers; agist bulls and bucks from the individual farms in the non-breeding season; undertake applied research work to improve the productivity and efficiency of the Yalavou Project; store and supply equipment and materials for individual farm development; and provide a small labour pool to assist individual farmers.

The focal farm development comprises 400 acres of legume based pastures and 350 acres of Nadi Blue grass. The construction programme includes cattle yards, goat pens and fences; twelve residential buildings and an office, machinery shed and storeroom. Also communal loading yards are to be constructed for use by all farmers. Farm plant and vehicles for project staff are to be purchased.

Both cattle and does are to be imported with commercial bulls being resold to farmers at subsidised prices. Bucks are to be purchased locally.

The investment and income and operating expenses at market prices are shown in Appendix Tables 5.7 and 5.8 respectively.

5.1.3 Rural Community Centre

The development of a Rural Community Centre on the focal farm is designed to encourage social change through new community activities and interests, especially the adoption of new commercially oriented production techniques. The Community Centre is to comprise a multi-purpose community hall, playing field and recreational facilities, school, dispensary, commercial store and a religious centre. See Appendix Table 5.7.

5.1.4 Roads

A total of 56 miles (90 kilometres) of feeder roads is to be

developed, primarily to provide access to the boundaries of all farms. The roads are to be constructed and maintained by the Fijian Public Works Department Staff with all the plant and equipment being provided by Australia. Planned development of the roads is to take 3 years to allow for staff and operator training. A low level bridge is to be constructed to provide access to Area II. See Appendix Tables 5.9 and 5.10 for investment and operating costs and income, which is the salvage value of the plant and equipment to be retained by the Public Works Department.

5.1.5 Forestry and Watershed Protection

A watershed protection area has been demarcated for protection against soil erosion by means of reafforestation. Details of the proposal include the purchase of 1.4 million pine seedlings, planting of 2,000 acres of pine forests, construction of 30 miles of tracks and firebreaks within the protection reserves and a training course for one or more forest rangers. See Appendix Tables 5.11 and 5.12 for costs and income from timber sales, respectively.

5.1.6 Technical Services and Project Management Personnel

Because of the limited supply of technical expertise and management skills in Fiji the project provides for a large technical assistance input of expatriate personnel to extend the capacity of the Fijian Government. This feature of the project was emphasised because of the number of producers requiring close supervision and guidance to achieve efficient production. The proposed plan is to recruit expatriate management and particular technical skills to work with and train junior technicians from within Fiji.

Expatriate personnel would participate in the first 6 years of the project providing 378 man months of management and technical input. The

Fiji Government is to provide an additional 1,641 man months of technical expertise and labour inputs over a 10 year period (excluding manpower requirements for road construction). See Appendix Tables 5.13 and 5.14 for details of the nature and cost of Fijian and Expatriate staffing requirements.

5.2 Distribution of Financial Costs and Benefits

The estimation of consumption distribution weights is dependent upon the identification of the beneficiaries of the financial costs and benefits including all transfer payments. This section outlines the benefits of the project and identifies the beneficiaries and providers of the benefits and costs as a necessary prelude to the estimation of the consumption distribution weights in the following section.

The project has direct production benefits as well as intangible and secondary benefits. Specifically, the project is expected to increase annual production of carcass beef to 790 tons. This production level would be equivalent to the amount of beef imported in 1975 or 38 per cent of domestic production. Increased goat meat production to about 24 tons at steady state represents 30 per cent of the quantity of goat meat imported in 1975 or 6 per cent of the then recorded domestic consumption. In addition, staple food crop production is expected to increase and some timber is to be sold in the long term.

The intangible benefits of the project occur through the training of both technical staff and farmers and through the improvement of the quality of life of the participating farmers and their families. Some secondary benefits are also expected. These benefits include: rehabilitation of the Tilivalevu cattle scheme near Sigatoka; the improved viability of small manganese mines and the opening up of native timber resources as the

result of improved road access; additional national revenue from access to new tourist areas; enhancement of the road construction and maintenance capacity of the Public Works Department through the retainment of the road building plant and equipment; and savings in transport costs for the population outside the project area, who currently have limited all year access to markets.

Following the Consultants Report *only the direct costs and benefits are taken into account in this study.* The training and social development costs are included in the overall project costs because it is difficult to separately identify and value these costs. Also the benefits of training cannot be valued separately but these benefits can be assumed to be inherent in the improved farm productivity and consequent prices received for the livestock.

The individual farms derive their income from the sale of livestock, crops and timber and receive a training grant of \$F1,000 from the Government. In addition, the farmers benefit from both project and Government subsidies. The Project subsidises the farmer by: paying the additional costs of cattle resulting from importation; providing free labour, technical and administrative assistance during the development period; and, providing quality bulls at lower than market prices. Direct government subsidies occur on a number of major inputs.¹ In addition, the Government subsidises the Fiji Development Bank loans to the farmer so that the farmer pays only 4 per cent interest on the farm development loan. The farmer is responsible for both investment and operating expenses.

The Government will receive revenue from: the sale of cattle from the focal farm;² the commission received by 'Commercial Undertakings' for

1 Details of Government subsidies are given in Appendix Table 6.1.

2 In this study the focal farm, roads, watershed protection area and Fijian and expatriate staff are the responsibility of the Fijian Government.

the sale of cattle;¹ the sale of timber from the watershed protection area; the salvage value of the road plant and equipment; the transfer of farmers net income in the form of loan repayments; income taxes on project staff; and the transfer of income in the form of land rent from the farmers.² The Fijian Government will meet the cost of all subsidies on inputs; the interest rate subsidy over the repayment period for the FDB loans to individual farmers; the subsidies on the price of cattle sold to individual farmers; the development and maintenance costs of the focal farm, rural community centre, watershed protection area, roads and Fijian and expatriate staff.³

Another group receiving benefits from the project is the Mataqali (landowners). As mentioned in Chapter 2 some income is redistributed through the extended family. The Mataqali are expected to receive benefits indirectly from the project as a consequence of the normal traditional customs, obligations and ceremonies inherent in the extended family. It is assumed that the Mataqali families, of which there are approximately 50 owning land on the Project location, receive 20 per cent of each farmers income commencing in Year 11 of the Project, when the majority of farms have been developed and repaid their loans.

5.3 Project Specific Parameters

5.3.1 Consumption Distribution Weights (d's)

Consumption distribution weights are estimated for private

- 1 'Commercial Undertakings' is a section of the Department of Agriculture and acts as an agent and charges a commission of 5 per cent on the proceeds of the sale of slaughter cattle.
- 2 The Native Land Trust Board collects rent and retains 25 per cent and distributes 22.5 per cent to village chiefs and the remainder to the members of the Mataqali. As the amount of rent collected and redistributed to the Mataqali is insignificant the rent is assumed in this study to be income to the Government.
- 3 It is assumed that the aid to the project is a grant, that is untied aid, and the Fijian Government freely purchases from Australia.

beneficiaries only as government income receives a weighting of unity.

The estimation of consumption distribution weights requires estimates of the beneficiaries income without and with the project. Individual farmers incomes and costs without the project have been provided in the Consultants Report for only the existing livestock farms. Their net income without the project is estimated to be \$F835. An estimate of the net income without the project for both new livestock and crop farms was derived from a study of Fijian root crop farmers in the Sigatoka Valley during 1970-72 (Chandra, 1978). The farm management survey conducted between 1970 and 1972 showed that Fijian farms on average had a gross output of \$F733.¹ Cash inputs for root crop production was found to be less than \$F50 and the rent on land averaged approximately \$F13.75 per hectare for an average farm size of 2.64 hectares (Chandra, 1978, p.305). Therefore, net income without the project is \$F647. In this study it is assumed that the net income of the new livestock farmers, new crop farmers and the Mataqali in the absence of the Yalavou Project would be \$F647.²

Consumption distribution weights are estimated for two cases: assuming that farmers income is not redistributed to the Mataqali families and assuming that 20 per cent of each farmers income is redistributed, commencing in year 11 of the Project.

Information on income distribution of the farmers and Mataqali members is not known. Income has been estimated for each farm type and for the Mataqali members, with and without the project, as discussed above. Therefore, farm type has been used as a surrogate for income and hence

- 1 The gross output was defined as the value of all subsistence and commercial crops valued at the farm gate price.
- 2 A consumption distribution weight is not estimated for the hired labourers as their participation in the project is relatively minor and it is assumed that the project would not significantly change their net income.

consumption in estimating the consumption distribution parameter (d).¹

The net income for each farm type is variable over the period of the project, except for crop farms, and therefore two distribution weights for years 2-15 and 16-30 are estimated for each farm type. Also three weights are used when the redistribution of income to the Mataqali is introduced.

The calculations of per capita consumption by farm type and Mataqali families are shown in Appendix Tables 5.18 and 5.19 for the two cases: without redistribution and with redistribution to the Mataqali, respectively. It can be seen from these tables that average per capita consumption is expected to rise by about 650 per cent for the new and existing livestock farms and about 290 per cent for the new crop farms. With redistribution of farmers income the average per capita consumption of the Mataqali will increase about 200 per cent.

The private beneficiaries of the project are expected to receive substantial increases in average per capita income. In Tables 5.2 and 5.3 distribution parameters are therefore calculated using the Squire and van der Tak formulae for non-marginal changes in per capita consumption.

For both cases, with and without redistribution to the Mataqali, weighted average distribution weights have been calculated for two and three time periods over the life of the project, respectively. The distribution weights for each farm type in each period were weighted by the total value of net incremental consumption benefits accruing to each farm type in each period of the project.²

-
- 1 Farm size has been used as a surrogate for income (Bruce, 1976; Bruce and Kimaro, 1978). Farm size in this project is assumed to be 580 acres for both new and existing livestock farms and 10 acres for crop farms. Although returns from individual farms may vary because of differential productivity of the land, farm type is a reasonable substitute for income.
 - 2 The weight was obtained by multiplying the average net increase in per capita consumption ($c_2 - c_1$) in each period by the number of farms of each type.

TABLE 5.2

DERIVATION OF DISTRIBUTION WEIGHTS (d) WITHOUT
REDISTRIBUTION TO MATAQALI

	New Livestock Farm		Existing Livestock Farm		New Crop Farm	
	Years		Years		Years	
	2-15	16-30	2-15	16-30	2-15	16-30
<u>n = 1.0</u>						
Real Per Capita Consumption $\bar{c}$	497	497	497	497	497	497
Average Private Per Capita Consumption <u>Without Project</u> c_1	116	116	149	149	116	116
Average Private Per Capita Consumption <u>With Project</u> c_2	218	869	333	876	354	455
Net Per Capita Consumption $c_2 - c_1$	102	753	184	727	238	339
Consumption Distribution Weight, d (a)	3.07	1.33	2.17	1.21	2.33	2.00
Weight (b) Years 2-15	0.47		0.45		0.08	
Years 16-30		0.65		0.33		0.02
Weighted Average d Years 2-15			2.61			
Years 16-30			1.30			
<u>n = 0.5</u>						
d (a)	1.75	1.11	1.46	1.07	1.51	1.39
Weighted Average d Years 2-15			1.60			
Years 16-30			1.10			

Notes: (a) The formulae for estimating (d) when $n = 1.0$ is:

$$d = \frac{\bar{c}(\log_e c_2 - \log_e c_1)}{(c_2 - c_1)}$$

and when $n = 0.5$

$$d = \frac{\bar{c} \left(\frac{c_2^{1-n} - c_1^{1-n}}{(1-n)} \right)}{(c_2 - c_1)}$$

(b) Weight based on the share of project benefits accruing to each farm type.

Sources: Table 4.3; Appendix Table 5.18.

TABLE 5.3

DERIVATION OF DISTRIBUTION WEIGHTS (d)
WITH REDISTRIBUTION TO MATAQALI

	New Livestock Farm			Existing Livestock Farm			New Crop Farm			Mataqali	
	Years			Years			Years			Years	
	2-10	11-15	16-30	2-10	11-15	16-30	2-10	11-15	16-30	11-15	16-30
<u>n = 1.0</u>											
Real Per Capita Consumption $\bar{c}$	497	497	497	497	497	497	497	497	497	497	497
Average Private Per Capita Consumption Without Project c_1	116	116	116	149	149	149	116	116	116	116	116
Average Private Per Capita Consumption With Project c_2	126	275	696	257	357	701	309	312	364	170	351
Net Per Capita Consumption $c_2 - c_1$	10	159	580	108	208	552	193	196	248	54	235
Consumption Distribution Weight, d											
(a)	4.11	2.70	1.54	2.51	2.09	1.39	2.52	2.51	2.29	3.52	2.34
Weight(b)											
Years 2-10	0.12			0.70			0.18				
Years 11-15		0.49			0.34			0.05		0.12	
Years 16-30			0.54			0.27			0.02		0.17
Weighted Average d											
Years 2-10					2.70						
Years 11-15					2.58						
Years 16-30					1.65						
<u>n = 0.5</u>											
d	2.03	1.63	1.20	1.58	1.43	1.15	1.57	1.57	1.49	1.87	1.51
Weighted Average d											
Years 2-10					1.63						
Years 11-15					1.59						
Years 16-30					1.25						

Notes: See Table 5.2.

Sources: Table 4.3; Appendix Table 5.19.

It can be seen from Table 5.2 and Table 5.3 that the distribution weights (d) all exceed unity reflecting that the consumption of the project beneficiaries is less than the national per capita consumption. Note that in the period 16-30 years average per capita consumption for both livestock farms exceeds the national average per capita consumption. Therefore, the consumption distribution weight would be expected to be less than unity. However, this is not the case and the reason is the very small level of per capita consumption (c_1) without the project.

Weighted average distribution is lower when n is set equal to 0.5 reflecting less Government interest in income redistribution.

The weighted average distribution in the case where income is not redistributed to the Mataqali is lower than in the income redistribution case. This result is expected because the benefits of the project are accruing to a larger number of beneficiaries who without the project would have per capita consumption levels below the national average level.

Interpreting the weighted average distribution weights (d) indicates, for the case where the Government is interested in income distribution ($n = 1.0$) and there is no redistribution to the Mataqali, (Table 5.2), that the Government values marginal consumption accruing to the farmers to be 161 per cent (years 2-15) and 30 per cent (years 16-30) more valuable than marginal consumption accruing to a person at the average per capita consumption level.

Both sets of distribution weights in Tables 5.2 and 5.3 are used in assessing the net social benefits of the project in Chapter 6.

5.3.2 Economic Wage Rate

Labour requirements for the project include both skilled (Appendix Tables 5.13 and 5.14) and unskilled labour (Appendix Table 5.20). The

wage rate for skilled labour is assumed to reflect its relative scarcity. Therefore, an economic wage rate is calculated only for unskilled labour, which is primarily family labour.

Chapter 3 provided evidence of both unemployment and under-employment in Fiji which can be expected to affect the market wage rates and marginal productivity of labour.

Estimates of the marginal productivity of labour for Fiji by regions is not available. However, Chandra (1978) in his study of farmers in the Singatoko Valley, the location of the Yalavou Project, used a Cobb Douglas production function to estimate the marginal value product of labour. The value estimated was \$0.286 per man hour.¹

The economic wage rate is defined as the marginal value productivity (opportunity cost) of labour measured in border prices. Multiplying the marginal value product by the Standard Conversion Factor ($\alpha = 0.87$) gives an economic wage rate of \$0.25 per man hour or \$1.25 per man day.²

A separate social wage rate is not required for it is assumed that the disutility of effort is zero. The social wage rate then becomes the economic wage rate adjusted by both the social cost of increased consumption and the social value of the increased consumption. All incremental private consumption benefits are adjusted by the same factors. As most of the unskilled labour is family labour this adjustment is more easily handled by simply applying the distribution weights to all private consumption benefits.³ This is undertaken in the social analysis in the following chapter.

1 This estimate compares with the estimate of \$0.30 per man hour used in the Consultants Report.

2 The market wage rate is \$0.50 per man hour or \$2.50 per day, implicitly assuming only 5 hours are worked per day (McGowan and Associates, 1978).

3 The adjustment factor to be applied to the incremental consumption out of net benefits is $(\beta_c - d/v)$.

This chapter has outlined the major features of the project and identified the project beneficiaries. Estimates of consumption distribution weights were calculated and the economic wage rate estimated. These project specific estimates and the national parameters developed above are applied in the economic and social analysis of the Yalavou Project in the next chapter.

CHAPTER 6
ECONOMIC AND SOCIAL ANALYSIS
OF THE YALAVOU PROJECT

In this chapter the application of the estimates of the national and project specific parameters, calculated in Chapters 4 and 5, to the Yalavou Project are reported. Economic and social analyses are conducted to assess the effect of incorporating distributional objectives (social analysis) on the selection and design of the project.

There were some problems with the Consultants Report that made the application of the Squire and van der Tak methodology difficult: some pertinent data, such as the labour inputs and farmers net income without the project were not provided; some assumptions regarding prices were not clearly specified; and some inconsistencies and minor errors were contained in the tables.¹ In order to compare the economic and social analysis of the SVT methodology, the Consultants economic analysis has been reworked, incorporating the minor corrections and applying a consistent set of assumptions.

The economic and social analyses are conducted as they would have been undertaken in the Feasibility Study, with only information up to the end of 1975 and the projections of the Seventh Development Plan being incorporated in the analysis.

6.1 Economic Analysis

The economic prices, with minor adjustments, used in the Consultants Report and the economic prices estimated in this study using the Squire and

1 Information to correct for these difficulties was provided in personal correspondence with the project team leader.

van der Tak methodology were applied to the Yalavou Project. Appendix 6.1 describes the differences in the estimation of these two sets of economic prices. In essence, the Consultants estimates are domestic market prices with the shadow exchange rate and official exchange rate assumed to be equal. In contrast, the economic prices estimated by the Squire and van der Tak method are border prices and all non traded goods are revalued by the Standard Conversion Factor.

Appendix Tables 6.1.2 and 6.1.5 present the incremental net cash flow for the project at the Consultants estimated economic prices and the Squire and van der Tak's estimated border prices, respectively.

Two discounted cash flow measures, the Net Present Value (NPV) and the Internal Rate of Return (IRR) are adopted in this study.¹ Following Bruce (1976), a distinction is made between the Economic NPV (ENPV) (Economic Rate of Return (ERR)) in economic analysis and the Social NPV (SNPV) (Social Rate of Return (SRR)) in social analysis.²

The central value of the economic accounting rate of interest, 10.9 per cent, estimated in Section 4.1.3 is used to calculate the Economic NPV for both economic analyses at Consultants' economic prices and SVT's border prices. Table 6.1 gives the ENPV and ERR for both the Consultants' and SVT's economic analyses.

The negative ENPV's and the ERR's below the economic accounting rate of interest of 10.9 per cent indicate that the Yalavou Project is not economically viable.³ At the lower economic accounting rate of interest of

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- 1 The NPV and IRR measures give the same accept/reject decision, assuming that the same opportunity cost of capital or cut-off point is used. However, these two measures can give different ranking orders (Bruce, 1976).
 - 2 The economic and social rates of return were calculated on a Texas Instruments Programmable 58 calculator.
 - 3 The original Feasibility Study gave an ERR of 4.3 per cent. The lower values obtained in this study is mainly due to the incorporation of the estimates of without project net income for both the new livestock and crop farms.

TABLE 6.1

ECONOMIC ANALYSIS: ENPV AND ERR

	ENPV 10.9% (\$F)	ERR (%)
Consultants Economic Analysis	-2491265	3.20
SVT's Economic Analysis	-755510	8.95

8.7 per cent the project would be accepted using SVT's border prices. The substantially higher discounted cash flow measures for the SVT approach is primarily the result of valuing cattle sales at world prices rather than at market prices and the implicit use of a shadow exchange rate.

6.2 Social Analysis

The Yalavou Project is currently being implemented and given that it was not acceptable in terms of economic efficiency criterion then it may be reasonable to assume that the decision was based on other criteria.

The net social benefits of the Yalavou Project were calculated on the basis of the parameter values of n equal to unity and v equal to 1.45, reflecting the Fijian Governments current value judgements. The derivation of the net social benefit stream is given in Appendix 6.2.

The distribution adjustment factor ($\beta_c - d/v$) was calculated for two periods: years 2 to 15 and 16 to 30. A value of minus 0.800 was calculated for the first period indicating that the average project beneficiary was far below the average per capita consumption level and that the social benefits of the project will exceed the economic benefits. For years 16 to 30 a small positive value of 0.103 was calculated.

Net social benefits were also calculated for the case where 20 per cent of individual farmers incomes were redistributed to the Mataqali families.

The results of the social analysis are presented in Table 6.2 and the economic rates of return are represented for comparative purposes.

TABLE 6.2

ECONOMIC AND SOCIAL ANALYSIS RESULTS

<u>Economic Analysis</u>		ENPV (10.9%) (%)	ERR (%)
Consultants Economic Analysis		-2491265	3.20
SVT's Economic Analysis		-755510	8.95
<u>Social Analysis</u> n = 1.0		SNPV (8.9%) (\$)	SRR (%)
SVT's Social Prices:			
Without redistribution to Mataqali		320926	9.59
With redistribution to Mataqali		545220	10.02

Table 6.2 shows that the Yalavou project is not an economically efficient use of resources but that it is socially acceptable. The SNPV is positive and the SRR exceeds the SARI of 8.9 per cent.¹ As expected, with the increased number of beneficiaries through the redistribution of income to the Mataqali the SNPV and the SRR are higher. This is indicative of the usefulness of the method in assessing implications of alternative project designs.

6.3 Sensitivity Analysis

All previous results have been for the Case 2 situation of n = 1.0, v = 1.45 and SARI = 8.9. The sensitivity of the SNPV and SRR to variations in these national parameters were analysed. The sensitivity analysis is conducted by calculating the SNPV and SRR for the Case 1 situation of n = 0.5, v = 2.08 and SARI = 7.5 per cent and considering the case of no redistribution to the Mataqali.

¹ In interpreting and comparing the ERR and SRR it must be recognised that the ERR is compared to the 10.9 per cent EARI and the SRR is compared to the 8.9 per cent SARI.

Table 6.3 presents the results of the sensitivity analysis.

TABLE 6.3
RESULTS OF SENSITIVITY ANALYSIS
OF THE NATIONAL PARAMETERS

	n	v	SARI (%)	d (a)	SNPV (\$)	SRR (%)
Case 2 - central values	1.00	1.45	8.9	2.61 1.30	320926	9.59
Case 1 n = 0.5	0.5	1.45	8.9	1.60 1.10	-144142	8.59
v = 2.08	1.00	2.08	8.9		-191217	8.48
SARI = 7.5	1.00	1.45	7.5		1153587	(b)

Notes: (a) The top figure refers to years 2-15 and the lower figure years 16-30.

(b) A change in the SARI does not change the value of the SRR.

Although the SNPV and SRR show the project to be unacceptable on income distribution grounds when 'n' is equal to 0.5 and 'v' is set at 2.08, these measures are relatively insensitive to variations in the national parameters. More specifically a one per cent decrease in the value of n and a one per cent increase in the value of v results in a less than one per cent change in the SRR.¹ Only the SNPV is affected by changing the SARI. Decreasing the SARI by one per cent raises the SNPV by more than one per cent. Thus, the SNPV is sensitive to variations in the SARI. A lower value of n or a higher value of v results in the project becoming relatively socially unacceptable.

6.4 Summary of Results

The economic analyses showed the Yalavou Project to be economically

1 Given the change from a positive to negative SNPV means that the use of this elasticity measure of the sensitivity is not appropriate.

inefficient in the utilisation of resources, even with the SVT economic analysis giving substantially higher ENPV and ERR than the Consultants economic analysis. Incorporating distributional considerations into the analysis showed the project to be socially acceptable. The SNPV and SRR increased slightly when redistribution of farmers income to the Mataqali was included in the social analysis. The SNPV and SRR measures were relatively insensitive to variations in the values of the parameters n and v but the project became marginally socially unacceptable with a lower value of n and a higher value of v .

The results presented in this chapter are discussed in Chapter 7. In addition, the following chapter discusses the usefulness of incorporating income distribution considerations into the analysis of investment projects and the relevance of such social cost benefit methodologies to project appraisal in Fiji.

CHAPTER 7

PRACTICAL RELEVANCE OF SOCIAL COST
BENEFIT METHODS TO FIJI

Different views prevail about the role and relevance of integrated project appraisal methods (MacArthur and Amin, 1978). The relevance of these methods have been questioned in terms of their conceptual basis, usefulness and appropriateness. (Stewart and Streeten, 1972; Joshi, 1972.) These discussions have generally focussed on theoretical issues. However, a comprehensive assessment of a methodology should go beyond its theoretical framework to the practical implications of its application. Moreover, the assessment should be based on an application to a particular project(s) within a specific country context.¹ Therefore, this chapter discusses the usefulness and relevance of incorporating distributional considerations into project appraisal methods for application in Fiji, based on the application of the Squire and van der Tak method.² The question of relevance is important not only to planners in Fiji but also to the Consultants and aid agencies who are responsible for the appraisal of projects and the disbursement of aid funds.

7.1 Discussion of the Results and Usefulness of the Methodology

The Yalavou Project was analysed using both the Consultants

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- 1 A methodology need not be relevant to either all countries or all types of projects.
 - 2 Walter (1978) has examined the relevance of the theoretical basis and underlying assumptions of the Little and Mirrlees methodology to small island economies like Fiji. Walter argued that the methodology was not relevant to projects with non-tradable outputs (that is infrastructural type projects) because of externalities and interdependencies and therefore as these are the main types of investment projects in these countries the methodology had limited relevance to such countries.

estimated economic prices and the prices estimated by the Squire and van der Tak (SVT) methodology. Both economic analyses showed the project to be economically inefficient. However, applying the SVT economic prices resulted in the project only being marginally non-acceptable relative to the very low economic rate of return obtained in the Consultants economic analysis.¹ This result is attributable to the valuation of inputs and outputs at border prices, particularly the pricing of cattle sales, and the shadow pricing of foreign exchange through the standard conversion factor.

The social analysis of the project, with a value of the elasticity of marginal utility (n) equal to unity and ignoring income redistribution to the Mataqali (landowners), produced a social rate of return, 9.6 per cent, marginally above the social accounting rate of interest, 8.9 per cent. Thus, the incorporation of distributional considerations into the project analysis has resulted in a marginally economic inefficient project being marginally acceptable on distribution grounds. The project is only marginally acceptable, despite the lower social accounting rate of interest, that is the cut-off rate, because the benefits of the increased consumption in years 2-15 are only slightly greater than the costs of increased consumption in years 16-30 indicated by the respective large negative and small positive values of the adjustment factor ($\beta_c - d/v$). That is, in years 2-15 the project beneficiaries lie below the average per capita consumption level but then lie above that level in the remaining years of the project.

The social analysis has affected the accept/reject decision about the project. This result contrasts with other studies where the social analysis did not alter this decision.² In fact, the social analysis in

1 Not all studies comparing the use of accounting and market prices have found the same substantial difference. Nehen (1979) found the Little Mirrlees method gave similar results to traditional economic analysis using market prices.

2 See Bruce (1976); Linn (1977), and Bruce and Kimaro (1978).

these studies confirmed the acceptance of the project on economic efficiency grounds. One significant implication of this study is that social analysis may lead to the acceptance of projects that seriously affect the finances of the public sector.¹ The Yalavou Project could have severe domestic budgetary implications for Fiji particularly given the present situation of a deficit in its public finance accounts.

The incorporation in the social analysis of a 20 per cent redistribution of the individual farmers income to the Mataqali (landowners) led to a slight increase in the social rate of return, rendering the project more acceptable on distributional grounds. The redistribution of income resulted in the consumption cost stream being negative in all years of the project as all project beneficiaries were below the average national per capita consumption level.

There are two implications stemming from this result for the usefulness of social analysis. First, and more importantly, is that by allowing for a larger number of beneficiaries in the project a greater net benefit to society would be attained, in terms of an increased social rate of return. Similarly, the social rate of return of the project would increase, for instance, if the size of the farms were reduced and the number of farms increased, allowing for an increased number of beneficiaries. Thus, social analysis is useful in assessing the relative merits of various project designs, particularly projects oriented to the poorer income groups, as is the strategy presently followed in most countries and donor agencies.

The second implication of the social analysis considering redistribution of income relates to the secondary effects of the project. Secondary effects are difficult to identify and quantify. The Yalavou

1 Heller (1974 and 1978) discusses the problems of the under-financing of investment expenditure.

Project has several such benefits, viz. training, reduced transport costs etc. which were not readily quantifiable. However, the inclusion of the secondary income distribution effect in this study and others (MacArthur, 1978) have illustrated the importance of incorporating such effects, where possible, into the analysis.

Hitherto, it has become evident that the proper specification of the distributional impact of a project can be vital to its acceptability and design. The correct specification is relatively more important with projects like the Yalavou Project where a large proportion of the benefits goes to the private sector and when the project is on the borderline of the accept/reject decision.

The sensitivity analysis showed that both the SNPV and SRR were relatively insensitive to variations in the value of the elasticity of marginal utility (n) and the value of public income relative to private average consumption (v), the two distributional weights. As expected, the SNPV is sensitive to variations in the social accounting rate of interest. However, this insensitivity does not mean that the values attached to both n and v are not important. In fact, a lower value of n equal to 0.5 and a higher value of v equal to 2.08 resulted in the project being socially non-acceptable, with the social rate of return being lower than the economic rate of return in the SVT economic analysis. In this case the costs of increased consumption exceeded the benefits to society as the value of d/v was very close to the value of β_c . This project then, in terms of distributional considerations is on the accept/reject border line and depends on whether the government is more oriented to growth (n equal to 0.5) or to income distribution (n equal to 1.0) or other factors. Moreover, this result indicates that projects designed for the poorer income groups may not be acceptable if the government is pursuing an objective of growth

with little concern for income redistribution. Thus, it is essential the objectives of the government be correctly specified, particularly for borderline projects with a large proportion of private beneficiaries.

Social analysis has been shown to be useful in terms of: allowing for the incorporation of and tradeoff between various government objectives in project analysis; and the selection and design of projects particularly those oriented towards the poorer income groups. The relevance of the methodology to projects like the Yalavou Project and to small island economies like Fiji is discussed in the following section.

7.2 Practical Relevance of the Methodology

The practical relevance of the methodology is conditional upon the role of government in national economic and social development and its administrative capacity.

7.2.1 Role of the Government

There are several aspects related to the relevance of the social cost benefit methodology. These include the government objectives, the role of the project in overall development planning, the type of the development projects, and the importance of foreign capital inflows.

The Fijian government, as discussed in Chapter 3, has adopted both growth and income distribution as the important objectives. The government's fiscal policies are supported by development projects designed to generate savings and redistribute the benefits of growth. In contrast to many developing country governments who simply make political pronouncements about distribution objectives (Potts, 1978), the Fijian government has made a deliberate effort to improve income distribution. The Yalavou Project, which is aimed at redistributing income to the rural areas, exemplifies the governments observed actions.

The appraisal of projects in Fiji on the basis of economic efficiency analysis alone is clearly not appropriate in view of the governments explicit distribution objective. The implicit assumptions of economic analysis, that the government is indifferent to the distribution of project benefits both between different consumers and between consumption and investment, do not correctly reflect policy objectives. Economic analysis is only a special case of social analysis. Social analysis provides a systematic and explicit framework more relevant to the policy objectives of the Fijian government, stressing the flexibility needed to adapt analysis to the diversity of situations to which it is applied.

It has been argued that social cost benefit analysis is more relevant to a country where the government has a controlling rather than a supporting role in the process of capital accumulation and growth (Fitzgerald 1974 and 1977; and Irvin 1978). Although the Fijian government does not control the capital accumulation process its share of gross capital formation has been increasing in recent years and now exceeds private capital formation. Declining private investment is encouraging expansion of public investment in directly productive projects, which contrast with the infrastructure or non-traded output projects which have historically characterised the Fijian governments' investment programme. Obviously, the Squire and van der Tak methodology is more relevant to projects with traded outputs than non-traded outputs. Nevertheless, cost effectiveness analysis based on the Squire and van der Tak methodology has been shown to be useful in guiding decisions of choice where the project output is a non-traded good providing only consumption benefits (Porter and Walsh, 1978).

The methodology is more relevant where the governments investment programme is project oriented rather than programme oriented. With a programme framework orientation the application of social cost benefit

analysis to a particular project is both inconclusive and meaningless.

Under a project based investment plan adopted in Fiji the government can attempt to devise a national public expenditure plan which is designed to direct public expenditure to those projects that most satisfy the governments objectives.

Foreign loans and aid are an important component of gross capital formation in Fiji. The SVT methodology with its numeraire expressed in border prices means the accounting rate of interest is directly comparable with interest on loans payable in foreign currency, or with lending abroad (Little and Mirrlees, 1974, p.147). Therefore, the method is most useful for the determination of the merits of alternative financing of projects, as well as assisting the government in negotiations with foreign investors with respect to tax concessions, joint venture options and royalty rates determinations.

Of course, the methodology is most irrelevant in closed economies. Given the Fijian government policies, border prices are likely to be an especially good guide for domestic opportunity cost since the foreign demands and supplies are not influenced by domestic action. Fiji is dependent on trade and is a price taker and border prices for imports and exports are exogenously determined. The dependence on trade and lack of structural economic integration are important factors affecting the validity of the Squire and van der Tak methodology for project design and selection.

7.2.2 Administrative Capacity

The operational relevance of the methodology is also dependent on the availability and reliability of data and the time and manpower resources available.

Some estimates of the national parameters were limited by the restricted availability of data inherent in a desk study. For instance,

separate conversion factors could not be estimated and values for the marginal productivity of capital and the critical consumption level were difficult to determine. For the project-specific estimates of the marginal productivity of labour and without project income a farm management study provided the necessary information. However, in a proper project appraisal more precise estimates would be required. Farm data by income class was not available to estimate precise average income distribution weights (d). However, more precise estimates require costly farm budget surveys by income class and therefore farm budgets by farm size (type) seem to provide reasonably representative information, at least for agricultural projects. In this study it became evident that the additional data required to conduct a social analysis was considerably less than for the economic analysis.

The data was sufficiently reliable to estimate the parameters with caution. In many cases, averageing over a number of years appears to cancel out errors in the annual values and provide reasonable estimates. Reliable estimates of the governments value judgements are necessary for social analysis. It has been argued that these estimates are open to abuse to justify the selection of projects that satisfy the interests of those concerned, whether they be politicians, private interest groups or aid donors (Stewart, 1975).

For proper and consistent economic and social analysis of projects in Fiji there is a need for a set of national parameters to be estimated by the Central Planning Office. The benefits of a single set of parameter estimates would exceed the costs, for all projects can then be appraised or compared on the basis of identical economic and social accounting prices.

However, for small economies like Fiji the time and resources of the administrative staff are at a premium. Not that the methodology is time consuming to apply. In fact, the most time consuming feature is the

initial understanding of the method. Resources are limited but once the parameters have been estimated there would be little effort in updating them. It would be appropriate then for an aid donor to provide technical assistance for the initial estimation of parameters and the training of officers in their calculation. The benefits would be invaluable for the estimates are useful not only for project appraisal but also for the analysis of government policy issues, such as the social benefits of taxation adjustments, the social worth of introducing subsidies and general macro planning.

7.3 Future Research

Distributional considerations can be useful in the selection and design of projects, particularly those developed for the poorest income groups. Further research is necessary to estimate, more precisely, the national parameters for Fiji. Access to more detailed and reliable statistics and improved methods of deriving the governments preferences are necessary to improve the social cost benefit analysis of projects in Fiji. Also, further studies of the application of the Squire and van der Tak methodology are necessary to assess its operational usefulness for project selection and design in other specific country-project contexts.

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APPENDIX TABLE 5.1
NEW LIVESTOCK FARM: INVESTMENT PROJECTIONS
(Market Prices) (a)

Investment Items	Unit	Unit Cost \$	Farm Year									
			1		2		3		4		5	
			No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$
Fixed												
Livestock Purchases:												
Bulls (b)	No.	200.00	-	-	2	400	-	-	-	-	-	
Heifers (c)	No.	76.00	45	3420	-	-	-	-	-	-	-	
Does (d)	No.	45.00	20	900	-	-	-	-	-	-	-	
Bucks (d)	No.	60.00	1	60	-	-	-	-	-	-	-	
Pasture Establishment:												
Nadi Blue	Acre	1.95	103	201	103	201	52	101	-	-	-	
Leucaena	Acre	24.23	11	267	11	267	11	267	10	242	-	
Siratro	Acre	23.28	22	512	21	489	-	-	-	-	-	
Fencing	Chain	4.38	401	1756	102	447	-	-	-	-	-	
Cattle Yards	No.	274.00	0.5	137	0.5	137	-	-	-	-	-	
Goat Yards and Paddock	No.	340.00	1	340	-	-	-	-	-	-	-	
House	No.	218.00	1	218	-	-	-	-	-	-	-	
Weed Removal:												
Guava	Acre	4.12	-	-	5	21	10	41	-	-	-	
Yaqona	Acre	4.08	-	-	20	82	40	163	-	-	-	
Pine Woodlot Establishment	Acre	-	-	-	-	-	-	-	-	-	-	
Farm Survey	No.	1500.00	-	-	1	1500	-	-	4	11	-	
Farm Equipment	No.	100.00	1	100	-	-	-	-	-	-	-	
Total Fixed Investment		-	-	7911	-	3544	-	572	-	242	11	
Working Capital												
Animal Health - Cattle	AU	1.50	43	65	44	66	43	65	75	113	152	
Goat Management (d)	AU	6.83	4	27	8	55	9	61	9	61	61	
Rent (e)	Acre	0.20	583	117	583	117	583	117	583	117	117	
Bull Agistment (b)	No.	7.00	-	-	2	14	2	14	2	14	14	
Pasture Maintenance	Siratro	2.56	-	-	22	56	43	110	43	110	110	
Hired Labour and Contract	Manday	2.50	109	273	25	63	-	-	-	-	-	
Miscellaneous (5 per cent)		-	-	24	-	19	-	19	-	21	23	
Total Working Capital		-	-	506	-	390	-	386	-	436	477	
Total Investment		-	-	8417	-	3934	-	958	-	678	488	

Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.
 (b) These items represent transfer payments from the farmer to the focal farm. These costs have been included in the focal farm projections (Appendix Table 5.7) and are excluded here to avoid double counting in the economic analysis. See Annex 17, p. 20 of Consultants Report for details of basic herd projection.
 (c) The heifers are supplied to the farmer at \$76 but the cost to the project is \$241. The difference is taken into account in the economic analysis.
 (d) Five goats are equivalent to one Animal Unit. See Annex 7, p. 9 of Consultants Report for details of basic herd projection.
 (e) Seventy five per cent is transferred to the Government.

Source: McGowan and Associates, 1976, Annex 17, p. 21.

APPENDIX TABLE 5.2

NEW LIVESTOCK FARM: INCOME AND OPERATING EXPENSES
(Market Prices) (a)

	Unit	Unit Cost \$	Without Project \$ (g)	Farm Year													
				1	2	3	4	5	6	7	8	9	10	11-18	19-23	24-25	
Income																	
Livestock Sales: (b)																	
Bulls	No.	166.00	-	-	-	-	-	-	-	-	166	-	-	38	38	38	38
Cows	No.	109.00	-	-	-	-	-	-	654	1199	1635	1635	1635	1635	1635	1635	1635
Heifers	No.	95.32	-	-	-	-	-	-	-	-	381	381	381	381	381	381	381
Steers	No.	130.28	-	-	-	-	-	-	2084	1824	1694	2345	2736	2736	2736	2736	2736
Goats	No.	-	-	-	-	357	379	426	495	520	520	520	520	520	520	520	520
Crop Sales																	
Training Grant	Year	500.00	-	530	795	795	795	795	795	795	795	795	795	795	795	795	795
Pine Woodlot	Year	1200.00	-	500	500	-	-	-	-	-	-	-	-	-	-	1200	-
Total Income		-	733	1030	1295	1152	1174	1221	4028	4338	5191	5676	6067	6105	7305	6105	6105
Operating Expenses																	
Animal Health - Cattle	AU	1.50	-	-	-	-	-	-	155	170	180	183	183	183	183	183	183
Goat Management (e)	AU	6.83	-	-	-	-	-	-	128	68	68	68	68	68	68	68	68
Rent (h)	Acre	0.20	-	-	-	-	-	-	117	117	117	117	117	117	117	117	117
Bull Agistment (f)	No.	7.00	-	-	-	-	-	-	14	14	14	14	14	14	14	14	14
Pasture Maintenance	Acre	2.56	-	-	-	-	-	-	110	110	110	110	110	110	110	110	110
Repairs and Maintenance	Year	45.00	-	-	-	-	-	-	45	45	45	45	45	45	45	45	45
Bull Replacement (f)	No.	200.00	-	-	-	-	-	-	-	-	400	-	-	66	66	66	66
House Replacement	House	5000.00	-	-	-	-	-	-	11	11	11	11	-	-	-	-	-
Woodlot Establishment	Acre	2.75	-	-	-	-	-	-	29	27	298	28	27	30	30	30	30
Miscellaneous (5 per cent)			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Operating Expenses		-	86	-	-	-	-	-	609	562	6243	576	564	633	633	633	633

Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.

(b) Cattle sale values are net of transport (\$5 per head) and commission charges of 5 per cent. Goat sales are prior to transport and commission charges which are deducted as part of Goat Management. Gross sales assumed for goats are \$22 for all classes other than yearling males, which are \$25. See Annex 17, p. 20 and Annex 7, p. 9 of the Consultants Report for details of the basic herd projection for cattle and goats, respectively.

(c) Training grant represents a subsidy to the farmer from the project and is taken account of in the investment costs of the Focal Farm.

(d) Sales assume a farm gate price of \$10 per 100 cubic feet net of harvesting costs.

(e) Five goats are equivalent to one Animal Unit.

(f) These are transfer payments from the farmer to the focal farm. Their cost is included as operating expenses and income to the focal farm in Appendix Table 5.8.

(g) Estimated from a survey of crop farmers in the Sigatoka Valley (Chandra, 1978).

(h) Seventy five per cent is a transfer to the Government.

Source: McGowan and Associates, 1976, Annex 17, p. 22.

APPENDIX TABLE 5.3
EXISTING LIVESTOCK FARM: INVESTMENT PROJECTIONS
(Market Prices) (a)

Investment Items	Unit	Unit Cost \$	Farm Year									
			1		2		3		4		5	
			No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$
Fixed												
Livestock Purchases:												
Bulls (b)	No.	200.00	2	400	-	-	-	-	-	-	-	-
Heifers (c)	No.	76.00	35	2660	-	-	-	-	-	-	-	-
Does	No.	45.00	20	900	-	-	-	-	-	-	-	-
Bucks	No.	60.00	1	50	-	-	-	-	-	-	-	-
Pasture Establishment:												
Nadi Blue	Acre	1.95	103	201	103	52	101	-	-	-	-	-
Leucaena	Acre	24.23	11	267	11	267	11	267	10	242	-	-
Siratro	Acre	23.28	22	512	21	489	-	-	-	-	-	-
Fencing (d)	Chain	4.38	353	1546	-	-	-	-	-	-	-	-
Cattle Yards	No.	274.00	0.5	137	0.5	137	-	-	-	-	-	-
Goat Yards and Paddock	No.	340.00	1	340	-	-	-	-	-	-	-	-
House (e)			-	-	-	-	-	-	-	-	-	-
Need Removal:												
Guava	Acre	4.12	10	41	20	82	-	-	-	-	-	-
Yagona	Acre	4.08	40	163	80	326	-	-	-	-	-	-
Pine Woodlot Establishment	Acre	2.75	-	-	-	-	-	-	-	-	4	11
Farm Survey	No.	1500.00	-	-	1	1500	-	-	-	-	-	-
Farm Equipment	No.	100.00	1	100	-	-	-	-	-	-	-	-
Total Fixed Investment		-	-	7327	-	3002	-	368	-	242	-	11
Working Capital												
Animal Health - Cattle	AU	1.50	60	90	68	102	63	95	97	146	113	170
Goat Management (f)	AU	6.83	4	27	8	55	9	61	9	61	9	61
Rent (g)	Acre	0.20	583	117	583	117	583	117	583	117	583	117
Bull Agistment (b)	No.	7.00	2	14	2	14	2	14	2	14	2	14
Pasture Maintenance Siratro	Acre	2.56	-	-	22	56	43	110	43	110	43	110
Miscellaneous (5 per cent)	-	-	-	12	-	17	-	20	-	23	-	24
Total Working Capital		-	-	260	-	361	-	417	-	471	-	496
Total Investment		-	-	7587	-	3363	-	785	-	713	-	507

Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.
 (b) These items represent transfer payments from the farmer to the focal farm. These costs have been included in focal farm projections (Appendix Table 5.7) and are excluded here to avoid double counting in the economic analysis. See Annex 17, p. 25 of Consultants Report for details of basic herd projection.
 (c) The heifers are supplied to the farmer at \$76 but the cost to the project is \$241. The difference is taken into account in the economic analysis.
 (d) It is assumed that 30 per cent of the fencing is complete.
 (e) It is assumed that the existing house is adequate.
 (f) Five goats are equivalent to one Animal Unit. See Annex 7, p. 9 of Consultants Report for details of basic herd projection.
 (g) Seventy five per cent is a transfer to the Government.

Source: McGowan and Associates, 1976, Annex 17, p. 26.

APPENDIX TABLE 5.4
EXISTING LIVESTOCK FARM: INCOME AND OPERATING EXPENSES
(Market Prices) (a)

		Farm Year														
Unit	Without Project	1	2	3	4	5	6	7	8	9	10	11-18	19-23	24-25		
Unit	\$															
Income																
Livestock Sales: (b)																
Bulls	No.	166.00	-	-	-	-	322	-	-	-	38	38	38	38		
Cows	No.	109.00	270	327	-	1090	-	872	1417	1635	1635	1635	1635	1635		
Heifers	No.	95.32	80	474	-	-	95	381	381	381	381	381	381	381		
Steers	No.	130.28	360	-	-	521	521	651	2215	2215	2736	2736	2736	2736		
Goats	No.	-	-	-	357	379	426	495	520	520	520	520	520	520		
Crop Sales		200	530	795	795	795	795	795	795	795	795	795	795	795		
Training Grant	(c)	500.00	-	-	-	-	-	-	-	-	-	-	-	-		
Pine Woodlot	(d)	1200.00	-	-	-	-	-	-	-	-	-	-	1200	-		
Total Income	-	910	1997	1295	2763	1695	2744	5469	5546	5546	6067	6105	7305	6105		
Operating Expenses																
Animal Health - Cattle	AU	1.50	20	-	-	-	-	171	177	183	183	183	183	183		
Goat Management	(e)	6.83	-	-	-	-	-	128	68	68	68	68	68	68		
Rent	(f)	0.20	25	-	-	-	-	117	117	117	117	117	117	117		
Bull Agistment	(g)	7.00	-	-	-	-	-	14	14	14	14	14	14	14		
Pasture Maintenance	Siratro	2.56	-	-	-	-	-	110	110	110	110	110	110	110		
Repairs and Maintenance	Year	45.00	30	-	-	-	45	45	45	45	45	45	45	45		
Bull Replacement	(g)	200.00	-	-	-	-	-	400	-	200	-	66	66	66		
House Replacement	House	5000.00	-	-	-	-	-	-	5000	-	-	-	-	-		
Woodlot Establishment	Acre	2.75	-	-	-	-	-	11	11	11	-	-	-	-		
Miscellaneous (5 per cent)	-	-	-	-	-	-	-	51	27	278	38	27	30	30		
Total Operating Expenses	-	75	-	-	-	-	-	1047	569	5826	786	564	633	633		

Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.
 (b) Cattle sales values are net of transport (\$5 per head) and commission charges of 5 per cent. Goat sales are prior to transport costs and commission charges which are deducted as part of Goat Management. Gross values assumed for goats are \$22 for all classes other than yearling males, which are \$25. See Annex 17, p. 25 and Annex 7, p. 9 of the Consultants Report for details of the basic herd projection for cattle and goats, respectively.
 (c) Training grant represents a subsidy to the farmer from the project and is taken account of in the investment costs of the Focal Farm.
 (d) Sales assume a farm gate price of \$10 per 100 cubic feet net of harvesting costs.
 (e) Five goats are equivalent to one Animal Unit.
 (f) Seventy five per cent is a transfer to the Government.
 (g) These are transfer payments from the farmer to the focal farm. Their cost is included as operating expenses and income to the focal farm in Appendix Table 5.8.

Source: McGowan and Associates, 1976, Annex 17, p. 27.

APPENDIX TABLE 5.5

NEW CROP FARM: INVESTMENT PROJECTIONS (Market Prices) (a)

Investment Items	Unit	Unit Cost \$	Farm Year									
			1		2		3		4		5	
			No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$
			Fixed									
Rotary Hoe and Attachments	-	850.00	1	850								
Other Equipment	-	75.00	1	75								
Machinery Shed and Storage	-	200.00	1	200								
House	-	218.00	1	218								
Fencing	Chain	4.38	50	219								
Farm Survey	-	50.00	1	50								
Total Fixed Investment		-	-	1612								
Working Capital												
Plant Operating Costs	Hour	2.00	100	200	100	200	100	200	100	200	200	
Fertiliser	Ton	200.00	1	200	1.5	300	2	400	2	400	400	
Agricultural Chemicals	-	-	-	50	-	50	-	50	-	50	50	
Planting Materials	-	-	-	30	-	30	-	30	-	30	30	
Hired Labour	Manday	2.50	150	375	100	250	100	250	100	250	250	
Rent (b)	Acre	5.00	10	50	10	50	10	50	10	50	50	
Miscellaneous (5 per cent)	-	-	-	42	-	44	-	49	-	49	49	
Total Working Capital		-	-	947	-	924	-	1029	-	1029	1029	
Total Investment		-	-	2559	-	924	-	1029	-	1029	1029	

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Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.
(b) Seventy five per cent is a transfer to the Government.

Source: McGowan and Associates, 1976, Annex 8, p. 9.

APPENDIX TABLE 5.6

NEW CROP FARM: INCOME AND OPERATING EXPENSES
(Market Prices) (a)

	Unit	Unit Cost \$	Without Project \$ (c)	Farm Year										
				1	2	3	4	5	6	7	8	9	10	11-25
Income														
Crop Sales:														
Tobacco	Acre	320.00	-	-	320	320	320	320	320	320	320	320	320	320
Cucumber/Zucchini	Acre	1140.00	-	570	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
Mixed Vegetables	Acre	1200.00	-	600	900	1200	1200	1200	1200	1200	1200	1200	1200	1200
Expanded Subsistence	Acre	400.00	-	800	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Total Income			733	1970	3560	3860	3860	3860	3860	3860	3860	3860	3860	3860
Operating Expenses														
House Replacement	-	-	-	-	-	-	-	-	5000	-	-	-	-	-
Plant Operating Costs	Hour	2.0	-	-	-	-	-	-	200	200	200	200	200	200
Fertiliser	Ton	200.00	-	-	-	-	-	-	400	400	400	400	400	400
Agricultural Chemicals	-	-	-	-	-	-	-	-	50	50	50	50	50	50
Planting Materials	-	-	-	-	-	-	-	-	30	30	30	30	30	30
Hired Labour	Manday	2.50	-	-	-	-	-	-	250	250	250	250	250	250
Rent (b)	Acre	5.00	-	-	-	-	-	-	50	50	50	50	50	50
Miscellaneous (5 per cent)	-	-	-	-	-	-	-	-	49	49	49	49	49	49
Total Operating Expenses		-	86	-	-	-	-	-	6029	1029	1029	1029	1029	1029

Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.

(b) Seventy five per cent is a transfer to the Government.

(c) Estimated from a survey of crop farmers in the Sigatoka Valley (Chandra, 1978).

Source: McGowan and Associates, 1976, Annex 8, p. 10.

APPENDIX TABLE 5.7
 FOCAL FARM AND PROJECT ADMINISTRATION: INVESTMENT PROJECTIONS
 (Market Prices) (a)

Investment Items	Unit	Unit Cost \$	Project Year									
			1		2		3		4		5	
			No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$	No. Units	\$
Livestock Purchases: (b)												
Commercial Bulls	No.	596.00	-	17	10 132	43	25 628	49	29 204	60	35 760	-
Stud Bulls	No.	1318.00	-	-	-	7	9 226	-	-	-	-	-
Stud Heifers	No.	310.00	-	-	-	180	55 800	-	-	-	-	-
Pasture Establishment:												
Nadi	Acre	1.95	-	140	273	140	273	70	137	-	-	-
Leucaena	Acre	24.23	-	50	1 212	50	1 212	-	-	-	-	-
Siratro	Acre	23.28	-	150	3 492	150	3 492	-	-	-	-	-
Elephant	Acre	10.00	-	2	20	-	-	-	-	-	-	-
Fencing:												
Boundary	Chain	4.45	-	450	2 003	-	-	-	-	-	-	-
Internal	Chain	4.19	-	450	1 866	-	-	-	-	-	-	-
Cattle Yards	No.	550.00	-	0.5	275	0.5	275	-	-	-	-	-
Goat Yards	No.	160.00	-	0.5	80	0.5	80	-	-	-	-	-
Farm Survey	No.	3000.00	-	1	3 000	-	-	-	-	-	-	-
Weed Removal:												
Guava	Acre	4.12	-	20	82	40	165	-	-	-	-	-
Yagona	Acre	4.08	-	80	326	160	653	-	-	-	-	-
Pine Woodlot Establishment	Acre	2.75	-	-	-	-	-	-	-	4	11	-
Communal Loading Yards	(c) No.	420.00	-	2	840	2	840	3	1 260	3	1 260	-
Plant and Equipment	(d) No.	Variable	-	-	53 900	-	-	-	-	-	-	-
Focal Farm Buildings	(e) No.	Variable	-	-	218 000	-	-	-	-	-	-	-
Community Centre	(e) No.	Variable	-	-	-	-	-	-	-	-	-	-
Compensation Payment	(f)	-	-	2 000	-	-	-	-	-	-	-	-
Miscellaneous (5 per cent)	(f)	-	-	600	-	-	11 457	-	4 880	-	1 852	-
Total Investment	-	-	-	12 600	-	310 297	-	240 601	-	102 481	-	38 883

Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.

(b) See Annex 16, p. 11 of Consultants Report for details of basic herd projection.

(c) These yards are strategically located throughout the project area adjacent to the road.

(d) For details see Consultants Report, Annex 16, p. 9.

(e) For details see Consultants Report, Annex 16, p. 8.

(f) This represents a payment to be made to the present occupants of the land chosen for the focal farm.

Source: McGowan and Associates, 1976, Annex 16, p. 7.

APPENDIX TABLE 5.8

FOCAL FARM AND PROJECT ADMINISTRATION: INCOME AND OPERATING EXPENSES
(Market Prices) (a)

	Unit	Cost	Unit	Project Year												
				1	2	3	4	5	6	7	8	9	10	11-16	19-23	24-30
Income.																
Cattle Sales (b)	-	-	-	-	-	-	-	-	12 494	13 594	16 626	22 674	27 078	29 278	29 278	
Sire Agistment (c)	-	149	409	930	1 414	1 823	1 823	1 823	1 823	1 823	1 823	1 823	1 823	1 823	1 823	
Pine Woodlot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 200	
Total Income	-	149	409	930	930	1 414	1 823	12 317	15 417	18 499	24 497	28 901	32 301	31 101		
Operating Expenses.																
Cattle Purchases:																
Stud Bulls	No.	1318.00	-	-	-	-	3 954	-	3 954	2 636	-	-	-	-	-	
Animal Health - Cattle	AU	2.00	-	358	350	340	602	682	718	792	806	806	806	806		
Rent	Acre	0.20	-	230	230	230	230	230	230	230	230	230	230	230		
Pasture Maintenance	Acre	2.56	-	-	384	768	768	768	768	768	768	768	768	768		
Repairs and Maintenance	Year	90.00	-	-	90	90	90	90	90	90	90	90	90	90		
Woodlot Establishment	Acre	2.75	-	-	-	-	11	11	11	11	-	-	-	-		
Research (d)	Year	2000.00	3000	2 000	2 000	2 000	2 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000		
Office Requisites	Year	1000.00	2000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000		
Plant and Equipment	Year	-	600	3 600	8 600	8 600	8 600	5 500	5 500	5 500	5 500	5 500	5 500	5 500		
Operating Costs (e)	-	-	-	4 000	11 000	21 000	27 000	24 000	11 000	-	-	-	-	-		
Farmer Training Grant (f)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Miscellaneous (5 per cent)	-	280	792	1 184	1 704	2 003	1 964	966	615	553	421	421	421	421		
Total Operating Expenses	-	5880	16 622	24 846	35 742	42 031	41 219	20 247	12 886	11 580	8 815	8 815	8 815	8 815		

Notes: (a) These figures differ from those in the Consultants Report. Specifically, the sale price of cattle is assumed to be the same price as for the individual farm.

(b) Sales price assumed for cattle: cast for age bulls \$166, cull cows \$109, heifers \$95.32, cull bulls or steers \$130.28, working bulls within project \$200, outside project \$400. See Annex 16, pp. 11 of Consultants Report for basic herd projections.

(c) Based on \$7.00 per bull, i.e. 20 cents per week for 35 weeks and \$4.60 per buck.

(d) Research grant available for research on specific problems confronting the project.

(e) Plant and equipment costs for vehicles and plant associated with focal farm and project management. This item includes a replacement allowance for project vehicles.

(f) Payment made to farmers at the rate of \$500 per year for first two years.

Source: McGowan and Associates, 1976, Annex 16, p. 10.

APPENDIX TABLE 5.9

ROADS: INVESTMENT PROJECTIONS

(Market Prices, \$'000)

Investment Item	Unit	Project Year							
		1		2		3		4	
		No. Units	Cost \$'000	No. Units	Cost \$'000	No. Units	Cost \$'000	No. Units	Cost \$'000
<u>Fixed</u>									
Plant and Equipment (a)	No.	-	-	1	507.6	-	-	-	-
Spare Parts (a)	No.	-	-	1	46.6	-	-	-	-
Workshop Equipment and Tools (a)	No.	-	-	1	50.0	-	-	-	-
Sigatoka Bridge (b)	No.	-	-	-	-	1	45.0	-	-
Materials for Culverts and Roadside Furniture (c)	Mile	-	-	18.7	67.1	18.7	67.1	18.7	67.1
Total Fixed Investment	-	-	-	-	671.3	-	112.1	-	67.1
<u>Working Capital</u>									
Plant and Equipment	18.7 miles	-	-	18.7	73.3	18.7	73.3	18.7	73.3
Operating Costs (d)									

Notes: (a) See Annex 13, p. 27 of Consultants Report for details.
 (b) Three hundred foot timber structure at \$150 per linear foot.
 (c) See Annex 13, p. 30 of Consultants Report for details.
 (d) See Annex 13, pp. 28 and 29 of Consultants Report for details.

Source: McGowan and Associates, 1976, Annex 13, p. 33.

APPENDIX TABLE 5.10

ROADS: INCOME AND OPERATING EXPENSES

(Market Prices, \$'000)^(a)

	Project Year											
	1	2	3	4	5	6	7	8	9	10	11	12-30
<u>Income</u>												
Salvage Plant (b)					354.6							
<u>Operating Costs</u>												
Road Maintenance (b)					44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6

Notes: (a) These figures may differ from those contained in the Consultants Report due to minor corrections.
 (b) The salvage value of road plant is included as project income to avoid the computational difficulty associated with the valuation of the benefits accruing from the use of this plant after it is given to the Public Works Department. See Annex 13, p. 31 of Consultants Report.
 (c) Includes labour and materials cost. See Annex 13, p. 32.

Source: McGowan and Associates, 1976, Annex 13, p. 34.

APPENDIX TABLE 5.12

FORESTRY AND WATERSHED PROTECTION: SALES AND OPERATING EXPENSES
(Market Prices)

Item	Project Year														
	Without Project	1-12	13	14	15	16	17	18	19	20	21	22	23	24	25
<u>Sales</u>															
Timber (a), (b), (c)	-	-	-	-	-	-	-	-	-	-	-	37 500	37 500	37 500	37 500
<u>Operating Expenses</u>															
Maintenance Labour (d)	-	-	-	-	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

Notes: (a) Assume only 25 per cent of the area is harvested due to difficult access etc.
 (b) Production based on MAI of 200 cubic feet per acre at 15 years.
 (c) Sales based on \$10 per 100 cubic feet.
 (d) Operating expenses based on \$2.50 per day for labour. Refers to general maintenance. In addition the Project Forester contributes to maintenance.

Source: McGowan and Associates, 1976, Annex 9, p. 16.

APPENDIX TABLE 5.13

FIJI DEVELOPMENT AND TRAINING STAFF: WAGE AND SALARY PROJECTION

Staff Occupation	No. Staff	Level Public Service	Unit	per Unit \$	Project Year											11+									
					1		2		3		4		5		6		7		8		9		10		
					No. Unit	Cost \$	No. Unit	Cost \$	No. Unit	Cost \$	No. Unit	Cost \$	No. Unit	Cost \$	No. Unit		Cost \$	No. Unit	Cost \$	No. Unit	Cost \$	No. Unit	Cost \$	No. Unit	Cost \$
Land Development																									
Assistant to General Manager	1	5	Man Year	5 500	-	-	1	5 500	1	5 500	1	5 500	1	5 500	1	5 500	1	5 500	1	5 500	1	5 500			
Loans Supervisor	1	6	Man Year	4 700	-	-	1	4 700	1	4 700	1	4 700	1	4 700	1	4 700	1	4 700	1	4 700	1	4 700			
Office Manager	1	7	Man Year	4 000	-	-	1	4 000	1	4 000	1	4 000	1	4 000	1	4 000	1	4 000	1	4 000	1	4 000			
Horticulture Specialist	1	7	Man Year	3 500	-	-	-	1	3 500	1	3 500	1	3 500	1	3 500	1	3 500	1	3 500	1	3 500				
Forester	1	7	Man Year	3 500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Focal Farm Foreman	1	8/9	Man Year	3 100	-	-	0.75	2 325	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100			
Task Force Foreman	1	8/9	Man Year	3 100	-	-	0.75	2 325	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100			
Task Force Foreman	1	8/9	Man Year	3 100	-	-	0.75	2 325	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100	1	3 100			
Office Clerks	3	4	Man Year	2 000	-	-	3	6 000	3	6 000	3	6 000	3	6 000	3	6 000	3	6 000	3	6 000	3	6 000			
Farm Hands	4	4	Man Year	2 000	-	-	3	6 000	4	8 000	4	8 000	4	8 000	4	8 000	4	8 000	4	8 000	4	8 000			
Yard Builders and Fencers	4	4	Man Year	2 000	-	-	3	6 000	4	8 000	4	8 000	4	8 000	4	8 000	4	8 000	4	8 000	4	8 000			
Sub Total			Man Years		-	-	14.25	39 175	18	49 000	18	49 000	19	52 500	16.5	46 950	12	36 100	11.5	34 550	8.75	25 725			
Add Social Service 15%					-	-	-	5 876	7 350	7 350	7 875	7 875	7 875	7 875	7 875	7 875	5 415	5 183	5 183	5 183	3 859	3 859			
Sub Total Land Development					-	-	-	45 051	56 350	56 350	60 375	60 375	60 375	60 375	60 375	53 993	41 515	39 733	39 733	29 584	29 584				
Road Construction																									
Works Supervisor	1		Man Year	3 140	-	-	1	3 140	1	3 140	1	3 140	-	-	-	-	-	-	-	-	-	-			
Road Foreman	1		Man Year	2 400	-	-	1	2 400	1	2 400	1	2 400	-	-	-	-	-	-	-	-	-	-			
Mechanical Supervisor	1		Man Year	3 140	-	-	1	3 140	1	3 140	1	3 140	-	-	-	-	-	-	-	-	-	-			
Mechanic	1		Man Year	2 440	-	-	1	2 440	1	2 440	1	2 440	-	-	-	-	-	-	-	-	-	-			
Storeman	1		Man Year	1 750	-	-	1	1 750	1	1 750	1	1 750	-	-	-	-	-	-	-	-	-	-			
Pay Clerk	1		Man Year	1 500	-	-	1	1 500	1	1 500	1	1 500	-	-	-	-	-	-	-	-	-	-			
Sub Total					-	-	6	14 370	6	14 370	6	14 370	-	-	-	-	-	-	-	-	-	-			
Add Administration and Social Charge 50%					-	-	-	7 185	7 185	7 185	7 185	7 185	-	-	-	-	-	-	-	-	-	-			
Sub Total Permanent Staff					-	-	-	21 555	21 555	21 555	21 555	21 555	-	-	-	-	-	-	-	-	-	-			
Equipment Operators (a)	6		Man Year	2 640	-	-	6	15 840	6	15 840	6	15 840	-	-	-	-	-	-	-	-	-	-			
Truck and Tractor Drivers	8		Man Year	2 240	-	-	8	17 920	8	17 920	8	17 920	-	-	-	-	-	-	-	-	-	-			
Light Plant Operators	2		Man Year	2 240	-	-	2	4 480	2	4 480	2	4 480	-	-	-	-	-	-	-	-	-	-			
Charge Hands	2		Man Year	2 800	-	-	2	5 600	2	5 600	2	5 600	-	-	-	-	-	-	-	-	-	-			
Carpenters	2		Man Year	2 240	-	-	2	4 480	2	4 480	2	4 480	-	-	-	-	-	-	-	-	-	-			
Steel Fixer	1		Man Year	1 960	-	-	1	1 960	1	1 960	1	1 960	-	-	-	-	-	-	-	-	-	-			
Labourers	15		Man Year	1 820	-	-	15	27 300	15	27 300	15	27 300	-	-	-	-	-	-	-	-	-	-			
Sub Total Temporary Staff					-	-	36	77 580	36	77 580	36	77 580	-	-	-	-	-	-	-	-	-	-			
Sub Total Road Construction					-	-	42	99 135	42	99 135	42	99 135	-	-	-	-	-	-	-	-	-	-			
PROJECT TOTAL \$					-	-	-	144 186	-	155 485	-	155 485	-	60 375	-	60 375	-	41 515	-	39 733	-	29 584			

Notes: (a) Based on hourly rates assuming 275 working days of 8 hours per day.

Source: McGowan and Associates, 1976, Annex 15, p. 16.

APPENDIX TABLE 5.14

EXPATRIATE DEVELOPMENT AND TRAINING STAFF: WAGE AND SALARY PROJECTION

Staff Occupation	Unit	Salary		Project Year																			
		Base Rate A\$ per Unit	Country Allowances A\$/Unit	1		2		3		4		5		6		7		8		9		10	
				Total A\$	per No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit	Cost A\$	No. Unit
Full Time Fiji (A)																							
General Manager	Man Year	19 000	3 700	22 700	2 12	3 783	1	22 700	1	22 700	1	22 700	1	22 700	1	22 700	1	22 700	1	22 700	1	22 700	1
Farm Management Specialist	Man Year	14 100	2 700	16 800	-	-	1	16 800	1	16 800	1	16 800	1	16 800	1	16 800	1	16 800	-	-	-	-	-
Farm Development Supervisor	Man Year	9 000	1 700	10 700	-	-	9 12	8 025	1	10 700	1	10 700	1	10 700	1	10 700	1	10 700	-	-	-	-	-
Farm Development Supervisor	Man Year	9 000	1 700	10 700	-	-	9 12	8 025	1	10 700	1	10 700	6 12	5 350	-	-	-	-	-	-	-	-	-
Road Engineer	Man Year	15 000	2 700	17 700	2 12	2 950	1	17 700	1	17 700	8 12	11 800	-	-	-	-	-	-	-	-	-	-	
Machinery Supervisor	Man Year	13 100	1 700	14 800	-	-	1	14 800	1	14 800	1	14 800	-	-	-	-	-	-	-	-	-	-	
Total Salary Full Time Staff	Man Year	-	-	6 733	5 12	88 050	6	93 400	5 12	87 500	3 12	55 550	3	50 200	1	22 700	1	22 700	1	22 700	1	22 700	1
Airfares and Establishment Costs (C)																							
Overheads (110% of Base Salary)		-	-	3 740	-	8 280	-	4 000	-	4 000	-	4 500	-	2 000	-	1 200	-	1 200	-	1 200	-	1 200	-
Rent Allowance (a)		-	-	6 234	-	82 170	-	87 120	-	81 620	-	51 260	-	46 310	-	20 900	-	20 900	-	20 900	-	20 900	-
		-	-	350	-	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sub Total (A)		-	-	17 407	-	193 200	-	184 520	-	173 120	-	111 310	-	98 510	-	44 800	-	44 800	-	44 800	-	44 800	-
Part time Support Consultants (B)																							
Project Supervisor - Overall	Man Month	-	-	5 000	1	5 000	2	10 000	2	10 000	2	10 000	2	10 000	1	5 000	1	5 000	1	5 000	1	5 000	1
Project Supervisor - Roads	Man Month	-	-	5 000	1	5 000	2	10 000	1	5 000	-	-	-	-	-	-	-	-	-	-	-	-	
Special Consultants	Man Month	-	-	4 500	-	-	3	13 500	4	18 000	3	13 500	2	9 000	1	4 500	-	4 500	-	4 500	-	4 500	-
Purchasing Officer	Man Month	-	-	4 500	2	9 000	1	4 500	1	4 500	1	4 500	1	4 500	1	4 500	-	4 500	-	4 500	-	4 500	-
Per Diems in Fiji	Month	-	-	750	3	2 250	5	3 750	6	4 500	5	3 750	3	2 250	2	1 500	1	750	1	750	1	750	1
Travelling Expenses	Return Flight	-	-	400	2	800	4	1 600	5	2 000	4	1 600	3	1 200	2	800	1	400	1	400	1	400	1
Sub Total (B)	Man Months	-	-	-	10	22 050	18	47 850	20	49 000	16	38 350	11	26 950	8	21 300	3	6 150	3	6 150	3	6 150	3
TOTAL (A) + (B)	A\$ Man Years	-	-	-	-	39 457	-	241 050	-	233 520	-	211 470	-	138 260	-	119 810	-	50 950	-	50 950	-	50 950	-
	F\$ Man Years	-	-	-	-	42 614	-	260 334	-	252 202	-	228 3 8	-	149 321	-	129 395	-	55 026	-	55 026	-	55 026	-

Notes: (a) Until end of Year 2 at \$350 per month when houses are completed house provided in Sigatoka by FWD rent free.

(b) Based on Local Allowance \$2,030, child allowance \$320, Domestic provided for single man plus Local Allowance of \$770.

(c) Based on return airfare to Australia annually; married man tran costs \$775.

Source: McGowan and Associates, 1976, Annex 15, p. 17.

APPENDIX TABLE 5.15
NEW LIVESTOCK FARM: INCREMENTAL CASH FLOWS AT MARKET PRICES
(\$F)

	Without Project	Farm Year																
		1	2	3	4	5	6	7	8	9	10	11-12	13-15	16-18	19-23	24-25		
<u>Cash Inflow</u>																		
Cattle Sales	-	-	-	-	-	-	2738	3023	3876	4361	4752	4790	4790	4790	4790	4790		
Goat Sales	-	-	357	379	426	495	520	520	520	520	520	520	520	520	520	520		
Crop Sales	530	795	795	795	795	795	795	795	795	795	795	795	795	795	795	795		
Training Grant	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Pine Woodlot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200		
FDB Loan:																		
Cattle and Goats	4380	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Other Items	4037	3534	958	678	488	-	-	-	-	-	-	-	-	-	-	-		
House (a)	-	-	-	-	-	-	-	5000	-	-	-	-	-	-	-	-		
Total Inflow	733	9447	5229	2110	1852	1709	4028	4338	10191	5676	6067	6105	6105	6105	7305	6105		
<u>Cash Outflow</u>																		
Investments	8417	3934	958	678	488	-	-	-	-	-	-	-	-	-	-	-		
Operating Expenses (b)	-	-	-	-	-	609	562	6243	576	564	564	633	633	633	633	633		
Debt Service:																		
Interest Payments (c)	169	415	513	546	569	-	-	-	-	-	-	-	-	-	-	-		
Principal and Interest	-	-	-	-	-	-	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785		
House Repayments (d)	-	-	-	-	-	-	-	1252	1252	1252	1252	1252	1252	1252	1252	1252		
Total Outflow	86	8586	4349	1471	1224	1057	2394	2347	9280	3613	3601	3670	2418	633	633	633		
Net Cash Flow	647	861	880	639	628	652	1634	1991	911	2063	2466	2435	3687	5472	6672	5472		
Incremental Net Cash Flow	-	214	233	-8	-19	5	987	1344	264	1416	1819	1788	3040	4825	6025	4825		

Notes: (a) House loan is separate from farm development loan and is assumed to be taken in year 8.
 (b) Operating expenses include house replacement in year 8.
 (c) Principal repayment holiday for the first five years; interest payable at 4 per cent per annum throughout.
 (d) House loan assumed to be repaid over five years at 8 per cent interest.

Source: Appendix Tables 5.1 and 5.2.

APPENDIX TABLE 5.16
EXISTING LIVESTOCK FARM: INCREMENTAL CASH FLOWS AT MARKET PRICES
(\$F)

	Without Project	Farm Year															
		1	2	3	4	5	6	7	8	9	10	11-12	13-15	16-18	19-23	24-25	
<u>Cash Inflow</u>																	
Cattle Sales	710	967	-	1611	521	1523	4179	4231	4231	4752	4790	4790	4790	4790	4790	4790	4790
Goat Sales	-	-	-	357	379	426	495	520	520	520	520	520	520	520	520	520	520
Crop Sales	200	530	795	795	795	795	795	795	795	795	795	795	795	795	795	795	795
Training Grant	-	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pine Woodlot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200	-
FDB Loan:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cattle and Goats	-	4020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Items	-	3567	3363	785	713	507	-	-	-	-	-	-	-	-	-	-	-
House (a)	-	-	-	-	-	-	-	-	5000	-	-	-	-	-	-	-	-
Total Inflow	910	9584	4658	3548	2408	3251	5469	5546	10 546	6067	6105	6105	6105	6105	7305	6105	6105
<u>Cash Outflow</u>																	
Investments	-	7587	3363	785	713	507	-	-	-	-	-	-	-	-	-	-	-
Operating Expenses (b)	-	-	-	-	-	-	1047	569	5826	786	564	633	633	633	633	633	633
Debt Service:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest Payments	-	152	371	454	484	508	-	-	-	-	-	-	-	-	-	-	-
Principal and Interest (c)	-	-	-	-	-	-	1597	1597	1597	1597	1597	1597	1597	1597	-	-	-
House Repayments (d)	-	-	-	-	-	-	-	-	1252	1252	1252	1252	1252	-	-	-	-
Total Outflow	75	7739	3734	1239	1197	1015	2644	2166	8675	3635	3413	3482	2230	633	633	633	633
Net Cash Flow	835	1845	924	2309	1211	2236	2825	3380	1871	2432	2692	2623	3875	5472	6672	5472	5472
Incremental Net Cash Flow	-	1010	89	1474	376	1401	1990	2545	1036	1597	1857	1788	3040	4637	5837	4637	4637

Notes: (a) House loan is separate from farm development loan and is assumed to be taken in year 8.
 (b) Operating expenses include house replacement in year 8.
 (c) Principal repayment holiday for the first five years; interest payable at 4 per cent per annum throughout.
 (d) House loan assumed to be repaid over five years at 8 per cent interest.

Source: Appendix Tables 5.3 and 5.4.

APPENDIX TABLE 5.17

NEW CROP FARM: INCREMENTAL CASH FLOWS AT MARKET PRICES

(\$F)

	Without Project	Farm Year										
		1	2	3	4	5	6	7	8	9	10	11-25
<u>Cash Inflow</u>												
Crop Sales	1970	3560	3860	3860	3860	3860	3860	3860	3860	3860	3860	3860
Farm Loan (a)	2559	-	-	-	-	-	-	-	-	-	-	-
House Loan	-	-	-	-	-	-	5000	-	-	-	-	-
Total Inflow	733	4529	3560	3860	3860	3860	8860	3860	3860	3860	3860	3860
<u>Cash Outflow</u>												
Investments (b)	2559	924	1029	1029	1029	-	-	-	-	-	-	-
Recurrent Expenses (a)	-	-	-	-	-	6029	1029	1029	1029	1029	1029	1029
Debt Service:												
Farm Repayment (b)	575	575	575	575	575	-	-	-	-	-	-	-
House Repayment (c)	-	-	-	-	-	1252	1252	1252	1252	1252	1252	-
Total Outflow	86	3134	1499	1604	1604	1604	7281	2281	2281	2281	2281	1029
Net Cash Flow	647	1395	2061	2256	2256	2256	1579	1579	1579	1579	1579	2831
Incremental Net Cash Flow	-	748	1414	1609	1609	1609	932	932	932	932	932	2184

- Notes: (a) Farm loan represents total investment costs for year 1.
 (b) Farm loan repaid over five years at 4 per cent interest.
 (c) House loan repaid over five years at 8 per cent interest.

Source: Appendix Tables 5.5 and 5.6.

APPENDIX TABLE 5.18

PER CAPITA CONSUMPTION BY FARM TYPE WITHOUT REDISTRIBUTION TO MATAQALI

	New Livestock Farm		Existing Livestock Farm		New Crop Farm	
	Years		Years		Years	
	2-15	16-30	2-15	16-30	2-15	16-30
<u>With the Project</u>						
Net Income (\$F) (a)	1220	5407	1863	5449	1982	2831
Average Family Size (b)	5.6	5.6	5.6	5.6	5.6	5.6
Per Capita Income (\$F)	218	966	333	973	354	506
Marginal Propensity to Consume (c)	1.0	0.9	1.9	0.9	1.9	0.9
Per Capita Consumption	218	869	333	876	354	455
<u>Without the Project</u>						
Net Income (\$F)	647		835		647	
Average Family Size (b)	5.6		5.6		5.6	
Per Capita Income (\$F)	116		149		116	
Marginal Propensity to Consume (c)	1.0		1.0		1.0	
Per Capita Consumption	116		149		116	

Notes: (a) Average annual income per farm after loan repayment.
 (b) Average family size for Fijian crop farm family (Chandra, 1978).
 (c) Estimates of the marginal propensity to consume are not available for Fiji but it is reasonable to assume that some income will be saved given the non-marginal increase in income from the project.

Source: Chandra, 1978; Appendix Tables 5.15 to 5.17.

APPENDIX TABLE 5.19

PER CAPITA CONSUMPTION BY FARM TYPE WITH REDISTRIBUTION TO MATAQALI

	New Livestock Farm			Existing Livestock Farm			New Crop Farm			Mataqali Family (a)		
	Years			Years			Years			Years		
	2-10	11-15	16-30	2-10	11-15	16-30	2-10	11-15	16-30	11-15	16-30	16-30
<u>With the Project</u>												
Net Income (\$F) (b)	707	1714	4326	1439	2221	4359	1733	1944	2265	954	2182	
Average Family Size (c)	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	
Per Capita Income (\$F)	126	306	773	257	397	778	309	347	404	170	390	
Marginal Propensity to Consume (d)	1.0	0.9	0.9	1.0	0.9	0.9	1.0	0.9	0.9	1.0	0.9	
Per Capita Consumption	126	275	696	257	357	701	309	312	364	170	351	
<u>Without the Project</u>												
Net Income (\$F)		647			835			647		647		
Average Family Size (c)		5.6			5.6			5.6		5.6		
Per Capita Income (\$F)		116			149			116		116		
Marginal Propensity to Consume (d)		1.0			1.0			1.0		1.0		
Per Capita Consumption		116			149			116		116		

Notes: (a) Income is 20 per cent of individual farmers average annual income. About 50 Mataqali owned the land on which the project is located.
 (b) Average annual income after loan repayment.
 (c) Average family size for Fijian crop farm family (Chandra, 1978).
 (d) Estimates of the marginal propensity to consume are not available for Fiji but it is reasonable to assume that some income will be saved given the non-marginal increase in income from the project.

Source: Chandra, 1978; Appendix Tables 5.14 to 5.16.

APPENDIX TABLE 5.20

SUMMARY OF UNSKILLED LABOUR REQUIREMENTS
(Man Hours/Unit)

	Unit	Livestock Farm	Crop Farm	Focal Farm	Protection Area
<u>For Development</u>					
Pasture Establishment:					
Nadi	Acre	1.0	-	1.0	
Leucaena	Acre	8.0	-	8.0	
Siratro	Acre	4.5	-	4.5	
Fencing	Chain	2.5	2.5	-	
Cattle Yards	No.	120.0	-	-	
Goat Yards and Paddock	No.	50.0	-	-	
House	No.	200.0	200.0	-	
Weed Removal:					
Guava	Acre	33.0	-	33.0	
Yaqona	Acre	5.0	-	5.0	
<u>For Maintenance</u>					
Pasture Maintenance:					
Leucaena	Acre	2.25	-	2.25	
Siratro	Acre	2.0	-	2.0	
Hired Labour and Contract:(a)					
Year 1	Year	547.0(b)	750.0	-	
Year 2	Year	127.0(b)	500.0	-	
Family Labour (a),(c)	Year	1000.0	1000.0	-	
General Maintenance					Variable (d)

- Notes: (a) Assumes five hours per day (McGowan and Associates Pty Ltd, 1976).
 (b) 'New' livestock farms only.
 (c) Assumes 200 working days per year.
 (d) See Appendix Table 5.11.

Source: Personal correspondence with project team leader.

APPENDIX 6.1

PROCEDURE FOR ESTIMATION OF ECONOMIC PRICES

The Yalavou Project is analysed using the economic prices in the Consultants Report and the economic prices derived from the SVT methodology. Following are the features common to both sets of prices and their differences are highlighted below.

The assumptions of the economic analysis of the Yalavou Project for both sets of prices are:

- a. The prices of all outputs and investment and operating cost items remain at 1975 price levels in real terms.
- b. All subsidies (taxes) are added (deducted) to (from) the current market prices.
- c. All transfer payments are excluded because no services were performed.
- d. Land is assumed to be already owned by the farmer and is not valued at its opportunity cost. Only the rent on the land is valued.
- e. Value of the herd is attributed to the final year of the project and the residual value of the road plant is attributed to the project in year 5, at the end of the construction period.
- f. All costs are separated into investment, operating and labour components.

Consultants Estimates of Economic Prices

The Consultants economic prices for output and investment and operating cost items are domestic market prices adjusted for subsidies and

taxes. There are no import duties levied on the cattle and plant and equipment purchased from Australia. Appendix Table 6.1.1 provides the subsidies and taxes. Details of the extent of all subsidies and taxes was not available and so the difference between the market price and the economic price was taken as being a 'net' subsidy/tax.

The economic price (opportunity cost) of labour other than skilled labour is valued at \$F0.30 per man-hour or \$F1.50 per man day.

The official and shadow rates of exchange were assumed to be equal as there are minimal restrictions on foreign exchange in Fiji.

In the Feasibility Report income and costs without the project were provided only for the existing livestock farms. The estimates for both the new livestock farms and crop farms is incorporated in this study and therefore differs from the Feasibility Report. These values for without project income and costs remain unchanged at market prices.

The incremental net cash flow is presented in Appendix Table 6.1.2. Appendix Table 6.1.3 contains the actual economic prices estimated by the Consultants.

Estimates of Border Prices (SVT Methodology)

The estimation of outputs and inputs at border prices requires the elimination of all transfer payments and the decomposition of each item into traded, non-traded and labour components and the valuation of each in terms of border prices. The first step has been completed in the Consultants economic prices, and is used as the starting point for the estimation of SVT's border prices.

With the exception of output prices each investment and operating cost item has been decomposed into traded and non-traded components based on the crude approximation of the percentage foreign exchange component.¹

¹ This information was obtained from McGowan and Associates (1976) and personal communication with the project team leader.

APPENDIX TABLE 6.1.1

CONSULTANTS ESTIMATED ECONOMIC PRICES:

SUBSIDIES AND TAXES

Superphosphate:	Market Price	\$108 per ton
	Subsidy	\$48 per ton
	Economic Price	\$156 per ton

Pasture Establishment

Application rate of 400 pounds of superphosphate per acre.

	Leucaena (acre)	Siratro (acre)
Market Price	\$ 24.23	23.28
Subsidy	\$ 8.56	8.56
Economic Price	\$ 32.79	31.84

Pasture Maintenance

Application rate of 53 pounds of superphosphate per acre.

Market Price	\$2.56
Subsidy	\$1.13
Economic Price	\$3.69

Fencing

	Livestock Farm (chain)	Focal Farm	
		Internal (chain)	Boundary (chain)
Market Price	\$ 4.38	4.19	4.98
Subsidy	\$ 2.94	2.87(a)	3.27
Import Duty	\$ 0.26	-	0.70
Economic Price	\$ 7.06	7.06	7.55

Note: (a) This is a net subsidy. Details of import duty were not available.

Weed Removal

Guava - application of 1 gallon of 245-T plus 29 gallons of diesel to 5 acres.

Yagona - application of 0.5 gallons of 245-T to 80 gallons of water per acre

	245-T (gallon)	Diesel (gallon)
Market Price	\$ 8.16	0.57
Subsidy	\$ 8.10	-
Import Duty	\$ -	0.01
Economic Price	\$ 16.26	0.56

APPENDIX TABLE 6.1.1 (Cont'd)

The economic price of the following items was provided in a personal communication from the Project team leader. The details of the derivation of these prices is not available and therefore the difference between the market price and the economic price is assumed to represent either a net subsidy or net tax.

Item	Market Price \$	Net Subsidy \$	Net Tax \$	Economic Price \$
Cattle Yards:				
Individual Farm	274	148		422
Focal Farm	550	530		920
Goat Yards:				
Individual Farm	340	30		370
Focal Farm	160	20		180
House (Bure)	218	27		245
Pine Woodlot Establishment (acre)	2.75	11.25		14.00
Rotary Hoe and Attachments	850		85	765
Establishment Elephant Grass Pasture	10.00	5.00		15.00
Communal Loading Yards	420	210		630
Focal Farm Buildings	311500		103730	207770
Community Centre	105000		34965	70035

Focal Farm Plant and Equipment Operating Costs - 10 per cent net tax.

The Consultants economic cost of Fijian and Expatriate Project staff is 93 per cent and 66 per cent respectively, of the market price and is assumed to be taxation in this study.

All livestock and plant and equipment are imported duty free.

Sources: Personal Correspondence with Project team leader.
McGowan and Associates, 1976.

APPENDIX TABLE 6.1.3

ESTIMATION OF BORDER PRICES OF INVESTMENT AND OPERATING COST ITEMS (excluding labour)

(\$)

Unit	Total Cost		Foreign Exchange Costs	Local Cost		Local Cost at Border Prices	Foreign Exchange Cost	Total Cost at Border Price
	at Consultants Economic Price			at Consultants Economic Price				
	(a)	(b)		(c)	(d)			
Investment Cost Items								
Livestock Farms:								
Livestock Purchases: (a)								
Heifers	No.	241.00	231.00	10.00	8.70	231.00	239.70	
Does	No.	45.00	27.00	18.00	15.66	27.00	42.66	
Bucks	No.	60.00	-	60.00	52.80	-	52.80	
Pasture Establishment:								
Nadi	Acre	1.95	-	1.95	1.70	-	1.70	
Leucaena	Acre	32.79	28.53	4.26	3.71	28.53	32.24	
Siratro	Acre	31.84	28.34	3.50	3.05	28.34	31.39	
Fencing	Chain	7.66	3.53	3.53	3.07	3.53	6.60	
Cattle Yards	No.	422.00	-	422.00	367.14	-	367.14	
Goat Yards and Paddock	No.	370.00	-	370.00	321.90	-	321.90	
House (b)	No.	245.00	19.60	225.40	196.10	19.60	215.70	
Weed Removal:								
Guava	Acre	5.42	5.26	0.16	0.14	5.26	5.40	
Yagona	Acre	8.13	8.05	0.08	0.07	8.05	8.12	
Pine Woodlot Establishment	Acre	14.00	-	14.00	12.18	-	12.18	
Farm Survey	No.	1500.00	-	1500.00	1305.00	-	1305.00	
Farm Equipment	No.	100.00	50.00	50.00	43.50	50.00	93.50	
Crop Farms:								
Rotary Hoe and Attachments		765.00	459.00	306.00	266.22	459.00	752.22	
Other Equipment		75.00	45.00	30.00	26.10	45.00	71.10	
Machinery Shed and Storage		200.00	-	200.00	174.00	-	174.00	
House	No.	245.00	19.60	225.40	196.10	19.60	215.70	
Fencing	Chain	7.06	3.53	3.53	3.07	3.53	6.60	
Farm Survey	No.	50.00	-	50.00	43.50	-	43.50	

APPENDIX TABLE 61.3(CONT'D)

Roads:									
Plant and Equipment	No.	507600.00	507600.00	-	-	507600.00	507600.00	507600.00	507600.00
Spare Parts	No.	46600.00	34950.00	11650.00	10135.50	34950.00	34950.00	45085.50	
Workshop Equipment and Tools	No.	50000.00	50000.00	-	-	50000.00	50000.00	50000.00	
Sigatoka Bridge	No.	45000.00	29700.00	15300.00	13311.00	29700.00	29700.00	43011.00	
Materials for Culverts and Roadside Furniture	Mile	3.588	2.332	1.256	1.093	2.332	2.332	3.425	
Focal Farm and Project Administration:									
Livestock Purchases:									
Commercial Bulls	No.	596.00	581.00	15.00	13.05	581.00	581.00	594.05	
Stud Bulls	No.	1318.00	1288.00	30.00	26.10	1288.00	1288.00	1314.10	
Stud Heifers	No.	310.00	295.00	15.00	13.05	295.00	295.00	308.05	
Pasture Establishment:									
Nadi	Acre	1.95	-	1.95	1.70	-	-	1.70	
Leucaena	Acre	32.79	28.53	4.26	3.71	28.53	28.53	32.24	
Siratro	Acre	31.84	28.34	3.50	3.05	28.34	28.34	31.39	
Elephant	Acre	15.00	13.05	1.95	1.70	13.05	13.05	14.75	
Fencing:									
Boundary	Chain	7.55	4.84	2.71	2.36	4.84	4.84	7.20	
Internal	Chain	3.53	3.53	7.06	3.07	3.53	3.53	6.60	
Cattle Yards	No.	920.00	-	920.00	800.40	-	-	800.40	
Goat Yards	No.	180.00	-	180.00	156.60	-	-	156.60	
Farm Survey	No.	3000.00	-	3000.00	2610.00	-	-	2610.00	
Weed Removal:									
Guava	Acre	5.42	5.26	0.16	0.14	5.26	5.26	5.40	
Yaqona	Acre	8.13	8.05	0.08	0.07	8.05	8.05	8.12	
Pine Woodlot Establishment	Acre	14.00	-	14.00	12.18	-	-	12.18	
Communal Loading Yards	No.	630.00	-	630.00	548.10	-	-	548.10	
Plant and Equipment	No.	63900.00	58149.00	5751.00	5003.37	58149.00	58149.00	63152.37	
Focal Farm Buildings	No.	207700.00	30310.00	177390.00	154329.00	30310.00	30310.00	184639.00	
Community Centre	No.	70035.00	11906.00	58129.00	50572.00	11906.00	11906.00	62478.00	
Compensation Payment	No.	2000.00	-	2000.00	1740.00	-	-	1740.00	

APPENDIX TABLE 6.1.3(CONT'D)

Protection Area Forests and Management:									
Training Course	No.	3000.00	-	3000.00	2610.00	-	2610.00		
Access Roads to Production Areas	Mile	500.00	-	500.00	435.00	-	435.00		
Timber Seedlings	Thous.	4.00	-	4.00	3.48	-	3.48		
Planting Costs	Acre	17.50	-	17.50	15.23	-	15.23		
Operating Cost Items									
Livestock Farms:									
Animal Health - Cattle	No.	1.50	0.90	0.60	0.52	0.90	1.42		
Goat Management	No.	6.83	4.10	2.73	2.38	4.10	6.48		
Rent	Acre	0.50	-	0.05	0.05	-	0.05		
Pasture Maintenance:									
Leucaena	Acre	-	-	-	-	-	-		
Siratro	Acre	3.69	3.06	0.63	0.55	3.06	3.61		
Repairs and Maintenance	Year	45.00	22.50	22.50	19.58	22.50	42.08		
House Replacement	No.	5000.00	400.00	4600.00	4002.00	400.00	4402.00		
Pine Woodlot Establishment	Acre	14.00	-	14.00	12.18	-	12.18		
Crop Farms:									
House Replacement	No.	5000.00	400.00	4600.00	4002.00	400.00	4402.00		
Plant Operating Costs	Hour	1.50	0.90	0.60	0.52	0.90	1.42		
Fertiliser	Ton	248.00	200.00	48.00	41.76	200.00	241.76		
Agricultural Chemicals	Year	50.00	30.00	20.00	17.40	30.00	47.40		
Planting Materials	Year	30.00	18.00	12.00	10.44	18.00	28.44		
Rent	Acre	0.10	-	0.10	0.10	-	0.10		
Roads:									
Plant and Equipment	18.7								
Operating Costs (a)	Miles	73300.00	54975.00	18325.00	15943.00	54975.00	70918.00		
Road Maintenance (a)	Year	24337.00	18253.00	6084.00	5293.00	18253.00	23546.00		

APPENDIX TABLE 6.1.3(CONT'D)

Focal Farm and Project									
Administration:									
Cattle Purchases:									
Stud Bulls	No.	1318.00	1288.00	30.00	26.10	1288.00	1314.10		
Animal Health - Cattle	No.	2.00	1.20	0.80	0.70	1.20	1.90		
Rent	Acre	0.05	-	0.05	0.05	-	0.05		
Pasture Maintenance:									
Siratro	Acre	3.69	3.06	0.63	0.55	3.06	3.61		
Repairs and Maintenance	Year	90.00	45.00	45.00	39.15	45.00	84.15		
Pine Woodlot Establishment	Acre	14.00	-	14.00	12.18	-	12.18		
Research	Year	2000.00	-	2000.00	1740.00	-	1740.00		
Office Requisites	Year	1000.00	500.00	500.00	435.00	500.00	935.00		
Plant and Equipment									
Operating Costs (e)	Variable								

- Notes: (a) Market price adjusted for subsidies and taxes.
 (b) Foreign exchange component as provided in personal communication with the project team leader.
 (c) Local cost at consultants economic price multiplied by the Standard Conversion Factor ($\alpha=0.87$).
 (d) Local cost at border price plus foreign exchange cost.
 (e) Foreign exchange component is 80 per cent of the total cost.

The traded or foreign exchange component is assumed to be at its border price value and the non-traded or domestic component is revalued at border prices by multiplying by the Standard Conversion Factor. Details of the revaluation of the investment and operating cost items from the Consultants economic price to SVT's economic price is shown in Appendix Table 6.1.3.

The unskilled labour component (See Appendix Table 5.20) is measured in border prices at the economic wage rate value of \$F0.25 per man-hour or \$F1.25 per man day.

In the Consultants economic analysis all output was valued at domestic market prices. However, domestic cattle production reduces beef imports and therefore the appropriate border price is the projected c.i.f. import price adjusted by the local transport and marketing margin revalued to its border price equivalents by multiplying by the Standard Conversion Factor. The selection of the appropriate border price is not always easy (Guisinger and Papageorgiou, 1976). Meat is imported into Fiji in either fresh or frozen form from both Australia and New Zealand. The border price selected for this study is the weighted average c.i.f. price based on the respective c.i.f. values and volume of imports of 'Meat of Bovine Animals' from Australia and New Zealand for 1974 and 1975.¹ (Fiji, Bureau of Statistics, *Trade Report* 1975.) Hence, the weighted average border price is \$F0.45 per pound carcass weight.² No direct estimate of handling and transport costs were available and consequently a value of \$F0.01 per

1 This category has statistical code 011-110 and is mainly composed of frozen and fresh beef and veal. Because of the level of aggregation the reliability of both value and volume figures is questionable. Also, price controls were introduced to set maximum retail prices for locally produced beef and maximum mark-ups on imported beef. However, the Government was unable to influence the landed cost of meat (McGowan and Associates, 1976, Annex 6, p.5).

2 Carcass weight represents approximately 60 per cent of liveweight (Personal Communication, Bureau of Agricultural Economics, Australia).

pound liveweight was adopted.¹ Appendix Table 6.1.4 shows the comparative economic prices used in the Consultants Report and those estimated in this study using the SVT methodology.

APPENDIX TABLE 6.1.4
UNIT ECONOMIC PRICES RECEIVED FOR LIVESTOCK SALES
(\$F per Head)

	Consultants Estimate of Price			Border Prices Estimates		
	Sale Price (a)	Commission and Freight (b)	Farmers' Price (3)	c.i.f. Price (c)	Handling and Transport (d)	Farmers' Price (6)
	(1)	(2)	(3)	(4)	(5)	(6)
Cattle:						
Bulls	180.00	14.00	160.00	324.00	6.26	317.74
Cows	120.00	11.00	109.00	216.00	4.18	211.82
Heifers	105.60	10.28	95.32	178.20	3.45	174.75
Steers	142.40	12.12	130.28	240.30	4.65	235.65
Goats:						
Male	-	-	25.00 (e)	-	-	21.75 (f)
Female	-	-	22.00 (e)	-	-	19.14 (f)

- Notes:
- (a) Sale price based on 15¢ per lb. liveweight for bulls (1200 lb. L/W) and Cows (800 lb. L/W) and 16¢/lb. liveweight (L/W) for heifers (660 lb. L/W) and steers (890 lb. L/W).
 - (b) Transport charges are \$5 per head and commission charges are 5 per cent of sale price.
 - (c) Sale price based on 45.0¢ per lb. carcass weight where carcass weight is 60 per cent of liveweight.
 - (d) Assume 1¢/lb. carcass weight multiplied by Standard Conversion Factor (0.87).
 - (e) Calculated on basis of \$1 per lb. carcass weight which is 44 per cent of liveweight: male goats 56 lb. liveweight and female goats 50 lb. liveweight. Commission and freight charges are included as part of recurrent expenses: see item 'Goat Management' in Appendix Tables 5.1 to 5.4.
 - (f) Calculated by multiplying column (3) by Standard Conversion Factor of 0.87.

Sources: McGowan and Associates, (1976), Annex 17, pp.18,22.
Fiji, Bureau of Statistics Trade Report, 1974 and 1975.

¹ Derived from the figure of \$F10.00 to handle and transport a 660 pound beast revalued at border prices by the Standard Conversion Factor (Personal Communication with project team leader).

Goat sales were valued at \$F1.00 per pound carcase, weight in the Consultants Report, reflecting the market price for fresh goat meat.¹ Since only frozen goat meat is imported from Australia and New Zealand the weighted average price of \$F0.43 per pound was considered to be not comparable with the above market price for fresh meat, indicating a preference for fresh goat meat. In lieu of more reliable data it was considered to be reasonable to treat goat meat as a non-traded commodity. Hence, the border price for goat meat is the market price revalued by the Standard Conversion Factor. Details of the economic price is shown in Appendix Table 6.1.4.

The border price for all crop and timber sales is simply the market price multiplied by the Standard Conversion Factor. This estimation procedure was necessary in the absence of c.i.f. and f.o.b. prices for comparable commodities.

Stud bulls are valued at border prices by adding the revalued handling and transport costs ($\$F30.00 \times 0.87 = \$F26.10$) to the c.i.f. price of \$F1288.00 per head to give a border price per head of \$F1314.10.

The salvage value of the construction plant and equipment at the end of project year 4 is composed of imported goods with only 'spare parts' having a domestic or non-traded component of 50 per cent. The appropriate border price is the c.i.f. import price and for the 'spare parts' the local component is multiplied by the Standard Conversion Factor.

The income and costs without the project of the individual farms is also crudely revalued in terms of border prices by multiplying by the Standard Conversion Factor to give border price values of \$638 for both new livestock and crop farms and \$792 for the existing livestock farms.

Appendix Table 6.1.5 contains the incremental net cash flow for the project at SVT economic prices.

1 Carcase weight is 44 per cent of liveweight (McGowan and Associates, 1976, Annex 7, p.7).

APPENDIX TABLE 6 1.5

ECONOMIC ANALYSIS: INCREMENTAL NET CASH FLOW AT SVT BORDER PRICES

	Project Years																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Income																														
Individual Farms:																														
New Livestock Farms	-	3257	6532	21777	34009	51567	95561	147579	266363	354440	477354	549611	603110	627845	641374	642688	642688	642688	642688	642688	642688	642688	642688	642688	642688	642688	642688	642688	642688	642688
Existing Livestock Farms	-	2246	14428	35526	62205	67770	111933	139619	201514	286012	313797	321102	335685	340041	341136	341428	341428	341428	341428	341428	341428	341428	341428	341428	341428	341428	341428	341428	341428	341428
New Crop Farms	-	5142	111975	14267	16725	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790	16790
Local Farm	-						4377	37645	17178	19925	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141	53141
Roads-Salvage Value of Plant	-																													
Waterfished Protection	-																													
Net Cash Flow	-	10677	13147	229741	341533	501842	677167	945330	1251399	1513399	1718550	1862604	1965276	2035817	2082441	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427
Investment Costs																														
Individual Farms:																														
New Livestock Farms	-	114613	155706	93014	250777	333095	79594	19318	6674	882																				
Existing Livestock Farms	-	11926	86302	131677	237858	112369	23259	6994	2023	196																				
New Crop Farms	-	4761	6348	7435	3174	1567																								
Local Farm	-	10184	20225	184253	78427	39668																								
Roads	-	60714	107003	64348																										
Waterfished Protection	-						15348	15348	8823	8823																				
Net Cash Flow	-	10677	13147	229741	341533	501842	677167	945330	1251399	1513399	1718550	1862604	1965276	2035817	2082441	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427
Operating Costs (b)																														
Individual Farms:																														
New Livestock Farms	-	260	2791	6795	11489	17396	25467	46530	62976	69353	127518	84687	116527	31301	31434	31434	31434	31434	31434	31434	31434	31434	31434	31434	31434	31434	31434	31434	31434	31434
Existing Livestock Farms	-	191	1179	3186	6951	10335	12705	14973	21165	46684	55590	87575	36201	16911	16716	16728	16728	16728	16728	16728	16728	16728	16728	16728	16728	16728	16728	16728	16728	16728
New Crop Farms	-	1516	2301	3364	3629	3755	16961	6157	8157	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755	3755
Local Farm	-	14423	21015	31635	37125	36978	19151	12229	10027	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141	8141
Roads	-	7000	7000	7000	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546	23546
Waterfished Protection	-	10184	20225	184253	78427	39668																								
Net Cash Flow	-	10677	13147	229741	341533	501842	677167	945330	1251399	1513399	1718550	1862604	1965276	2035817	2082441	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427
Labour Costs																														
Skilled Labour	-	13203	14460	14460	56149	56149	50213	38652	36952	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513	27513
Unskilled Labour	-	28126	17025	10473	15073	9853	85431	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317	36317
Net Cash Flow	-	10677	13147	229741	341533	501842	677167	945330	1251399	1513399	1718550	1862604	1965276	2035817	2082441	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427	2105427
Total Investment Costs	-	12184	108165	530676	63214	639877	467041	118201	41660	17720	9901																			
Incremental Net Cash	-	45577	112010	104756	105846	430950	679175	173806	39622	186430	344004	499381	608083	696859	830306	845992	847586	847586	847586	847586	847586	847586	847586	847586	847586	847586	847586	847586	847586	847586
Flow																														

Notes: (a) Includes value of herd at the end of the project.
(b) Operating costs for Waterfished Protection Area is for maintenance labour which is included as unskilled labour costs.
(c) Mainly family labour. Valued at \$0.25 per man hour.
(d) For the individual farms.

APPENDIX 6.2

DERIVATION OF NET BENEFITS AT SOCIAL PRICES

Appendix Table 6.2.2 presents the derivation of net benefits at social prices from economic efficiency incremental net cash flow. Column 1 is the economic net cash flow of SVT's economic analysis given in Appendix Table 6.1.5. As the distribution adjustment factor is applied to private consumption out of net benefits it is necessary to add back the incremental value of unskilled hired labour at market prices to the incremental net benefits of individuals.¹ Column 4 gives the total financial income to private beneficiaries, and as farmers in Fiji do not pay tax it is assumed that no tax will be paid out of the increased income. This net income at market prices is multiplied by the marginal propensity to consume, 0.9 to obtain the incremental consumption in column 6.² The incremental consumption at market prices is multiplied by $(\beta_c - d/v)$, the distribution adjustment factor. Two distribution adjustment factors are calculated: for years 2-15 and years 16-30, for the values of $n = 1.0$ and $v = 1.45$. Note that the distribution adjustment weight for years 2 to 15 is a large negative value, -0.800, indicating that the average individual beneficiary of the project is far below the average per capita consumption level and the private social benefits of the project will exceed the economic benefits. However, for the remaining project years of 16 to 30 a small positive adjustment value of 0.103 is evidence that the average individual is slightly above the average per capita consumption level. Column 9 shows Government income and private savings which is not adjusted by the adjustment distribution factor in deriving net social benefits. Column 10 shows the net social benefits of the project.

-
- 1 Government net benefits/costs (See Appendix Table 6.2.1) and private savings are equal and receive a weighting of unity. The net private benefits at market prices include family labour which was not separately costed in deriving net cash flows at market prices. Consumption of skilled and expatriate labour is assumed to be unity.
 - 2 The MPC of 0.9 is the same as that used in deriving consumption per capita from the project.

APPENDIX TABLE 6.2.1
GOVERNMENT: INCREMENTAL CASH FLOW AT MARKET PRICES
(\$F)

	Project Years																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Cash Inflow from																														
Individual Farms (a)																														
New Livestock Farms	-	25942	36470	86196	69577	100310	56664	61779	98510	122716	174444	184616	209952	193988	183972	158932	133365	95849	60149	40514	8384	8384	8384	8384	8384	8384	8384	8384	8384	8384
Existing Livestock Farms	-	3343	20560	30926	58286	29911	21665	31173	42417	69360	80332	97978	104782	101858	94536	84784	64407	49817	37041	11086	6698	6698	6698	6698	6698	6698	6698	6698	6698	6698
New Crop Farms	-	1875	2500	3125	3125	3125	5156	5833	6510	6510	6510	2754	1502	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Focal Farm (b)	-	-	-	-	-	-	12494	13594	16626	22674	27078	-	-	-	-	28901	28901	28901	32301	32301	32301	32301	32301	31101	31101	31101	31101	31101	31101	31101
Roads	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Watershed Protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxes: Fiti and	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Expatriate Staff	14489	98607	96633	98536	54995	48221	22488	21615	21490	21490	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071	2071
Commission on Cattle Sales	-	48	290	467	1235	1070	3041	4940	9703	14244	18777	20388	22234	23056	23437	23471	23471	23471	23471	23471	23471	23471	23471	23471	23471	23471	23471	23471	23471	23471
Total Cash Inflow	14489	129815	156253	209250	541818	182637	121508	138934	195256	256995	309212	307807	340541	321223	304266	298409	252465	200359	155283	111693	73175	110675	110675	109475	109475	71975	71975	71975	71975	71975
Cash Outflow to																														
Individual Farms(c)																														
New Livestock Farms	-	12189	23413	53264	61642	82264	66988	57498	47340	43008	36096	36096	36096	36096	36096	36096	32806	29046	19646	14476	6016	6016	6016	6016	6016	6016	6016	6016	6016	6016
Existing Livestock Farms	-	1734	11683	22369	42040	38721	30082	27275	25355	21574	20570	20570	20570	20570	20570	20570	20059	16993	12905	5240	3196	3196	3196	3196	3196	3196	3196	3196	3196	3196
New Crop Farms	-	525	544	739	711	735	432	331	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230
Focal Farm	19480	326919	265447	138223	80914	41219	20247	12886	11580	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815	8815
Roads	-	444000	185400	140400	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600	44600
Watershed Protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Labour Costs:																														
Fijian Staff	-	14106	155485	155485	60375	60375	53993	41515	39733	39733	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584	29584
Expatriate Staff	42614	20314	252202	228388	149221	129195	55026	55026	55026	55026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	61094	110478	934174	741868	439603	397109	289018	259281	239014	230636	147395	144895	142395	140895	140895	140895	137094	130268	116780	103945	93441	93441	93441	93441	93441	93441	93441	93441	93441	93441
Net Cash Flow	-46605	-106663	-771921	-532618	102215	-214672	-167510	-220347	-483758	-26359	161817	162912	198146	180328	163371	157514	115371	70091	38503	7748	-20266	17234	17234	16034	16034	21466	21466	21466	21466	21466

Notes: (a) Includes sale of bulks and heifers, bull agistment and loan repayment.
(b) Income from share agistment included in income from individual farms.
(c) Includes subsidies on all inputs.

APPENDIX TABLE 6.2.2

SOCIAL ANALYSIS: NET BENEFITS AT SOCIAL PRICES (Without Redistribution)
(\$F)

Year	Net Benefits at SVT Economic Prices	Net Private Benefits at Market Prices	Unskilled Hired Labour Costs at Market Prices	Net Financial Income	Marginal Propensity to Consume	Incremental Consumption at Market Prices	Dis-tribution Adjustment ($\beta c - d/v$)	Consumption Adjustment $\Delta c (\beta c - d/v)$	Government Income and Private Savings	Net Benefits at Social Prices	SNPV at 8.9%
	(1) (a)	(2) (b)	(3) (b)	(4) = (2) (3)	(5)	(6) = (4) x (5)	(7) (c)	(8) = (6) x (7)	(9) (d)	(10) = (1) - (8)	(11)
1	-45577	-	-	-	-	-	-	-	-46605	-45577	-41840
2	-1426102	4752	3036	7788	0.9	7009	-0.800	-5607	-1059884	-1420495	-1197477
3	-948756	14482	3750	18232	0.9	16409	-0.800	-13127	-736098	-935629	-724177
4	-1058648	23165	7339	30504	0.9	27454	-0.800	-21963	-529568	-1036685	-737083
5	-430959	39749	5513	45262	0.9	40736	-0.800	-32589	106741	-398370	-260136
6	-679175	35007	6857	41864	0.9	37678	-0.800	-30142	-210486	-649033	-389420
7	-173806	52559	2384	54943	0.9	49449	-0.800	-39559	-162016	-134247	-73970
8	39622	59617	3750	63367	0.9	57030	-0.800	-45624	-114010	85246	43134
9	186430	91458	6250	97708	0.9	87937	-0.800	-70350	-133987	256780	119146
10	344004	118138	8750	126888	0.9	114199	-0.800	-91359	39048	435363	185465
11	489381	132413	8750	141163	0.9	127047	-0.800	-101638	175933	591019	231088
12	608083	142326	6250	148576	0.9	133718	-0.800	-106966	177770	715049	256703
13	696859	148667	3750	152417	0.9	137175	-0.800	-109740	213388	806599	266178
14	830306	190076	2250	192326	0.9	173093	-0.800	-138474	199561	968780	293540
15	845992	214522	2250	216772	0.9	195095	-0.800	-156076	185048	1002068	278575
16	847586	248744	2250	250994	0.9	225895	0.103	23267	182613	824319	211026
17	847586	295388	2250	297638	0.9	267874	0.013	27591	145135	819995	192699
18	847586	346794	2250	349044	0.9	314140	0.013	32356	104995	815230	176090
19	848630	395270	2250	397520	0.9	357768	0.013	36850	78255	811780	160732
20	850252	448460	2250	450710	0.9	405639	0.013	41781	52819	808471	147142
21	856598	503778	2250	506028	0.9	455425	0.013	46909	30337	826261	137986
22	898455	537378	2250	539628	0.9	485665	0.013	50023	71197	848432	129810
23	914599	568578	2250	570828	0.9	513745	0.013	52916	74317	861683	121497
24	918523	594978	2250	597228	0.9	537505	0.013	55363	75757	863160	111348
25	917171	585378	2250	587628	0.9	528865	0.013	54473	74797	862698	102661
26	877930	568578	2250	570828	0.9	513745	0.013	52916	78549	825014	89927
27	868698	534978	2250	537228	0.9	483505	0.013	49801	75189	818897	81890
28	852554	503778	2250	506028	0.9	455425	0.013	46909	72069	805645	74119
29	847586	477378	2250	479628	0.9	431665	0.013	44461	69429	803125	67463
30	3509531	477378	2250	479628	0.9	431665	0.013	44461	69429	3465070	266810

- Notes: (a) See Appendix Table 6.1.5.
 (b) See Appendix Tables 5.15-5.17, 5.20.
 (c) $\beta c = 1.0$; $d = 2.61$ for years 2-15 and 1.30 for years 16-30; $v = 1.45$.
 (d) Social value of private savings and social value of public income are equal and are not adjusted.