

RRP:TON 26028

ASIAN DEVELOPMENT BANK

REPORT AND RECOMMENDATION

OF THE

PRESIDENT

TO THE

BOARD OF DIRECTORS

ON A

PROPOSED LOAN AND TECHNICAL ASSISTANCE GRANTS

TO THE

KINGDOM OF TONGA

FOR THE

OUTER ISLANDS AGRICULTURE DEVELOPMENT PROJECT

November 1995

CURRENCY EQUIVALENTS

(as of 15 November 1995)

Currency Unit	=	Tongan Pa'anga (T\$)
US\$1.00	=	T\$1.25
T\$1.00	=	US\$0.80

In this Report a rate of US\$1.00 = T\$1.25 has been used. This was the rate prevailing at the time of Project appraisal.

ABBREVIATIONS

AusAID	Australian Agency for International Development
BME	Benefit Monitoring and Evaluation
DPVI	Sixth Development Plan
EEZ	Exclusive Economic Zone
EU	European Union
GDP	Gross Domestic Product
HRD	Human Resource Development
MAF	Ministry of Agriculture and Forestry
MEA	Ministry of Foreign Affairs
MLCI	Ministry of Labour, Commerce and Industry
MOF	Ministry of Finance
MOW	Ministry of Works
NGO	Nongovernment Organization
PMD	Prime Minister's Department
PSC	Project Steering Committee
TDB	Tonga Development Bank
TTC	Tonga Telecommunications Commission
WID	Women In Development

NOTES

- (i) The fiscal year (FY) of the Government ends on 30 June.
- (ii) In this report, '\$' refers to US dollars and T\$ to the Tongan Pa'anga.

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TONGA
OUTER ISLANDS AGRICULTURE DEVELOPMENT PROJECT
LOAN AND PROJECT SUMMARY

Borrower	:	Kingdom of Tonga
Project Outline	:	The proposed Project will contribute towards increasing national agricultural production and exports by improving agricultural production, postharvest processing, and marketing on the outer islands of the Niuas and on 'Eua. This will be achieved by: (i) enhancing the capabilities and responsiveness of the agricultural research and extension services; (ii) providing improved marketing information and infrastructure; (iii) improving communication links with the outer islands, and; (iv) providing production infrastructure, including farm roads.
Classification	:	Primary - Economic Growth Secondary - Poverty Alleviation A Summary Initial Environmental Examination was undertaken.
Rationale	:	<p>Much of the agricultural and other development in Tonga takes place on the main island of Tongatapu, and the population of the outer islands is comparatively disadvantaged. The inhabitants of the Niuas are isolated from the main islands, with poor communications links. The proposed Project will encourage agricultural and economic development in the Niuas and on 'Eua; other aid agencies are funding similar projects on the other two main island groups of Vava'u and Ha'apai.</p> <p>Although most of Tonga's export income derives from agricultural produce, there is no coherent marketing strategy and system. The Project will strengthen a marketing organization, known as Tonga Trade, established within the Ministry of Labour, Commerce and Industry (MLCI). The Project will also strengthen the capacity of the Ministry of Agriculture and Forestry (MAF) to implement projects, with special reference to improving the market information available to growers.</p>
Objectives and Scope	:	The objectives of the Project are to: (i) increase agricultural productivity on the outer islands, (ii) reduce the income disparities between households on the different island groups, and (iii) stimulate agricultural exports. The scope of the Project includes:

- (i) Capacity Strengthening of MAF: the provision of training, improved office and residential accommodation, vehicles, office equipment and field equipment for MAF personnel on the outer islands;
- (ii) Farming System Improvement: the funding of research and development costs for trial crops, a safe agrochemical use program, and producer training and extension support in the outer islands;
- (iii) Market Support and Development: the provision of smallscale demonstration crop processing facilities and produce markets on the outer islands and advice on handicraft design, marketing, and small business operation; and
- (iv) Infrastructure: the provision of improved roads, water supply, and telecommunication facilities on the outer islands.

Cost Estimates : The total cost of the Project is estimated at \$5.7 million equivalent of which the foreign exchange cost is \$2.8 million and the local currency cost is \$2.9 million equivalent.

Financing Plan : (\$ million equivalent)

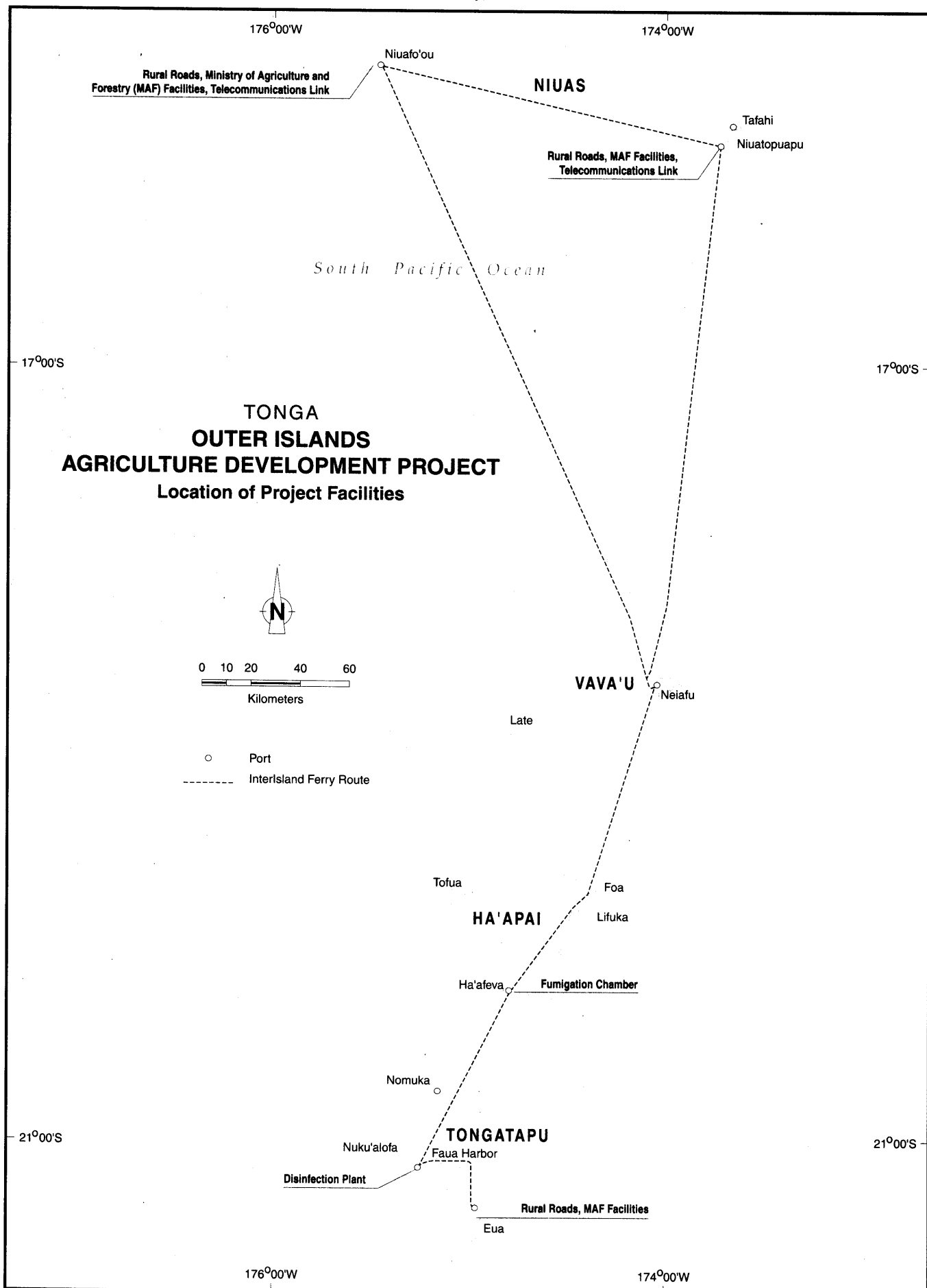
Source	Foreign Exchange	Local Currency	Total	Percentage of Total
Bank	2.8	0.8	3.6	64
Government	<u>0.0</u>	<u>2.1</u>	<u>2.1</u>	<u>36</u>
Total	2.8	2.9	5.7	100

Loan Amount and Terms : A loan of SDR2.434 million equivalent (currently \$3.64 million equivalent) from the Bank's Special Funds resources with a repayment period of 40 years including a grace period of 10 years, and carrying a service charge of 1 per cent per annum.

Period of Utilization : Until 30 June 2001.

Executing Agency : Ministry of Finance (MOF).

Implementation Arrangements	:	MOF will establish a Project Steering Committee to oversee the management and implementation of the Project. MAF, the Ministry of Works (MOW) and the Tonga Telecommunications Commission (TTC) will implement their respective components.
Procurement	:	All procurement to be financed under the loan will be carried out in accordance with the Bank's <i>Guidelines for Procurement</i> . MOW will be responsible for carrying out civil works, either through force account or contractors, using its own equipment. Vehicles, computers and other equipment will be procured through international shopping or direct purchase and the telecommunications equipment through international competitive bidding.
Consultant Services	:	A total of 11 person-months of international consulting services will be required to assist with the implementation of the Project. The consultants will be engaged in accordance with the Bank's <i>Guidelines on the Use of Consultants</i> .
Estimated Project Completion Date	:	31 December 2000.
Project Benefits and Beneficiaries	:	The Project, by improving infrastructure and communications facilities will provide better marketing opportunities for farmers in the Niuas and on 'Eua. The capacity building and resources made available to MAF will assist farmers to take advantage of these opportunities. As a result, farmers will be able to increase yields and areas cropped and adopt more profitable cropping patterns. A total of about 1,000 farm families will benefit with farm incomes estimated to increase from between 60 and 90 percent. The Economic Internal Rate of Return (EIRR) for the Project is estimated to be 16 percent.
Technical Assistance	:	Two associated technical assistance grants are proposed: (i) one in the amount of \$600,000 equivalent for capacity strengthening of MAF, for which it will be the Executing Agency; and (ii) one in the amount of \$850,000 equivalent to provide institutional strengthening of Tonga Trade, for which MLCI will be the Executing Agency. The consultants engaged under both TAs will be selected in accordance with the Bank's <i>Guidelines on the Use of Consultants</i> .



I. THE PROPOSAL

1. I submit for your approval the following Report and Recommendation on (i) a proposed loan to the Kingdom of Tonga for the Outer Islands Agriculture Development Project; and (ii) proposed technical assistance for institutional strengthening of Tonga Trade. The Report also describes proposed technical assistance for capacity strengthening of the Ministry of Agriculture and Forestry (MAF), and if the proposed loan is approved by the Board, I, acting under the authority delegated to me by the Board, shall approve such technical assistance.

II. INTRODUCTION

2. The Government of the Kingdom of Tonga accords high priority to development of the agricultural sector to maintain adequate rural living standards, provide food security, generate export earnings, and reduce dependence on food imports. In addition, the Government focuses its development efforts on the outer islands where poverty is more widespread and income-generating opportunities are limited. During the Bank's Country Programming Mission in 1992 the Government requested assistance for a Project with these two objectives. In response to this request, the Bank approved a technical assistance (TA) to prepare a feasibility study¹ for the Project. The study was completed in January 1995. A Bank Fact-Finding Mission was fielded in March 1995 to review the proposed Project and hold discussions with farmers, community organizations, the Government, and the concerned agencies to resolve issues related to the Project. An Appraisal Mission, fielded from 3 July to 18 July 1995, visited the area covered by the Project on 'Eua and in the Niua, reached agreement with the Government on the technical, organizational, implementation, financial, and economic aspects of the Project and confirmed that the Government accorded a high priority to the Project.² Loan negotiations were held by fax from 6 to 17 November with the authorized representatives from the Borrower.

III. BACKGROUND

A. The Agriculture Sector

3. The population of Tonga consists of about 100,000 persons living on four main island groups, which are widely dispersed over 360,000 square kilometers (sq km) of ocean. The natural resource base is limited, consisting of some fertile volcanic soils, a large but relatively unexploited offshore tuna resource and attractive scenery offering some tourism potential. The structure of the society is stable, social indicators are high, particularly for education, and mortality rates are low. Agriculture remains the dominant economic activity, contributing 40 per cent to gross domestic product (GDP) in 1993 and

¹ TA No. 1970-TON: *Agriculture Development Project*, for \$430,000, approved on 26 October 1993.

² The Mission comprised N. Storr, Project Economist/Mission Leader; T. Watanabe, Programs Officer; P. Moala, Project Officer, SPRM; and M. Rayner, Financial Analyst/Staff Consultant. Ms. E. McGill, Counsel, assisted the Mission from Headquarters.

providing over 70 per cent of domestic employment. While agriculture is vitally important to Tonga in both an economic and a social context, the economy is also underpinned by remittances from the large expatriate population - an estimated additional 40,000 Tongans live overseas - and by foreign aid. Private remittances in 1993/4 amounted to \$56 million and foreign aid to \$32 million in the context of a national annual GDP of \$160 million.

4. A major impetus to economic growth has been provided by exports of squash and to a lesser extent vanilla. A niche market for squash exports to Japan during the months of November to January was first identified by a New Zealand company in 1987 and was rapidly exploited by Tongan farmers and traders to the extent that, by 1993, the value of squash exports amounted to 66 per cent of total exports. However, 90 per cent of squash production is located on the main island of Tongatapu. This development has accentuated the disparity between the economies of the main island and the outer islands. The production and export of coconuts, coconut products, and bananas were spread throughout Tonga and were significant until about 1992, when the terms of trade worsened, while only 10 per cent of the main replacement activity of squash production takes place away from Tongatapu. Exports of copra from the outer islands have dramatically reduced in recent years and there has been almost no replanting of the already aged coconut trees.

5. Traditional Tongan agriculture is based on a small holding (*'api'uta*) of 3.3 hectares (ha). These are agroforestry systems utilizing a bush or grass fallow, followed for several years by a series of crops intercropped with coconuts and other trees to create rotational, multistoried systems incorporating a fallow period. These farming systems have shown adaptability by readily incorporating new crops and technologies. Most importantly, they have proven robust, productive, and sustainable, and agriculture has become an integral component of the traditional social system. Tongan farmers are not purely subsistence farmers, but operate their farms within a complex social framework that has evolved over centuries and continues to adapt to new crop opportunities.

6. Previously, changes to the farming system have been of an agricultural or technological nature with no radical alteration of the system itself. However, current changes are proving to be pervasive and stem from a desire to change the fundamental farming patterns by introducing elements of intensive agriculture with high inputs of agrochemicals, employment of paid labor and an increase in mechanization. This change has been brought about because the aspirations of many people, particularly on Tongatapu, have been affected by higher education, media exposure, foreign travel and increased participation in the cash economy. The "preferred consumption basket" is becoming increasingly disassociated from the traditional production pattern, the difference being made up by an increasing preference for imported goods, requiring a cash income and hence changes in the use of the smallholdings and its agricultural production.

7. Past attempts to introduce commercial and intensified livestock production have generally been frustrated by the high capital costs and the high costs of imported feed. However, there is considerable potential to improve household livestock production through programs of nutrition, animal health, and management. Forestry is a small sector contributing less than 0.2 percent of GDP, but trees are still an important part of

the agricultural system. Wood is an important fuel source for cooking, many handicrafts are based on tree products and timber and coconut leaves are widely used for construction purposes.

8. The agricultural sector nationally faces several constraints including lack of scale, distance from markets, the high costs and limited availability of transport links, high costs and shortages of labor from out-migration and significant risks associated with the climate, especially drought and cyclones. In addition, the sector receives limited Government support - only 6 percent of recurrent budgetary allocations, despite providing nearly 80 percent of the value of all exports in 1993 and accounting for the bulk of employment. The narrow tax base in the rural sector scarcely contributes to the limited Government revenue base, adding to the problems of limited capacity and recurrent expenditure to support agriculture.

9. Other important aspects of the agricultural sector are that: (i) domestic production of food crops for home consumption is significant, and food security issues are generally dealt with at the household and village levels; (ii) handicrafts and livestock production are important elements in the income of rural households, especially in the outer islands, and; (iii) the recent increases in national revenues resulting from agricultural exports have been to an extent countermanded by corresponding increases in the imports of inputs including seeds, fertilizer, agrochemicals, farm machinery, and transport.

10. The main sectoral issues include (i) reducing the economic vulnerability resulting from exports of just one crop — squash — to a limited market; (ii) achieving equitable development in the different island groups; (iii) overcoming Tonga's geographic and economic isolation; and, (iv) achieving an efficient reorganization of the structure and functions of MAF.

B. Government Policies and Plans

11. The Government development objectives and strategies for the economy are outlined in the Sixth Development Plan (DPVI) that covers the period 1991-1995. The predominant objective of DPVI is to achieve sustainable economic growth with a more equitable distribution of income. The Government is committed to developing an appropriate macroeconomic framework, fiscal and monetary policies, and incentives and regulations. The Bank is currently providing TA to help the Government achieve these goals¹. Their achievement is essential to ensuring the efficient distribution of resources, the expansion of the market economy, the diversification of the economic base, and the implementation of a dynamic export-oriented policy. Recurring themes in DPVI are achieving economic growth, regional development, and greater private sector participation. So far, the results of implementing DPVI have been encouraging.

12. The focus on regional development arises from the substantial disparities in income distribution among the different island groups because of differences in

¹ TA No. 2017-TON: *Improved Financial and Economic Management*, for \$565,000, approved on 14 December 1993.

development potential as well as the severe resource allocation bias against the outer islands. This has been reinforced by the switch to squash as the country's principal export earner and away from traditional products such as copra and bananas, which were produced on all the island groups. DPVI seeks to reduce these imbalances by redirecting resources to provide more equitable access to infrastructure, goods, and services in the less developed outer islands through regional development programs.

13. Cabinet-level island development committees have been formed for Vava'u and Ha'apai and, under the direction of these committees, aid packages providing funding for institutional capacity building and infrastructure are currently being planned for Vava'u (by the European Union) and for Ha'apai and small farm holdings on Tongatapu (by the Australian Agency for International Development). Similar development committees will be formed for the Niuas and for 'Eau under the Project.

C. External Assistance to the Agriculture Sector and the Outer Islands

14. External assistance to Tonga is estimated to be over 20 percent of GDP. Japan, Australia, and New Zealand continue to be the main bilateral sources of assistance. Japanese assistance has mainly been for road construction and rehabilitation. Australia and New Zealand have channeled most of their assistance to support human resource development (HRD) activities, mostly through scholarships in their countries. Australia also assists with infrastructure development, while New Zealand has been targeting support for private sector development. The availability of grant funds through these and other sources has tended to reduce the demand for loan financing from the Bank, particularly in the social sectors, for which the principal aid agencies are actively seeking to allocate more funds. The details on external assistance to Tonga are in Appendix 1.

15. The European Union has concentrated its aid to Tonga on Vava'u, and has provided about \$7 million equivalent of funding directed specifically to the agriculture sector via the recently initiated Vava'u Integrated Agriculture and Forestry Development Program for 1996-2000. In the agriculture sector, Australia is focusing its assistance through the proposed Tonga-Australia Smallholder Farming System Project for \$5.4 million on Tongatapu and the Ha'apai island group. In its 1996 aid program, New Zealand will provide \$220,000 for a water supply project on Niuafu'ou, while on 'Eau it has been active in the forestry sector. New Zealand also provides equity grants and venture capital funds for the Tonga Development Bank (TDB), which is also being assisted by the Bank.

16. The infrastructure in the Niuas and on 'Eau will be improved under the Bank's Transport Infrastructure Project¹. Work on the ports will be undertaken on Niuafu'ou, Niuatoputapu, Tafahi (a small island near Niuatoputapu) and 'Eua, and the rural roads will be upgraded on 'Eua.

¹

Loan No. 1303-TON(SF): *Transport Infrastructure Project* for \$10 million equivalent, approved on 28 June 1994. The loan has a scheduled closing date of 31 December 1999.

D. Lessons Learned

17. Tonga has a generally successful record in implementing Bank-financed projects. Seven projects have been post evaluated and rated as generally successful between 1973 and 1994, and one as partially successful.

18. The proposed Project includes the provision of physical infrastructure and telecommunications facilities as well as agricultural development. Thus, the proposed Project is similar to the two earlier Bank-financed Multiproject Loans to Tonga.¹ The Project Performance Audit Reports concluded that: (i) these projects had generally met their objectives; (ii) multiproject loans covering investments in several small subprojects effectively helped the development of small countries in the South Pacific and this type of lending saved significant administrative costs; (iii) the socioeconomic impact of the projects should be assessed instead of relying solely on a quantitative economic analysis; (iv) appropriate rentals should be charged for facilities to avoid putting a strain on Government's resources, and; (v) continued strengthening was needed in the identification, selection, and evaluation processes, for projects in the public sector especially with the increase in loans in Tonga's external development assistance and the concomitant increase in debt service requirements.

19. Some success has been achieved by other aid agencies in funding agricultural development projects in Tonga. The principal lessons learned overall include: (i) Tongan farmers are entrepreneurial and productive, however, because the rural economy is supported by overseas aid and remittances, they will probably only increase nonsubsistence production if a profitable market is assured (a prime example of this was the ready conversion to squash production, once a lucrative market had been identified); (ii) Tongan rural life is affected by a complex web of sociocultural arrangements, and the participatory design of projects must take full account of these arrangements; (iii) the capacity of MAF to implement projects has so far been limited, and particularly so on the outer islands; (iv) as a result of this limited capacity, considerable care must be taken to assure that the implementation arrangements for projects are workable; (v) there is a need to involve foreign consultants in the implementation of projects, and; (vi) the progress of projects tends to be quite slow and realistic implementation schedules need to be established.

20. These findings have been taken into account in the design of the Project, in particular by: (i) maximizing the level of community involvement in developing the Project, coordinated by the Government's permanent island representatives; (ii) providing for sustainable strengthening of MAF's operations in the outer islands, and; (iii) minimizing the subsequent burden on the Government's recurrent budget by transferring part of the burden for the maintenance of the facilities provided under the Project to the island communities.

¹ Loan No. 435-TON(SF): *Tonga Multiproject Loan*, for \$1.2 million, approved on 10 December 1979 and closed on 6 September 1982, and Loan No. 540-TON(SF): *Second Tonga Multiproject Loan*, for 1.68 million, approved on 17 November 1981 and closed on 21 April 1988.

E. The Bank's Sectoral Strategy

21. The Bank's operational strategy for Tonga is to assist the Government and the private sector in accelerating and sustaining economic growth by: (i) developing and diversifying the productive sectors such as agriculture; (ii) providing infrastructure and support services for economic growth; (iii) encouraging private sector development, and; (iv) emphasizing human resource development and training to strengthen institutional capacity. Thus, the lending program is oriented to policy assistance and the development of the productive sectors, with particular emphasis on the provision of support for infrastructure to remove the constraints to development in agriculture, fisheries, and tourism. The TA program includes advisory support for the productive sectors and for the public sector to help to maintain the productive infrastructure on a sustained and well-managed basis. The TA program includes both HRD and Women In Development (WID) elements and focuses on reform of the economic and financial management system.

22. The Bank's assistance for the development of the private sector includes helping the Government to define its appropriate role and the necessary support functions in agriculture and agroprocessing. To help stimulate the private sector, the Bank will continue to encourage the Government to simplify the business regulation environment and to implement policies to attract foreign investment.

23. Absorptive capacity is still a constraint in Tonga, and there are limitations in institutional capabilities that make projects less effective unless these issues are addressed. However, the Government has at its disposal a well-educated and skilled public service. The public administration as a whole is too large and the Government is aware of the need to reduce and streamline departments, privatize some activities, and generally make the public sector more efficient.

24. In the short term, the main priority in the Bank's strategy will be to assist the Government in its efforts to diversify the economy and expand production by developing such strategic sectors as agriculture and fisheries, and providing infrastructure. The Bank's TA activities will support institutional strengthening, national economic management, and financial management to improve efficiency in the public sector, and support the privatization and commercialization programs.

F. Policy Dialogue

25. The Bank's policy dialogue in Tonga in recent years has focused on macroeconomic management and the budget formulation process through TAs provided to the Ministry of Finance (MOF)¹. The institutional development of the ministries of the Government has been a major objective of advisory TAs which were provided in association with loans or independently. The proposed Project continues this process, with associated advisory TAs aimed at strengthening and developing both MAF and Tonga Trade, a marketing organization.

¹

TA No. 1271-TON: *Institutional Strengthening of the Ministry of Finance*, for \$392,000, approved on 22 February 1990 and completed in August 1995; TA No. 1668-TON: *Review of the Operations of the Ministry of Finance*, for \$100,000, approved on 4 February 1992 and completed in June 1993.

26. A Bank-financed review¹ of the structure and operations of MAF carried out in 1992 concluded that MAF was an effective organization that has generally fulfilled its mandate, but that some structural reorganization would be necessary in order for MAF to undertake efficiently its changing role in an environment of increasingly commercialized agricultural production. This recommendation was accepted in principle by MAF and is being implemented. The provision of the associated advisory TA to strengthen the institutional capability of MAF will assist it in implementing these improvements.

27. The Bank has continuously been supportive of the Government's view that the traditional life styles and values of villages in Tonga should not be eroded as a result of economic development. The proposed Project will allow a viable economic life to be maintained in remoter villages by encouraging the sustainable production of high-value cash crops, thus reducing the risk of rural-urban drift.

28. The Bank has continuously supported the Government's efforts to maintain a distortion-free economy, to encourage the growth of the private sector, and to develop more orderly marketing systems, vital to a country with substantial overseas trade in a competitive environment. The development of Tonga Trade will not only lead to more orderly, better informed and more aggressive marketing, but the information will be channelled directly to the private sector, which will also benefit from improvements in Government services.

29. An outstanding concern relates to the low level of Government investment in the agriculture sector - only 6 percent of recurrent budgetary allocations - whereas agricultural exports account for 80 percent of the value of all exports. The Government will be encouraged to increase investment in the sector and, in particular, to maximize private sector investments aimed at achieving sustainable increases in agricultural production and exports.

IV. THE PROJECT

A. Rationale

1. The Project Area

30. Much of the agriculture and other economic activity in Tonga takes place on the main island of Tongatapu, and the populations of the outer islands are comparatively disadvantaged, both economically and socially. In addition, the inhabitants of the Niuas are very isolated from the main islands because of the poor communications links. The proposed Project is intended to encourage agricultural and social development on 'Eua and in the Niuas, while other aid agencies are funding similar projects on the other two main island groups of Vava'u and Ha'apai. In addition, although the bulk of Tonga's export income derives from agricultural produce, there is a lack of a coherent marketing strategy and system. The Project will improve national

¹ TA No. 1712-TON: *Review of the Operations of the Ministry of Agriculture and Forestry*, for \$75,000, approved on 5 June 1992 and completed in December 1993.

and export marketing prospects by supporting the early operations of a coordinated marketing organization.

31. The Kingdom of Tonga comprises 171 islands, of which 36 are inhabited, aggregated into the four major groups of Tongatapu, Ha'apai, Vava'u, and the remote Niuas group. The land area is 700 sq km, and includes both volcanic and coral islands. In addition to the land area, Tonga also has an exclusive economic fishing zone (EEZ) of 700,000 sq km. The presence of the Niuas within the country adds about 160,000 sq km to the national EEZ. The main islands of Tongatapu and Vava'u, are relatively well developed, with a full range of services and an active private sector, but the other islands and the remoter islands, particularly the Niuas and 'Eua, are far less well provided with services and have only partially shared in national development.

32. The tiny and remote Niuas group consists of two main islands, Niuafo'ou and Niuatoputapu, which are located about 200 km apart and about 650 km from the main island of Tongatapu. The combined area covers 53.5 sq km, of which about 20 sq km is a fresh water lake on Niuafo'ou. There are 12 main villages and a relatively stable population of 2,130 persons on the two islands. There is a disproportionate shortage of males in the 30-54 age group as a result of out-migration. 'Eua, about 16 sq km in area, is located only 22 km from Nuku'alofa and access to the main island is considerably easier than from the Niuas. The total population of 'Eua has increased slightly over the last ten years and now totals about 5,100, living in 14 main villages.

33. Public administration is provided on each island by a Government representative, with Government agencies including a treasury, post office, basic health and education services and Ministry of Fisheries and MAF offices. The TDB is represented on all three islands. The Prime Minister's Office appoints a permanent island representative to each outer island.

34. The infrastructure on the Niua islands is minimal, with the exception of two airfields, which are in good condition. Niuatoputapu has a good port, albeit with some difficulties in the reef passage, whereas Niuafo'ou has very poor port facilities, requiring lightering onto a lava outcrop. Port facilities in the Niuas are to be improved under the Bank-financed Transport Infrastructure Project. There are basic ring roads on both islands, with a number of other tracks that usually become impassable in the rainy season. Air services are infrequent, averaging about once every three weeks, and there is a monthly ship to Nuku'alofa and quarterly shipping services to Western Samoa and Fiji. 'Eua has much better sea and air links to Nuku'alofa, with daily return shipping services by two vessels and return air services twice a day four days a week and once a day two days a week. However, travel by road on 'Eua is constrained, especially in the wet season, when some of the agricultural tracks become impassable.

35. Telecommunications links with Nuku'alofa and beyond are adequate for the residents of 'Eua, which is sufficiently close to Tongatapu to be served with a microwave link. However, telecommunications services for the Niuas are via public radio telephone links that are inconvenient and unreliable. Electricity is available 24 hours per day on 'Eua; but, on the Niuas, it is available only for lighting at the Government and church facilities. Fresh water is collected in rainwater tanks, the more prosperous houses having their own individual tanks. Houses generally consist of sleeping quarters only,

with cooking, washing, and toilet facilities located outside. Some 25 percent of houses are only partially thatched.

36. Household sizes average about 6.5 persons. The average annual income for households that include a civil servant is about \$5,000 on 'Eua and \$4,000 in the Niua, and for those without a civil servant it is about \$2,000; 40 percent of all households have annual incomes of less than \$1,000. A significant proportion of cash income comes from the sales of handicrafts, agricultural production being mainly for household use; remittances account for about 10 percent of household incomes. Cash income is generally spent on family needs, church donations, school fees, and kava¹; expenditures on imported goods are generally limited to kerosene, flour, mutton, fats, and some soft drinks.

37. The average size of land holding is about 3.5 ha. Farming practices are based on the traditional agroforestry systems, in which the chief crops include taro, manioc, other local varieties of root crops grown for subsistence purposes, vegetables, bananas, and coconuts. The cash crops include vanilla and kava, and some squash on 'Eua. The farming system is complex and sustainable under adverse conditions, and focuses on providing food security, risk management and providing products for social exchange. The development of cash cropping has evolved in parallel to the basic system, and is often on land set aside from the traditional cycle of fallow and rotation. Responses to markets for cash crop surpluses are opportunistic, and depend on the market information available to the growers; for example, farmers on 'Eua were quick to take advantage of the growth in squash production on Tongatapu, and growers in the Niua are currently exporting watermelons and taro to American Samoa, taking advantage of the need for inter-island vessels to visit Pago Pago for routine servicing. However, producers revert to the traditional system in the absence of profitable market opportunities, but with production still well above subsistence levels.

2. Project Design

38. The agricultural economy of Tonga is passing through a transition period, as traditional and stable farming systems convert to a more market-driven pattern. Nonsubsistence production was previously oriented towards the commodity markets such as copra, but it has increasingly moved to more entrepreneurial export markets, in particular squash exports to Japan and vanilla exports. Farmers have generally responded well to these new opportunities; however, they are increasingly vulnerable to the vagaries of external markets. Therefore, there is a need to improve the market intelligence and support services available to farmers, with a corresponding improvement in research and extension services and the educational levels of farmers so that agricultural production can continue to be secure and profitable. A further reason for developing and improving agricultural production is to maintain viable income opportunities in the villages, preserve the traditional and sustainable way of life and prevent rural-urban drift.

¹ A drink made from the powdered root of the kava plant (*piper methysticum*) and used mainly for social purposes.

39. The Project is designed to increase economic activity in the agriculture sector in general and in the outer islands in particular by making producers aware of profitable, exploitable, and sustainable market opportunities. The Project also responds to their anticipated increased need for extension support and communications services and infrastructure; thus, the development will be oriented towards the private sector and driven by the market. The Project and an associated advisory TA for strengthening the capacity of MAF are intended to enhance agricultural production in the Niua and 'Eua, while the other advisory TA is to strengthen Tonga Trade and lead to improved postharvest export processing and marketing opportunities for Tonga as a whole.

40. The Project will lead to an improvement in the standard of living and welfare of families through the enhancement of farming systems, by promoting sustainability, diversification, food production, and an increase in cash incomes. Exports will be increased by improving product handling, processing, market information, and trade promotion systems, and developing new institutions and infrastructure. Credit will not be provided under the Project because credit facilities are available on all the islands from the TDB. However, communities will be encouraged by the extension services of MAF to form their own informal credit societies in order to stimulate local cooperation and reduce their dependence on Government services.

41. Shipping services will not be directly increased as a part of the Project, but the shipping companies have indicated that they would be able to increase the frequency of services if the demand were there. The volume of shipping that currently visits the Niua is adequate for the amount of produce that is shipped; the problem with the shipping services is their lack of reliability and predictability, rather than the volume of freight. The proposed improvement in the communication links will give producers much better access to market and shipping information and will allow them to schedule their production better. The Bank-financed Transport Infrastructure Project will improve the harbors, wharves, and approaches on the Niua, thus reducing the occasions when ships are unable to load or unload. Although significant increases in production are anticipated as a result of the Project, this will be mainly lower volume, high value crops such as vanilla and kava, rather than the more traditional, bulky copra and coconuts.

42. MAF will provide marketing support and specialist expertise to enhance the activities of the private sector. A market information system will be introduced through Tonga Trade that will collect, analyze, and publish information for all sectors. This will be supported by well-directed research, extension, and training and the unique features of Tongan products will be identified and promoted. The framework for the Project is in Appendix 2.

B. Objectives and Scope

43. The objectives of the Project are to: (i) increase agricultural productivity and farm incomes on the outer islands; (ii) reduce the income disparities between households on the different island groups, and; (iii) stimulate agricultural exports. These objectives will be achieved by: (i) improving the agricultural extension services provided to the outer islands by MAF, with associated research and trials capabilities; (ii) increasing and sustaining agricultural production systems on the Niua and 'Eua and improving the standards of living of agricultural households on these islands through a

community based and integrated approach; (iii) providing market support and development assistance to the farmers of the Niuas and 'Eua, and; (iv) providing the infrastructural development and support required by the Niuas and 'Eua to support integrated agricultural development and a reasonable quality of life. The scope of the Project includes the following components:

1. MAF Capacity Strengthening

44. The Project will strengthen the agricultural extension services in the outer islands, particularly the Niuas and 'Eua, and provide supporting research and trials work. Emphasis will be placed on expanding the current work of MAF staff to include baseline socioeconomic surveys, research and development of new crops, marketing and quality improvement, and improvements in farm management.

45. The MAF facilities on the Niuas and 'Eua will be upgraded to include new and renovated office space, staff housing, training facilities, and transport, for both existing and new staff. The management of the Project will also benefit from assistance provided through an associated advisory TA for the Institutional Strengthening of MAF.

2. Farming Systems Improvement

46. The goal of increasing and sustaining agricultural production systems on the Niuas and 'Eua and improving the standard of living of rural households will be achieved through a community-based and integrated approach. New crops will be introduced where appropriate, improved farm management of existing crops will be taught, and market access for farm and handicraft products will be provided.

47. The Project will support initial surveys of pests and diseases, animal health, and household nutrition status, and will establish production and marketing potentials. Appropriate research and development will be funded on the targeted islands and the safe usage of agrochemicals will be promoted, especially as farming systems become more intensified. MAF extension staff will work with local producers and dealers to develop small-scale demonstration crop processing facilities to be funded by the Project.

3. Market Support and Development

48. Support under the Project for market development will include funding for three processing, storage, and marketing buildings and stores located near the port facilities. Market information and training materials will be provided for handicraft and tourism opportunities as well as agricultural production, and training courses will cover market identification, product presentation and packaging, and basic small business management.

4. Infrastructure

49. The Project will support the infrastructural development required in the Niuas and on 'Eua to support integrated agricultural development. This component will include about 57 km of new and improved agricultural road works, telecommunications

links on both Niuafo'ou and Niuatoputapu, and domestic water supply tanks and piping. The location of the agricultural roads to be constructed or improved will be decided by the island communities, coordinated by the permanent island representatives and assisted by technical advice from MOW. The Project will also support the construction of quarantine, disinfestation, and fumigation facilities on the Niuas to allow them to act as ports of entry and exit for fruits and vegetables, and will provide appropriate training for MAF staff. A fumigation chamber to be located on Ha'apai and a dry heat disinfection plant on Tongatapu will also be provided by the Project.

50. About \$220,000 of the funds for the Project will be used to establish a community fund on each island for small infrastructure projects such as strategic fencing and improvements to communal weaving houses. The funds will be provided as part of the Government's contribution to the Project. They will be held at the local office of the TDB and will be used for capital improvements that will facilitate agricultural production, marketing or processing, handicrafts, or tourism. The projects will be selected from each village or community and coordinated by the permanent island representative. A unanimous decision of the communities will be necessary for the release of the funds; the senior MAF officer on each island will be responsible for reporting on the utilization of the fund.

51. The Tonga Telecommunications Commission (TTC) will install a satellite-based telephone and telecommunications link between Tongatapu, Vava'u and Ha'apai by mid-1996, using other sources of financing. Compatible ground stations, including satellite disks, switching equipment, power supply, office equipment, and buildings will be provided on Niuafo'ou and on Niuatoputapu under the Project to link in with the national and international network. The telecommunications subcomponent will be financed through a subloan from MOF to TTC, and TTC will use the revenues from telephone calls and other services to repay the subloan.

52. While a dependable supply of electricity is also highly desirable to maintain an adequate quality of life on the outer islands, this will be addressed by a separate project programmed for 1996, the feasibility studies for which are about to begin under a Bank-financed project preparatory TA.¹

C. Cost Estimates

53. The total cost of the Project is estimated at \$5.7 million equivalent. The foreign exchange cost is estimated at \$2.8 million equivalent or 49 percent of the total cost. The local currency cost is estimated at \$2.9 million equivalent or 51 percent of the total cost, including \$0.7 million equivalent for taxes and duties. The cost estimates include provisions for price escalation, physical contingencies, and the service charge on the Bank loan during construction. The cost estimates are summarized in Table 1 and shown in more detail in Appendix 3.

¹

TA No.2275-TON, for \$100,000. approved on 29 December 1994.

Table 1: Summary of Project Cost Estimates
(US\$ million equivalent)

Item	Foreign	Local	Total
A. MAF Capacity Strengthening	0.2	0.5	0.7
B. Farming System Improvement	0.2	0.2	0.4
C. Marketing Support and Development	0.2	0.3	0.5
D. Infrastructure	1.8	1.6	3.4
Base Costs	2.4	2.6	5.0
E. Physical Contingencies ^a	0.1	0.2	0.3
F. Price Contingencies ^b	0.1	0.1	0.2
G. Service Charge	0.2	-	0.2
TOTAL COST	2.8	2.9	5.7

^a at an overall average of 6.8 percent¹

^b at 2.2 percent for foreign costs and 4.0 percent for local costs

D. Financing Plan

54. It is proposed that the Bank provide a loan of \$3.64 million equivalent from its Special Funds resources to finance approximately 64 percent of the costs of the Project. About 22 percent of the Bank's loan (\$0.8 million) would be for financing local costs. This is considered justified in view of the low capacity for domestic resource mobilization and is consistent with the other major donors who finance local costs. The remaining 36 percent (\$2.1 million equivalent), for which finance will be provided by the Government, will cover all taxes and duties (\$0.7 million equivalent), part of the civil works, most of the consulting services and training, domestic water supplies, community funds for small projects, the additional administrative costs of the MAF extension services and MAF Research Division labor, travel, and per diems. The financing plan is shown in Table 2. The Government anticipates that about \$1.3 million of its contribution will be financed from bilateral sources. However, in the event of a shortfall in bilateral funding, the Government will provide finance from its own resources.

55. The Bank loan will have a maturity period of 40 years, including a grace period of 10 years, and will carry a service charge of 1 percent per annum. The Borrower will be the Kingdom of Tonga. The proceeds from the Bank loan for the telecommunications subcomponent (\$1.7 million) will be relent to TTC by the Government under a subsidiary loan agreement. The terms of the relending will be at least the Bank's US dollar ordinary capital resources rate, currently 6.91 percent per annum, with a

¹ 10 percent for civil works, 5 percent for general items of equipment and no allowance for specific items of equipment or consulting services.

maturity of 15 years including a grace period of 3 years. The Government will bear the foreign exchange risk on the TTC loan.

Table 2. Financing Plan
(US\$ million equivalent)

	Foreign Exchange	Local Currency	Total Costs	Percent of Total Costs
Bank	2.8	0.8	3.6	64.0
Government	-	2.1	2.1	36.0
Total	2.8	2.9	5.7	100.0

E. Implementation Arrangements

1. Executing and Implementing Agencies

56. The Ministry of Finance (MOF) will be the Executing Agency for the Project and MAF, MOW, and TTC will be the implementing agencies for their respective components. MOF will assign a senior staff member at the level of Deputy Secretary as Project Director, with the necessary number of supporting staff to carry out the overall coordination of the Project. MOF, as the Executing Agency, will be responsible for maintaining the appropriate reporting, administrative and financial links with the Bank. MAF will establish a Project Office, which will be directly responsible to the Director of MAF and will have strong links to MAF's Policy and Planning and Extension and Research Divisions. MAF will appoint a Project Manager for the MAF capacity strengthening, farming systems improvement, market support, and development components. The Project Manager will be supported by four staff concerned with extension, research, and community development. MOW and TTC will each appoint Project Managers for their subcomponents under the infrastructure component. The Project Director and the Project Managers will be appointed and a Project Steering Committee and the Project Office will be established prior to loan effectiveness.

2. Project Organization and Coordination

57. MOF will be responsible for coordinating the activities of the three implementing agencies. The Prime Minister's Department (PMD) will also play a coordination role by virtue of its appointment of the permanent island representatives on each island. A Project Steering Committee (PSC), convened by MOF and meeting every two months, will be established to ensure integration at the Government level. The PSC will include representatives from MAF, MLCI, MOF, MOW, PMD, TDB, TTC, the Ministry of Foreign Affairs (MFA), the permanent island representatives from each of the outer islands and the Central Planning Department (CPD). Strong links will also be established between the Project and Tonga Trade to ensure that: (i) market information is passed on to farmers through the existing MAF Marketing Unit, and; (ii) feedback from farmers and the extension and research services is made available to Tonga Trade. The organization and management structure for the Project is presented in Appendix 4.

3. Procurement

58. The proposed civil works will be small-scale and will be scattered in remote locations so they will not be of interest to international or major local contractors. For this reason they will be undertaken by MOW on a force account basis or by direct hiring of local contractors. This arrangement is cost-effective because the civil works are located where MOW either has workshops and equipment depots or already has experience working. MOW has the necessary skills and experience to allocate and supervise the work subcontracted to domestic private contractors. The Government has agreed to ensure that all civil works will be carried out in compliance with the applicable environmental guidelines. Vehicles and equipment will be procured under international shopping and direct purchase arrangements, and telecommunications equipment by international competitive bidding in accordance with the Bank's *Guidelines for Procurement*.

4. Consulting Services and Training

59. A total of 11 person-months of international consulting services will be required to assist in implementation of the Project. The short-term consultancies will cover postharvest technology (3 person-months), training and extension (3 person-months), handicraft design (2 person-months) and marketing and small business operation (3 person-months). About 3 person-months of local consulting services will be required, covering the safe use of agrochemicals and farmer training for market development. The consultants will prepare training materials, work together with MAF extension staff to produce training and extension programs, train the extension staff, and undertake training workshops in village communities. The farmer training programs will be participatory in nature and will cover the items listed above. The consultants will also instruct MAF staff in farmer training techniques and will, together with MAF staff, develop a strategy for repeating and enhancing the training program at suitable intervals. The draft terms of reference for the consultants are in Appendix 5. The consultants will be selected and engaged in accordance with the Bank's *Guidelines on the Use of Consultants*.

5. Implementation Schedule

60. The Project will be implemented over a five year period. It is expected to start in March 1996 and to be completed by August 2001. The preparatory works will begin in the first quarter of 1996 and physical works will start by the first quarter of 1997, and coincide with the small ports component of the Transport Infrastructure Project. The detailed implementation schedule is in Appendix 6.

6. Imprest Fund Account

61. To avoid delays in the processing of withdrawals from the Bank loan during the implementation of the Project, an imprest account will be set up at a bank in Tonga acceptable to the Bank. The imprest account will be established, operated, and controlled by MOF in accordance with the Bank's *Guidelines on Imprest Fund and Statement of Expenditures Procedures (SOE)*, with an initial deposit of about \$0.5 million equivalent to meet about six months of estimated expenditures. The SOE procedure may

be used to: (i) claim reimbursement for individual expenditures not exceeding the equivalent of \$20,000 for each item, and; (ii) liquidate advances for individual payments from the imprest account not exceeding the equivalent of \$20,000 for each payment.

7. Reports, Accounts and Audit

62. MOF will maintain separate records and accounts for the Project and will provide the Bank with quarterly reports covering physical progress, Project accounts, including the imprest account and SOE records, and performance indicators for all components. The implementing agencies - MAF, MOW and TTC - will also maintain separate records and accounts for their subcomponents and will provide quarterly reports on their progress to MOF, which will prepare a consolidated report for submission to the Bank. Separate accounts will be maintained for the community funds for small infrastructure projects. At the termination of the Project, MOF will provide the Bank with a project completion report containing implementation, operation, cost, benefit and other relevant details as required by the Bank. The accounts of the Project will be audited annually by independent auditors whose qualifications, experience, and terms of reference are acceptable to the Bank. MOF will also be responsible for submitting certified copies of the audited accounts, including the auditors' opinion on the use of loan proceeds, compliance with covenants in the Loan Agreement and the use of procedures for the imprest accounts and SOE, to the Bank within six months after the end of the relevant fiscal year.

8. Benefit Monitoring and Evaluation

63. The MAF extension teams will establish participatory Benefit Monitoring and Evaluation (BME) systems and will also develop and administer assessments using verifiable indicators of change, including economic, social and environmental assessments. These skills will be available within MAF by the time the implementation of the Project begins as a result of the ongoing EU and AusAID projects in Vava'u and Ha'apai, which include the development of BME techniques. Baseline surveys of household incomes and consumption patterns, and agricultural production will be carried out by MAF Project staff. The surveys will be carried out in accordance with the Bank's *Handbook on Benefit Monitoring and Evaluation*. In addition, participating farmers will be encouraged to evaluate the progress and success of the Project.

9. Midterm Review

64. A midterm review of the Project will be carried out at the start of the third year of implementation (1998) or at a time to be mutually agreed between the Government and the Bank. The physical and financial progress of the Project will be critically reviewed, estimates will be made of the socioeconomic impact of the Project, and any necessary modifications will be made to the funding and implementation arrangements for the Project. A particular point of concern to the midterm review team will be to what extent the proposed changes in the institutional arrangements of MAF have taken place, and how effective they have been.

10. Operation and Maintenance and Cost Recovery

a. Operation and Maintenance Arrangements

65. The operation and maintenance (O&M) costs associated with the physical facilities constructed or renovated under the Project will be supported by the Project until the end of the implementation period for the Project, at which time the respective agencies will take over full responsibility. MOF, in conjunction with MAF, MOW and the permanent island representatives, will be responsible for drawing up an action plan to ensure the proper maintenance of the facilities and equipment provided under the Project. The participating communities will be encouraged from the outset to accept responsibility for maintaining the installed infrastructure, especially on the remote Niuas, where logistical problems hamper the Government's ability to carry out nonemergency maintenance.

b. Cost Recovery

66. No provision has been made to make a direct recovery of the investment and recurrent costs for the Project because there is no agricultural taxation system in place. Although implementing a system for taxing agricultural producers may form part of a future policy dialogue between the Bank and the Government, taxing the already disadvantaged farmers on the outer islands would still have a low priority. The telecommunications subcomponent will generate its own revenue stream and is expected to reach its break-even point at the end of five years. The mandate for developing Tonga Trade involves identifying and implementing methods so it can be at least 50 percent self-financing after the first two years.

F. The Ministry of Agriculture and Forestry

67. MAF is a long established agency, currently employing about 360 staff organized in eight divisions. These divisions include administration, policy and planning, forestry, livestock, quarantine and quality management, mechanical services, research and extension. A Bank-financed TA review of the operations of MAF carried out in 1992 concluded that MAF was an effective organization and had managed to fulfil its mandate during a time of significant shifts in national agricultural production patterns and exports, and a cut in budget support. The review noted that MAF's strengths included the number, qualification, and technical knowledge of its staff; its experience in the introduction and niche marketing of cash crops; a strong extension network; a well respected quarantine service; and a desire to improve its performance. The weaknesses of MAF related to the management of human and financial resources; technical skills (farm and business management, analytical, monitoring, evaluation, understanding of the cash economy); and lack of evaluation and incentives for performance. MAF also suffers from a phenomenon common to many of the agencies in the Pacific Island countries - a tendency for younger and well qualified staff to resign or to move to other positions in the Government after a few years experience.

68. A recommendation was made by the review team that MAF should move towards a four divisional structure - corporate management, forestry, research and extension, and quarantine and quality management. This recommendation was accepted

in principle by the Government and MAF has made a systematic effort in recent years to improve its skills, in particular in dealing with the increasingly important private sector. A report on the progress of improving MAF's operations is in as Appendix 7, with particular reference to actions taken to support projects focussed on the outer islands. A strategic plan for the future operation of MAF is due to be finalized by December 1995. A small marketing unit has been established within the Policy and Planning Division, and this unit will be retained and used as the interface between the market intelligence and information generated by Tonga Trade and MAF's extension and research divisions.

G. Environmental and Social Measures

1. Environment

69. The Project is classified as environmental category B. An environmental impact assessment (EIA) was carried out as part of the preparation process and concluded that only a few activities under the Project have the potential to generate significant environmental effects. While the Project will lead to some expansion and intensification of agricultural land use, it aims to largely build on, and not to change, the traditional Tongan farming system of multicropping and agroforestry.

70. The increase in the use of agrochemicals and fertilizers is limited to relatively small areas for coffee and watermelons (or similar crops), the production of which will increase as a result of the Project. The Project includes consulting services to educate farmers about the appropriate use of agrochemicals and fertilizers. The Government has agreed to prepare an action plan for farmer training in these matters within six months of loan effectiveness.

71. The implementation of the infrastructure component of the Project has the potential to give rise to very minor erosion problems. Appropriate planning supervision and dialogue with the island communities should minimize such effects. The Government has agreed to ensure that all civil works carried out under the Project are in compliance with the applicable environmental laws and regulations. A Summary Initial Environmental Examination (SIEE) is available.¹

2. Social Analysis

72. A comprehensive socioeconomic analysis¹ of communities in the Niua and 'Eua was undertaken as part of the feasibility study for the Project and revealed a high degree of social cohesion and structure. The communities on all the islands both need and support the Project as an opportunity to improve their quality of life. Their lack of development assistance in the past was highlighted, especially in comparison with Tongatapu and Vava'u.

73. A critical part of the work of the MAF extension and research teams will be with the local government and traditional social structure on the target islands, including the structure of authority through the nobles and their representatives, the extended

¹ Supplementary appendix available in the file.

families and their leaders, and the church. At the local level there are men's and women's work groups, some relatively temporary and others well-established, and overlain on this structure is the administrative network of village officers and village committees, district officers, district agricultural committees, government agencies, and a permanent island representative.

74. Thus, the basic community system is well established, and considerable participation and interaction already takes place. In addition, the farmers on the islands have shown themselves to be hardworking and eager to respond to new opportunities, as long as they are profitable. The main thrust of the Project is to: (i) educate farmers and their families about profitable opportunities via improved communications links and the activities of Tonga Trade; (ii) provide an improved physical infrastructure to facilitate increases in production, and; (iii) deliver improved extension and research services as requested by the farmers. Given the integrity of the existing social structure, this task is expected to be achievable. The Project will also benefit communities in general and women in particular by providing access to markets for handicrafts as well as agricultural produce, by training in marketing and business methods, and by improving access through better road links.

H. Advisory Technical Assistances

75. The Government has requested the Bank to provide support for two capacity building advisory TAs to strengthen and develop the capacities of both MAF and MLCI.

1. Capacity Strengthening of MAF

76. The identified weaknesses of MAF in formulating and implementing development projects in the agriculture sector will be addressed under this advisory TA. The weaknesses to be addressed include the limited management and technical skills, as well as planning capabilities, and the need for improved research planning and implementation and for more effective and from targeted delivery of extension services, with particular focus on the commercial agriculture sector and specific training needs. Staff development will be effected through a mixture of overseas training aimed at developing future management staff, plus shorter overseas courses in marketing, WID issues, appropriate farming systems, and journalism techniques. A provision has also been made to locally train senior MAF staff in market information and promotion systems.

77. The objective of the advisory TA is to develop MAF staff skills and improve their ability to respond to technical and marketing queries raised by highly commercial and efficient farmers and merchants in the private sector, as well as to inform growers and traders about new market opportunities, and production and processing techniques. Therefore, MAF's activities will increasingly become driven by the market and led by the private sector, rather than the more traditional regulatory and general advisory role. The advisory TA will also fund short-term inputs from overseas specialists covering market information, promotion, and development to provide MAF staff with current information and skills and to support them in the management of MAF projects. The implementation of the advisory TA will be linked to the approval by the Minister for Agriculture and Forestry of MAF's Strategic Plan for improving its future operations. A major concern of the midterm review will be a critical assessment of the extent of the restructuring of MAF, and its effectiveness.

78. The advisory TA will be implemented over a three year period and is estimated to cost \$630,000 equivalent; of which \$514,000 will be foreign exchange and \$116,000 local currency costs. The Bank will finance \$514,000 of foreign exchange and \$86,000 of local currency costs for a total of \$600,000, and the Government will provide \$30,000 of local currency for office space, office supplies and equipment, and secretarial assistance. About 25.5 person-months of specialist foreign consultant services will be required, with expertise in the fields of project management (18 person-months), management information systems (3 person-months), benefit monitoring and evaluation (2 person-months) and media communications skills (2.5 person-months). The consultants will be recruited on an individual basis in accordance with the Bank's *Guidelines on the Use of Consultants*. The terms of reference for the consultants, the detailed cost estimates, and the financing plan are in Appendix 8. In addition, the Government will provide a training program for MAF staff, to be carried out in parallel with the Bank-financed advisory TA. The training program will mainly be financed from bilateral sources¹. If bilateral funding is not available, the Government will fund this training from its own resources.

2. Institutional Strengthening of Tonga Trade

79. The Government has adopted a policy that the marketing of agricultural and other commodities should be rationalized under a new entity known as Tonga Trade, which was established within MLCI in early 1995. The establishment of Tonga Trade has been in response to an urgent need to rationalize and improve the country's agricultural export marketing system, including its quality controls, and to find viable alternatives to squash exports, the continued viability of which is vulnerable to other producers exploiting the same limited market. Tonga Trade will also assist importers to locate the most economic sources for imported goods.

80. The proposed advisory TA will provide institutional support to Tonga Trade. Specifically, it will assist MLCI to develop the following four functional areas of Tonga Trade:

- **Market Development:** identifying markets through research and market opportunity analysis, assisting in the development of exporters' marketing skills, and facilitating the development and implementation of market management plans for product groups;
- **Trade Information:** establishing, maintaining, analyzing, and disseminating commodity information of interest to Tonga; the information will include prices as well as trade issues such as labelling, quarantine, and phyto-sanitary requirements;
- **Trade Policy:** advising and acting on international trade policy issues, in conjunction with other divisions of MLCI, Tonga Trade will be responsible for regulatory aspects such as licenses, and quality and presentational

¹

Most of the Government's contribution involves overseas and domestic training. Australia, New Zealand, and the EU have funded such training in the past.

standards; these regulations will be established by other divisions within MLCI, and;

Trade Promotion: in conjunction with appropriate public and private sector organizations, developing profiles for inward and outward trade missions, organizing inward and business visitor programs and developing investment portfolios.

81. A total of 20.5 person-months of consultancy inputs will be required to implement the advisory TA. The expertise will include: (i) an export marketing development specialist (12 person-months) to assist the assigned Director of Tonga Trade. The specialist's inputs will consist of seven months in the first year, with two later visits of 10 weeks each; (ii) a specialist in management information systems (5 person-months) to design, create, and install a computer data base and local area network to be available to interested users, and; (iii) short-term specialists (3.5 person-months) for training in the development of marketing plans, presentational skills, and data base analysis. The consultants will be selected on an individual basis and engaged in accordance with the Bank's *Guidelines on the Use of the Consultants*.

82. The advisory TA will also finance investigations and visits to export markets, participation in international trade fairs, acquisition of information, production of publications, and dissemination of information.

83. The total cost of the advisory TA over a period of two years is estimated at \$1,080,000 equivalent, of which \$670,000 will be foreign exchange and \$410,000 will be local costs. The Bank would provide \$850,000 equivalent on a grant basis to cover the total foreign exchange cost and \$181,000 of local costs and the Government would provide \$230,000 equivalent. The TA will be charged to the Bank-funded technical assistance program. The details of the resources required, terms of reference for the consultants, the estimated costs and the financing plan for the advisory TA are in Appendix 9. The Government has also agreed to appoint an individual with suitable professional experience as the Director of Tonga Trade, and to provide the Director with executive authority. It is intended that private sector support of Tonga Trade will be gradually increased. MLCI will draw up an action plan by the end of the first year's operations, indicating how at least 50 percent of the funding for Tonga Trade will come from the private sector by the beginning of the third year of operations.

V. PROJECT JUSTIFICATION

A. Benefits and Beneficiaries

84. The Project will benefit about 7,300 persons living on the Niuas and on 'Eua, where the socioeconomic analysis showed the income levels were low, access to Government services and resources was restricted, and access to cash income opportunities, domestic water supplies, high quality housing, and transport and communications infrastructure was limited compared with Tongatapu where the rate of economic growth has been considerably higher.

85. Nationally, agricultural producers will benefit from the improvements in market information and promotion; and in the quality, postharvest handling, quarantine, and processing systems. The result of the Project and the associated advisory TAs will

be to open up access to profitable export markets for products other than squash, thus reducing the country's vulnerability to dependence on exports of one crop.

86. Additional benefits will accrue from the improvement of quality of life on the Niuaus, improved environmental awareness, and the increased production of food and export crops.

B. Financial and Economic Analysis

1. Financial Analysis

a. Farm Models and Crop Budgets

87. The major effect of the Project will be an increase in the awareness about profitable market opportunities within Tonga and overseas, and the adoption of improved production techniques to produce for these markets. This process will lead to increases in the area cultivated, crop yields, and household incomes. Handicraft production, which is a feature of the traditional household production system, will also benefit from the increase in extension and market information, which will lead to improvements in the quality and quantity of the handicrafts produced and thus, in household incomes.

88. The crops included in the analyses are already grown on the islands, are suited to the environmental conditions, and have a future market potential. In addition, the crops generate sufficient returns to make increased production attractive to the farmers. With improved market information farmers may introduce new crops, in particular coffee. The estimates for increases in cropped areas and in yields "with-" and "without-" the Project are based on comprehensive field investigations and discussions with farmers.

89. To estimate the financial impact of the Project on farm families on 'Eua and in the Niuaus, three household farm models have been prepared. These show, for a typical household on each island, the costs and returns from those crops and handicrafts for which there are markets, either domestic or export, for increased production. The household models are derived from individual crop and handicraft budgets. The models are partial household models because they do not include all sources of household income such as off-farm employment, remittances, or income from livestock and crops for which no immediate additional market prospects exist. The models include no benefits from livestock as the extension staff will not be targeting livestock production under the Project.

90. The average household has access to about 3.5 ha of potentially cultivable land of which they currently cultivate no more than 60 percent at any one time on 'Eua and much less in the Niuaus. The interventions under the Project are likely to increase the area cultivated and to raise yields. The expected cropping intensities "with" and "without" the Project are summarized in Table 3.¹

¹ The calculation of cropping intensities is difficult in Tonga because of intercropping and the multistoried nature of the intercropping.

Table 3. Projected Changes in Household Crop Production

Item	'Eua	Nuiatoputapu	Nuiafo'ou
Cultivable Area - ha	3.5	3.5	3.5
Cropping Intensity - without Project %	60	17	17
Cropping Intensity - with Project %	69	26	26
Increased Cropping Intensity - %	14	50	50

91. It has been assumed that, in the absence of the Project, crop yields would increase over a 20 year period as some new varieties and improved cultivation practices gradually become available and are adopted. With the Project, the same yield increases would occur over a 10 year period because of improved extension and research. The assumed yield increases range from 8 percent to 19 percent. Activities under the Project will also result in an increase in the quality and hence income from handicrafts.

92. The average household size is 6.5 on 'Eua and Nuiatoputapu and 5.8 on Niuafo'ou. The households are assumed to have the equivalent of two full-time agricultural workers and two handicraft workers. On the basis of the crop and handicraft labor requirements there is more than sufficient labor available to meet the needs of the increased production, even allowing for activities not included in the model.

93. The farm models are in Appendix 10. The increase in family incomes resulting from participation in the Project ranges from 60 to 90 percent over a ten year period. These increases and the returns to labor from the increase in agricultural and handicraft production will provide a sufficient incentive for households to increase their production in response to market demands. The average incremental returns to labor from agriculture and handicraft production of between T\$6.00 and T\$14.00 per day compare with T\$ 2.50 (including food) per hour for men working as unskilled laborers on 'Eua and Tongatapu and T\$2.00 per hour in the Niuas, but where there are limited employment opportunities for unskilled labor. The returns to labor from handicraft production average about T\$1.00 per hour or less per hour at present whereas those from crop production are T\$6.00 per hour or more.

b. Telecommunications

94. An analysis of the financial viability of the telecommunications component has been undertaken. The Project will provide a satellite telecommunication system for the two Niuas to replace the existing tropospheric system, which is both unreliable and costly to maintain. The proposed system will provide ready access to the international telephone network.

95. A financial analysis of the new system is presented in Appendix 10 and a recent financial appraisal of TTC is in a supplementary appendix¹. In calculating the incremental financial revenues from the proposed system the analysis uses the number of circuits and the future domestic revenue per circuit from the feasibility study at the current tariff rate. Without the new system, revenues are assumed to remain constant as traffic growth is constrained by the limitations of the existing system. The revenue generated by the existing system is assumed to equal the value of the outgoing calls estimated at T\$12,000 per annum per island².

96. The new system will also generate revenue from international calls and this has been estimated from TTC's forecasts using the national ratio of domestic to international revenue. A further financial benefit will accrue from a saving in maintenance costs estimated by TTC to be 5.5 percent of current total revenues. The only incremental operating costs are for satellite rental because the system will need no additional staff and will be solar powered. The share of the satellite rental costs has been estimated from the feasibility study in proportion to the number of channels.

97. Using these assumptions, the investment in a satellite telecommunication system for the Niuaus would give a financial internal rate of return of between 4 percent and 5 percent. However, some of the assumptions can be considered conservative, for example, that there would be no increase in the number of channels after five years. Also the assumed volume of traffic per channel is low.

2. Economic Analysis

98. The benefits from the Project have been estimated for each island on the basis of information from the 1993 Land Use Crop Survey, the likely increases in crop areas on each of the islands as a result of activities under the Project, and the crop budgets used for the preparation of the farm models. The changes in the land use pattern expected as a result of the Project are summarized in Table 4. The increase in cropping intensity is expected to occur during years 1-5 of the implementation of the Project.

¹ The supplementary appendix is available in the file.

² Monthly revenue from outgoing calls on Niuauputapu averages T\$1,000 according to TTC.

Table 4. Projected Changes in Land Use Patterns

Crop Area	'Eua	Niutoputapu	Niuafo'ou
Without Project			
Total Crop Area - ha	711	81	86
Cropping Intensity - %	46	35	26
With Project			
Total Crop Area - ha	802	110	115
Cropping Intensity - %	51	47	34
Increase in Cropping Intensity - %	13	36	34

99. The economic analysis of the Project has been carried out in accordance with the Bank's *Guidelines on the Economic Analysis of Projects* and is presented in detail in Appendix 9. The economic internal rate of return (EIRR) of the whole Project is 16 percent. This return is considered conservative because only modest increases in cropped area and crop yields have been included and no benefits have been included for handicraft production. The latter were excluded because of a lack of information on which to assess the likely overall increase in production as opposed to that at the household level.

100. A sensitivity analysis was undertaken to assess the impact of changes in key variables by calculating switching values for these variables. The results of the sensitivity analysis are in Table 5, and indicate that there would have to be a change of 20-30 percent in key variables before the EIRR dropped below 12 percent.

Table 5. EIRR Sensitivity Analysis (percent)

1)	Base EIRR	16
2)	One year delay in crop production benefits	13
	Two year delay in crop production benefits	11
	Three year delay in crop production benefits	9
	Excluding non-agricultural telecommunications benefits	15
3)	Switching Value - percent change in variable to reduce EIRR to 12 percent	
	Reduction in overall benefits	20
	Increase in total costs	30
	Increase in crop production costs	88

C. Project Risks

101. The major risks associated with the Project include the difficulties in: (i) the difficulty of recruiting appropriately trained and motivated MAF extension staff for the positions in the Niuas (especially) and on 'Eau; (ii) motivating farmers on the outer islands to expand crop areas, plant new crops and pursue new marketing opportunities; (iii) developing marketing initiatives, establishing suitable contacts and constructing necessary processing and storage facilities; (iv) maintaining the existing shipping and air services to the Niuas and to 'Eau. Because the Project focuses on the expansion of crops with relatively high value to volume ratios, which can be stored for a reasonable period of time; therefore, regular freight services even if infrequent are necessary to ensure that marketing commitments can be fulfilled; (v) fulfilling the quarantine requirements on a consistent basis; (vi) maintaining disease free and fertile soils in the Niuas and on 'Eau, and; (vii) ensuring the marketing agency - Tonga Trade - fulfills its functions effectively.

102. The Project design addresses these risks by: (i) providing comprehensive training and support facilities and good working conditions for MAF staff; (ii) maximizing the involvement of local communities in identifying and promoting profitable development opportunities; (iii) linking the Project to the associated advisory TA to strengthen Tonga Trade and to provide timely and relevant market information; (iv) encouraging an increase in outer island production, thus making the provision of shipping services more financially attractive to the shipping companies; (v) providing additional facilities for the quarantine services, and; (vi) providing institutional support to Tonga Trade to ensure that its initial and subsequent operations are efficiently and effectively carried out.

103. In addition, the introduction of new technology under the Project is limited. All of the crops whose production is proposed to be increased under the Project are currently grown commercially in Tonga and most have already been grown successfully in the Niuas and on 'Eau. The different infrastructure and processing facilities to be constructed under the Project are not technically sophisticated and, with appropriate planning and selection of consultants and contractors, should be completed successfully.

D. Environmental Impact

104. An SIEE was carried out as part of the feasibility study for the Project and concluded that the proposed Project is unlikely to have any harmful effects on the environment. Some of the activities under the Project include building institutional capacity, raising environmental awareness, and providing educational opportunities. There is some possibility that crops and processing activities with potentially harmful side effects may be introduced as part of the intensification process, and training will also be given in the safe use of agrochemicals on intensified crops. Some erosion may take place if the new roads are not constructed properly. The Environmental Protection Section of the Ministry of Land, Surveys and Natural Resources will be represented on the Island Development Committees and will be involved in the training of farmers and MAF staff.

E. Social Dimensions

1. General

105. No serious social or cultural tensions are discernable at present, and the activities under the Project are expected to have a positive rather than a negative social impact because they will lead to a higher standard of living. The economic aspects of the Project will be positive and beneficial and the increase in farm production and access to markets will promote entrepreneurial activities in the area. Apart from income generation, the food crop improvement program will enhance the level of food security of participating households. The increases in food crop production and the utilization of the residues by livestock will expand the range of nutritious food available to the local communities, leading to an improvement in general health. The more dependable and diverse income opportunities will reduce rural-urban drift.

106. The rural road construction and improvement program will facilitate physical access to settlements and farm holdings and will improve villagers' access to off-farm economic opportunities. The improvement in accessibility means that both the marketing of farm produce and the delivery of goods and services to the islands will be eased, leading to a rise in farm-gate prices and a reduction in the prices of goods imported from outside. In addition, agricultural extension services, health care, and a number of other social services can be provided more effectively.

107. The improvement in communications will also engender a process of innovation diffusion, an essential element for economic growth and social progress. The rural infrastructure development program will increase the exposure of the target population to activities outside their communities and will facilitate flows of information and knowledge. Improvements to the transport infrastructure will allow the dissemination of extension information to the remote villages. Thus, the rural road development program will play a pivotal role in spreading these activities to other parts of Tonga. The ultimate beneficiaries will not be confined to the participants in the Project, but the rural population in general.

2. Women in Development

108. Rural women's work traditionally involves producing food crops, harvesting the crops, marketing the surplus agricultural production, raising livestock, gathering and carrying firewood and water, caring for children and other domestic chores. The Project has been designed to ensure that women are not marginalized and have access to inputs and receive benefits from the Project.

109. Most women have limited access to nonformal education, extension, and support services. The value of the considerable amount of work that women perform on behalf of their families is rarely recognized, nor that their work increases the time the other family members have for directly productive and income-generating activities. Although women in the villages often form their own groups, especially for saving purposes, poorer women are frequently excluded from these groups and women are also often underrepresented in village agricultural group discussions.

110. Experience elsewhere has shown that the expansion of food cropping can and often does increase women's workloads because they must contribute labor to cash crops in addition to their normal tasks of food production. However, developments in the production of food crops are designed to increase yields and thus reduce the time and energy required for food production. The Project will help to introduce simple cultivation technologies, high yielding varieties, and cropping systems that will significantly increase farm yields per unit area, thereby reducing the time required for food production activities. The Project will also support an increase in the production of handicrafts, the income from which is normally retained by the women, who are the producers.

111. Overall, the Project will seek to ensure equal participation of women in all activities and especially in new techniques of farm and tree crop management. Project staff will work with resident WID advisors to promote and facilitate women's involvement and participation in the overall Project and provide information and training in areas such as family planning, health, nutrition, sanitation and child care. The training of village officials, farmers, and staff of the Project will emphasize the importance of maximizing the development potential of the women in the rural communities, and extension staff will be trained to encourage women's participation in development activities.

VI. ASSURANCES

A. Specific Assurances

112. The Government has given the following assurances, in addition to the standard assurances which have been incorporated in the legal documents:

- (i) the Government will ensure, through the permanent island representatives, that local communities on the outer islands are fully consulted on all important aspects of the activities under the Project to be implemented in their communities, and that all members of these communities (including women) have an adequate opportunity to participate in extension and training activities carried out under the Project;
- (ii) the Government will ensure that all civil works carried out under the Project are in compliance with the applicable environmental laws and regulations, and with the applicable guidelines of the Bank;
- (iii) within six months of loan effectiveness, MAF will prepare an action plan acceptable to the Bank for training farmers on the outer islands in integrated pest management techniques and the appropriate use of agrochemicals and fertilizers;
- (iv) within twelve months after the commencement of the advisory TA for the institutional strengthening of Tonga Trade, MLCI will prepare a time-bound action plan acceptable to the Bank for implementing the recommendations of the advisory TA which are acceptable to the Government and the Bank, to ensure that at least 50 percent of the costs of Tonga Trade are met by the private sector within the next twelve months; and

- (v) Commencement of the advisory TA for the capacity strengthening of MAF will be conditional on the approval by the Minister for Agriculture and Forestry of a strategic plan satisfactory to the Bank for the future operations of MAF. Plan implementation will start within two months of loan effectiveness.

B. Conditions of Loan Effectiveness

113. The following conditions of loan effectiveness were agreed on:
- (i) the Project Director and three Project Managers will be appointed and the Project Steering Committee and the Project Office will be established; and
 - (ii) MLCI will have appointed an individual with suitable professional experience as the Director of Tonga Trade, and will have provided that the Director has the authority needed to direct the activities of Tonga Trade.

C. Condition of Disbursement

114. No loan proceeds will be disbursed for the telecommunications subcomponent of the Project until a Subsidiary Loan Agreement satisfactory to the Bank has been executed and delivered by the Government and TTC and has become effective and binding on both parties.

VII. RECOMMENDATION

115. I am satisfied that the proposed loan and technical assistance would comply with the Articles of Agreement of the Bank and recommend that the Board approve:

- (i) the loan in various currencies equivalent to Special Drawing Rights 2,434,000 to the Kingdom of Tonga for the Outer Islands Agriculture Development Project, with a service charge at the rate of 1 percent per annum and with an amortization of 40 years, including a grace period of 10 years, and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board; and
- (ii) the technical assistance of \$ 850,000 equivalent to the Government of the Kingdom of Tonga for institutional strengthening of Tonga Trade.

MITSUO SATO
President

17 November 1995

APPENDIXES

Number	Title	Page	Cited On (page,para.)
1.	External Assistance to Tonga		4,14
2.	Project Framework		10,42
3.	Project Cost Estimates and Financing Plan		12,53
4.	Project Organization and Management Structure		14,57
5.	Outline Terms of Reference for Project Implementation Consultants		15,59
6.	Implementation Schedule		15,60
7.	Progress Achieved in Improving the Operations of Ministry of Agriculture and Forestry		18,68
8.	Advisory TA for Capacity Strengthening of Ministry of Agriculture and Forestry		20,78
9.	Advisory TA for Institutional Strengthening of Tonga Trade		21,83 25,99
10.	Financial and Economic Analyses		23,93 24,95

Supplementary Appendixes
(Available if required)

- A. Detailed Cost Tables
- B. Summary Initial Environmental Examination (SIEE)
- C. Socioeconomic Conditions in the Project Area
- D. Financial Analysis of Tonga Telecommunications Commission
- E. Calculation of the Standard Conversion Factor for Tonga
- F. Crop Models
- G. Women in Development (WID) Considerations
- E. Economic Analysis Supporting Tables

External Assistance to Tonga

A. By Major Source (\$ million)	1991/92	1992/93	1993/94	Past 3 Years Annual Average	1994/95 Program
Multilateral Assistance (ODA NET)					
ADB	2.2	1.6	2.8	2.2	1.2
EU	-0.1	1.1	2.6	1.2	-
IDA	1.0	0.1	0.2	0.4	0.6
IFAD	0.6	0.2	0.5	0.4	0.7
UNDP	0.5	0.3	0.5	0.4	0.4
UNTA	0.6	0.5	0.8	0.6	-
OTHER	0.1	0.2	0.3	0.2	-
Subtotal Multilateral Assistance	4.9	4.0	7.7	5.5	2.9
Bilateral Assistance					
Australia	7.6	8.7	7.1	7.8	8.6
France	0.2	0.2	0.2	0.2	0.3
Germany	0.3	1.4	0.2	0.6	0.6
Japan	3.4	5.3	12.0	6.9	7.8
New Zealand	2.8	3.4	4.6	3.6	5.6
United Kingdom	0.1	0.1	0.1	0.1	0.2
Subtotal Bilateral Assistance	14.4	19.1	24.2	19.2	23.1
Total	19.3	23.1	31.9	24.8	26.0
B. By Sector Development Commitments (%)					
Natural Resources/Agriculture				7.3	8.2
Energy				19.7	10.3
Industry/Minerals				0.0	0.3
Finance				1.7	2.0
Transport & Communications				14.7	21.0
Social Infrastructure				48.0	49.0
Multisector/Others				8.3	9.2
Total				100.0	100.0

Source: Central Planning Department (Tonga), ADB

Notes:

UNTA & EU Figures are not in the records.
OTHER (Multilateral) not specified.

PROJECT FRAMEWORK

Design Summary	Targets	Monitoring Mechanism	Risks/Assumptions
Goal 1. Increase productivity and farm incomes 2. Reduce the income disparities between households on the different island groups	Targets: 1.1 Raised annual average farm incomes on - Eua by 30% - Niutoputapu by 40% - Niuafo'ou by 50% 2.1 Reduce the percentage of households in the Niuas and Eua below the national average income by 50%	Monitoring 1.1 Project Maintenance & Evaluation (M&E) - baseline and continuing surveys 2.1 Project M&E - plus district officer statistics	Assumptions: 1. No major shifts in output markets 2. No damage from natural disasters 3. Efficiency of support services
Purpose: 1. To encourage and support sustainable and profitable market-driven agricultural production on the Niuas and 'Eua	1.1 Increase the areas cropped of taro, yams, vanilla, kava, and watermelons by 20% ha/crop on 'Eua, 10 ha/crop on Niutoputapu and 15 ha/crop on Niuafo'ou. 1.2 Increase average annual yields by: <div style="text-align: right; margin-left: 100px;">mt/ha</div> <div style="margin-left: 20px;"> Taro - 19 yams - 18 squash - 19 vanilla - 10 Kava - 19 watermelons - 10 </div> 1.3 EIRR of at least 16%	1.1 Project M&E and Ministry of Agriculture and Forestry (MAF) annual Land Use and Crop Survey 1.2 Project M&E and MAF annual Land Use and Crop Survey	Assumptions: 1. Farmers participate; intervention packages prove successful; No change in external markets, etc.; Extension staff enthused; transport links reliable;
Components/Output: 1. MAF Capacity Strengthening	1.1 Training facility refurbished 1.2 Eua facilities improved 1.3 Niutoputapu facilities improved 1.4 Niuafo'ou facilities improved	1.1 Project M&E 1.2 Project M&E 1.3 Project M&E 1.4 Project M&E	1. MAF staff stay motivated on outer islands 2. MOW and TTC able to construct facilities 3. MAF staff training effective, including equipment utilization 4. Farmers attend training programs 5. Technical packages are site-appropriate 6. Market campaign focused on suitable enterprises 7. Market links with Tonga trade effective
2. Farming Systems Improvement	2.1 Research and development equipment installed and utilized	2.1 Project M&E	

Design Summary	Targets	Monitoring Mechanism	Risks/Assumptions
	2.2 Safe agro-chemical usage program completed	2.2 Project M&E	
	2.3 Producer training and extension program completed	2.3 Project M&E	
3. Market Support and Development	3.1 Improved processing, storage and marketing infrastructure constructed	3.1 Project M&E	
	3.2 Market information and promotion campaign completed	3.2 Project M&E	
	3.3 Farmers Training in market development	3.3 Project M&E	
4. Infrastructure	4.1 57 km. of farm roads constructed	4.1 Project M&E - Ministry of Works (MOW)	
	4.2 3 community funds established	4.2 Project M&E - MOW	
	4.3 2 telecommunications links installed and commissioned	4.3 Project M&E - Tonga Telecommunications Commission (TTC)	
	4.4 60 domestic water supply system installed	4.4 Project M&E	
	4.5 quarantine, disinfection and fumigation facilities installed	4.5 Project M&E - MOW	
Activities			Assumptions:
1.1 Assign MAF staff	- Total Costs US\$815,000	1.1 Project M&E - MAF	1. Staff remain motivated
1.2 Briefing group meetings		1.2 Project M&E - MAF	2. Correct market opportunities identified
1.3 Design MAF staff training programs		1.3 Project M&E - MAF	3. Proper design and construction
1.4 Implement staff training programs		1.4 Project M&E - MAF	
1.5 Design physical facilities		1.5 Project M&E - MOW	
1.6 Construct and commission facilities		1.6 Project M&E - MOW	
1.7 Procure Equipment		1.7 Project M&E - MAF	
2.1 Additional farmers meetings to select suitable crops	- Total Costs US\$453,000	2.1 Project M&E - MAF	
2.2 Agree crop interventions		2.2 Project M&E - MAF	
2.3 Design research program		2.3 Project M&E - MAF	

Design Summary	Targets	Monitoring Mechanism	Risks/Assumptions
2.4 Design farmers training program	- Total costs US\$512,000	2.4 Project M&E - MAF	
2.5 Procure Equipment		2.5 Project M&E - MAF	
2.6 Execute research program		2.6 Project M&E - MAF	
2.7 Train farmers		2.7 Project M&E - MAF	
2.8 Ensure input supplies		2.8 Project M&E - MAF	
3.1 Design market infrastructure		3.1 Project M&E - MAF	
3.2 Construct market opportunities		3.2 Project M&E - MOW	
3.3 Identify market opportunities		3.3 Project M&E - Tonga Trade	
3.4 Design Information and promotion campaign		3.4 Project M&E - Tonga Trade	
3.5 Implement information and promotion campaign		3.5 Project M&E - MAF	
3.6 Design producer training program	- Total costs US\$4.1 million	3.6 Project M&E - MAF	
3.7 Train producers		3.7 Project M&E - MAF	
4.1 Design road standards and alignments		4.1 Project M&E - MOW	
4.2 Construct roads		4.2 Project M&E - MOW	
4.3 Agree telecommunications specifications		4.3 Project M&E - TTC	
4.4 Install and commission telecommunication links		4.4 Project M&E - TTC	
4.5 Design quarantine, disinfection and fumigation facilities		4.5 Project M&E - MOW	
4.6 Construct quarantine, disinfection and fumigation facilities		4.6 Project M&E - MOW	

PROJECT COST ESTIMATES
(US\$'000)

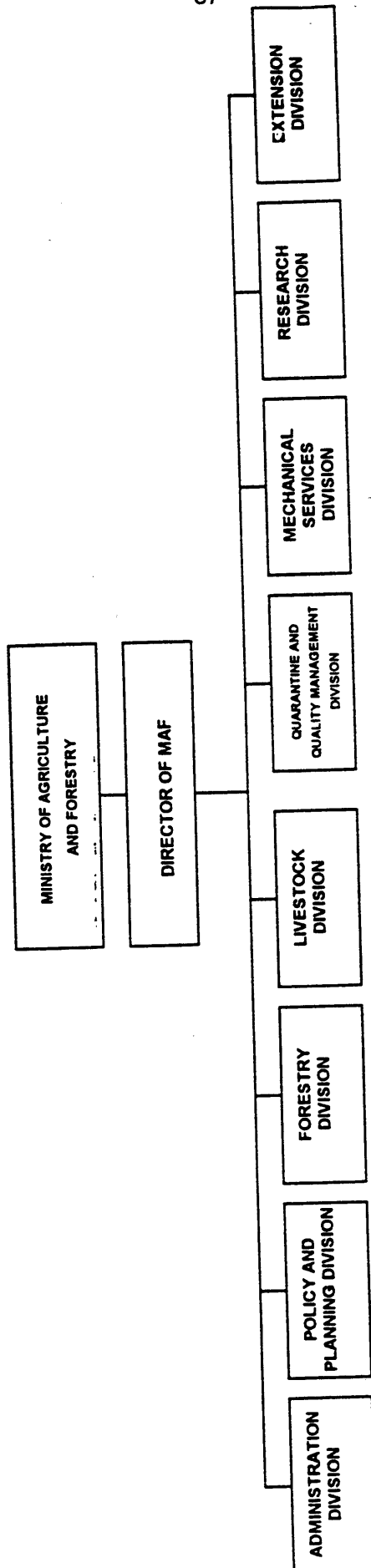
Item	(US\$)		Total
	Local	Foreign	
I. Investment Costs			
A. Civil Works			
Buildings	971.5	323.8	1,295.3
Roads	601.7	200.6	802.3
Water Supply	89.8	89.8	179.6
Subtotal Civil Works	1,663.0	614.2	2,277.2
B. Vehicles	111.0	91.9	202.9
C. Equipment and Furniture	112.4	112.4	224.8
D. Telecommunications Equipment	444.8	1,334.5	1,779.3
E. Consulting Services			
Training	8.5	2.8	11.3
Specialist Services(Local)	18.2	-	18.2
Specialist Services(Foreign)	-	204.2	204.2
Subtotal Consulting Services	26.7	207.0	233.7
F. Research and Development			
Research Labour	48.5	-	48.5
Travel and Accommodation	50.4	16.8	67.1
Training Materials and Publications	67.4	22.4	89.8
Subtotal Research and Development	166.2	39.2	205.4
Total Investment Costs	2,524.1	2,399.4	4,923.5
II. Recurrent Costs			
Operations and Maintenance	125.4	-	125.4
Total Recurrent Costs	125.4	-	125.4
Total Baseline Cost	2,649.6	2,399.3	5,048.9
Physical Contingencies	141.2	194.5	335.7
Price Contingencies	87.0	119.7	206.7
Total Project Cost	2,877.8	2,713.5	5,591.3
Service Charge on the Loan	-	132.5	132.5
Total Costs	2,877.8	2,846.0	5,723.8

FINANCING PLAN^{1/}
(US\$'000)

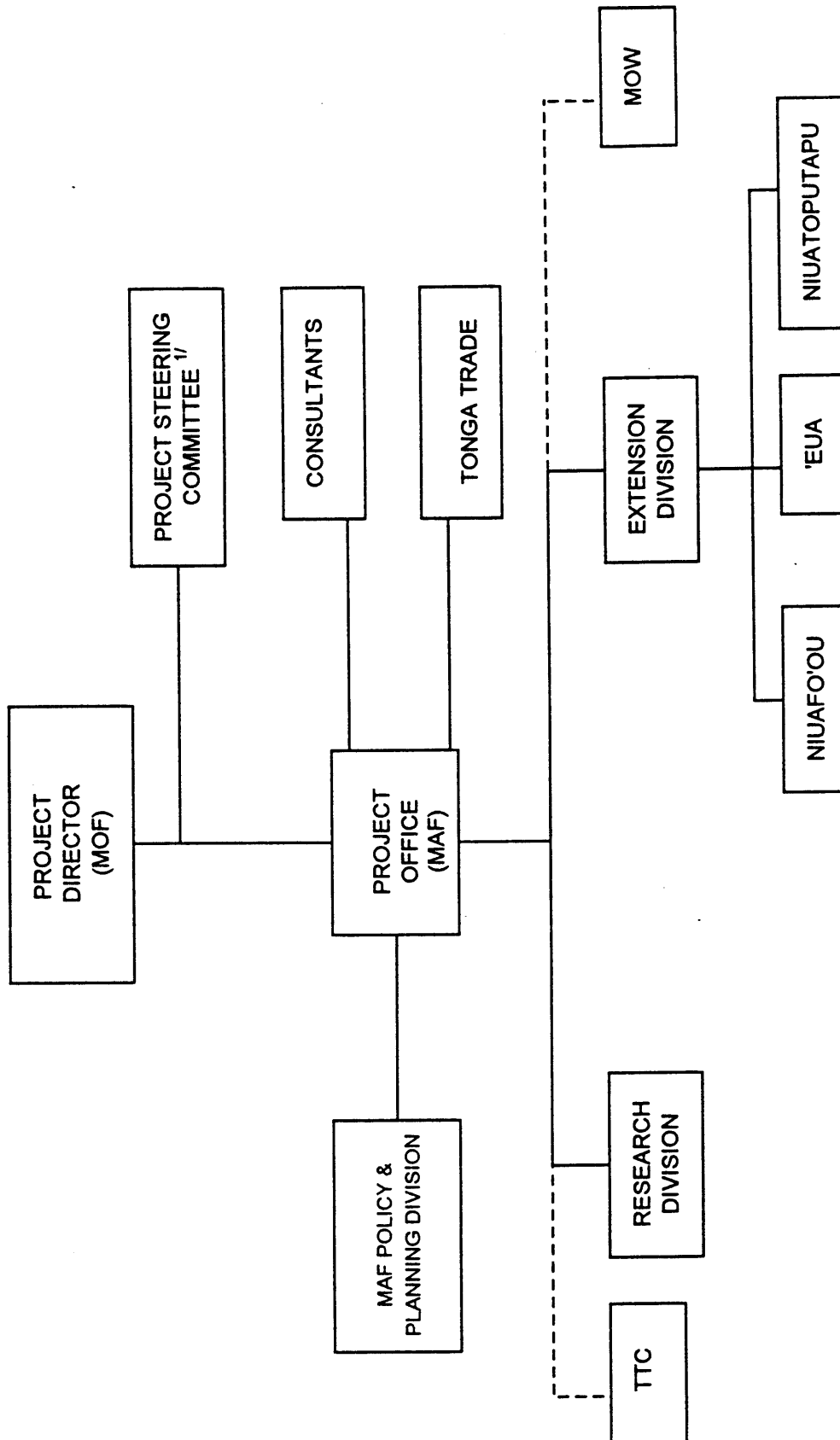
Item	Foreign	ADB Loan Local	Total	Government Local	Total
I. Investment Costs					
A. Civil Works					
Buildings	370.3	157.3	527.6	953.6	1,481.2
Roads	232.0	603.3	835.3	92.8	928.1
Water Supply	-	-	-	207.1	207.1
B. Vehicles	94.0	28.4	122.4	85.0	207.4
C. Equipment & Furniture	81.9	-	81.9	168.5	250.4
D. Telecommunications Equipment	1,718.7	-	1,718.7	191.0	1,909.7
E. Training					-
Training	-	-	-	12.1	12.1
Specialist Series (Local)	-	-	-	19.2	19.2
Specialist Series (Foreign)	216.6	-	216.6	-	216.6
F. Research and Development					
Research Labour	-	-	-	52.4	52.4
Travel and Accommodation	-	-	-	74.6	74.6
Training Materials and Publications	-	-	-	98.5	98.5
Total Investment Costs	2,713.5	789.0	3,502.5	1,954.9	5,457.4
II. Recurrent Costs					
A. Operations and Maintenance	-	-	-	133.9	133.9
Service Charge on the Loan	132.5	-	132.5	-	132.5
Total Project Costs	2,846.0	789.0	3,635.0	2,088.8	5,723.8

^{1/} Includes all physical and price contingencies

MINISTRY OF AGRICULTURE AND FORESTRY
CURRENT ORGANIZATIONAL STRUCTURE



PROJECT ORGANIZATIONAL CHART



^{1/} Representatives of Ministry Agriculture and Forestry (MAF), Ministry of Labour, Commerce and Industries (MLCI), Ministry of Finance (MOF), Ministry of Works (MOW), Tonga Telecommunications Commission (TTC), Ministry of Foreign Affairs (MFA), Prime Minister's Department (PMD) and Tonga Development Bank (TDB)

OUTLINE TERMS OF REFERENCE FOR PROJECT IMPLEMENTATION CONSULTANTS

A. Post Harvest Technology Specialist (1 International for 3 months)

- (i) work with the Ministry of Agriculture and Finance marketing organization and Tonga Trade to identify profitable crop options for the outer islands;
- (ii) define the market requirements for agricultural produce in terms of presentation, quality, freshness and stage of processing;
- (iii) work together with groups of farmers participating in the Project, explain the profitable crop options and detail the requirements for processing and packaging;
- (iv) identify what processing, storage and packaging facilities will be necessary in general, draw up suitable designs and specify the costs thereof;
- (v) work with individual village communities to define their particular needs, locate suitable sites, define the costs involved and assist the communities to access development funds, where necessary;
- (vi) train MAF extension workers in all the above matters, including selecting specific staff on each island to have especial responsibilities for low cost food processing matters;
- (vii) together with the assigned MAF staff, work together with a number of pilot communities to help them install the necessary processing, packaging or storage facilities.

B. Producer Training and Extension Specialist (1 International for 3 months)

- (i) in consultation with other team members, staff of the Project and other concerned projects and organizations, prepare training materials on participatory extension methodologies appropriate for intensive training sessions for extension workers (including field sessions and case studies);
- (ii) work together with MAF extension staff to establish the producer training and extension program, including in-service training and the establishment of staff work programs
- (iii) participate in training sessions for extension staff to teach the new technologies in practical sessions;
- (iv) recommend appropriate extension techniques and participate in and supervise working sessions with extension personnel in all the locations covered by the Project;

- (iv) assist in the social preparation and community organizing of beneficiaries of the Project, including the development of training methodologies and initiatives to be used by extension staff.

C. Handicraft Design Specialist (1 International, for 2 months)

- (i) work with the private sector and Tonga Trade to identify profitable handicraft products which can be produced on the outer islands;
- (ii) define the market requirements for handicrafts in terms of design, presentation and size of market, including potential new markets;
- (iii) work together with potential handicraft groups in village communities, explain the profitable handicraft opportunities and detail the requirements for presentation, quality and packaging;
- (iv) identify whether any additional handicraft production facilities will be necessary and, if so, draw up suitable designs and identify the costs thereof;
- (v) train MAF extension workers to be aware of the potential markets for handicrafts, including how to put potential producers in touch with market outlets, including selecting specific staff on each island who should have especial responsibilities for handicraft matters, and;
- (vi) together with the assigned MAF staff, work together with a number of pilot communities to help them develop suitable and profitable handicraft production facilities.

D. Marketing and Small Business Operation (1 International, for 3 months)

- (i) work together with MAF, the Tonga Development Bank (TDB), Tonga Trade and local communities to establish what would be suitable small businesses to be established in the outer islands;
- (ii) work through the local communities to identify individuals or subgroups who would be interested in establishing small businesses or expanding their operations, emphasizing the need for business development to be market-led;
- (iii) identify specific MAF and TDB officers who would concentrate on the development of small businesses in the outer islands, and give appropriate training where necessary;
- (iv) with the close involvement of the assigned officers, work together with an initial selection of interested individuals or subgroups to establish firm business plans, with a clearly defined market, build-up in production and requirements for working capital;

- (v) where credit will be necessary, create the necessary links with TDB and assist the initial group of entrepreneurs to apply for and receive credit;
- (vi) train producers in basic business management skills, including simple book-keeping and the need to strictly monitor the progress of the business against a clearly-defined plan and, if so, draw up suitable designs and identify the costs thereof;
- (v) train MAF extension workers to be aware of the potential markets for handicrafts, including how to put potential producers in touch with market outlets, including selecting specific staff on each island to have especial responsibilities for handicraft matters, and;
- (vi) together with the assigned MAF staff, work together with a number of pilot communities to help them develop suitable and profitable handicraft production facilities.

E. Safe Use of Agrochemicals (1 Local for 1 month)

- (i) work with the MAF extension services and identify potential crops for introduction or intensification on the outer islands;
- (ii) work with the MAF research services to define which chemicals would be likely to be introduced to assist in the intensification of the production of these crops;
- (iii) confer with agrochemical dealers to define the availability of stocks of the chemicals in question and the applicable safety regulations;
- (iv) working with MAF extension staff, define the transport and storage requirements and procedures to transport the chemicals in question to the outer islands;
- (v) travel to the outer islands and train the resident MAF island extension and research staff in the safe use of agrochemicals;
- (vi) together with the MAF staff, organize farmers group meeting and carry out initial training in the safe use of agrochemicals;
- (vii) develop a program with the MAF staff to ensure the repetition and reinforcement of the farmer training program at suitable intervals, and;
- (viii) alert MAF staff and farmers groups to the environmental consequences of improper disposal of agrochemicals.

F. Farmer Training for Market Development (1 local for 2 months)

- (i) work with other team members, the MAF marketing unit and Tonga Trade to define new and existing agricultural and other products with potential for development;

- (ii) together with the post-harvest technology specialist, visit local and export dealers to define storage, packaging and presentational requirements for potential products;
- (iii) together with the post-harvest technology specialist, check with airports and shipping services for specific packaging and transport requirements;
- (iv) work with the MAF quarantine service to define applicable local and international quarantine regulations;
- (v) visit the outer islands and review the present and expected market processing and storage facilities;
- (vi) whilst on the outer islands, work with farmers and handicraft producers groups to instruct them in the requirements of the specific markets which they are addressing in order to maximize the value added of their products and to establish sustainable markets, and;
- (vii) develop a program with the MAF outer island staff to ensure the repetition and reinforcement of the farmer training program at suitable intervals.

Implementation Schedule

Activity	1996	1997	1998	1999	2000
Nominate Project Manager	■				
Establish Project Office	■				
Recruit and Field Consultants	■	■	■		
Initial Market Investigations	■				
Design Civil Works and Telecommunications Systems	■	■			
Construct MAF Facilities		■	■	■	■
Construct Roads		■	■	■	■
Construct Market Buildings		■	■		
Install Telecommunications System		■	■		
Select and Train MAF Staff		■	■		
Farmer Group Meetings		■	■		
Prepare Community Development Plans		■	■		
Farmer and Producer Training		■	■	■	■
Generate Improved Extension Packages		■	■	■	■
Implement Extension Packages		■	■	■	■
Plan Research program		■	■		
Implement Research Program		■	■	■	■
Specify and Order Equipment and Vehicles	■				
Receive and Deploy Equipment and Vehicles		■			
Implement MAF advisory TA	■	■	■		
Review and Refine Market Information		■	■	■	■
Review Transport links		■	■		
Implement Tonga Trade advisory TA	■	■	■		
Baseline Socioeconomic Surveys		■	■	■	■
Monitoring and Evaluation		■	■	■	■
Midterm Review					

PROGRESS ACHIEVED IN IMPROVING THE OPERATIONS OF MINISTRY OF AGRICULTURE AND FORESTRY

A. Introduction

1. In May 1993, the Bank commissioned a report entitled: *Tonga: A Review of the Operations of the Ministry of Agriculture and Forestry*. The report made four main recommendations under the following headings:

- Structure of Ministry of Agriculture and Forestry (MAF)
- Institutional Strengthening
- Divisional Recommendations
- Corporatization and Privatization

2. The progress made to date in implementing these recommendations is summarized in the sections below.

B. Structure of MAF

3. The report recommended a move towards a four divisional structure. Although accepted in principle, this had not been implemented by mid 1995 and the original eight divisions were still retained.

4. This was regarded by MAF as not being an easy recommendation to carry out because it would require relocating, retraining staff and some redundancies, which will be a political issue.

5. In any case, prior to any restructuring, MAF would need to have its Strategic Plan and streamline its operations. The Strategic Plan should clarify the objectives, the functions of MAF and the services it is to deliver to its clients.

6. MAF produced a draft Strategic Plan in 1994. In 1995, the Cabinet approved the requirement that all ministries should have the following items in place by December 1995.

- A Strategic Plan
- Job Descriptions for all Posts
- Staff Performance Appraisal

7. The MAF draft Strategic Plan was drafted in August 1995, and be finalized in December 1995. Job descriptions for all posts should be documented by December 1995. The restructuring process should be discussed beginning in October 1995, and its implementation, whether partial or complete, should take place in 1996. The Prime Minister's Office has already strengthened its training section in order to support the production of the Strategic Plan and has provided management training to MAF's senior managers.

C. Outer Islands Agricultural Development and Management

8. Special attention is to be paid to developing agriculture and other enterprises on the outer islands. MAF's approach to dealing with the outer islands is that, training, fund allocation, and staffing will be controlled from Headquarters. MAF has now completed a Vava'u Agriculture Plan funded by the Food and Agriculture Organization, and 'Eua and the Niuas will be covered by the ADB Project. In 1995, MAF will finalize a development plan for Ha'apai funded by Australia and the plan for Tongatapu will also be prepared by a team from Australia. All these plans will involve complete project packages, with Project Management Staff reporting directly to the Director of Agriculture through the Head of Planning.

9. MAF's new Treasury coding system was installed in 1995, and as a result of the linkages with all the divisions have been strengthened and networking has been encouraged. For example, the Head of Extension in Tongatapu will plan and monitor extension programs in the outer islands in consultation with the outer islands staff.

10. An Outer Island Liaison Officer was appointed in Headquarters in 1995 and was assigned responsibility for outer island resource acquisition and allocation. If the proposed loan program is approved for implementation in 1996, the management structure approved will be put in place immediately thereafter. By mid-1995, the situation as regards the outer islands was that:

- (i) the responsibility for activities on the outer islands will fall under the Administration Division;
- (ii) the post of outer islands liaison officer has been established and staffed;
- (iii) the heads of individual divisions will set up their programs and monitor projects in outer islands, coordinated through the Administration Division and thus creating a divisional network;
- (iv) the Policy and Planning Division is responsible for monitoring projects on the outer islands, and;
- (v) the day to day operations of MAF in the outer islands are the responsibility of the officer in charge of outer islands.

D. MAF Staffing on the Outer Islands

11. MAF has already taken steps to upgrade staff even without any aid assistance and has provided the following additional staff to the outer islands:

- (i) Vava'u Three additional staff, one with a Masters degree;
- (ii) 'Eua One staff with a Bachelor Degree as Officer-in-Charge for 1995,
Two additional technical officers with diplomas;

- | | | |
|-------|--------------|---|
| (iii) | Niuatoputapu | No additional staff as yet, but one Women In Development officer will be fielded in December 1995. Note that there is currently an accommodation problem for additional staff, and; |
| (iv) | Niufo'ou | One technical officer with a diploma. There are now four MAF staff altogether on Niufo'ou. |

E. Progress on Other Matters

1. Administration Division

12. Other steps have been taken towards the reorganization and improvement of MAF's activities, as follows:

- (i) Legislation Review: three legal specialists were fielded in Tonga in July 1995 for a period of three months to review agricultural legislation;
- (ii) Policy Analysis: a postgraduate staff member is due to return in December, 1995 and will be assigned to policy analysis work;
- (iii) Privatization of Mechanical Services: targeted for corporatization by July 1996;
- (iv) Farming System Research and Extension Approach: a team is expected from Australia in October 1995 to draft a project proposal for the Farming System Research and Extension Approach (FSR&E), and;
- (v) Divisional Recommendations: (a) an Australian accountant has been recruited for the Administration Division; (b) a local accountant is on training and will be in place in December, 1995; (c) the accountant has drawn up an internal auditing system; (d) a quarterly financial reporting system is in place; (e) an inventory of all MAF assets has been initiated; (f) the Administration Division now has a pivotal role in encouraging divisions to improve their accountability for handling revenues and MAF budgets, and; (g) the heads of divisions agreed in July 1995 on the design of a financial management system in addition to the quarterly financial reporting system.

2. Quarantine and Quality Management Division

- (i) A qualified local veterinarian was fielded in February, 1995;
- (ii) The Australian veterinarian provided under the staffing scheme carried out some paraveterinarian training;
- (iii) A proposal for institutional strengthening for the Livestock Division has been submitted to AusAID;

- (iv) The livestock extension service has been amalgamated with the Extension Division, and;
- (v) Staff in the Livestock Division have been trained to function as subject matter specialists.

3. Research and Extension Division

- (i) The outer island projects will include degree and diploma training for extension workers;
- (ii) An applied and on-farm research program will be initiated in the outer islands during 1995;
- (iii) Subject matter specialists in livestock and agroforestry have now been fielded. The ministry has approved that all livestock extension work should be carried out by the Extension Division with six livestock staff being transferred to the Extension Division. There is now only one forestry extension staff member who will now be the subject matter specialist on agroforestry, providing training to extension staff who will in turn contact the farmers and demonstrate various methods and approaches, and;
- (iv) Optimization of the linkages between research and extension through technical meetings and joint training sessions will be investigated as part of the Australian FSR&E project.

4. Training

- (i) A substantial staff training effort has been implemented by the Training Section of the Prime Minister's Office;
- (ii) A review of the training needs of MAF will be carried out in December 1996, and;
- (iii) A Manpower Plan for MAF will also be produced in December 1996.

5. Corporatization

- (i) The Tonga Sawmill Corporation became a private company on 1 July 1995;
- (ii) The Mechanical Services Section is targeted for privatization by 1 July 1997, and;
- (iii) The National Market will be privatized in 1997.

ADVISORY TECHNICAL ASSISTANCE FOR CAPACITY STRENGTHENING OF MINISTRY OF AGRICULTURE AND FORESTRY

A. Introduction

1. The final report of the consultants for the project preparatory technical assistance (TA) identified a number of areas in which the Ministry of Agriculture and Forestry (MAF) would need to be strengthened to implement the proposed Outer Island Agriculture Development Project, in addition to a number of other similar projects. The Government agreed to the proposal and, during the Fact-Finding Mission for the Project, requested that advisory TA¹ be provided to strengthen MAF in conjunction with the loan rather than being financed under the loan.

2. The consultants' report also identified a requirement for a systematic training program for MAF staff. The Government agreed to these training recommendations and has undertaken to identify bilateral grant support for this training. The training program will be implemented in parallel with the advisory TA, but it will be financed separately. The details of the scope and costs of this training program are provided below for reference purposes.

B. Background and Rationale

3. MAF is a long established agency that currently employs about 360 staff organized in eight divisions. These divisions include administration, policy and planning, forestry, livestock, quarantine and quality management, mechanical services, research, and extension. A Bank-financed review of the operations of MAF² concluded that it was an effective organization and had managed to fulfil its mandate during a time of significant shifts in national agricultural production patterns and exports, and a cut in budget support. The review noted that MAF's strengths included the number, qualification, and technical knowledge of its staff; its experience in the introduction and niche marketing of cash crops; a strong extension network; a well respected quarantine service; and a sincere desire to improve its performance. The weaknesses of MAF related to resource management issues (human, financial, and assets); technical skills (farm and business management, analytical techniques, monitoring, evaluation, understanding of the cash economy); and lack of performance appraisal and incentives for performance. MAF also suffers from a phenomenon common to many South Pacific island nations, a tendency for younger and well-qualified staff to resign or to move to new positions within the Government after a few years experience.

4. A recommendation was made by the review team that MAF should move towards a four divisional structure - corporate management, forestry, research and extension, and quarantine and quality management. This recommendation was accepted in principle by the Government and a Strategic Plan for the reorganization and future operations of MAF is due to

¹ The advisory TA was first listed in *ADB Business Opportunities* in July 1995.

² TA No. 1712-TON: *Review of the Operations of the Ministry of Agriculture and Forestry*, for US\$ 75,000, approved on 5 June 1992.

be approved by the Cabinet in 1996. MAF has made a systematic effort in recent years to improve its skills, in particular in dealing with the increasingly important private sector. To this end, a small marketing unit has been established within the Policy and Planning Division, and this unit will be retained and used as the interface between the market intelligence and information generated by Tonga Trade and the extension and research divisions of MAF.

5. Therefore, the advisory TA will focus on strengthening MAF's capacity in such key areas as improving the management of its various market-oriented development projects. This will assist in achieving the Bank and the Government's and the Bank's objectives of addressing the key issues in the agriculture sector, in particular of finding ways to reduce the national dependence on exports of a single crop - squash - and to improve the efficiency and effectiveness of the Government's support services.

C. The Technical Assistance

1. Objective

6. The advisory TA is intended for institutional strengthening. The objective is to develop MAF staff skills and to improve the ability of staff to respond to technical and marketing queries raised by commercial farmers and traders in the private sector, as well as to inform growers and merchants about new market opportunities and new production and processing techniques.

2. Scope

7. The primary focus of the TA is to ensure that information on market information and requirements, originating from Tonga Trade and MAF's own marketing unit, is speedily and efficiently conveyed to farmers, in particular those on the outer islands; that farmers' enquiries are promptly and correctly answered; and that the necessary research and extension services reach the farmers in an efficient and timely manner.

8. Therefore, attention will be paid to improving the efficiency of MAF's internal operations for routine matters and for the implementation of development projects. The scope of the TA will include:

- **Consultant Services:** the services of an institutional development specialist will be provided for a total of eighteen person-months, spread over a period of three years. Additional inputs will be provided by specialists in management information systems (3 person-months), benefit monitoring and evaluation (2 person-months) and media communication skills (2.5 person-months). The terms of reference of these consultants are detailed below;
- **Equipment, Vehicle and Office Facilities:** the necessary office equipment for the implementation of the TA will be provided, together with a vehicle for use on Tongatapu and the renovation of an existing office, and;
- **Operating Costs:** the TA will also support the operational costs of the consultant team, including vehicle running costs and internal air fares to the outer islands.

3. Cost Estimates and Financing Plan

9. The total cost of the TA is estimated at \$630,000, shown below. Of this, \$514,000 represents foreign exchange costs and \$116,000 local costs. The Bank will finance the \$600,000, being the total foreign exchange cost and \$86,000 of local costs. The Government will pay all the costs of the complementary training program.

4. Implementation Arrangements

10. MAF will be the Executing Agency for the TA, which will be implemented under the overall supervision of the Director of MAF. The consultants will be provided with office accommodation at MAF Headquarters. The consultants will be recruited on an individual basis, in accordance with the Bank's *Guidelines on the Recruitment of Consultants*. The implementation period of the TA will be two and a half years, including three six month inputs by the institutional development specialist/team leader. The short-term specialists will be fielded during the first year of the TA.

11. The institutional development specialist will produce an inception report within one month of arrival, detailing the work plan as agreed with MAF, timing of consultancy inputs, logistical arrangements and finalized cost estimates. This consultant will produce a midterm report three months after the start of each six months input and a progress report at the end of each six month input. The short-term specialists will each produce a report at the end of their inputs. Five copies of each report will be provided to the Government and two copies to the Bank - one to Office of Pacific Operations and one to South Pacific Regional Mission.

D. Outline Terms of Reference for Consultants

1. Institutional Development Specialist/Team Leader (1 International for 18 months)

- (i) assist the MAF Project Manager in the establishment of the organizational structure of Outer Islands Agriculture Development Project, especially the enhanced extension services on the outer islands, and in the implementation of all components of the Project;
- (ii) discuss and define the management information systems for this and other MAF Projects, including the links with the monitoring and evaluation systems;
- (iii) assist in developing effective coordination between MAF and other agencies - Ministry of Finance (MOF), Ministry of Works (MOW) and Tonga Telecommunications Commission (TTC) - and the Project Steering Committee;
- (iv) assist in refining the detailed terms of reference of consultants for this and other MAF projects, ensuring quality of work, and reporting on and evaluating the performance of the consultant teams;

- (v) ensure that data generated by the consultants assisting in the implementation of all MAF projects is properly circulated and made available;
- (vi) facilitate MAF's links with Tonga Trade, including ensuring that market information is disseminated to farmers and Project staff, and that farmers' requests for information are fed back to Tonga Trade and properly dealt with;
- (vii) after assessing how local community organizations operate and interrelate, advise on the design of the training programs for MAF staff in order for the extension and research workers to become fully familiar with the process of introducing the initiatives under the Project to the beneficiaries;
- (viii) assist in facilitating the participation and involvement of women in all aspects of the Project;
- (ix) assist in the design of the baseline survey methodology and the collection of baseline and monitoring information to assess the socioeconomic impact of the Project on beneficiaries, and;
- (x) liaise with other MAF projects, especially those in Vava'u and Ha'apai, to ensure that marketing information and requirements are passed on to farmers and that appropriate support services are provided.

**2. Management Information Systems Expert
(1 International for 3 months)**

- (i) establish budget and actual financial plans and forecasts for MAF's various projects and technical assistance, differentiating between loan, grant, and government funding sources;
- (ii) establish systems for highlighting divergences between planned and actual expenditures, and analyzing various remedial courses of action;
- (iii) analyze the existing activities and reporting systems of MAF's marketing unit, work together with the Tonga Trade management team to define the market information outputs that will emanate from Tonga Trade, design and implement the links between the MAF marketing unit and Tonga Trade and establish the systems for market information to be passed on to farmers and growers via the extension network;
- (iv) work with the Benefit Monitoring and Evaluation (BME) specialist to ensure that relevant BME information is communicated to the management of the Project;
- (v) ascertain the availability of existing databases within MAF, devise systems for the regular updating of the most useful databases and ensure that the information is made available to management of the Project;

- (vi) using MAF data and the various project feasibility studies as a base, develop a series of farm and enterprise models to be maintained and updated by extension and research staff, and establish the feedback mechanisms by which any significant changes in the profitability of various crop options are brought to the attention of the management of the Project, and;
- (vii) in conjunction with the BME specialist, establish the requirements for data and other information by the Bank and other aid agencies' review and project completion missions, and design and implement systems for collecting such data.

**3. Benefit Monitoring and Evaluation (BME) Specialist
(1 International for 2 months)**

- (i) in consultation with MAF's project managers, define appropriate methodologies for carrying out baseline surveys in accordance with the Bank's *Guidelines on Benefit Monitoring and Evaluation* and the scope of these surveys;
- (ii) define the responsibilities for carrying out the baseline surveys and establish computerized data bases and analysis mechanisms;
- (iii) in the cases of new and upcoming projects, work with project staff to develop workplans for carrying out baseline and subsequent surveys and carry out pilot trials;
- (iv) confirm that the scope and methodologies for baseline and subsequent surveys are consistent across the range of MAF's existing and upcoming projects;
- (v) in addition to the baseline and subsequent surveys to be carried out by MAF staff, devise and implement pilot systems to incorporate feedback from farmers and community groups as to their perceptions on the success or otherwise of MAF's development projects;
- (vi) working with the MAF extension officers, develop a framework for recording and evaluating the activities of the Island Development Committees, with particular reference to the utilization and effectiveness of the funds for small community projects;
- (vii) in conjunction with the MIS specialist, define the need for BME data by the Bank and other aid agencies' review and project completion missions, and establish systems for generating these data, and;
- (ix) in consultation with MAF and other relevant agencies' project managers, establish the probable need for specific impact assessments, define the range of data which is likely to be needed and outline the systems for identifying, collecting and collating these data.

- 4. Media Communications Skills Expert
(1 International for 2.5 months)**
- (i) identify the beneficiaries of MAF's development projects and establish their needs for information on market requirements, production, processing and storage techniques and other information such as the availability of credit facilities;
 - (ii) define the most suitable media for reaching the beneficiaries, according to the type of information required, and establish responsibilities amongst governmental and other bodies for generating this information;
 - (iii) in conjunction with the beneficiaries of MAF's projects, in particular on the outer islands, plan and agree on suitable media campaigns and frequencies;
 - (iv) train MAF marketing, research and extension staff and Tonga Trade staff in techniques of media communications, and;
 - (v) work together with farmer and community groups to develop technologies to record and transmit their experiences to a wider audience.

ADTA FOR CAPACITY STRENGTHENING OF MAF
COST ESTIMATES
(\$'000)

Item	Foreign Exchange	Local Currency	Total
A. Bank Financing			
1. Consultant Services			
Institutional Development Specialist (18 p-m)	243.00	—	243.00
Short-Term Consultancies (7.5 p-m))	101.30	—	101.30
Airfares (5)	25.00	—	25.00
per Diems	80.30	—	80.30
2. Equipment, Vehicles and Office			
Office Equipment	—	10.00	10.00
Office Renovation	—	5.00	5.00
Vehicle	25.00	—	25.00
3. Incremental Operating Costs			
Vehicle Running Costs	—	15.00	15.00
Internal Air Travel		25.00	25.00
Miscellaneous Operating Costs	—	15.00	15.00
4. Contingencies	39.40	16.00	54.40
Subtotal (A)	514.00	86.00	600.00
B. Government Financing			
Office Space	—	5.00	5.00
Office Supplies and Equipment	—	10.00	10.00
Secretarial Assistance	—	15.00	15.00
Subtotal (B)	—	30.00	30.00
Total (A + B)	514.00	116.00	630.00

**ADVISORY TECHNICAL ASSISTANCE
FOR
INSTITUTIONAL STRENGTHENING OF TONGA TRADE**

A. Introduction

1. In the early stages of the design of the Project, the Government requested Bank assistance in two areas - an agricultural development project for the outer islands and assistance to develop a national agricultural marketing system to reduce the country's dependence on squash exports. These two objectives were combined at the Fact-Finding stage for the TA, and the consultants proposed a Project incorporating both elements. The national marketing aspects were to be covered by a market information and promotion system within Ministry of Agriculture and Forestry (MAF). However, the Government subsequently established an autonomous body called "Tonga Trade" within the Ministry of Labour, Commerce and Industry (MLCI). During the Fact-Finding Mission for the Project, the Government proposed and the Mission agreed that assistance to develop a national marketing capability should be concentrated within Tonga Trade, albeit with strong links to the farmers through the MAF extension services. The Mission also agreed to the Government's request to provide institutional strengthening for Tonga Trade through an advisory TA.

B. Background and Rationale

2. The current shift in Tongan agricultural exports from commodity based products such as copra and bananas to niche market products requires a change in marketing and promotion methods from a reactive to a active system, with the private sector taking an increasingly by key role. This change will be achieved by promoting potential markets and enabling people from all sectors of the industry to make informed decisions. Many past major developments, including the development of export markets for squash have come from the private sector.

3. The lack of an integrated initiative for market analysis, development, and promotion is a constraint to the development of the commercial agricultural sector in Tonga. This problem is caused by the shortage of appropriate market information and the limited capability of the industry to react to that information. There is a need to install a system that will provide ongoing information on prices and market requirements for products that can be integrated into the farming systems in Tonga. At the same time, it is vital to maintain quality standards in order to secure export markets.

4. While it is generally accepted that the future for Tongan agricultural products lies in establishing niche markets and looking for market windows for those products, at present there is no single organization in Tonga with all the resources necessary to perform this function. Niche marketing is a successful market strategy if attention is paid to obtaining good marketing information, quality management, product development and maintaining strong linkages between producers and the market. Niche markets are by definition small and as such can be fickle.

5. A strategic marketing planning system should be adopted as standard practice. The development of such plans, highlighting key points and intended actions,

should be carried out by individuals within the specific industries promoting each product. The details of the plans will be different for each product, but the process will be similar.

6. The establishment of Tonga Trade is a response to these concerns, which it will address by researching, analyzing, and advising on marketing issues as well as facilitating appropriate contacts and action between the Government and growers and exporters in the private sector.

7. Tonga Trade will have four functional divisions:

- **Market Development:** identifying markets through research and gap analysis, assisting in the development of exporters' marketing skills, and facilitating the development and implementation of market management plans for product groups;
- **Trade Information:** establishing, maintaining, analyzing and disseminating of information on international markets of interest to Tonga, as well as price and volume information; this division will also highlight trade requirements such as labelling, quarantine, and phytosanitary regulations;
- **Trade Policy:** advising other divisions of MLCI on international trade policy issues and market processes such as quality and presentational standards, and;
- **Trade Promotion:** in conjunction with appropriate public and private sector organizations, being responsible for the developing of profiles for inward and outward trade missions, organizing business visitor programs, and developing investment portfolios.

8. In order to function effectively, Tonga Trade will establish: (i) strategic marketing plans for each selected product type; (ii) a communications program to inform user groups, obtain feedback and input, and build confidence in the new organization; and (iii) project management to implement agreed strategic marketing plans.

9. MAF will continue to have a pivotal role in collecting domestic market information, in distributing market information from Tonga Trade to farmers and growers through its extension service, and in ensuring that levels of production and quality standards are driven by market information. MAF will also have a key role in development activities, guided by information on new and potential market opportunities, and by crop and agriprocessing research and development.

C. The Technical Assistance

1. Objective

10. The objective of the TA is to strengthen Tonga Trade to allow it to develop and manage the processes by which Tongan agricultural and other exports are identified, introduced, promoted, and delivered to the accessible domestic and external markets.

2. Scope

11. Tonga Trade will bring together the existing Government agencies, in particular MLCI, MAF, and Tonga Development Bank, exporters, marketing companies and growers in the private sector, ad hoc bodies such as the Island Development Committees, and Nongovernment Organizations such as the newly formed Tonga Growers Association. Tonga Trade will concentrate on agricultural exports, but will also be concerned with trade in fisheries products, handicrafts, and manufactured goods; its actions thereby will benefit a large number of producers in Tonga.

12. Tonga Trade will instigate marketing initiatives and function as a clearing house for market information. It will have particular responsibilities for collecting market information on export markets; identifying and developing new export market opportunities, including fresh and processed products; and promoting products into those markets. Tonga's best opportunities for increased income from exports in the short run must come from improved returns from existing commodities rather than pursuing unproven markets for new products. Orderly marketing, rather than wild fluctuations of output, will be necessary in order to achieve this objective. Tonga Trade will also assist in identifying new domestic market opportunities and will exploit the competitive advantages of local producers over imported products.

13. Wherever possible Tonga Trade will coordinate and facilitate activities between the key agencies, especially MAF, growers and the private sector, rather than undertake them itself. It will coordinate quarterly meetings of key players to discuss new developments and to plan marketing and promotional activities. The scope of the TA will include:

- **Consultant Services:** the services of an export marketing and management specialist/team leader will be provided for a total period of 12 person-months to work with and train the staff of Tonga Trade. Additional support will be provided by specialists in management information systems (5 person-months), and short-term technical assistance (3.5 person-months) for training in such areas as the development of marketing plans, presentational skills and data base analysis. The outline terms of reference for the two principal consultants are detailed below;
- **Equipment and Vehicles:** Tonga Trade will establish a computerized information network to provide ready access to market and trade information by major user groups in both the private and public sectors. It must also have the capability of directly accessing market information from international data bases. Therefore, the TA will provide the necessary computers and networking hardware, in addition to office equipment and furniture, two vehicles and the initial purchase of marketing information;
- **Overseas Promotion:** The TA will provide for a limited number of visits to export trade markets and for participation in trade fairs. However, in

view of current developments in information technology, the emphasis of the TA will concentrate more on operating from Tonga, and;

Other Costs: The TA will also provide for a number of additional development costs, including communications, publications and dissemination, internal airfares for the consultants, workshops and training courses.

3. Cost Estimates and Financing Plan

14. The total cost of the TA is estimated at \$1,080,000, of which \$668,600 represents foreign exchange costs and \$411,400 local costs. The Bank will finance \$668,600 of foreign exchange costs and \$181,400 of local costs for a total of \$850,000, and the Government will finance \$230,000 of local costs.

4. Implementation Arrangements

15. MLCI will be the Executing Agency for the TA, which will be implemented under the overall supervision of the Secretary of MLCI. Tonga Trade currently has three suitably qualified staff, but it plans to have an establishment of nine, a Director, a Deputy Director, four section heads, and three support staff. Suitable staff will be recruited, from within Government or outside, and the division will be rehoused in premises suitable to the receiving of international trade visitors. The facilities will be financed by the Government.

16. The TA consultants will be provided with office accommodation at the Tonga Trade offices. The consultants will be recruited on an individual basis, in accordance with the Bank's *Guidelines on the Recruitment of Consultants*. The implementation period of the TA will be two years, including three inputs from the export marketing specialist. The management information system specialist and the short-term consultants will be fielded within the first year of the TA. The TA will be implemented in two phases: (i) a first phase of approximately six months to create a business plan for the operation of Tonga Trade and assist the permanent staff to gain support from industry and other sections of government for Tonga Trade's activities, and; (ii) a second phase during the next 18 months that will continue to train the permanent staff to achieve the objectives of Tonga Trade.

17. The team leader will submit quarterly progress reports to the Secretary of MLCI and the Bank. About 12 months after commencement of the TA, a tripartite meeting will be held among the Bank, the Government, and the consultant to undertake a midterm review of the TA. The consultant will submit to the Secretary, MLCI, and the Bank a draft final report one month prior to the completion of the services and the final report at the conclusion of services. Five copies of each report will be provided to the Government and two copies to the Bank - one to Office of Pacific Operations and one to South Pacific Regional Mission.

D. Outline Terms of Reference for Principal Consultants

1. Export Marketing and Management Specialist (1 International for 12 months)

18. The primary assistance will be provided by an individual consultant who is an expert in market development and management. The consultant should have experience in the development of export markets and extensive practical knowledge and experience working in developing countries, preferably in the South Pacific. The consultant should be proficient in the following: (i) communication skills; (ii) export market development; (iii) knowledge of primary produce and commodities; (iv) working with industry groups; (v) negotiation skills; (vi) facilitation of marketing planning workshops; (vii) coordination of industry groups, and (viii) market information analysis. The consultant will:

- (i) assist in strengthening Tonga Trade by on-the-job training and enhancing the skills of local staff. The consultant will work closely with the Divisional Manager of Tonga Trade who will be appointed at the level of Deputy Secretary;
- (ii) make an initial listing and ranking of potential markets for produce which is currently grown in Tonga, or which can be produced in Tonga, and prioritize the list;
- (iii) define the market potential for individual products in terms of market size, profitability and seasonality and develop a strategic marketing plan for each product type within a specific geographic market;
- (iv) develop a communications programme to communicate information on market potential to producers, merchants, exporters and industry groups, including defining the mechanisms by which market information will continue to be generated and updated after the TA ends;
- (v) work together with MAF staff and the consultants for the capacity strengthening TA for MAF to refine the links by which market information generated by Tonga Trade is passed on to growers via the MAF extension services, and also to ensure that Tonga Trade responds to marketing enquiries put via the extension services by farmers and growers;
- (vi) work together with MAF staff to (a) develop models to inform farmers of the financial profitability of potential new products and markets, and (b) rationalize and make available information on quarantine requirements and phytosanitary regulations;
- (vii) together with the Tonga Development Bank, develop financial analysis of returns from crop types, funding needs of farmers, requirements for farm investment plans, and conformance with financial regulations.

- (viii) work with producers in other sectors, such as fisheries, handicrafts and small industries, to focus on the potential for developing Tongan exports in these sectors;
- (ix) provide background material as required by other divisions of MLCI to cover trade issues that require regulation or legislation;
- (x) investigate cheaper sources of goods for importation to Tonga, and advise importers accordingly, and;
- (xi) actively promote the value of the information generated by Tonga Trade to the private sector and design and implement a plan to ensure that at least 50 percent of the annual funding for Tonga Trade is provided by the private sector within two years after the start of the TA.

**2. Management Information Systems Specialist
(1 International for 5 months)**

- (i) work together with other Tonga Trade staff to define the best potential markets for Tongan products, locate sources of information on the size of those markets and derive data series on end prices at retail and wholesale levels, freight, handling and insurance costs, etc. to give exporters and producers a clear picture of the net returns that they can expect;
- (ii) specify and initiate the procurement of the necessary computer hardware and software for the establishment of an interactive data base within Tonga Trade; the equipment should be compatible with equipment installed in other Government offices and in the private sector;
- (iii) establish computerized data bases for the above information, train Tonga Trade staff in their establishment and maintenance, and define the systems necessary to update the data;
- (iv) specify and procure the necessary equipment to install a local area network to provide relevant marketing information on a regular or on-demand basis to other concerned departments of the Government, in particular the extension services on the outer islands, and to merchants and growers in the private sector.

COST ESTIMATES
(\$'000)

Item	Foreign Exchange	Local Currency	Total
A. Bank Financing			
1. Consulting Services			
Export Marketing and Management Specialist (12 p-m)	162.00	-	162.00
MIS Specialist (5 p-m)	67.50	-	67.50
Short-Term Consultancies (3.5 p-m)	47.30	-	47.30
Airfares (6)	30.00	-	30.00
per Diems	-	64.60	64.50
2. Equipment, Vehicles and Office			
Office Equipment & Furniture	-	20.00	20.00
Computers	25.00	-	25.00
Local Area Network Equipment	20.00	-	20.00
Logo Device and Design Format	-	10.00	10.00
Vehicles (2)	50.00	-	50.00
Initial Marketing Information	30.00	-	30.00
3. Overseas Promotion			
Export Trade Market Visits	96.00	-	96.00
Participation in Trade Fairs	80.00	-	80.00
4. Other Costs			
Communications	-	30.00	30.00
Publications and Dissemination	-	20.00	20.00
Internal Airfares	-	10.00	10.00
Workshops and Training Courses	-	10.00	10.00
5. Contingencies	60.80	16.80	77.60
Subtotal (A)	668.60	181.40	850.00
B. Government Financing			
1. Recruitment Costs			
Vehicle Running Costs	-	12.00	12.00
Rents and Utilities	-	50.00	50.00
2. Staffing			
Director	-	24.00	24.00
Deputy Director	-	24.00	24.00
Section Heads (4)	-	64.00	64.00
Training & Liaison Officer	-	16.00	16.00
Computer Operators (2)	-	20.00	20.00
3. Contingencies	-	20.00	20.00
Subtotal (B)	-	230.00	230.00
Total (A & B)	668.60	411.40	1,080.00

FINANCIAL AND ECONOMIC ANALYSIS

A. Introduction

1. This appendix presents the assumptions, data, and results of the financial and economic analysis that assesses the impacts of the proposed Project. Agriculture in the Niua and on 'Eau would benefit from improvements in agricultural research, from the quality and coverage of the extension advice provided by MAF, and from significantly improved market information. The investments needed to bring these improvements include better telecommunications links; infrastructure including agricultural roads, quarantine facilities, accommodation, and transport for resident extension personnel; and technical assistance to be provided under the two associated advisory TAs.

2. The major impact of the Project will be an increase in the awareness about profitable market opportunities, both local and export, and the adoption of improved production techniques to produce for these markets. This process will lead to increases in the area cultivated, crop yields, and household incomes. Handicraft production, which is a feature of the traditional household production system, will also benefit from improved extension and market information and will lead to improvements in the quality and quantity of the handicrafts produced and thus in household incomes.

3. The crops included in the analyses are already grown on the islands, are suited to the environmental conditions, and have a sound market potential. In addition, the crops are able to generate sufficient returns to make increased production attractive to the farmers. However, the benefits of the Project do not depend upon the introduction of new crops, although with improved market information farmers may introduce new crops in particular coffee. The estimates for "with" and "without" the Project cropped areas and increases in yields are based on comprehensive field investigations and discussions with farmers. Price data were collected in mid-1995 and are shown in financial and economic terms in Tables 1.

B. Financial Analysis

1. Farm Models and Crop Budgets

4. To estimate the financial impact of the Project on farm families in 'Eua and the Niua, three household farm models have been prepared. These show, for a typical household on each island, the costs and returns from those crops and handicrafts for which there are markets, either domestic or export. The household models are derived from individual crop and handicraft budgets. Both the enterprise and household models show the inputs and outputs required using existing technology ("without" the Project situation) and with new technology ("with" the Project situation) for selected years. The models are partial household models because they do not include all sources of household income such as off-farm employment, remittances, or income from livestock and crops for which no immediate additional market prospects exist. The models include no benefits from livestock because the extension staff will not be targeting livestock production under the Project. Tables 2 and 3 show the costs and returns for the individual crops and handicrafts from which the household models have been compiled and the household models.

a. Sources of Data and Assumptions

5. The sources of yield, input, and price data for the enterprise budgets include the feasibility study, the United Nations Development Program/Food and Agriculture Organization *Vava'u Integrated Agriculture and Forestry Development Programme Report (1994)*, the World Bank - *Kingdom of Tonga Agriculture Sector Strategy Review (1990)* and farmers, traders and Government officials spoken to during the Fact-Finding and Appraisal Missions.

6. The data collected during the 1993 Land Use and Crop Survey by the Policy and Planning Division of MAF form the basis for the cropping patterns upon which the household models are based. According to the feasibility study, the average household has access to about 3.5 hectares (ha) of potentially cultivable land of which the family currently cultivates no more than 60 percent at any one time in 'Eua and much less in the Niuas. Project interventions are likely to increase the area cultivated and to raise yields; the Table below summarises the expected cropping intensities "with" and "without" the Project¹.

Item	'Eua	Niuaatoputapu	Niuafo'ou
Cultivable Area - ha	3.5	3.5	3.5
Cropping Intensity - without Project (%)	60	17	17
Cropping Intensity - with Project (%)	69	26	26
Increase in Cropping Intensity - (%)	14	50	50

7. It has been assumed that, in the absence of the Project, crop yields would increase over a 20 year period as some new varieties and improved cultivation practices gradually became available and were adopted. In the "with" the Project situation the same yield increases would occur over a 10 year period because of improved extension and research services. The yield increases assumed range from 8 percent to 19 percent as shown in the Table below (percent increase in output per ha). For new vanilla plantings the analysis has taken an average yield at full development, seven years after planting, of 800 kilograms (kg) per ha. Project activities would also result in an increase in the quality of handicraft production and hence an increase in incomes.

¹ The calculation of cropping intensities is difficult in Tonga because of intercropping and the multi storied nature of this intercropping.

Item	'Eua % Increase	Niuas % Increase
Taro	19	19
Yams	18	18
Kava	19	19
Squash	19	-
Watermelon	8	10

8. The average household size is 6.5 persons in 'Eua and Niuatoputapu and 5.8 in Niuafu'ou. Households are assumed to have the equivalent of two full-time agricultural workers and two handicraft workers. On the basis of the crop and handicraft labor requirements the changes in labor use would be as follows.

Item	'Eua	Niuatoputapu	Niuafu'ou
Increased Labor for Crop Production (%)	41	53	67
Increased Labor for Handicrafts (%)	123	0	100

9. While some of the percentage increases appear high they are from a very low base, especially in the case of handicrafts in 'Eua and Niuafu'ou, and in all cases there is more than sufficient labor available to meet the needs of the increased production, even allowing for activities not included in the models. The anticipated increased participation in handicraft production, which is largely undertaken by women, is in line with their views as expressed to the consultants for the project preparatory TA.

10. The analysis assumes that households would finance the cost of establishing new vanilla vines with a long-term loan from Tonga Development Bank repayable over 10 years including a 3 year grace period and at an annual interest rate of 9 percent. Funds are available from the TDB and the Project would not need to provide funds for credit.

b. Results

11. The Table below summarises the household incomes and the returns to labor from the three farm models at full development in T\$ per year.

Item	'Eua	Niuaatoputapu	Niuafo'ou
Cash Flow T\$ - with Project	8,367	7,606	4,958
Cash Flow T\$ - without Project	4,892	4,378	2,515
Increase (%)	71	62	97
Return to Labor T\$/hr - with Project	6	3	4
Return to Labor T\$/hr - without Project	6	2	3
Return to Labor T\$/hr - currently	4	2	3

12. The much higher "with" and "without" the Project cash flows from 'Eua reflect the higher cropping intensity found on 'Eua farms with farmers producing for the nearby market in Tongatapu. The returns from the Niuafo'ou model are lower than those from Niuaatoputapu because of the absence of kava from the model and a lower income from handicrafts. Handicraft production is much less developed on Niuafo'ou compared with the other two islands because of the greater distance to markets.

13. The increase in family income and the returns to labor from increased agricultural and handicraft production will provide a sufficient incentive for households to increase their production in response to market demands. The average incremental returns to labor from agriculture and handicraft production of between T\$6.00 and T\$14.00 per day compare with T\$ 2.50 (including food) per hour for men working as unskilled laborers in 'Eua and Tongatapu and T\$2.00 per hour in the Niuaas, but where there are limited employment opportunities for unskilled labor. The returns to labor from handicraft production average around T\$1.00 per hour or less per hour at present while those from crop production are T\$6.00 per hour or more.

2. Telecommunications

14. An analysis of the financial viability of the telecommunications component has been undertaken. The Project will provide a satellite telecommunication system for the two Niuaas to replace the existing tropospheric system, which is both unreliable and costly to maintain. The proposed system will provide ready access to the international telephone network. A detailed assessment of the Tonga Telecommunications Commission's recent financial performance is available in a supplementary appendix, but it is summarised here.

15. TTC's financial performance over the last five years (1988/89 to 1993/94) has been relatively good with a positive net profit before tax, but on a declining trend. Total sales have been increasing, but the rate of increase has failed to match the rate at which costs have been rising. The profit before tax was 2.9 percent of total sales in 1993/94 according to the unaudited accounts compared with nearly 4 percent in the previous two years. One of the causes of the sharp rise in costs was the increased cost of maintaining the existing tropospheric system. Further significant increases in revenue are not possible with the existing system. TTC's balance sheets for the last five years show a sound business structure.

16. The long-term debt to equity ratio remained below 58:42, while the total debt to equity averaged 65:35 over the 1991/94 period. On the assets side, the balance sheet shows a decline in fixed assets from, T\$14.8 million in 19989/90 to T\$13.56 in 1993/94, but a growth in current assets from T\$1.56 million to T\$2.46 million over the same period. The former figure reflects the depreciating value of the assets without any asset replacement, while the latter reflects an increase in debtors — a problem which TTC is addressing. The balance sheet shows a decrease in the long-term debt, but with a growing short-term debt. A significant proportion of the long-term debt (86 percent) is the tropo-scatter loan for which the Government is responsible for repaying out of the profit from the Cable and Wireless contract. Excluding this amount would result in a much improved increase in TTC's long-term debt to equity ratio. The analysis shows that TTC is currently a financially sound institution. Even if TTC's financial position were to worsen, the Government could remedy the situation by increasing the rates it charges.

a. Data Sources and Assumptions

17. The analysis uses data from four sources, a feasibility study prepared for TTC by the Telecommunication Development Bureau, TTC's accounts and balance sheets for the years up to 1993/94, their revenue and expenditure forecasts for the years 19934/95 to 1999/2000 and the revenue from calls to and from Niuatoputapu.

18. In calculating the incremental financial revenues from the proposed system the analysis uses the number of circuits and the future domestic revenue per circuit from the feasibility study at the current tariff rate. In the absence of the new system revenues are assumed to remain constant as traffic growth is constrained by the limitations of the existing system. In the absence of information on the volume of calls to and from each island the revenue generated by the existing system is assumed to equal the value of the outgoing calls, estimated at T\$12,000 per annum per island¹.

19. The new system will also generate revenue from international calls and this has been estimated from TTC's forecasts using the national ratio of domestic to international revenue. A further financial benefit will accrue from a saving in maintenance costs estimated by TTC to be 5.5 percent of current total revenues. The only incremental operating costs are for satellite rental as the system will need no additional staff and will be solar powered. The share of the satellite rental costs have been estimated from the feasibility study in proportion to the number of channels.

b. Results

20. Using the above assumptions the investment in a satellite telecommunication system for the Niuaus would give a financial rate of return of between 4 percent and 5 percent. Some of the assumptions might be considered conservative, for example, there is no increase in the number of channels after five years and the consultants considered that their assumed volume of traffic per channel was low. However, for Niuatoputapu the assumed revenue from outgoing calls in year five would be more than five times higher than at present, so in the case of the Niuaus this assumption may not be so conservative. The Government has indicated that this low financial

¹ Monthly revenue from outgoing calls averages T\$1,000 for Niuatoputapu according to TTC staff on the island.

rate of return is acceptable because of the social benefits that good communications will bring to the remote islands.

C. Cost Recovery

21. There is no provision to recover any of the costs associated with the provision of extension and research facilities. The annual recurrent costs for these facilities provided under the Project beginning in year six onwards would average T\$76,000 including an allowance for vehicle replacement every seven years and equipment after five years. For the other investments under the Project, including telecommunications and quarantine facilities, the costs will be recovered from the users.

D. ECONOMIC ANALYSIS

1. Derivation of Benefits

a. Cropping Patterns and Yields

22. The benefits of the Project have been estimated for each island on the basis of information taken from the 1993 Land Use Crop Survey, the likely increases in crop areas on each of the islands as a result of activities under the Project, and the crop budgets used for the preparation of the farm models. The Table below summarizes the changes in the land use pattern expected as a result of the Project. The increase in cropping intensity is expected to occur during years 1-5 of the Project.

Crop Area	'Eua	Niutoputapu	Niuafo'ou
Without Project			
Total Crop Area - ha	711	81	86
Cropping Intensity - %	46	35	26
With Project			
Total Crop Area - ha	802	110	115
Cropping Intensity - %	51	47	34
Increase in Cropping Intensity - %	13	36	34

23. Land tenure is not expected to be a problem because: (i) land ownership and temporary use rights are already clearly established in accordance with the existing social system; and (ii) cropping intensities are currently low at between 26 percent and 46 percent, and are only expected to rise to no more than 50 percent following the interventions under the Project. The current cultivable area is substantially less than total agricultural land (even excluding permanent pastures) and it would be possible to increase cropped areas by increasing the cultivable area as well as increasing the percentage of the current cultivable area which is cropped.

b. Economic Farmgate Prices

24. The economic farmgate prices for the crops included in the analysis are derived from export parity prices, even though some produce may be consumed locally. Even under these circumstances the economic value is the same as the export parity price because none of the products would substitute for imports.

25. The international price for taro is high reflecting the higher prices now being received because of production problems in Western Samoa. The squash and vanilla international prices are subject to possible wide variations in future. However, the economic analysis results are not particularly sensitive to these price assumptions, as the Project does not envisage an increase in the area of squash and only expects an additional 30 ha of vanilla. The international price assumed for kava is very similar to the current domestic price of around T\$16/kg. In the case of taro and watermelons, the analysis assumes that trade from the Niua to Pago Pago will be authorized, thereby eliminating the need for transportation to Tongatapu prior to export.

c. Crop Production Costs

26. The crop budgets provided the basic information for the calculation of the crop production costs. In converting the financial values to their equivalent economic values the following assumptions were made: (i) the costs of planting material were multiplied by the conversion factor used to revalue the output prices; (ii) fertilizer, agrochemical, and tractor costs were included at their financial values as these inputs represent only a very small proportion of the costs of production; (iii) other nontraded costs were revalued using the standard conversion factor (SCF) of 0.7¹; and (iv) labor was valued at its domestic opportunity cost, multiplied by the SCF to convert this value into its border price equivalent.

d. Telecommunications Benefits and Costs

27. The analysis assumed, when valuing the economic benefits from the new telecommunication system, that a major benefit will be the improved market information which will enable farmers to realise the prices indicated in the economic valuation of incremental production. Thus, no additional benefit has been included for domestic traffic such as exporters in Tongatapu. However, incoming international calls from Tongans living overseas provide foreign exchange and this revenue has been included as an additional economic benefit. According to TTC, 90 percent of the international revenues come from incoming calls. However, in the future some of these calls will relate to agriculture; for example, from overseas importers so the economic value of the incoming calls has been reduced to 70 percent to avoid double counting these benefits (Table 4). In addition, the maintenance cost saving has been included at its financial value as have the satellite rental costs.

¹

A supplementary appendix in the file shows the calculation of the SCF for Tonga.

e. Project Costs

28. The local cost element of the financial costs was revalued using the SCF, while the foreign exchange element was included at its border price. Certain costs of the Project would benefit other islands apart from, or in addition to, 'Eua and the Niuaus and these costs have been adjusted accordingly. For example, the costs of investments in Ha'api have been excluded from the economic analysis because no benefits have been calculated for investments in facilities on that group of islands, while only 50 percent of the costs of quarantine training for MAF staff, promoting the safe use of agrochemicals, farmer training for market development, and market information and promotion have been included as these activities would also benefit farmers on other islands. In addition, the analysis excludes the costs of water supply provision and community development funds because no benefits from these investments have been calculated. Finally, 50 percent of the costs for the advisory TA for strengthening MAF and 25 percent of the costs of the advisory TA for the strengthening of Tonga Trade have been included because both these TAs would also benefit other islands.

29. The costs of continuing the activities initiated under the Project after the five year investment period have been expressed in their economic values using an average conversion factor of 0.85, on the assumption that the foreign exchange percentage is 50 percent.

2. Results of the Economic Analysis

30. The changes in production costs and returns on each of the three islands based on these assumptions have been combined in Table 5, which also includes the costs of the Project and associated portions of the costs of the advisory TAs.

31. The overall economic internal rate of return (EIRR) for the Project is 16 percent. This return is considered conservative as only modest increases in cropped area and crop yields have been included and, unlike the household models, no benefits have been included for handicraft production. The latter were excluded because of a lack of information on which to assess the likely overall increase in production as opposed to that at the household level.

32. To assess the impact of changes in key variables a sensitivity analysis was undertaken by calculating switching values for these variables. The Project is quite sensitive to changes in the value of crop production and a 19 percent reduction in benefits would reduce the internal rate of return to 12 percent — the assumed opportunity cost of capital, but much less sensitive to changes in costs. The costs of the Project, including a portion of the costs of the advisory TAs, would have to increase by 30 percent to reduce the EIRR to 12 percent. Similarly, increases in crop production costs would have little impact on the EIRR and it would take an 88 percent increase in crop production costs or an 1450 percent increase in crop investment costs to reduce the EIRR to 12 percent. The exclusion of the telecommunications benefits would reduce the rate of return by only 1 percent. A one year delay in the receipt of crop production benefits, but with no changes in costs, would reduce the EIRR to 13 percent, a two year delay to 11 percent, and a three year delay to 9 percent.

33. Even with conservative crop production assumptions and under cost adverse assumptions the return from the Project should exceed the opportunity cost of capital of 12 percent.

Table 1

Tonga
Outer Islands Agricultural Development Project
PRICES
(In T\$)

		Financial Prices	Economic Prices
		1-20	1-20
Outputs			
'Eua Crops			
Yams	mt	1,000	1,400
Taro	mt	500	700
Kava (Dried)	mt	10,000	14,000
Vanilla	mt	10,000	12,000
Squash	mt	500	650
Water Melon	mt	700	630
Nias Crops			
Yams	mt	900	1,260
Taro	mt	550	770
Kava (Dried)	mt	10,000	14,000
Vanilla	mt	10,000	12,000
Water Melon	mt	700	700
Inputs			
Seeds and Plants 'Eua			
Yam Planting Material	kg	2.00	2.80
Taro Planting Material	kg	0.15	0.21
Kava Planting Matreial	stem	0.30	0.36
Vanilla Planting Material	kg	0.50	0.60
Squash Seeds	kg	280	364
Water Melon Seeds	kg	10	9
Seeds and Plants Nias			
Yam Planting Material	kg	2.20	3.08
Taro Planting Material	kg	0.15	0.21
Kava Planting Material	stem	0.30	0.42
Vanilla Planting Material	unit	0.60	0.72
Water Melon Seeds	kg	11	11
Other Purchased Inputs 'Eua			
Fencing	unit	80	80
Trees	no	0.10	0.10
Pollination	unit	50	50
Tractor Cultivation	hr	35	35
Urea	kg	0.58	0.58
NPK	kg	0.65	0.65
Agricultural Chemicals	kg	22	22
Baskets	basket	0.50	0.35
Other Purchased Inputs - Nias			
Fencing	unit	88	88
Trees	no	0.11	0.11
Pollination	unit	55	55
Baskets	basket	0.50	0.35
Handicraft Inputs	sum	70	70
Labor			
Labour - 'Eua			
Agricultural Labour	hour	2.50	1.75
Handicraft Labour	hour	1.50	1.05
Labour - Nias			
Agricultural Labour	hour	2.00	1.40
Handicraft Labour	hour	1.00	0.70

Table 2

Tonga
Outer Islands Agricultural Development Project
Eua Farm Model Family
FINANCIAL BUDGET (DETAILED)
(In T\$)

	With Project										Future Percentage Change	
	1	2	3	4	5	6	7	8	10	20	Present	Without
Main Production											1	20
Yams	1,100	2,231	2,261	2,292	2,322	2,353	2,383	2,414	2,475	2,600	1,100	1,300
Taro	2,000	2,020	2,040	2,059	2,079	2,099	2,119	2,138	2,178	2,375	2,000	2,375
Kava (Dried)	800	808	816	1,653	1,675	1,695	1,717	1,738	1,781	1,900	800	950
Vanilla	-	-	-	-	100	400	700	800	800	800	-	800
Squash	800	808	816	824	832	840	847	855	871	950	800	950
Tapa Cloth	200	200	950	950	950	950	950	950	950	950	200	200
Sub-total Main Production	4,900	6,067	6,882	7,778	7,958	8,336	8,716	8,986	9,055	9,575	4,900	5,775
Production Cost												
Investment												
Vanilla Planting Material	-	175	-	-	-	-	-	-	-	-	-	-
Fencing	-	64	-	-	-	-	-	-	-	-	-	-
Trees	-	18	-	-	-	-	-	-	-	-	-	-
Tractor Cultivation	-	18	-	-	-	-	-	-	-	-	-	-
NPK	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total Investment Costs	-	274	7	7	-	-	-	-	-	-	-	-
Operating												
Yam Planting Material	250	500	500	500	500	500	500	500	500	500	250	500
Taro Planting Material	94	94	94	94	94	94	94	94	94	94	94	94
Kava Planting Material	9	9	9	18	18	18	18	18	18	18	9	18
Squash Seeds	140	140	140	140	140	140	140	140	140	140	140	140
Pollination	-	-	-	-	5	15	25	25	25	25	-	25
Tractor Cultivation	77	77	77	84	84	84	84	84	84	84	77	77
Urea	12	12	12	12	12	12	12	12	12	12	12	12
NPK	26	26	26	26	33	33	33	33	33	33	26	26
Agricultural Chemicals	53	53	53	53	53	53	53	53	53	53	53	53
Baskets	104	127	120	132	133	134	136	137	140	151	104	123
Sub-total Operating Costs	764	1,037	1,039	1,058	1,071	1,082	1,093	1,095	1,098	1,108	764	1,108
Sub-Total Production Cost	764	1,311	1,045	1,064	1,071	1,082	1,093	1,095	1,098	1,108	764	1,108
Other Outflows												
Others (inc. New Kava Establishment)	100	225	225	225	100	100	100	100	100	100	100	100
OUTFLOWS	864	1,536	1,270	1,289	1,171	1,182	1,193	1,195	1,198	1,208	864	1,208
Cash Flow Before Financing	4,036	4,530	5,612	6,489	6,787	7,154	7,522	7,701	7,857	8,367	4,036	4,892
Financial Inflows												
Disbursements on Long Term Loan	-	288	-	-	-	-	-	-	-	-	-	-
Transfer from Previous Period	765	1,023	1,045	1,064	1,071	1,082	1,093	1,095	1,098	1,108	765	783
Sub-Total Financial Inflows	765	1,311	1,045	1,064	1,071	1,082	1,093	1,095	1,098	1,108	765	783
Financial Outflows												
Long Term Principal	-	-	-	-	19	21	23	25	29	-	-	-
Long Term Interest	-	-	26	28	26	24	22	20	16	-	-	-
Transfer to Next Period	1,023	1,045	1,064	1,071	1,082	1,093	1,095	1,098	1,099	1,108	765	783
Sub-Total Financial Outflows	1,023	1,045	1,090	1,097	1,127	1,138	1,140	1,141	1,144	1,108	765	783
Net Financing	-258	266	-45	-32	-56	-56	-48	-46	-46	-46	-	-
Cash Flow After Financing	3,778	4,797	5,567	6,457	6,731	7,098	7,476	7,654	7,811	8,367	4,036	4,892
Residual value of												
Transfer to Next Period	-	-	-	-	-	-	-	-	-	-	-	-
Farm Family Benefits After Financing	3,778	4,797	5,567	6,457	6,731	7,098	7,476	7,654	7,811	8,367	4,036	4,892
Returns per Family-Day of Labor	4	4	4	4	4	5	5	5	5	6	4	6
Incremental Returns per Incremental Family-Day of Labor	-	4	3	4	4	5	5	5	5	6	-	6

IRR = 355.7%, NPV = 17,039.79

Table 3

Tonga
Outer Islands Agricultural Development Project
Niatopotapu Family
FINANCIAL BUDGET (DETAILED)

(In T\$)

Main Production	990	1,000	1,009	1,019	1,028	1,038	1,047	1,057	1,076	1,170	990	1,170	1,170
Yams	880	1,337	1,354	1,371	1,388	1,405	1,422	1,439	1,472	1,568	880	1,045	1,568
Taro	800	808	816	1,653	1,675	1,695	1,717	1,738	1,781	1,900	800	950	1,900
Kava (Dried)					100	400	700	750	750	750			750
Vanilla	1,768	1,768	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318	1,768	1,768	2,318
Pandanus Mats	4,438	4,913	5,497	6,361	6,509	6,855	7,203	7,301	7,397	7,708	4,438	4,933	7,708
Sub-total Main Production													56
Production Cost													
Investment		210											
Vanilla Planting Material		70											
Fencing		19											
Trees		300											
Sub-total Investment Costs													
Operating	275	275	275	275	275	275	275	275	275	275	275	275	275
Yam Planting Material	38	56	56	56	56	56	56	56	56	56	38	38	56
Taro Planting Material	9	9	9	18	18	18	18	18	18	18	9	9	18
Kava Planting Material					6	17	25	25	25	25			25
Pollination	56	72	73	75	76	77	78	79	80	85	56	64	85
Baskets	70	70	70	70	70	70	70	70	70	70	70	70	70
Handicraft Inputs	447	483	483	495	501	513	522	523	524	528	447	455	528
Sub-total Operating Costs	447	782	483	495	501	513	522	523	524	529	447	455	529
Sub-Total Production Cost													
Other Outflows	100	225	225	225	100	100	100	100	100	100	100	100	100
Other Costs (Inc. New Kava Establishment)	547	1,007	708	720	601	613	622	623	624	629	547	555	629
OUTFLOWS	3,891	3,908	4,788	5,641	5,908	6,243	6,582	6,679	6,773	7,077	3,891	4,378	7,077
Cash Flow Before Financing													
Financial Inflows		300											
Disbursements on Long Term Loan	448	482	483	495	501	513	522	523	524	529	448	455	529
Transfer from Previous Period	448	782	483	495	501	513	522	523	524	529	448	455	529
Sub-Total Financial Inflows													
Financial Outflows					20	22	23	26	30				
Long Term Principal			27	27	27	25	23	21	16				
Long Term Interest	482	483	495	501	513	522	523	523	525	529	448	455	529
Transfer to Next Period	482	483	522	528	559	569	569	570	572	529	448	455	529
Sub-Total Financial Outflows	-35	299	-38	-33	-59	-56	-48	-48	-48				
Net Financing	3,856	4,205	4,750	5,608	5,849	6,187	6,534	6,631	6,725	7,077	3,891	4,378	7,077
Cash Flow After Financing													
Residual value of													
Transfer to Next Period										529		455	529
Farm Family Benefits After Financing	3,856	4,205	4,750	5,608	5,849	6,187	6,534	6,631	6,725	7,086	3,891	4,833	7,608
Returns per Family-Day of Labor	2	2	2	2	2	2	2	2	2	3	2	2	3
Incremental Returns per Incremental Family-Day of Labor		2	7	10	10	12	13	13	13	14			14

IRR = 988.3%, NPV = 12,759.39

Table 4.

Tonga
Outer Islands Agricultural Development Project
Telecommunications Costs and Returns (T\$)

Item	1	2	3	4	5	6	7	8	9	10	20
Financial Benefits											
Number of Circuits	4	5	6	6	7	7	7	7	7	7	7
- Nukunono	3	4	4	5	6	6	6	6	6	6	6
- Nukunono	7	9	10	11	13	13	13	13	13	13	13
Total											
Domestic Revenue per Circuit											
Minutes per Year	45,000										
Gross Revenue per Minute	0.25										
Less Tariff for Terrestrial Network	0.033										
Net Revenue per Minute	0.22										
Revenue per Circuit	9,765										
Revenue From Domestic Traffic	24,000	87,885	97,650	107,415	126,945	126,945	126,945	126,945	126,945	126,945	126,945
Less Current Revenue	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
Incremental Domestic Revenue	0	63,885	73,650	83,415	102,945	102,945	102,945	102,945	102,945	102,945	102,945
International Revenue											
International Call Revenue	1,549,701	1,782,156	2,049,480	2,356,902	2,710,437	3,117,002	3,584,553	3,584,553	3,584,553	3,584,553	3,584,553
Less C&W ISD Billing	180,000	360,000	396,000	416,000	436,000	456,000					
Net Revenue from International Calls	1,369,701	1,422,156	1,653,480	1,940,902	2,274,437	2,661,002	3,584,553	3,584,553	3,584,553	3,584,553	3,584,553
Domestic Telephone Revenue	1,887,603	2,076,364	2,284,000	2,512,400	2,763,640	3,040,004	3,040,004	3,040,004	3,040,004	3,040,004	3,040,004
Ratio Net Revenue from International to Local Calls	0.73	0.68	0.72	0.77	0.82	0.88	1.18	1.18	1.18	1.18	1.18
Revenue from International Calls (Nuias)	0	60,195	70,693	82,981	104,474	111,119	149,684	149,684	149,684	149,684	149,684
Less Current Revenue	0	0	0	0	0	0	0	0	0	0	0
Incremental Revenue from International Calls	0	60,195	70,693	82,981	104,474	111,119	149,684	149,684	149,684	149,684	149,684
Maintenance Cost Saving (5.5% of Revenues)		8,144	8,144	8,144	8,144	8,144	8,144	8,144	8,144	8,144	8,144
Total Incremental Revenue	0	132,224	152,487	174,541	215,563	222,208	260,774	260,774	260,774	260,774	260,774
Investment Costs	2,356,200	36,045	36,045	36,045	36,045	36,045	36,045	36,045	36,045	36,045	36,045
Share of Satellite Rental Costs											
Incremental Financial Cash Flow	(2,356,200)	88,035	108,298	130,351	171,374	178,019	216,584	216,584	216,584	216,584	216,584
Internal Rate of Return %	4.5										
Non Agricultural Economic Benefits											
Foreign Exchange Incoming International Calls 70%	0	42,136	49,485	58,087	73,132	77,783	104,779	104,779	104,779	104,779	104,779
Plus Maintenance Cost Savings		36,045	36,045	36,045	36,045	36,045	36,045	36,045	36,045	36,045	36,045
Less Satellite Rental											
Net Additional Incremental Benefit	0	14,236	21,584	30,186	45,231	49,882	76,878	76,878	76,878	76,878	76,878

Table 5

Tonga
Outer Islands Agricultural Development Project
Project Summary
ECONOMIC BUDGET (AGGREGATED)
(in T\$)

	1	2	3	4	5	6	7	8	10	20	Present	Future Without	Future With	Percentage Change
											1	20	20	%
Main Production														
'Eua Crops	178,787	364,708	557,393	777,771	808,088	852,628	904,547	993,953	1,012,240	3,034,040	3,598,535	4,808,775		28
Niuas Crops	138,828	238,753	334,394	458,859	480,478	512,392	543,199	592,209	600,800	647,920	768,460	1,369,260		78
Sub-total Main Production	317,615	603,461	891,787	1,234,630	1,288,566	1,365,020	1,447,745	1,586,162	1,613,040	3,681,960	4,364,995	5,978,035		37
Production Cost														
Investment														
Purchased Inputs	8,400	8,400	8,400	12,600										
Seeds and Plants 'Eua	10,080	5,040	7,560	7,560										
Seeds and Plants Niuas	3,960	4,720	4,480	6,480	850	390								
Other Purchased Inputs 'Eua	3,586	1,793	2,690	2,690										
Other Purchased Inputs - Niuas	26,028	19,453	23,130	29,310	650	390								
Sub-Total Purchased Inputs														
Labor	2,800	5,530	8,260	9,660	6,825	4,095								
Labour - 'Eua	2,800	3,640	5,460	4,900	3,360	1,680								
Labour - Niuas	5,600	9,170	13,720	14,560	10,185	5,775								
Sub-Total Hired Labor	31,628	28,623	36,850	43,870	10,835	8,165								
Sub-total Investment Costs														
Operating														
Purchased Inputs	18,213	32,425	48,638	68,350	68,350	68,350	68,350	68,350	68,350	264,733	264,733	333,083		26
Seeds and Plants 'Eua	13,450	22,536	28,034	33,920	33,920	33,920	33,920	33,920	33,920	63,210	63,210	97,130		54
Seeds and Plants Niuas	5,392	10,870	16,478	22,694	23,686	25,080	26,705	28,571	28,706	102,781	108,819	137,525		26
Other Purchased Inputs 'Eua	980	1,695	2,391	3,467	4,060	4,818	5,520	6,431	6,474	8,680	10,129	16,603		64
Other Purchased Inputs - Niuas	36,034	67,526	95,490	128,431	130,015	132,168	134,495	137,272	137,450	439,404	446,891	584,340		31
Sub-Total Purchased Inputs														
Labor	24,424	49,045	73,851	104,996	109,154	113,658	120,267	122,981	123,813	482,230	497,788	621,600		25
Labour - 'Eua	18,254	27,959	38,736	54,206	56,003	58,639	61,347	62,386	62,608	99,400	102,060	164,668		61
Labour - Niuas	40,678	77,004	112,587	159,202	165,157	172,296	181,614	185,367	186,421	581,830	599,848	786,269		31
Sub-Total Hired Labor	76,712	144,530	208,077	287,634	295,172	304,484	316,109	322,639	323,870	1,021,034	1,046,738	1,370,808		31
Sub-total Operating Costs	108,338	173,153	244,926	331,503	306,007	310,629	316,109	322,639	323,870	1,021,034	1,046,738	1,370,808		
Sub-Total Production Cost														
Other Costs	19,500	16,500	16,500	16,500	7,500	7,500	7,500	7,500	7,500	7,500				
Other Costs	224,436	204,983	197,333											
MAF ADTA (50%)	151,623	180,961												
Tonga Trade ADTA (25%)	3,082,070	583,670	613,479	100,471	64,650	64,650	64,650	64,650	64,650	1,021,034	1,046,738	1,442,758		38
Project Costs	3,458,129	989,114	827,312	116,971	72,150	72,150	72,150	72,150	72,150	398,259	398,259	76,878		
Sub-Total Other Costs	3,458,129	1,097,452	1,000,465	361,897	450,744	378,157	382,779	388,259	394,789	2,660,927	3,318,257	4,612,155		40
OUTFLOWS	14,296	21,584	30,186	45,231	49,882	76,878	76,878	76,878	76,878					
Other Benefits (Telecommunications)	(3,458,129)	(765,801)	(375,420)	560,075	829,117	960,290	1,059,119	1,136,364	1,268,251	2,660,927	3,318,257	4,612,155		
Cash Flow														
IRR														
NPV														

16%
1,485,665