

# ***South Pacific Cluster Evaluation***



*Australian Agency for International Development*



# ***South Pacific Cluster Evaluation***

***Evaluation No: 8 - September 1998***

South Pacific Cluster Evaluation  
Evaluation No: 8  
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# South Pacific Cluster Evaluation

## Introduction

Four completed projects from AusAID's South Pacific program were selected for this cluster ex-post evaluation:

- Fiji-Australia Teacher Education Project
- Fiji Meteorological Radar Project
- Vila Schools and USP Sub-Centre Project
- Vanuatu Cocoa Development Project, Phase II

Cluster evaluation, covering a group of projects, allows common themes and issues to be highlighted. Significant cost savings in the evaluation process are also achieved, which may make it cost-effective to evaluate small projects which would probably not otherwise be evaluated ex post.

This report presents the findings of a post-evaluation mission during November/December 1997. Assessment is made of the projects' sustainability, potential development outcomes (and impact) and effectiveness in achieving their objectives.

The evaluation is based on a review of the project completion reports (PCR), material in AusAID files, discussions with staff members of AusAID's Fiji and Vanuatu desks in Canberra and the AusAID posts in Suva and Port Vila, the project implementing agencies and other in-country agencies. The evaluation was undertaken over a five-week period including ten days reviewing documents in AusAID's head office and preparing for the field mission. This was followed by twenty-five days in Fiji and Vanuatu for field work and preparation of reports. Wrap-up meetings were held in Suva and Port Vila at the end of the field-work phase, attended by senior staff from several agencies. The draft evaluation report was finalised in Canberra and circulated for review by the implementing agencies and AusAID staff. Comments received were taken into consideration in finalising the report

## Structure of the Report

The Report comprises four sections:

1. Fiji-Australia Teacher Education Project
2. Fiji Meteorological Radar Project
3. Vila Primary Schools and USP Sub-Centre Project
4. Vanuatu Cocoa Development Project, Phase II

Pages are numbered within each section. Each section comprises:

Abbreviations

List of Tables

Basic Project Data

Summary

Project Description

Implementation Performance

Impact Assessment

Sustainability

Key Issues and Lessons Learned

Appendixes

Tables are numbered consecutively within each section.

## AIDAB and AusAID

In 1995, the Australian International Development Assistance Bureau (AIDAB) was renamed the Australian Agency for International Development (AusAID). Throughout these reports AusAID is used irrespective of which name was current at the time.

## Evaluation Responsibilities

The evaluation was carried out by a team consisting of:

|                 |                                   |
|-----------------|-----------------------------------|
| Ross Brownhall  | Team Leader/Evaluation Specialist |
| David Sloper    | Institution/Education Specialist  |
| Robert Anscombe | Civil Engineer                    |
| Satish Chandra  | Task Manager, AusAID              |

## Fiji and Vanuatu Government Support

The level of Fiji and Vanuatu Government support was very high in each agency contacted. A considerable amount of time and effort was spent by them in assembling information requested by the team and, in the field, information and assistance were provided readily by each agency. In each case, the support and commitment of the

relevant Government agency in managing and developing the projects since completion have been vital to their success.

AusAID posts in Suva and Port Vila were also helpful to the team, organising itineraries and meetings with great efficiency.

## 1. Project Summaries

### 1.1 Fiji-Australia Teacher Education Project

**Objectives and Scope.** The Fiji-Australia Teacher Education Project (FATEP) was initiated in response to needs identified by the Government of Fiji (GOF) and operated as a joint GOF-Government of Australia (GOA) project from November 1992 to October 1995. The goal was to improve secondary education teaching through the development of the Fiji College of Advanced Education (FCAE) as a provider of preservice and inservice education for secondary teachers. The four components of the project were:

- ④ Component A: Institutional Development
- ④ Component B: Preservice Junior Secondary Teacher Education
- ④ Component C: Inservice Secondary Teacher Education
- ④ Component D: Project Management.

The Ministry of Education and Technology (MOET) was the implementing agency for the GOF and Griffith University was appointed Australian Managing Contractor (AMC). Total project costs were of the order of AUD8 million. The FATEP attained its objectives within budget and on schedule for each of the components.

**Implementation.** The four components of the contract were completed satisfactorily by the AMC. Fijian officials, both at ministry and institutional levels, expressed a high level of satisfaction with the project, the AMC and AusAID. The project provided Fiji with refurbished physical facilities for secondary teacher education based at Nasinu. Sufficient equipment and specialised resources to review and modernise the curriculum and to support dynamic planning and management were among key elements. Of vital significance was the counterpart training and attachments abroad. Continuing positive developments at FCAE since the project was completed may be regarded as further confirmation of substantial foundations being laid through the successful implementation.

These developments include: approximately 21 per cent of secondary teachers have received professional training and qualifications through FCAE in programs linked to FATEP; a supportive relationship exists between MOET and FCAE and the basis of a strong reciprocal relationship between FCAE and the University of the South Pacific (USP) has been established; creation of expectations of high performance among FCAE staff which encourages a self-sustaining capability; graduates who demonstrate superior levels of adequacy and professionalism in school postings; and management and planning competence at FCAE which are linked to regimes for maintenance and sufficient financial support.

The document, Development Strategy for Fiji: Policies and Programmes for Sustainable Growth, presented to the Fiji Parliament on 4 December 1997 stated (at S.10.16) a commitment for the FCAE continuing to be a premier national institution of tertiary education.

**Conclusions and Key Issues.** Overall, the project succeeded in meeting all of its objectives. It was an excellent development project addressing a critical shortage of quality secondary school teachers. The FCAE has now become a modern secondary teacher training institution. The number and quality of graduate teachers have improved significantly since the without-project situation. The incremental gain which graduate teachers now bring to their classrooms is very significant. In the longterm this will create a major social and economic impact in Fiji.

All project initiatives are considered sustainable and some have been improved since project completion. For example, the computing equipment and the library facilities have been upgraded further. Operation and maintenance budgets are sufficient to maintain and improve the FCAE facilities. Within MOET, at the highest policy level, there is a very strong commitment to and support for the FCAE.

Five key lessons learned were identified. They may have applicability to other projects in Fiji and comparable countries. Close cooperation between a contractor preparing a project design and a recipient government ministry was considered important. Selection of an AMC team leader with the right character and qualities was of overriding importance. Training attachments abroad were viewed as having a value that goes beyond the specific training undertaken. A tracer study of graduates was identified as yielding potentially useful information about a project and its impact. The final issue was

training in leadership and management. This was considered a needed adjunct component to sustain and advance project developments.

## 1.2 Fiji Meteorological Radar Project

**Objectives and Scope.** The goal of the project was to contribute significantly to the enhancement of Fiji's civil disaster preparedness capabilities. The purpose of the project was to provide an improved wind and severe weather forecasting and monitoring capability for Fiji and the region. The goal was to be achieved through delivery of five components:

- ⊗ new weather radars operational at Nadi and Nausori airports
- ⊗ maintenance and operation manuals
- ⊗ test equipment and spares
- ⊗ Fiji Meteorological Service (FMS) staff training in the use of the equipment
- ⊗ Civil Aviation Authority of Fiji (CAAF) technical staff training in the maintenance of the equipment.

**Implementation.** The installation and commissioning of the two radars was needed to help prepare Fiji for mitigating the effects of cyclones. The Australian Managing Contractor (AMC) was able to bring forward the installation of the Nadi radar by diverting major radar components procured for Australia to Fiji. This resulted in the installation and commissioning of the Nadi radar by December 1993, in time for the majority of the 1993/94 cyclone season. The radar at Nausori was commissioned in October 1994, following the long lead time required for procurement of the radar equipment. It was, however, commissioned one month ahead of the contract schedule.

In addition to the provision of the radars, training in equipment maintenance and operation was undertaken in both Fiji and Australia. FMS personnel were trained in system operation while five technicians from the CAAF participated in the AMC's training courses in radar system maintenance, PC maintenance and data communications.

The two radars have been well operated and maintained since commissioning by the Fiji agencies although there are concerns over the lengthy spare part procurement procedures.

**Conclusions and Key Issues.** The Fiji Meteorological Radar Project (FMRP) has proved to be an excellent development project with enormous potential social and economic benefits. It was a technology transfer and skills upgrading project with the installation of two radars at the Nadi and Nausori airports. The project succeeded in meeting all of its objectives. The utilisation of the radars is expected to improve cyclone warning and national preparedness.

Key lessons identified through the implementation of this project included:

- ④ The success of a simple project design and implementation for targeting a very specific need in a technical area.
- ④ A high level of technical cooperation between specialists in Australia and Fiji in the meteorological radar and weather forecasting fields.
- ④ The need for effective institutional cooperation between line agencies in Fiji. This has occurred during and since implementation.

### 1.3 Vila Primary Schools and USP Sub-Centre Project

**Objectives and Scope.** The goals of the Vila Primary Schools and USP Sub-Centre Project were:

- ④ For the Vila Schools, the goal was to increase the availability of primary school facilities in the urban area of Port Vila and so to increase the literacy level of children.
- ④ For the USP Sub-Centre Santo, the goal was provision of new and consolidated physical facilities in Santo to provide extension programs and vocational and further education opportunities for the northern region.
- ④ For the Government Training Centre, the goal was to provide more appropriate training facilities.

For the implementation contract, the three sub-projects were integrated into a single project which had the following four components: design and document preparation, facilities construction, training and equipment, and project management.

**Implementation.** The four components of the contract were completed satisfactorily by the managing agent. When the draft

Project Completion Report (PCR) is submitted to AusAID by the AMC, the last contractual requirement will have been met and the project completed.

Three primary schools were upgraded at Vila North, Anabrou and Ecole Centre Ville (formerly known as Ecole Publique). A new primary school was provided at Fres Wota on a greenfield site to provide primary education facilities for a new developmental area. In total, 32 new classrooms were provided and some existing classrooms were refurbished.

Major construction was undertaken at USP Sub-Centre at Santo to provide an integrated complex of core academic and service buildings. These included a library, general office, satellite tutorial room, computer room, three lecture rooms, a toilet block, covered assembly area, and a central breezeway between the library and the service components.

Refurbishment of the Government Training Centre in Port Vila was also undertaken.

## Conclusions and Key Issues

**Vila Primary Schools.** The project facilities, as implemented, meet the overall goal of providing additional capacity to the primary school system in Port Vila. All facilities provide a greatly improved teaching and learning environment which is of benefit to both teachers and students.

There are concerns at the current level of maintenance at the schools. These relate to the shortage of funds and the non-use of the maintenance manual provided by the project.

Four key lessons learned were identified:

- ④ the need for effective consultation with all stake holders during the design process
- ④ appropriate selection of materials and fittings with due regard to maintenance requirements and the availability of spare parts
- ④ the involvement of national contractors
- ④ the need for a firm commitment to maintenance.

**USP Sub-Centre, Santo.** Overall this sub-project was excellent, the detractions being some small but significant design faults. It is an effective and timely contribution to education and training and provides the best educational resources in northern Vanuatu. The

high pitched roof covering the central complex raised the cost of construction. This may be justified if, as the team expects, the current complex ultimately forms the nucleus of a larger campus. Any additional construction, even if built to integrate with the initial complex, would be at lower unit costs than this project.

The resources of the USP Sub-Centre are used by students enrolled in vocational and tertiary courses and by the wider community.

Four key lessons learned were identified that may have applicability to other projects:

- ④ consultation processes need to involve all stakeholders effectively
- ④ concentration of investment in key institutions
- ④ a study of comparative costs of options for higher education should be undertaken
- ④ means of funding to support, upgrade, or replace critical resources after project completion needs to be examined at project design.

**Government Training Centre.** The rehabilitation and refurbishment of the Government Training Centre has provided a dynamic institution with improved capabilities to deliver appropriate training to both the public and private sector. GTC staff believe the project has made a significant contribution to a greatly improved learning environment. Demand for training exceeds supply and options are currently being reviewed to increase utilisation and capacity. The Centre is managed well.

While some of the lessons learned in the two other sub-projects also apply to the GTC, it is clear that relatively small strategic inputs as were provided to the GTC can make a disproportionate difference to the learning environment of an institution, raising the motivation of staff and increasing organisational effectiveness.

## 1.4 Vanuatu Cocoa Development Project, Phase II

**Objectives and Scope.** The project was designed to address a serious shortfall in the quality of cocoa exports. It built on ground work laid by the 1979 UNDP/FAO Cocoa Development Project and the AusAID Cocoa Development Project, Phase I. It forms part of the Government of Vanuatu's (GOV) strategy to increase export earnings through improvements in cocoa quality. The goal of the

project was to contribute to economic self-reliance by increasing the value of Vanuatu's exports through improved quality of smallholder cocoa produced under sustainable production systems. The target was to improve export cocoa quality from 20 per cent Grade 1 at the start of the project to 60 per cent Grade 1 by year four.

The project's five components aimed to: improve extension effectiveness, optimise production systems, improve processing capability, improve cocoa marketing and provide efficient and effective management. The Department of Agriculture and Horticulture (DAH) was the implementing agent for the GOV. The Australian Managing Contractor was MACAV Pty Ltd.

**Implementation.** Project implementation was delayed on three accounts. Early in project implementation, there was a delay in finalising cocoa processing techniques to be promoted by the project. Secondly, the time required to obtain grower participation through the community development approach had been underestimated in the project design. Thirdly, a public service strike resulted in dismissal of most of the project's DAH staff and delayed implementation for seven months from June 1994 to December 1994. Some staff were gradually re-employed but all positions were not filled. The Mid-Term Review in July 1993 found that "the project was up to a year behind schedule in some activities" but concluded that the design remained valid. With some modifications, the project was completed on time and within budget.

**Conclusions and Key Issues.** The project largely achieved the goal of increasing the value of Vanuatu's exports through improved quality of smallholder cocoa. Overall, most of the projects objectives were achieved. Moderate incremental benefits were obtained through the smallholder adoption of cocoa hybrids and by better design and knowledge of the fermentation process. Hybrids have the potential to increase yield by up to 50 per cent while at the same time improving quality by increasing average bean size. Improved fermentation practice reduced the proportion of "slaty" beans. The combined effect of higher yield and quality has the potential to significantly increase household incomes.

The marketing component was the weakest part of the project. Purchasing practice of the Vanuatu Commodities Marketing Board (VCMB) was improved through the introduction of an internationally recognised grading system. However, no action had been taken by VCMB to establish a purchasing depot on Malekula, which would have been required to improve smallholder access to

price-for-grade marketing and thereby incentives for quality improvement.

The extension component, in particular the Community Development Approach (CDA), resulted in a more integrated uptake of on-farm cocoa technology. In addition, the CDA has the potential to be adopted and institutionalised throughout the extension programs of DAH. The potential longterm social and gender benefits of CDA are enormous.



# Fiji-Australia Teacher Education Project

# Abbreviations

|         |   |
|---------|---|
| AMC     | Australian Managing Contractor (Griffith University)          |
| AusAID  | Australian Agency for International Development               |
| BEMTUP  | Basic Education Management and Teacher Upgrading Project      |
| FATEP   | Fiji-Australia Teacher Education Project                      |
| FCAE    | Fiji College of Advanced Education                            |
| FIT     | Fiji Institute of Technology                                  |
| GOA     | Government of Australia                                       |
| GOF     | Government of Fiji  |
| LERC    | Library and Educational Resources Centre                      |
| LTC     | Lautoka Teachers College                                      |
| MOET    | Ministry of Education and Technology                          |
| MOEWCST | Ministry of Education, Women, Culture, Science and Technology |
| PCR     | Project Completion Report                                     |
| PID     | Project Implementation Document                               |
| PSC     | Public Service Commission                                     |
| PEMAC   | Physical Education, Music, Arts and Craft                     |
| PGCE    | Post Graduate Certificate in Education (of USP)               |
| STTC    | Secondary Teacher Training Certificate                        |
| USP     | University of the South Pacific                               |

# Basic Project Data

**Project Name:** Fiji-Australia Teacher Education Project

**Executing Agency:** Ministry of Education, Women, Culture, Science and Technology (later renamed Ministry of Education and Technology [MOET]).

**Managing Contractor:** Griffith University.

Notes: (1) From PCR dated October 1995.

(2) Based on exchange rate of AUD1.00 equals FJD1.01.

|   | Planned   | Actual (1)   |
|---|---|--|
| <b>Technical Assistance</b><br>(Person months)<br>Long term advisers<br>Short term advisers<br><i>Total</i>   | To be confirmed   | To be confirmed  |
| <b>Project Costs</b><br>AusAID<br>GOF (2)<br><br><i>Total project costs</i>   | AUD3,668,600<br>FJD3,230,700<br>(AUD3,198,713)<br>AUD6,867,313  | AUD3,711,000<br>FJD4,343,900<br>(AUD4,300,891)<br>AUD8,011,891 |
| <b>Key Dates</b><br>GOF Request<br>PDD Completion<br>AMC appointed<br>MOU signed<br>Project Commencement<br>PID Completion<br>Mid-term Review<br>Project Completion | May 1991<br>November 1991<br>July 1992<br>August 1992<br>November 1992<br>December 1992<br>March 1994<br>October 1995 |  |

## 2.1 Summary

**Objectives and Scope.** The FATEP was initiated in response to needs identified by the GOF and operated as a joint GOF-GOA project from November 1992 to October 1995. The goal was to improve secondary education teaching through the development of FCAE as a provider of preservice and inservice education for secondary teachers. The four components of the project were:

- 🌐 Component A: Institutional Development
- 🌐 Component B: Preservice Junior Secondary Teacher Education

- Component C: Inservice Secondary Teacher Education
- Component D: Project Management.

MOET was the implementing agency for the GOF and Griffith University was appointed AMC. Total project costs were of the order of AUD8 million. The FATEP attained its objectives within budget and on schedule for each of the components.

**Implementation.** The four components of the contract were completed satisfactorily by the AMC. Fijian officials, both at ministry and institutional levels, expressed a high level of satisfaction with the project, the AMC and AusAID. The project provided Fiji with refurbished physical facilities for secondary teacher education based at Nasinu. Sufficient equipment and specialised resources to review and modernise the curriculum and to support dynamic planning and management were among key elements. Of vital significance was the counterpart training and attachments abroad. Continuing positive developments at FCAE since the project was completed may be regarded as further confirmation of substantial foundations being laid through the successful implementation.

These developments include: approximately 21 per cent of secondary teachers have received professional training and qualifications through FCAE in programs linked to FATEP; a supportive relationship exists between MOET and FCAE and the basis of a strong reciprocal relationship between FCAE and the USP has been established; creation of expectations of high performance among FCAE staff which encourage a self-sustaining capability; graduates who demonstrate superior levels of adequacy and professionalism in school postings; and management and planning competence at FCAE which are linked to regimes for maintenance and sufficient financial support.

The document, Development Strategy for Fiji: Policies and Programmes for Sustainable Growth, presented to the Fiji Parliament on 4 December 1997 stated (at S.10.16) a commitment for the FCAE continuing to be a premier national institution of tertiary education.

**Conclusions and Key Issues.** Overall, the project succeeded in meeting all of its objectives. It was an excellent development project addressing a critical shortage of quality secondary school teachers. The FCAE has now become a modern secondary teacher training institution. The number and quality of graduate teachers have improved significantly since the without-project situation. The

incremental gain which graduate teachers now bring to their classrooms is very significant. In the longterm this will create a major social and economic impact in Fiji.

All project initiatives are considered sustainable and some have been improved since project completion. For example, the computing equipment and the library facilities have been upgraded further. Operation and maintenance budgets are sufficient to maintain and improve the FCAE facilities. Within MOET, at the highest policy level, there is a very strong commitment to and support for the FCAE.

Five key lessons learned were identified. They may have applicability to other projects in Fiji and comparable countries. Close cooperation between a contractor preparing a project design and a recipient government ministry was considered important. Selection of an AMC team leader with the right character and qualities was of overriding importance. Training attachments abroad were viewed as having a value that goes beyond the specific training undertaken. A tracer study of graduates was identified as yielding potentially useful information about a project and its impact. The final issue was training in leadership and management. This was considered a needed adjunct component to sustain and advance project developments.

## **2.2 Project Description**

The Fiji-Australia Teacher Education Project (FATEP) began in November 1992 and ended in October 1995, a little more than two years before the field evaluation. Given the minimum of a one and two-year academic cycle for several major project components, the timing of this post-evaluation allowed the team to review development outcomes with some regard for impact as well as effectiveness. Numbers of key Fijian personnel involved in implementing the project from 1992 to 1995 have moved on from their previous appointments and therefore some measures of effectiveness were difficult to assess. However, as an educational project based in the Fiji College of Advanced Education (FCAE), it was a reasonable expectation that institutional and other documentary records such as those of the Ministry of Education and Technology (MOET) were maintained. The timing was appropriate to evaluate project relevance and sustainability and to identify lessons to be learned.

### 2.2.1 Rationale

From the 1986 census, Fiji's labour force consisted of 240,000 of whom about one third were employed full time in the formal sector. The Project Implementation Document (PID) noted that following the 1987 coups, over 4,000 employed persons officially migrated between June 1987 and July 1989. This exodus depleted Fiji's supply of skills, with 16 per cent of administrative/managerial personnel, seven per cent of clerical staff, and seven per cent of the professional/technical labour force estimated to have emigrated by mid-1989. This phenomenon, combined with increased school enrolments, produced a shortage of secondary school teachers by the end of 1989. Any increase in the supply of trained secondary teachers would specifically assist human resource development in Fiji and more generally, social and economic development.

The Government of Australia (GOA) provided assistance to the Government of Fiji (GOF) through a secondary teacher inservice course for a 12 year period until 1983. Then followed an increase in the number of untrained secondary teachers in Fiji. In 1989, a new program started with GOA assistance aimed at providing teacher training for graduates already teaching. This increased quality but not the overall number of teachers.

By 1990, the shortage of teachers had developed for several reasons including: loss due to emigration; the introduction of earlier retirement; increases in secondary school enrolment; and the withdrawal of USP from preservice teacher education. The FATEP aimed to improve secondary education teaching in Fiji by developing the former Nasinu Residential College as the FCAE, a tertiary institution providing both preservice and inservice education for secondary teachers. The project's preservice component aimed to increase the number of new teachers entering secondary education and the inservice component aimed to upgrade the qualifications of teachers already in secondary schools.

### 2.2.2 Formulation

GOF began its planning in 1990 and produced a report in 1991 on the use of the Nasinu facility for secondary teacher education. The project was initiated in May 1991 when the GOF requested Australian support in the form of technical assistance and supporting teaching resources. AusAID completed a project design in November 1991 and an MOU was signed in August 1992 with Griffith University being appointed Australian Managing Contractor

(AMC). The Ministry of Education, Women, Culture, Science and Technology (MOEWCST) was implementing agency for the GOF. A mid-term review was undertaken in March 1994 and the project was completed within agreed minor time and cost variations in October 1995.

### 2.2.3 Objectives and Scope

The goal of the FATEP was to improve secondary education teaching in Fiji through the development of the FCAE as a fully operational institution providing preservice and inservice education for secondary teachers. The four components of the project were:

④ **Component A: Institutional Development**

This included preparation of a Forward Development Plan for the College, establishment of sound management and administration systems, and development of facilities to provide an optimal environment for the operation of teaching programs.

④ **Component B: Preservice Junior Secondary Teacher Education**

This focussed on the development of teacher education curricula in education and ten specialist teaching streams. It also involved procurement of teaching resources and equipment in each of the ten areas. College lecturing staff, who had been assigned in 1991 from school and MOET appointments, were upgraded through training attachments and postgraduate study programs.

④ **Component C: Inservice Secondary Teacher Education**

This involved incorporation of an existing Australian supported Secondary Teachers Training Course (STTC) into FCAE programs. The STTC provided teacher training for graduates already teaching at senior secondary level. It was conducted during the teachers' school vacations and also required completion of three USP extension courses.

④ **Component D: Project Management**

Key aspects of the implementation plan included upgrading facilities at the former Nasinu Residential College, relocation of some activities occupying college space, preparation of a Forward Development Plan to project needs for staff and resources, and the introduction of management practices and

systems. Long and shortterm Australian advisers worked with the FCAE to develop the education components of the project.

#### 2.2.4 Project Cost

Approved costs in the PID were: GOA - AUD3,668,600 and GOF - FJD3,230,700 (about AUD3,198,713). Following the Mid-term Review in March 1994, variations and additions to the budget were agreed. Under the 1993-94 Annual Plan, GOA approved AUD165,400 for additional technical assistance and the refurbishment of the Library and Educational Resources Centre (LERC), micro-teaching laboratories and media workshop. Under the 1994-95 Annual Plan, GOA approved an additional AUD350,980 for library resources and automation, and audio-visual equipment. It also approved access to funds for training attachments and distance education fellowships.

Actual costs reported in the PCR were: GOA - AUD3,711,000 (estimated at August 1995) and GOF - FJD4,343,900 (about AUD4,300,891).

### 2.3 Implementation Performance

The four components of the contract were completed satisfactorily by the managing contractor. Fijian officials, both at ministry and institutional levels, expressed a high degree of satisfaction with the project, the AMC and AusAID. The PCR states that the project attained its objectives within budget and on schedule for each of the components. Continuing positive developments at FCAE since the project was completed may be regarded as further confirmation of substantial foundations being laid through generally successful implementation.

MOET officers specifically mentioned the needs assessment and appraisal procedures that were followed prior to the inauguration of FATEP. These were valued by the GOF for way in which they engaged Fijian officials at several levels in a way that identified needs and subsequently facilitated project implementation. The FATEP process was much preferred to the two-phase design and implement procedure followed in some recent AusAID projects.

## 2.4 Impact Assessment

### 2.4.1 Preservice Junior Secondary Teacher Education

**Major Programs.** This core project component aimed to increase the number of qualified teachers in junior secondary schools, Forms 1 to 4. Two major streams of preservice teacher education were established during the project:

- ⊗ a two-year Diploma in Education program with an entry requirement of a completed Fiji Form 7 (the equivalent of 13 years of formal education)
- ⊗ a one-year Diploma in Education program with entry requirements of either a Diploma in Tropical Agriculture from the Fiji College of Agriculture or a Diploma in Construction Studies (or several equivalent awards) from the Fiji Institute of Technology.

**Curriculum Development.** One of the most significant achievements of the project was the development of a teacher education curriculum in ten key subject areas. These included subject majors such as English, Social Science, Mathematics, Science, Accounting, Economics, Home Economics, Industrial Arts, Secretarial Studies and Agriculture. In addition to subject majors, core courses were developed in Computer Literacy, Expressive Arts (Physical Education, Music, Art and Craft [PEMAC]). Education courses were developed in Teaching Methods in each of the major specialisations and in the areas of psychology, sociology and media studies.

Curriculum development has continued since the project. At a meeting of the FCAE Academic Board in November 1997, approval was given to recommendations from the Academic Development and Review Committee to combine two existing courses into one and to establish a new course in Education Measurement and Evaluation. To establish a new course in tertiary institutions involves considerable work and persuasion through committees that closely guard discipline domains and resources. To disband a course once established is no small matter. The capability of the FCAE to originate and validate course and program revisions may be regarded as a mark of institutional maturity. From the Forward Development Plan, it appears that there has been no student intake into the Secretarial Studies subject major since 1996. The FCAE advised that

preservice graduates in this major have already met teaching needs in secondary schools and filled all establishment positions.

**Enrolment and Graduation.** At January 1997, there were 494 graduates of the preservice program. Another 129 graduated at a ceremony held on 28 November 1997, making a total, since 1993, of 623 Diploma of Education graduates of FCAE. Demand for places in the two-year preservice diploma program continues to be high, with some 2,000 persons reportedly applying for admission each year.

The PID had estimated a student wastage rate of ten per cent annually. The PCR states that during the project there was initially a small shortfall in projected enrolment. However, as the non-completion rate among enrolled students was only four percent, graduate output was equal to projections. Table I presents basic enrolment and graduation data for both streams of the preservice diploma for the years 1993-97.

**Table 1: Preservice One & Two Year Diploma in Education  
Enrolment and Graduation : 1993 to 1997**

| Year | Gender       | Enrolment |        |       | Graduation |
|------|--------------|-----------|--------|-------|------------|
|      |              | Year 1    | Year 2 | Total |            |
| 1993 | Male         | 47        | 27     | 74    | 25         |
|      | Female       | 52        | 58     | 110   | 56         |
|      | <i>Total</i> | 99        | 85     | 184   | 81         |
| 1994 | Male         | 52        | 60     | 112   | 55         |
|      | Female       | 54        | 83     | 137   | 81         |
|      | <i>Total</i> | 106       | 143    | 249   | 136        |
| 1995 | Male         | 62        | 69     | 131   | 69         |
|      | Female       | 82        | 69     | 151   | 69         |
|      | <i>Total</i> | 144       | 138    | 282   | 138        |
| 1996 | Male         | 52        | 63     | 115   | 64         |
|      | Female       | 64        | 72     | 136   | 75         |
|      | <i>Total</i> | 116       | 135    | 251   | 139        |
| 1997 | Male         | 72        | 43     | 115   | 65         |
|      | Female       | 106       | 60     | 166   | 64         |
|      | <i>Total</i> | 178       | 103    | 281   | 129        |

Source: FCAE

An analysis of data in Table 1 reveals a pattern of consistency and of growth in relation to enrolment and graduation statistics for the two preservice diploma programs. It should be noted that graduation numbers in any year derive from a composite of enrolments in the

previous year for the two-year diploma, and enrolments in the same year for the one-year program. The latter program is around ten per cent of total annual enrolment. For the purposes of the present analysis, this pipeline effect between total annual enrolment and graduation numbers is not disaggregated.

During the FATEP period, the annual average total enrolment was 238 and the annual average graduation was 118. In the two years since completion of the project in 1995, the annual average total enrolment has increased to 266 and the annual average graduation to 133. These increases are further evidence of continuing institutional growth and development. In many countries, primary teaching often may be regarded as a female occupation and secondary teaching more as a male occupation. The data in Table 1 also show that for the period 1993 to 1997, females constituted 56 per cent of the preservice enrolment and 55 per cent of graduates.

A notable development in 1997 was the admission of 30 private students above the set GOF quota of 150 students for whom Public Service Commission (PSC) scholarships are available. For 1997 and 1998, private students pay tuition fees of FJD600 per year in addition to the standard FJD100 caution fee and FJD20 student association fee paid by all students. These fee-paying students are treated indistinguishably from scholarship students. MOET advised that in order to ensure high quality teacher education at FCAE, there are no immediate plans to increase the number of private students. A major constraint is the staffing establishment at FCAE, limits on which are set outside the MOET. The evaluation team noted that the ratio of fee-paying to scholarship students could be varied without increasing the total enrolment of students in residence. Officials in MOET stated that the current ideal for teacher education in Fiji is that students should live in residence.

**Enrolment Expansion.** The Forward Development Plan notes that any expansion of enrolment in preservice teacher education programs would relate to:

- ④ the capacity of the school system to provide quality support for teaching practice and other elements of the practicum
- ④ the availability at FCAE of large and medium size general teaching space.

Residential capacity at the College has not been a limiting factor to date. However, development beyond an enrolment of 252 full-time students would require either additional hostel accommodation or

the enrolment of day students on a non-residential basis. It is important that there be a thorough study of capital and recurrent costs, effectiveness, and alternatives involved in any proposal to expand residential accommodation. Experience in comparable countries indicates that when colleges and universities become landlords, there is usually a continuing drain of resources away from more direct educational activities. The evaluation team noted that the Lautoka Teachers College included a non-residential enrolment in its primary school training programs.

**Quality and Postings.** The quality of teachers graduating from the preservice program is reported by principals to be high. In 1997, a total of 64 secondary schools were used for the teaching practicum. Students in the two-year diploma program complete a practicum of 5 weeks annually and those in the one-year program undertake a practicum of 7 weeks. The practicum is a period of intense professional development for the trainee teacher and involves a close relationship between FCAE lecturers, supervisory and associated personnel in the schools, and the diploma student. Inevitably there is a multiplier effect in the relationship between the College and schools that extends beyond teaching practice formalities. FCAE staff involved with practicum duties engage in professional interaction with corresponding subject specialists in schools through the provision of advice and occasional seminars. This is a continuation of professional development activity initiated during the FATEP period.

Each preservice student is provided with a well edited and attractively published Practicum Handbook. This includes guidelines, principles and expectations as well as various observation and assessment forms to be completed by an FCAE lecturer, an associate teacher in the school, the school coordinator for trainee teachers, and also by the student. The performance standards for this formative component in teacher education that were established during the project appear to be strongly maintained.

The quality of teacher preparation inaugurated during FATEP has evidently not diminished. The PCR included results from a 1995 survey of preservice graduates based on assessment by school principals. A majority of graduates were rated Excellent and Very Good on a five-point scale and only six per cent were below Good. The FCAE advised that the adequacy of graduate performance has been scored at 80 per cent or higher. One consequence of the

overall high quality rating has been that numbers of preservice graduates have been assigned to teaching at senior secondary level.

Data obtained from MOET show that there was a total of 640 persons with Diploma in Education qualifications teaching secondary schools in 1996 (including some who completed the USP award, last offered in the 1980s). Of the 640 personnel, 561 or 88 per cent teach in senior secondary high schools and this clearly includes a large majority of FCAE graduates. This would be consistent with reports received during the field evaluation that while most preservice diploma graduates are teaching at Form 3 and 4 level, some are making an expanding contribution to teaching at Forms 5 and 6. The FCAE advised that such postings were further recognition of the high regard with which the preservice program and its graduates were held by schools. To conduct a tracer survey of FCAE graduates, including a comparative analysis of professional characteristics at graduation and after several years' teaching service, would be worthwhile.

## 2.4.2 Inservice Secondary Teacher Education

**Core Program.** This core program component aimed to increase quality in senior secondary schools, Forms 5 to 7, through provision of inservice programs for graduate teachers who have no formal teacher education. It built on the existing STTC which had been introduced in November 1990 with GOA assistance under an Accountable Cash Grant. The major task under FATEP was to transfer responsibility for the STTC to the College. The initial transfer of responsibility to the FCAE was accomplished for the STTC program conducted in November-December 1992. The PCR states that:

- ⊗ FCAE staff assumed full responsibility for the STTC from January 1993 until November 1994.
- ⊗ Because of difficulties relating to FCAE employment conditions, the STTC scheduled for November-December 1994 was not offered.
- ⊗ As FCAE staff leave entitlements were not compatible with the timing of the STTC, the MOEWCST decided from mid-1995 to contract the program out using senior school system personnel among other lecturers.

- In 1997, the STTC continues to be offered by MOET through the FCAE on its campus and several school-based locations.

Issues relating to the operational management of the STTC and aspects of employment conditions may involve policy considerations for the FCAE, MOET and other agencies of the GOF. Such issues are formally outside the TOR of the present evaluation. The STTC continues to be taught as an advertised program of the FCAE and one which attracts a large enrolment.

**Curriculum Development.** The STTC has not been as successful as the preservice diploma programs. Success in attaining STTC objectives reflects in part on aspects of course design and curriculum and also on the competing demands between full-time employment and part-time study that participants face. The curriculum was revised when the STTC was incorporated as a program of the FCAE. This revision, with the change of teaching methods developed under FATEP, dramatically increased retention rates to 100 per cent. The PCR notes that although most participants passed the teaching methods courses conducted by the College, fewer completed the required three USP extension courses.

The FCAE has further revised the curriculum to develop what is now called an Accelerated STTC. The courses for this revised program are offered entirely through the FCAE without the requirement to complete three USP courses. The accelerated format requires inservice students, all of whom are university graduates, to attend intensive STTC residential schools in each school vacation for 12 months. During the same year, they also study course materials part time. The Accelerated STTC, offered entirely by the FCAE, has attracted a large enrolment of 339 for the inaugural intake that began on 24 November 1997. Included among the enrolled students were some who had not completed the USP requirement of the previous STTC. The new Accelerated STTC was presented simultaneously at the FCAE and at three secondary schools in Suva. Lecturers for the Accelerated STTC in November-December 1997 were contracted on a sessional basis with school system personnel, FCAE and USP staff being among those engaged. The chief coordinator of STTC staff is the Vice-Principal of FCAE. To provide additional library and learning resources, an amount of FJD10,000 has been allocated to support this program.

Examinations in this new program are conducted by the College as will be assessment for the award of the Secondary Teachers

Certificate which MOET will recognise for staff seniority and promotion. As participants are university graduates, the issue of credit recognition and transfer to a USP degree does not arise. Quality assurance measures for the curriculum and the Accelerated STTC program rest with the FCAE. The STTC Coordinating Committee is comprised principally of senior MOET officers. Course design and curriculum changes made to inaugurate the Accelerated STTC may be viewed as appropriate developments, subsequent to FATEP, that are a relevant response to national needs.

**Enrolment and Graduation.** Data in the PCR concerning enrolment, progression, and completion rates for participants in the STTC included the following observations:

- ⊗ Of a total of 162 teachers who enrolled in Stage 1 of each Cycle in the four years 1991 to 1994 inclusive, 98 or 61 per cent completed all requirements.
- ⊗ Intakes were ethnically balanced and the completion rate of Indians (80 students) was more than four times higher than that of Fijians (18 students).
- ⊗ The retention rate increased dramatically to 100 per cent after the College assumed full responsibility for the program.

**Table 2: Inservice Secondary Teacher Training Program  
Enrolment and Graduation : 1993 to 1997**

| Year            | Gender       | Enrolment   | Graduation        |
|-----------------|--------------|-------------|-------------------|
| 1993<br>Cycle 3 | Male         | 33          | 21                |
|                 | Female       | 18          | 15                |
|                 | <i>Total</i> | <i>51</i>   | <i>36</i>         |
| 1994<br>Cycle 4 | Male         | 46          | 26                |
|                 | Female       | 16          | 6                 |
|                 | <i>Total</i> | <i>62</i>   | <i>32</i>         |
| 1995            | Male         | Not Offered |                   |
|                 | Female       |             |                   |
|                 | <i>Total</i> |             |                   |
| 1996<br>Cycle 5 | Male         | 30          | 14                |
|                 | Female       | 19          | 14                |
|                 | <i>Total</i> | <i>49</i>   | <i>28</i>         |
| 1997<br>Cycle 6 | Male         | 41          | Not Yet Completed |
|                 | Female       | 36          |                   |
|                 | <i>Total</i> | <i>77</i>   |                   |

Source: FCAE

Table 2 presents basic enrolment and graduation data for the previous (non-accelerated) inservice STTC program for the years 1993-97.

The pipeline effect separating any direct relationship between annual enrolment and graduation data is significant because the previous STTC required participants to complete three USP units over several years at the end of FCAE courses. An analysis of data in Table 2 reveals that for the two STTC cycles conducted during the FATEP period, the annual average enrolment was 57 and the annual average graduation was 34. In the two years since completion of the project in 1995, the annual average enrolment has increased to 63. As the second of the two STTC cycles was in progress in December 1997, it was not possible to calculate a comparative average graduation rate.

The data in Table 2 also show that for the years 1993 to 1997, females constituted 37 per cent of the inservice enrolment and for 1993 to 1996, females were 36 per cent of graduates. One conclusion is that, once enrolled in the STTC, female students perform as well as the larger male enrolment. Explanation for the lower proportion of female enrolment in the inservice compared with the preservice program may be found in: the multiple social obligations of married females to spouse, and to nuclear and extended families; interrupted career and formal study patterns; and difficulties in finding time and place at home for reasonable periods of continuous study.

**Enrolment Expansion.** Large numbers, comparable to the 1997 enrolment, are unlikely to continue to enrol in the STTC because successful attainment of its objectives should see the end of the program. MOET advised that in 1997 there were 642 graduate teachers with no formal teacher training serving in secondary schools. Given that 352 of this group enrolled in the Accelerated STTC in November 1997, around 290 current teachers may seek enrolment in a future STTC program. To this number can be added attrition from current enrolment and any untrained graduates who might be appointed. After the specific mandate of the STTC is fulfilled, it would be a reasonable assumption that the FCAE might build on its experience and continue the program's operating modality to service other quality assurance and upgrading needs among secondary teachers.

### 2.4.3 MOET, USP and External Factors

**Secondary Teacher Numbers.** The overall goal of FATEP was to improve secondary teaching in Fiji. From information the evaluation team were able to access, this project goal was achieved decidedly in qualitative terms and substantially in quantitative terms.

Considerable progress in its achievement as part of national human resource development is continuing. In a narrower sense, the Component B objective of the project, to strengthen junior secondary schools particularly through a quantitative input of teachers, may not have been fulfilled, or at the least its impact may have been partially diminished. This outcome is partly because of the success of the preservice program in producing quality teachers. Numbers of the FCAE preservice graduates have been deemed by principals as suitable to teach at senior secondary level. This situation may continue for as long as there is a shortage of trained teachers in the senior secondary schools.

The PCR reported that in 1994: the total secondary workforce was 3,285 persons including 57 volunteers; and over half of the total number were teaching classes in junior secondary school. Data concerning the location of teachers in secondary schools was obtained from MOET in a different form to that available in the PCR and is displayed in Table 3. In Table 3, junior secondary schools are defined as those which offer education in Forms 1 to 4 and senior secondary schools as schools offering education in Forms 1 to 7.

**Table 3: Secondary Teacher Workforce 1994 to 1996  
Junior Secondary and Senior Secondary Schools**

| Year | Gender       | Junior Secondary | Senior Secondary | TOTAL |
|------|--------------|------------------|------------------|-------|
| 1994 | Male         | 136              | 1,628            | 1,764 |
|      | Female       | 74               | 1,349            | 1,423 |
|      | <i>Total</i> | 210              | 2,977            | 3,187 |
| 1995 | Male         | 113              | 1,782            | 1,895 |
|      | Female       | 66               | 1,490            | 1,556 |
|      | <i>Total</i> | 179              | 3,272            | 3,451 |
| 1996 | Male         | 121              | 1,726            | 1,847 |
|      | Female       | 68               | 1,511            | 1,579 |
|      | <i>Total</i> | 189              | 3,237            | 3,426 |

Source: MOET

Figures for teachers in 1997 were not finalised and available to the evaluation team. The classification of junior and senior secondary schools does not show the actual deployment of teachers by level within senior secondary schools but is indicative. For the total secondary system these data suggest that the 136 preservice graduates from FCAE in 1994 contributed to the overall increase of 8 per cent in teacher numbers in 1995. Between 1994 and 1995, teacher numbers in junior secondary schools declined by 31 or 15 per cent and increased in senior secondary schools by 295 or 10 per cent. In December 1995, there were 139 additional preservice graduates from FCAE who were eligible for appointment to secondary schools in 1996. Between 1995 and 1996, the change in secondary teacher numbers show an overall decline of 25 teachers or 0.72 per cent, a decline in senior secondary of 35 teachers or one per cent, and an increase of 10 teachers or 6 per cent in junior secondary.

Of interest in terms of project effectiveness is the recent minor overall decline in the total number of secondary school teachers despite the continuing supply of FCAE diploma graduates. Various factors were advised to account for this decline including:

- ⊗ a lowering of the retirement age for teachers to 55
- ⊗ loss through the emigration of some teachers or by their pursuing other employment
- ⊗ the transfer of some teachers to other branches of the civil service.

For the three years from 1994 until 1996, when the total teacher workforce in junior and senior secondary schools was 3,426, the number of preservice graduates was 355 or 10 per cent of the total teacher workforce. During the same three years to 1996, the inservice STTC program contributed a further 68 qualified teachers to the secondary teacher workforce. The number of STTC graduates would have been higher if the program had been offered in 1995. Thus in 1996, the percentage of secondary teachers qualified through programs linked to FATEP was 12 per cent.

By the end of 1997 (disallowing any graduates from Cycle 6 of the previous STTC program in progress in December 1997), the total number of secondary teachers qualified through FCAE programs linked to FATEP was 720 or 21 per cent using 1996 figures of 3,426 for the total secondary teacher workforce. This indicates that within a period of five years since the first of preservice graduation,

FCAE with the assistance of FATEP has significantly improved secondary teaching in Fiji. A minor evaluation paradox results: while the principal project component of strengthening junior secondary education may not have been achieved in quantitative terms as fully as planned, the basic project goal of improving secondary education teaching is being accomplished.

**Table 4: Junior Secondary and Senior Secondary Schools  
Number of Schools and Enrolment: 1994 to 1996**

| Year | Schools          |                  | TOTAL | Gender       | Enrolment        |                  | TOTAL         |
|------|------------------|------------------|-------|--------------|------------------|------------------|---------------|
|      | Junior Secondary | Senior Secondary |       |              | Junior Secondary | Senior Secondary |               |
| 1994 | 20               | 125              | 145   | Male         | 1,539            | 30,786           | 32,325        |
|      |                  |                  |       | Female       | 1,530            | 31,765           | 33,295        |
|      |                  |                  |       | <i>Total</i> | <i>3,069</i>     | <i>62,551</i>    | <i>65,620</i> |
| 1995 | 20               | 125              | 145   | Male         | 1,449            | 31,433           | 32,882        |
|      |                  |                  |       | Female       | 1,473            | 32,460           | 33,933        |
|      |                  |                  |       | <i>Total</i> | <i>2,922</i>     | <i>63,893</i>    | <i>66,815</i> |
| 1996 | 20               | 125              | 145   | Male         | 1,423            | 33,263           | 34,686        |
|      |                  |                  |       | Female       | 1,511            | 33,876           | 35,387        |
|      |                  |                  |       | <i>Total</i> | <i>2,934</i>     | <i>67,139</i>    | <i>70,073</i> |
| 1997 | 20               | 126              | 146   | Male         | 1,340            | 33,310           | 34,650        |
|      |                  |                  |       | Female       | 1,452            | 34,304           | 35,756        |
|      |                  |                  |       | <i>Total</i> | <i>2,792</i>     | <i>67,614</i>    | <i>70,406</i> |

Source: MOET

- Notes: 1. Includes data from 12 Government and 133/134 grant aided schools.  
2. Excludes data from 4 independent schools (1 international, 3 religious)

During the same time period as secondary teacher numbers indicated some evidence of decline, other data obtained from MOET show a growth in student enrolment in secondary schools. The number of secondary schools and the enrolment of students by gender and level of secondary school for the years 1994 to 1996 are presented in Table 4.

A number of interpretations may be placed on these data in respect of issues arising from FATEP when the figures in Table 4 are analysed in conjunction with the workforce profile figures in Table 3. Two somewhat antithetical interpretations are:

- ④ that, based on the relationship between a reduction in teacher numbers and an increase in enrolment and schools, secondary education at both junior and senior levels is either on the brink of or has entered a phase of decline, or

- that the quality and effectiveness of graduates from both FCAE preservice and inservice programs enables teachers in junior and senior secondary schools to teach at increased staff-student ratios and levels of efficiency.

From available documentary and interview evidence, the evaluation team is firmly inclined to the second interpretation. It supports the view that the potential impact of FCAE on secondary education within the next five years will outweigh its influence to date.

**USP Credit Transfer.** A measure of quality improvement and effectiveness in teacher education arising from the project is seen in arrangements concluded in 1997 for credit transfer from FCAE awards to those of the USP. Detailed negotiations involved in this achievement have no doubt helped forge stronger relationships between the two institutions. The FCAE states in its 1997 publications that for Diploma in Education graduates, the following disciplines at the College have been granted approval for cross-crediting by the USP:

|                              |          |
|------------------------------|----------|
| ● English and Social Science | 10 units |
| ● Mathematics and Science    | 10 units |
| ● Accounting and Economics   | 8 units  |
| ● Home Economics             | 6 units  |

This is an excellent outcome and should be an incentive to Diploma in Education graduates to pursue further studies to gain a BEd degree of the USP. Attainment of a degree with a formal teacher qualification is a prerequisite for promotion to senior levels in secondary schools and in MOET. Some graduates of FCAE preservice diploma programs are currently undertaking degree studies at USP, with a few studying full time on scholarships. Three semesters of full time study are needed for an FCAE graduate to complete a BEd.

Now the FCAE has established a firm foundation for credit transfer arrangements, it is to be hoped that the agreement with USP will soon be expanded to include Agriculture among other majors. Not to include Agriculture might send an implicit signal to teachers and students as to its relative esteem in the College, the secondary schools, and the nation. An alternative and simpler approach to the complexities of inter-institutional credit transfers is to seek unspecified credit points rather than to search for direct equivalence. For instance, all graduates of FCAE preservice diploma programs

could be granted 10 units towards the BEd degree of USP. A qualifying condition might be that such credit be available after one or two years of satisfactory service as a secondary teacher.

#### 2.4.4 Institutional Development

**Governance and Management.** The FCAE functions as a specialised tertiary college of the MOET. A Board of Management operates as the controlling authority of the FCAE under explicit regulations of MOET. These regulations cover such matters as: academic concerns; finance and facilities; staffing and student policies and procedures; and organisational structure. They also specify that the membership of the Board shall comprise seven senior officers of MOET with the Permanent Secretary or nominee as Chairperson plus the FCAE principal, with the vice-principal to serve as secretary to the Board. Meetings are required to be held at least once each term. An Academic Board is the principal governance body within the College and much of its work is initially considered by one of its eight specialised committees. Management systems introduced during the FATEP period have been sustained. In the case of some computer software, systems have been upgraded. It was noted that the College Principal had set himself the task of being operationally skilled in use of the computer based systems.

Present arrangements derive from the project component which required establishment of sound management and administration systems and the development of facilities to provide for optimal operation of teacher education programs. The FCAE presents as an institution that is well managed and maintained. It is the recipient of close interest and high level support from the MOET. Current governance and management provisions appear to be appropriate to the College at this stage of its operations and development.

**Academic Programs and Administration.** As full-time programs at the FCAE had concluded, opportunity to observe academic programs was restricted. The evaluation team met with a number of heads of department and during several site visits inspected teaching and other specialised facilities. A sense of vibrancy and professionalism was evident in the way in facilities were maintained and information provided.

From committee reports and from publications, it was clear that the programs and courses begun during FATEP were subject to review and change. Change to curriculum and change in the formal relationship with the USP, detailed earlier in this report, are

pertinent examples of this ongoing process. The FCAE advised that the practice of work documentation and systematic planning was implanted during the project. Two dissimilar examples are the annual work plan for the College and the in-house publication, FCAE ECHO, which is edited on rotation by different departments. This publication, which carries staff news and also informative professional items, has an increasing circulation list outside the college. The Handbook for STTC Participants is an example of a publication which, since FATEP, has been upgraded from loose-leaf to stapled booklet format.

**Library and Educational Resources Centre.** During the project, support to develop this key element included: extension and refurbishment of existing facilities; establishment of a fully automated management and operating system; provision for users of furniture and equipment such as computers, CD ROM access, and video viewing; development of a collection of print and non-print materials; and staff training. At the end of the project, the LERC was operating effectively in servicing the current level of enrolment.

The collection currently has 15,824 items of which some 11,000 are monographs. In 1997, the LERC subscribed to 24 journals, a number of which are lower-cost local publications. The acquisitions budget in each of 1996 and 1997 was FJD8,000 although considerably more was requested.

Use of the LERC has increased substantially since 1995. Available seat places remain the same as during the project, being 25 study carrels and 135 seats at 25 tables which are said to be rather too close together. The LERC is the principal study location for students. In 1997, registered active borrowers total 337 of whom 281 are full-time students. Participants in the STTC course who number 339 in 1997 are additional, making a total of about 676 borrowers. Their use of facilities occurs for short intensive periods. Borrowing rose from 13,614 transactions in 1996 to a progressive total in 1997 of 15,524 until 27 November, an increase in excess of 14 per cent for the year thus far.

The Oasis automated system provides such statistics as the above and enables management of the collection. The College continues to pay fees (AUD870 in 1997) to the software provider which gives it an annual system update. New library personnel have received Australia-based training to attain Oasis Library Certification with assistance from AusAID for one person. LERC users have access to CD ROM data bases and directories and a higher speed modem has been

purchased to facilitate efficient access to the Internet. The LERC pays annual Internet charges to Telecom and students and staff must pay for all private use of this service.

The greatest benefits from the project for the LERC were reported to be: system automation allowing greater use of the collection; and facilities that encourage and develop independent use of resources. Regardless of the level of library and learning resources available in schools to which FCAE graduates are posted, they leave the College with fundamental knowledge and experience in information storage, retrieval and use. Illegal removal of books and other items from LERC is a issue of current concern. A security control system involving the fixing of magnetic tape in materials was identified as a priority need.

**Facilities, Equipment and Finance.** In addition to facilities and equipment provided for the library and educational resources centre, existing class room space was refurbished and equipped to provide a computer laboratory, a media workshop and two micro-teaching laboratories. The existing lecture theatre was extended and air conditioned. Refurbishment and extension of facilities took place in Home Economics, Industrial Arts, Secretarial Studies and Science. Subsequently, some refurbishment and upgrading has been undertaken in Agriculture, Art and Craft, and Music.

These improvements provided a suitable physical environment essential to other institutional development activities such as local staff training, development of management systems, curriculum development and operating systems for the library and teaching practice centre. All items are being fully utilised and have been kept in good condition. MOET policy is to maintain the standard of equipment and facilities established during the project. Adequate funding has been provided for this purpose. Service contracts have been negotiated with two companies for the maintenance and repair of computing hardware and other office and reprographic equipment.

**Recurrent Cost Funding.** MOET provided staff salaries, operational and maintenance costs throughout the FATEP period. During the project, the continued maintenance and replacement of equipment and the continued support for the practicum were significant issues. At that time, MOET recognised the magnitude of the undertaking and agreed to provide whatever support it could to the Principal's annual budget. FJD1.44 million was provided in 1997 and the amount for 1998 is FJD1.783. This amount is

additional to staff salaries and to five-yearly building maintenance carried out by the Public Works Department (FJD0.5 million). The Principal's budget is required to cover the requirements for the practicum, maintenance of general and teaching equipment, laboratory apparatus, reagents, minor works, spare parts and wages of maintenance staff. In general, the amount seems to be adequate. The Principal advised that he is able to apply for additional funds if that proves to be necessary.

**Human Resource Management and Development.** Training and staff development elements of the project were highly valued by all respondents. They provided the necessary basis for continuing development in other project components. During the FATEP period, 37 persons took part in training attachments and six staff enrolled in degree studies by distance education. Of the original 37 participants, 19 are no longer employed at the FCAE and their departure has occasioned some critical observations. The evaluation team holds the position that human resource development is best viewed from a national rather than an institutional perspective.

Many of those who have left FCAE continue to work in education and most are employed in areas that contribute to Fiji's national development, for instance: one person has a USP academic appointment and another works for the AusAID-GOF Basic Education Management and Teacher Upgrading Project (BEMTUP); three persons have been transferred to MOET headquarters and another promoted to Chief Education Officer; the former librarian is studying for a masters degree in Australia, the former assistant librarian works at the Reserve Bank, and the former library assistant is now at USP. One person has joined the Ministry of Tourism and another staff member has accompanied her spouse who is studying abroad. Four former staff have emigrated to Australia and another is in Australia for intensive medical treatment.

What is remarkable is that despite the departure from FCAE of about 50 per cent of the staff who had close involvement with FATEP, the programs and supporting services strengthened by the project have been sustained and continue to develop. A focal illustration is the library which makes a vital contribution to the professional development of students and staff even though all the original library personnel have left. FCAE advised that the project created performance standards and expectations which the College sustains. Staff are currently enrolled in degrees at masters and doctoral level, some on scholarships and some at their own expense.

The Principal has recently been elected president of the Pacific Association of Teacher Educators (PATE). Research projects are being pursued and seminars are held, some jointly with academic staff and groups from the USP.

## 2.4.5 Financial and Economic Impact

**Financial Impact.** The direct financial impact of the project on the FCAE was substantial. The project provided assets to the value of AUD308,000 for equipment for laboratories, library and administration. FCAE facilities were substantially upgraded.

The combination of better equipment and staff development significantly raised the level of operation of the College thereby increasing its operation and maintenance costs. These are budgeted at FJD1.8 million for 1998. The GOF maintained and increased its budget for the College throughout the project and subsequently. The GOF, through the MOET, is strongly committed to the ongoing development of the FCAE as its principal secondary teacher training facility.

**Economic Impact.** The project achieved its goal of enabling the College to become fully operational, significantly increasing its contribution to the national economy. The number of teachers graduating each year in the preservice program is shown in Table 1. A total of 404 teachers graduated during the 3 core years of the project (1994-96) and a further 96 teachers graduated from the inservice program over the same period. Graduates from the preservice program have contributed substantially to meeting the estimated 1993 shortfall of 895 junior secondary teachers. Graduates from the project's inservice program are helping to upgrade the existing teacher workforce but at the relatively low level of about 30 per year.

Teachers graduating from these programs are considered better trained than most of those currently employed. The project's contribution to the economy is achieved through an increased number of teachers trained and greater competence of those teachers. The benefit from the project is manifested in the improved performance of secondary students taught by teachers graduating from the FCAE from 1994 onwards. Improvements in student performance are difficult to quantify requiring measurement of the incremental improvement in grades through improved teaching.

Benefits will be realised at different levels. The majority of teachers from the preservice program will teach Forms 3 and 4, with only a

small proportion teaching Forms 5 and 6. Teachers graduating from the inservice program will teach students in Forms 5 to 7. Students graduating from Form 4 will have completed 10 years of compulsory schooling and may leave school to find work. With-the-project, these students should have a better education and consequently be more employable. Form 4 students generally acquire technical/vocational training and find work after one year. Alternatively, graduates from vocational schools aiming for better jobs can apply to enter the FIT. Entry to FIT by this route, however, is difficult because of competition from students continuing on in the Academic stream to Form 6 or 7 who are also be eligible to apply for entry to a university or FIT. With-the-project, better trained students with higher grades should gain tertiary access more readily than students from less well trained teachers. A fixed quota of places at tertiary level results in inflation of entry requirements limiting the number of student places. Better trained high school students, therefore, should be more successful at gaining entrance to tertiary level. Theoretically, they should also be more successful in their tertiary studies but there is currently no evidence to support this position. Students graduating from university and FIT should be highly employable and have a starting salary of about FJD8,000.

In the without-project scenario, it is assumed that MOET would have persevered with the establishment of the FCAE. It was already operating prior to project commencement and had an intake of about 100 trainees at the beginning of 1992. The annual intake would probably have increased to about 120 over time resulting in annual graduations of about 112 compared to average annual graduations of 135 with-the-project. Upgrading of the College, however, would have been more difficult particularly if Fiji had not been able to find an alternative donor. To not proceed with the FCAE, though, would have been untenable. Seeking assistance through the USP would not have provided a solution. Even if USP had been prepared to reopen diploma teacher training (closed in 1983), its physical constraints would have precluded it from meeting the numerical requirement for teachers. Therefore, it is assumed that, without-the-project, FCAE would have continued to graduate up to about 112 preservice trained teachers per year but at a lower level of proficiency. The STTC program that commenced in 1989, would probably have continued graduating about 30 trainees per year which is similar to the number graduating under the project.

The increment attributable to the project is therefore about 23 additional junior secondary teachers per year for the years 1994 to

1997 with a much higher level of training than would otherwise have been available. In addition, 30 inservice teachers would have gained a major increase in teaching ability. Furthermore, curriculum development and training of FCAE staff under the project has improved the capacity of FCAE to undertake additional training activities that were not part of the original project. For example, there was an additional enrolment of 30 private preservice trainees in 1997, above the normal quota of PSC sponsorships (150), indicating that the FCAE has some additional capacity. This higher level of enrolment may continue but further increases could require additional accommodation and extra work space in the library. The accelerated STTC program was also introduced in 1997 and will vastly increase the rate of upgrading inservice teachers. Altogether, 339 inservice teachers enrolled in this program in November 1997.

Improved teacher training has a high potential for multiplier effects. As a result of the project, more than 50 teachers with improved teaching abilities will enter the work force each year. With a standard class size of 35, an additional 1750 high school students per year would receive better teaching.

Over the next several years, this number can be expected to increase significantly through the accelerated STTC program and as the number of preservice graduates increases. For example, in 1998, the additional number of preservice graduates (over and above the without-project output) could be around 58 (compared with 23 in 1995) and the additional number graduating from the accelerated STTC in 1998 could be as high as 310 (over and above the without-project output). Given an standard class size of 35 these additional 368 teachers would teach 12,880 secondary students.

While it has not been possible to calculate an economic internal rate of return for the project because of the difficulty in valuing social benefits, it is evident there are very substantial benefits currently being achieved and there is enormous potential for greater benefits in the future.

#### **2.4.6 Environmental Impact**

The project is considered to be environmentally neutral. One significant issue during project implementation and post project is the disposal of chemical wastes from the chemical laboratories. Heavy metals and toxic chemicals resulting from student experiments are properly disposed of at the USP Laucala Bay waste management unit. Other chemicals considered non-hazardous are neutralised and

flushed down the drains, an accepted practice in schools and colleges in Fiji.

Although the environmental discipline is not specifically taught as a course at the FCAE, courses in agriculture, food and nutrition and the basic sciences have elements of environmental appreciation. It is considered that the graduates of FCAE have a good understanding of general environmental issues and are able to teach these to their students.

### **2.4.7 Social and Gender**

The GOF has a policy of equal employment opportunity for women and men. This policy applies in all government departments including education. In addition, the equal employment opportunity policy is encouraged in the private sector.

The FATEP has resulted in a major improvement in the number and quality of women secondary teachers graduating in Fiji. Between 1993 and 1997, the number of women graduates in the preservice one and two-year Diploma in Education programs was 345 or 55 per cent of the total graduates. For the inservice secondary teacher training program, women graduates for the period 1993 to 1996 were 36 per cent of the total. Clearly, women have been major beneficiaries of the project.

In the long term, the project is considered to have the potential to create a major social impact. The number and quality of graduate teachers has improved substantially from the without-project situation. All interviewees indicated that the graduate teachers are now more professional, motivated, mature, confident and have better self esteem than prior to the project. Although it is too early to measure yet, it is considered that the outcome of this project will create a longterm development impact in Fiji.

### **2.4.8 Occupational Health and Safety**

The FCAE considers occupational health and safety an important element of its training of good teachers. Equipment and processes are in place to protect students and staff from accidents. All laboratories are equipped with safety devices such as eye goggles, gloves, first aid kits and fire extinguishers. All electrical and mechanical equipment is regularly serviced. Standards of furniture in the laboratories and the computer rooms are high. Dangerous chemicals are properly secured in cupboards and their use for chemical experiments by students is closely supervised by the

teaching staff. The library facilities are modern, spacious and considered an excellent learning environment.

## 2.5 Sustainability

The FATEP was initiated in response to needs identified by the GOF. The success of the project and the continuing sustainability of the FCAE derive from the congruence between FATEP and the needs and policy directions identified by MOET. Support for the project and the development of the College owe much to the leadership exercised by senior officers of MOET and the FCAE and by Australian advisers.

The project provided Fiji with refurbished physical facilities for secondary teacher education based at Nasinu. Sufficient equipment and specialised resources to review and modernise the curriculum and to support dynamic planning and management were among key elements. Of vital significance was the counterpart training and attachments abroad. From site visits and other information, it is evident that both Ministry and College officials are committed to sustaining the investment made during FATEP. Regimes to ensure maintenance and adequate financial provision appear to be well established and human resource development is also viewed as an integral part of institutional operations. Evidence to support this positive perspective on sustainability is found elsewhere in this report and specifically in the following:

- ④ Within five years of project inauguration, approximately 21 per cent of secondary teachers have received professional training and qualifications through FCAE in programs linked to FATEP.
- ④ A productive and supportive relationship exists between MOET and FCAE and the basis of a strong reciprocal relationship between FCAE and the USP has been established to the benefit of FCAE graduates and education in Fiji.
- ④ FATEP created expectations and a forceful impact on FCAE staff. While about 50 per cent of original staff have left FCAE, the institution considers it has developed among staff a self-sustaining capability.
- ④ Graduates of FCAE demonstrate high levels of personal capability and professionalism in their school postings. An embryonic alumni association has developed, supported by a newsletter and occasional meetings.

At a GOF policy level, there is an express commitment for the FCAE continuing to be a premier national institution of tertiary education. The planning document, Development Strategy for Fiji: Policies and Programmes for Sustainable Growth, which was presented to Parliament on 4 December 1997 stated (at S.10.16):

“Key features of the development program and strategy to improve the education sector include:

- ⊗ upgrading LTC to increase the primary teacher training intake and simultaneously introducing new certificate-level courses in Pre-School Education and Special Education;
- ⊗ retaining teachers to age 60;
- ⊗ expanding FCAE to increase the junior secondary teacher training intake and broadening the curriculum of FCAE by including teaching of specialised PEMAC courses;
- ⊗ accelerating the current STTC program; and
- ⊗ promoting the PGCE course available at USP as an alternative to STTC.”

The section on education concludes by stating (at S.10.21): “The ultimate objective is to develop a National Educational Plan for the period 1997-2020.” The FCAE will clearly have a critical role in this plan.

Constraints which could affect the sustainability of FCAE and its ability to operate at present or better levels of performance and quality output include: inadequate funding growth for key activities such as practicum, library and educational resource centre, micro-teaching, computing and other specialised equipment; undue loss of trained personnel through emigration or transfer; demands for new program developments with insufficient resource support; and a failure to pursue ongoing needs analysis and program renewal after fulfilling initial objectives.

## 2.6 Key Issues and Lessons Learned

### 2.6.1 Conclusions

Overall, the project succeeded in meeting all of its objectives. It was an excellent development project addressing a critical shortage of high quality secondary school teachers. The FCAE has now become a modern secondary teacher training institution. The number and quality of graduate teachers have improved significantly since the

without-project situation. The incremental gain which graduate teachers now bring to their class rooms is very significant. In the long term this will create a major social and economic impact in Fiji.

All project initiatives are considered sustainable and some have been improved since project completion. For example, the computing equipment and the library facilities have been upgraded further. Operation and maintenance budgets are sufficient to maintain and improve the FCAE facilities. Within MOET, at the highest policy level there is a very strong commitment to and support for the FCAE. The achievements to date are a great credit to the dedication and commitment of the senior officials of MOET and the Principal of the FCAE as are their efforts to continue the improvement of education in Fiji.

## 2.6.2 Key Issues and Lessons Learned

Five key lessons are identified that may have applicability to other projects in Fiji and comparable countries.

- 🌐 **Project Design and Recipient Government Policy.** A strong positive lesson from this project is the need for close cooperation between a contractor preparing a project design and a recipient government ministry. This project addressed what the GOF had clearly identified as a specific need. Rather than build a new institution, the project upgraded an existing facility which had contributed to education in various ways since 1937. In addition, the project supported the development plans of MOET. All key players in the project worked together closely and cooperatively, had an interest in supporting project initiatives and had ownership of the outcomes. These factors helped to reduce project risks and enabled a successful project to be achieved.
- 🌐 **Selection of AMC Team Leader.** The Permanent Secretary of MOET and the FCAE Principal both specifically referred to the overriding importance of having the right qualities in the AMC team leader. In this case, they believed that the character of the team leader was instrumental in promoting cooperation between the two sides. The team leader's open character engendered trust. He had a firm management style but at the same time, provided an example for both teams. He set the pace of project activities and was instrumental in brokering the agreement between the FCAE and USP under which USP provides course credits.

- ④ **Training Abroad.** Training attachments abroad frequently have a value that goes beyond the specific training undertaken. For senior staff, there can be considerable benefit to management generally through being able to study varying management styles in different institutions. There is value also in gaining an appreciation of different standards and practices in organisation and management which may be applied to advantage in the home institution.
- ④ **Tracer Study.** For the FATEP and for comparable projects, a tracer study of graduates should be undertaken about five years after completion of the project. Useful analytical information about the project, its impact, and particularly about the performance characteristics of graduates in relation to project goals could be obtained.
- ④ **Training in Leadership and Management.** The FATEP was an innovative project which required rapid development and high levels of commitment and professionalism from a range of educators including: policy makers in MOET; the executive, teaching and support staff of the FCAE; secondary school system principals and staff among others involved in the practicum; and the AMC and Australian advisers. For all associated with FATEP, there was a sharp learning curve in the area of modern teacher education appropriate to the needs of Fiji.

That the goals of FATEP were met and have been further advanced is generally viewed as a rewarding experience for those involved as well as being, at times, a considerable strain on their professional and personal capabilities. Training in educative leadership and management has been identified as a needed adjunct component to projects like FATEP. Such training would better equip national agencies and personnel to sustain and to advance academic developments and to manage the investment more effectively.

# Fiji Meteorological Radar Project

# Abbreviations

|      |                                      |
|------|--------------------------------------|
| AMC  | Australian Managing Contractor       |
| BOM  | Australian Bureau of Meteorology     |
| CAAF | Fiji Civil Aviation Authority        |
| FEA  | Fiji Electricity Authority           |
| FMS  | Fiji Meteorological Service          |
| GOA  | Government of Australia              |
| GOF  | Government of Fiji                   |
| GOS  | Global Weather Observing System      |
| MOU  | Memorandum of Understanding          |
| NDMC | National Disaster Management Council |
| NDMO | National Disaster Management Office  |
| NDMP | National Disaster Management Plan    |
| NEOC | National Emergency Operations Centre |
| NWFC | National Weather Forecasting Centre  |
| PCC  | Project Coordinating Committee       |
| PSC  | Public Service Commission            |
| PWD  | Public Works Department              |
| ROU  | Record of Understanding              |
| SWB  | Special Weather Bulletin             |
| TC   | Tropical Cyclone                     |
| TCWC | Tropical Cyclone Warning Centre      |

# Basic Project Data

**Project Name:** Fiji Meteorological Radar Project  
**Executing Agency:** Fiji Meteorological Service  
**Managing Contractor:** Bureau of Meteorology, Australia

|  | Planned          | Actual       |
|--|------------------|--------------|
| <b>Technical Assistance</b>  |                  |              |
| Implementation advisers  | 30 months        | not known    |
| Training advisers  | 9 months         | not known    |
| <i>Total</i>   | <i>39 months</i> |              |
| <b>Project Costs</b>   |                  |              |
| AusAID   | AUD1,948,000     | AUD1,948,000 |
| GOF  | FJD896,000       | FJD800,000   |
| <b>Key Dates</b>   |                  |              |
| Prefeasibility Study   | November 1992    |              |
| Feasibility and Appraisal Study                                    | February 1993    |              |
| MOU with GOF   | June 1993        |              |
| ROU with BOM   | July 1993        |              |
| Effective Completion   | October 1994     |              |
| Actual Completion<br>(after final inspection<br>and liaison visit) | May 1997         |              |

## 3.1 Summary

**Objectives and Scope.** The goal of the project was to contribute significantly to the enhancement of Fiji's civil disaster preparedness capabilities. The purpose of the project was to provide an improved wind and severe weather forecasting and monitoring capability for Fiji and the region. The goal was to be achieved through delivery of five components:

- ④ new weather radars operational at Nadi and Nausori airports
- ④ maintenance and operation manuals
- ④ test equipment and spares
- ④ FMS staff training in the use of the equipment
- ④ CAAF technical staff trained in maintenance of the equipment.

**Implementation.** The installation and commissioning of the two radars was needed to help prepare Fiji for mitigating the effects of cyclones. The AMC was able to bring forward the installation of the

Nadi radar by diverting major radar components procured for Australia to Fiji. This resulted in the installation and commissioning of the Nadi radar by December 1993, in time for the majority of the 1993/94 cyclone season. The radar at Nausori was commissioned in October 1994, following the long lead time required for procurement of the radar equipment. It was, however, commissioned one month ahead of the contract schedule.

In addition to the provision of the radars, training in equipment maintenance and operation was undertaken in both Fiji and Australia. FMS personnel were trained in system operation while five technicians from the CAAF participated in the AMC's training courses in radar system maintenance, PC maintenance and data communications.

The two radars have been well operated and maintained since commissioning by the Fiji agencies although there are concerns over the lengthy spare parts procurement procedures.

**Conclusions and Key Issues.** The FMRP has proved to be an excellent development project with enormous potential social and economic benefits. It was a technology transfer and skills upgrading project with the installation of two radars at the Nadi and Nausori airports. The project succeeded in meeting all of its objectives. The utilisation of the radars is expected to improve cyclone warning and national preparedness.

Key lessons identified through the implementation of this project included:

- ⊗ The success of a simple project design and implementation for targeting a very specific need in a technical area.
- ⊗ A high level of technical cooperation between specialists in Australia and Fiji in the meteorological radar and weather forecasting fields.
- ⊗ The need for effective institutional cooperation between line agencies in Fiji. This has occurred during and since implementation.

## 3.2 Project Description

### 3.2.1 Introduction

Fiji experiences some form of cyclonic activity almost every year. Cyclones cause significant damage to infrastructure, agriculture, forestry, buildings, and cause serious injury and loss of life. The

cyclone season extends from November to April. However, a cyclone can form at any time of the year and continuous monitoring of the weather patterns in the region is essential to ensure that the country receives adequate warning of the possibility of a damaging cyclone. The responsibility for this resides with the Fiji Meteorological Service (FMS), based in Nadi, through its National Weather Forecasting Service (NWFS). Information from the NWFS is received by the National Disaster Management Office (NDMO) in Suva, which is responsible for disaster operations, mitigation, preparedness, emergency relief and rehabilitation.

### **3.2.2 Rationale**

Since the 1960s, Fiji has relied on the meteorological radar located at Nadi. This Cossor system became increasingly unreliable. During TC Kina in December 1993, the FMS was unable to track the cyclone resulting in a lack of adequate preparedness. The system was also poorly located and was unable to track weather from the north, through east to the south, because of high terrain. The system was also not able to be operated during cyclone peaks and had to be secured to prevent damage. In addition, the existing system did not provide the capabilities for the FMS to meet its international obligations in providing upper wind and other observational data to the Global Weather Observing System (GOS), and to provide forecasts and warnings of significant weather conditions to Fiji's regional neighbours. Over the last ten years, damage estimated at FJD275 million has been caused by cyclones in Fiji.

### **3.2.3 Formulation**

Following an official request from the Government of Fiji (GOF), immediately after TC Kina, AusAID commissioned a feasibility and design study for the provision of an improved meteorological radar system. A Memorandum of Understanding (MOU) between the Government of Australia (GOA) and GOF for provision of new facilities was signed in June 1993. A Record of Understanding (ROU) between the Australian Bureau of Meteorology (BOM) as the Australian Managing Contractor (AMC), and AusAID for project implementation was signed in July 1993.

Two radar installations were provided under the contract. The first, at Nadi, replaced the Cossor radar and is housed in civil works constructed by the Fiji Public Works Department (PWD). This radar was commissioned into operational service in December 1993. Full

operations, including upper air and observing operations, commenced in May 1994.

The civil works for the second facility at Nausori airport were completed by mid 1994, which enabled radar installation to be carried out by September 1994. The facility was fully operational and handed over to GOF at the end of October 1994, one month ahead of schedule. The site at Nausori was selected to provide improved radar coverage to the south and east at an established location with good existing infrastructure.

### 3.2.4 Objectives and Scope

The goal of the project was to contribute significantly to the enhancement of Fiji's civil disaster preparedness capabilities.

The purpose of the project was to provide an improved wind and severe weather forecasting and monitoring capability for Fiji and the region.

The goal was to be achieved through delivery of five components:

- ⊗ new weather radars operational at Nadi and Nausori airports
- ⊗ maintenance and operation manuals
- ⊗ test equipment and spares
- ⊗ FMS staff training in the use of the equipment
- ⊗ Civil Aviation Authority of Fiji (CAAF) technical staff trained in maintenance of the equipment.

### 3.2.5 Project Cost

GOA contributions to the project were AUD1,948,000. GOF contributions were about FJD800,000.

## 3.3 Implementation Performance

### 3.3.1 Implementation Process

The need for rapid installation and commissioning of the two radars was recognised by the AMC. Fiji had an increasing vulnerability to cyclones because of its inability to track their passage in close proximity to the country. The AMC was able to bring forward the installation of the Nadi radar by diverting major radar components procured for Australia to Fiji. This resulted in the installation and commissioning of the Nadi radar by December 1993, in time for the majority of the 1993/94 cyclone season.

The radar at Nausori was eventually commissioned in October 1994, significantly behind that at Nadi due to the long lead time required for procurement of the radar equipment. It was, however, commissioned one month ahead of the contract schedule.

In addition to the provision of the radars, training in equipment maintenance and operation was undertaken in both Fiji and Australia. FMS personnel were trained in system operation while 5 technicians from the CAAF participated in the AMC's training courses in radar system maintenance, P C maintenance and data communications.

Significant on-the-job training was also undertaken during project implementation.

Implementation was relatively trouble free except for some problems during the foundation construction for the radar at Nausori. This was caused by a lack of structural foundation skills in the PWD and was resolved after some delay.

### 3.3.2 Organisation and Management

The implementation process involved a number of agencies comprising:

| <b>Agency</b>                     | <b>Role</b>           |
|-----------------------------------|-----------------------|
| Bureau of Meteorology, Australia: | AMC                   |
| Fiji Meteorological Service:      | Operations            |
| Civil Aviation Authority of Fiji: | Equipment Maintenance |
| Fiji Electricity Authority:       | Power Supply          |
| Public Works Department:          | Infrastructure        |

A Project Coordinating Committee (PCC) was formed to formally oversee the project. This comprised representatives of GOF and Australia and was chaired by the Permanent Secretary responsible for FMS.

The Principal Architect from the PWD acted as a de facto project manager for the GOF on a day-to-day basis as the PWD was responsible for the construction of the works and the erection of radar towers. While this arrangement contributed to a close working relationship between the AMC and the PWD, it bypassed the FMS in the day-to-day decision making process. Although close links were required between the AMC and the PWD because of the significant infrastructure construction component of the project, it would have

been appropriate for FMS to have been fully involved. The relationship between the PWD and FMS is further discussed as a sustainability issue.

### 3.3.3 Project Completion

The project completion report was submitted by the AMC in December 1995. While the project commenced in May 1993, and was designed to be implemented over four years and eight months, the major activities of establishing and commissioning the two radars, and the training of operational and technical maintenance staff, were successfully completed within the first eighteen months. A series of inspection and liaison visits took place over the balance of the period, the last of which took place in May 1997. The project was completed within the design budget.

Staff development was specifically targeted in FMS and CAAF as the ongoing success of the project was predicated on this aspect. The main risk to project sustainability was seen as the possibility of loss of trained staff through staff mobility, and budget cuts. The report emphasised that the full realisation of benefits from the project is contingent on the provision and maintenance of national disaster and relief systems which are equipped to receive and respond to advice provided by the FMS. The report strongly recommended that separate action be taken to review the adequacy of the counter disaster relief structure.

## 3.4 Impact Assessment

### 3.4.1 Operational Performance

**Equipment Suitability.** The project comprised the supply and installation of state-of-the-art meteorological radar equipment. It is fully compatible with equipment in Australia and is supported on a regional cooperation basis by BOM. Indeed, information is available on dial-up to and from Fiji, New Zealand, Australia and New Caledonia. The Cook Islands has a radar and is currently seeking assistance from bilateral agencies for installation of weather surveillance equipment which will enhance the region's capabilities to track weather systems. Fiji is ideally situated as a regional centre for weather surveillance. The two radars are well sited and now provide the FMS with an almost complete survey of rain density for the Fiji island group.

The radars are vital for tracking cyclones as they approach the Fiji island group. They can detect rain densities up to an effective range

of approximately 250 km from each station. Used in conjunction with other data such as satellite images and ground observations, the system provides forecasters with an effective tool for accurately tracking the eye of cyclones, and therefore, changes in track on a real time basis. The radars are also useful for general weather forecasting, detecting other weather phenomena such as squall lines, and for providing a record of meteorological conditions on request for events such as accident inquiries.

Technological advancements are being made constantly. Refinements to the system have been possible through the support mechanisms at BOM. Ultimately, the technology will be superseded but it should continue to serve the FMS well for many years.

**Operations and Maintenance.** Responsibility for operation of the radars lies with the FMS whereas maintenance lies with the CAAF. This was recognised in the provision of training during the project. In general, both operation and maintenance have been undertaken well since the radars were commissioned. This was demonstrated during Tropical Cyclone Gavin in March 1997 when the radars played an important role in accurate forecasting. On this occasion, Gavin was identified on satellite images and monitored as it approached Fiji, intensifying as it did so. The cyclone took an unexpected change in track as it came within radar range. At the same time, satellite images became unreliable as high-level cloud obscured the eye. The NWFC was able to detect the change of direction using the radars and accurately predict its new track. Revisions to warnings were issued accordingly and the NDMO was able to take appropriate action.

While some damage associated with Tropical Cyclone Gavin was unavoidable, the use of radar assisted greatly in predicting the areas most at risk, increasing the degree of preparedness in those areas.

Funding for operation of the radars is determined on an annual basis. There are problems with the current system due to:

- ⊗ no carry over of unused budget
- ⊗ budget being fixed on previous year's expenditure.

Project estimates for the operating budget were about FJD40,000 per year. While this level may be appropriate for radars in Australia, it is considered inadequate in Fiji because of problems associated with unreliable and fluctuating power supplies and the relatively high cost of electricity. In addition, FMS has had its operating budget cut by 50 per cent this year due to its lower than expected levels of

expenditure since commissioning. The levels of recurrent funding are therefore of concern and have the potential to compromise operations.

The radars are sophisticated equipment that will require occasional relatively major maintenance and component replacement. The current funding arrangements do not recognise this and problems could occur in obtaining vital components to keep the facilities serviceable. Spare parts control is the responsibility of CAAF, which obtains a quote(s) and requests procurement through FMS. FMS then process the order through the established GOF system. Spare parts requirements need careful monitoring, remembering that orders for replacement parts have budgeting implications for the FMS. If spare parts are used, orders must be placed immediately to ensure that a spare is always available. There are concerns over these stores management issues. FMS is not always clear on the current state of spares held.

The CAAF resources budget allows for maintenance of all aviation systems, including that for the radars at the two sites but does not include the provision of spare parts. It is not possible to identify that part of the budget dedicated solely for the radars. However, as equipment maintenance demands increase, either with an increase in the amount of equipment or asset aging, careful monitoring of this situation will be required. Procedures are in place to prioritise maintenance works and schedule maintenance activities.

A high level of communication between the FMS, as the operating agency, and the CAAF is required to ensure that operational needs are met. The FMS has overall control over down time associated with preventative maintenance and can defer maintenance if the radars are needed during significant weather events. Once maintenance is complete, the equipment is signed off by CAAF as suitable for service by FMS staff.

Most recently, there have been problems with the Nausori radar which became unserviceable in September, 1997. The delay in obtaining spare parts has been the principal factor in this significant period of outage and is of particular concern since the cyclone season is now current. Delays in procurement relate to the rigid procedure followed for ordering equipment from overseas. This is managed by the GOF's Controller of Supplies. Potential problems surrounding the single sourcing of parts, usually obtained through the BOM, seem to have been avoided to date. Normal practice is for three quotes to be obtained as part of the procurement process. The

team was advised that parts had arrived and the radar was expected to be operational by the end of November, 1997. As yet, the cause of the component failure is unknown. CAAF technicians have planned some diagnostic tests prior to start up. It is vitally important to identify and rectify the cause of the problem rather than assume that component replacement is the solution. Both the FMS and CAAF need to ensure that spare parts orders are processed as quickly as possible through their respective organisations to minimise overall delays.

There has been a history of power supply problems to both radars, particularly at Nausori. Early problems were remedied with assistance from the BOM and focused on repair to the mains/generator control systems at each site. At Nausori, power is taken from an FEA line which is designed for domestic supply and experiences voltage fluctuations. FEA is not planning to upgrade the line in the foreseeable future. On BOM advice, the situation has been addressed with the provision of a line conditioner at the radar site. Mains power supply is backed up by a standby generator. The need for a step-up transformer should be considered. The situation at Nadi is more secure with mains power backed up by a standby unit and the airport backup system.

The infrastructure housing the radar facilities was provided by the GOF through the PWD. The intention was that the facilities would be maintained by the PWD on behalf of the FMS, charging the FMS for services. However, the building works at Nadi have yet to be accepted by FMS due to concerns over quality of workmanship. FMS identified cracking in major beams which has been brought to the attention of PWD. Repairs have yet to be undertaken and until they are completed to the satisfaction of FMS, the building works will not be accepted. This issue has remained unresolved for two years. While the building works currently provide a good standard of accommodation for the radar and other equipment, there are concerns over the longterm suitability of the buildings, particularly under cyclone and/or earthquake conditions.

**Disaster Management.** Fiji has a well developed natural disaster response mechanism able to take advantage of improved cyclone early warning and tracking information available from the project radars. The National Disaster Management Plan (NDMP) was published in January 1995. It is a comprehensive manual for alerts, warnings, disaster mitigation, preparedness, training, management, public awareness and education. The Natural Disaster Management

Act, 1997 is currently with the Parliament. It's provisions are similar to those already in the NDMP.

The National Disaster Management Council (NDMC) has overall responsibility for disaster management on a continuous basis irrespective of whether a disaster has occurred or not. It is responsible for development of strategies and policies for disaster mitigation. During emergencies, it has responsibility for efficient conduct of operations at national, divisional and district levels through the respective Emergency Operation Centres. NDMC is also responsible for rehabilitation programs following disasters. It reports to Cabinet. Its membership comprises the Minister for Regional Development as chairperson together with the Permanent Secretaries for all ministries, plus the heads of police and military forces, public utilities, PSC, FMS, Government Supplies, Fiji Council of Social Services and Fiji Red Cross Society.

Day-to-day implementation of disaster management activities is the responsibility of the National Disaster Management Office (NDMO), of the Ministry of Regional Development. The NDMO acts as secretariat to the NDMC. During emergencies, NDMO sets up the National Emergency Operations Centre (NEOC) to coordinate disaster monitoring, warning and immediate post-disaster response. NEOC only operates when a specific threat develops. For tropical cyclones this is when a special weather bulletin is issued. NEOC screens and issues disaster warnings and information to the public. Under normal conditions, NDMO implements all of the non-emergency functions of the NDMC.

The Tropical Cyclone Warning Centre (TCWC) in Nadi issues:

- ⊗ Routine Weather Bulletins
- ⊗ Special Weather Bulletins whenever the need arises to give specific warnings of tropical cyclones or other disturbances
- ⊗ 'Flash' Bulletins every three hours or as required to warn of a change in the situation.

The Cyclone Advisory System adopted for the region essentially consists of an 'alert phase' for gales or stronger winds within the next 36-48 hours, and a 'warning phase' when there is imminent threat of a tropical cyclone. Alerts/warnings are timed to allow several hours of daylight for bringing boats to safety and taking precautions against severe conditions. The convention adopted is to provide a warning in good time, even at the risk of a false alarm.

Warnings for coastal flooding caused by storm surge, normally associated with movement of cyclones onto land, are issued by the FMS. Warnings for river and stream flooding caused by high intensity rainfall are issued by FMS and/or PWD. There is a requirement for flood warnings to be as specific as possible indicating villages, settlements and areas at risk, expected flood levels and measures that should be taken.

Risk reduction measures promoted are:

- ⊗ risk assessment and hazard mapping
- ⊗ land use control and flood plain management
- ⊗ reduction of structural vulnerability in buildings and infrastructure
- ⊗ improvements in vegetative cover.

While the team was not able to assess the performance of this system, there was clear evidence in the form of comprehensive reports on each damaging cyclone, that the system is well developed and operational.

### 3.4.2 Institutional Development

**Technology Transfer.** The general level of education and technological knowledge in Fiji is of a relatively high standard. The provision of the radar facilities did not involve the introduction of totally unfamiliar technology to FMS, rather the upgrading of facilities with modern equipment. The basic skills already existed to take on-board the improvements. Upgrading of existing skills was undertaken by training in operational aspects of the radars by the BOM.

Training of CAAF staff in maintenance was undertaken in Australia by BOM. This included maintenance requirements, PC systems and communications. An additional course in Fiji covered hand soldering techniques. This training built on the existing technical skills of the participants who had been working with similar technology over a number of years. The maintenance course was originally scheduled for a three-month duration but was shortened to two months prior to implementation. The team understands that the shortened training resulted in a more intensive course and reduction of practical exercises. While all participants passed the examinations, the reduction of practical work may be contributing to the quantity of advice being sought from BOM since commissioning. Radar installation followed the radar maintenance training course in

Australia, providing ideal practical experience for the course participants.

The CAAF has developed inservice training to ensure that the necessary skills are passed on to new members of the technical team. Courses are based on BOM material and are conducted by the CAAF Training Standards Section over 11 to 12 weeks duration. The curriculum comprises class work, practical exercises and work on the radars. Six technicians have so far successfully completed training and have obtained a rating for work on the radars.

**Technology Support.** The Bureau of Meteorology has continued to provide support to FMS and CAAF, both in terms of scheduled adviser visits and advice on as-required basis. The last contractual visit took place in May 1997, marking the end of contractual support provided by the project under AusAID funding. Support since commissioning has been important during the initial phases of operation and maintenance to assist in the establishment and consolidation of necessary skills in the two organisations. Both organisations recognise significant benefits in maintaining technical support in the future.

**The Future.** Fiji is undertaking major public sector reform which will impact on both the CAAF and FMS. There is potential for changes in institutional structures, operational responsibilities and funding mechanisms, including cost recovery. It is important that these institutional issues do not compromise the ability to adequately operate and maintain the radars provided by the project.

### 3.4.3 Economic Impact

Fiji experiences some 10 to 15 tropical cyclones per decade on average, of which 3 to 5 cause major damage. Table 1 summarises the major cyclones since 1987 and the damage caused.

**Table 1: Cyclone Damage Since 1987**

| CYCLONE      | DATE          | DAMAGE, FJD (million) | DAMAGE      |
|--------------|---------------|-----------------------|-------------|
| Martin       | April 1987    | 13.7                  | Moderate    |
| Raja         | December 1987 | 11.5                  | Moderate    |
| Bola         | March 1988    | (a)                   | Severe      |
| Sina         | November 1990 | 32.8                  | Moderate    |
| Fran         | March 1992    | (a)                   | Moderate    |
| Joni         | December 1992 | 1.7                   | Moderate    |
| Kina         | January 1993  | 181.3                 | Very Severe |
| Tomas        | March 1993    | (a)                   | Moderate    |
| Gavin        | March 1997    | 34.0                  | Moderate    |
| <i>Total</i> |               | <i>275.0 (b)</i>      |             |

Source: NDMO

(a) Damage was not assessed in these years

(b) Converted to 1997 dollars

The annual average cost of cyclone damage is in the order of FJD27.5 million based on this data.

In the 57 years since 1941, there have been 42 severe weather events; 31 hurricanes, 7 storms and 4 gales, all of which caused damage, often extensive and, in some cases, loss of life. In all, 264 lives have been lost and 19 persons have been declared missing presumed dead. The cost of damage to homes, buildings, infrastructure and crops has been enormous.

The rationale for the project is predicated on the expectation that providing more reliable information on the track and intensity of a cyclone results in reductions in losses and damage. Casualties should also be reduced. While there are no estimates of the average annual cost of damage and loss that could be avoided by the use of the radars, the amount is considered to be substantial.

The main benefits of the project derive from:

- ⊗ early warning of severe weather events such as tropical cyclones and associated flooding
- ⊗ specialised weather forecasting for civil aviation
- ⊗ general forecasting for the public.

**Tropical Cyclones.** The benefits of being able to track accurately the path of a cyclone in real time within a radius of about 250 km of

Nadi/Nausori can be realised through the precautions that can be taken to minimise damage and avoid losses.

While information on the position, intensity, speed and direction of cyclones is made available by the FMS, the follow-up action is the responsibility of the Disaster Management Council and related bodies. During an emergency, a well established organisational structure comes into operation based on the operations of the NDMC.

Special Weather Bulletins (SWB) are issued once tropical cyclone status is confirmed. When the cyclone comes within radar range, SWBs are issued at closer intervals and become much more specific as to the locations most at risk. The cyclone is kept under constant surveillance. Radar tracking is sufficiently accurate to pinpoint immediately any deviations in speed and/or direction providing NDMO with three-hourly updates of expected developments. The amount of notice that can be given of the onset of destructive winds and flooding depends on the behaviour of the cyclone but the period can exceed 24 hours. CAAF determine whether or not to close airports and advice is provided to international aviation and shipping. Navigational aids are switched off and protected. People in low-lying areas can be advised to move to higher ground or to evacuation centres. Farmers can be advised to move livestock to higher ground, schools can be closed and ferry services cancelled. Weather bulletins advise people to take precautions around houses. In short, if accurate tracking is available, there is much that can be done to avoid damage and losses and to prevent casualties.

Apart from the economic costs, there are far reaching social costs. Cyclone damage is an inherent part of life in Fiji. Many houses are severely damaged. Those in rural areas and poorer urban areas are often not insured. It is difficult to value social losses in economic terms. However, it is clear that the combined annual value of social and economic losses due to cyclones would be very considerable.

There is significant potential for the joint operation of the two radars to reduce both economic and social losses by virtue of their greater combined range and higher performance over that of the previous Cossor unit. While there are no data on the extent to which economic losses can be reduced, it is possible to speculate on some aspects. For example, grounding of all shipping and aircraft in threatened areas should reduce casualties. Moving people and livestock out of low-lying areas under threat can further reduce

casualties and losses. While little can be done to protect crops, useful precautions can be taken to safeguard housing and other buildings.

If it can be assumed that the losses over the past 10 years could have been reduced by as little as two percent, the annual economic benefit would be about FJD0.55 million without taking account of lives that might be saved. Even with this very conservative assumption of damage reduction, the economic benefit would begin to exceed project costs in 5 years. It is evident, therefore, that longterm benefits of the radars are likely to far outweigh their costs.

**Civil Aviation.** Radar intelligence is used by all civil aviation using Nadi and Nausori airports. The radars provide an immediate picture of rain density formations that can influence flight paths. This is also valuable to the tourist industry for planning helicopter and scenic flights.

**General Forecasting.** Radar helps meet widespread public demand for weather forecasting services, particularly rainfall.

### 3.4.4 Environmental Impact

This project is considered to have a neutral impact on the environment. The radars are located in towers at approximately 15 m above ground level on relatively flat topography so as to protect nearby residents from the harmful effects of radiation, which is projected horizontally from the radar for up to 200 m. The design of the radars and housings are in accordance with standards practiced in Australia.

### 3.4.5 Social and Gender

The GOF has in place an equal employment opportunity policy. This policy applies to all government departments and is also encouraged in the private sector.

In the FMS and CAAF, the proportion of women is about 20 to 25 per cent which is around average for government departments. This project had little opportunity to specifically target women as the training and skills transfer was restricted to existing staff working on the old Cossor radar. These were forecasting and technical staff. During project implementation, FMS had one woman and seven men in forecasting whilst CAAF technical section had six men. Overseas training opportunities through this project were taken by five men.

The wider social benefits to Fiji of this project are enormous. Women and men benefit equally from early and accurate cyclone warning. In terms of social and economic losses avoided through better cyclone preparedness, this project is likely to have a major longterm impact on the welfare of women, children and men in Fiji.

### **3.4.6 Occupational Health and Safety**

It is considered that the occupational health and safety of personnel using the two radars has improved. The new radars are modern and create less physical stress (such as eye stress) during their use than when the Cossor radar was in service. The radar housing structures have been well designed. However there are concerns related to the structural integrity of the operations buildings at the Nadi radar because of the poor standard of construction. FMS personnel have doubts about its performance during earthquakes.

## **3.5 Sustainability**

### **3.5.1 Institutional**

Current arrangements for operation and maintenance have been working reasonably well to date but the division of roles between the two organisations is inefficient. This is soon to be resolved when FMS takes over responsibility for maintenance of the radars from CAAF. FMS has already established a technical section for this purpose and is in the process of recruiting staff. However, the current expertise in radar maintenance resides with CAAF and so FMS will have to initiate appropriate training for its new staff. Care will be needed during the transition phase and some input from the experienced CAAF staff may be required, particularly considering the lack of FMS staff at Nausori and the part-time input required for radar maintenance.

The process of institutional change may lead to more efficient mechanisms for spare parts procurement. Improvements are required in order to minimise radar outages.

In any case, ongoing training and support from BOM is highly desirable to ensure that operation and maintenance is carried out to best international practice. There is scope for a formal arrangement for this, which may be easier to establish with corporatisation. This was identified during project implementation but has not yet been implemented.

The current level of funding available for radar operation is inadequate and this will result in an increase in the periods of time for which radars will become unserviceable. The radars are a vital tool for disaster preparedness. It would be most unfortunate if they were not functioning during a cyclone event.

### **3.5.2 Resources**

It is important that the level of skills utilised in operating and maintaining the radars be maintained or enhanced. Since project commissioning, BOM has addressed this issue, but funding for the project has now ended. It is important that the Fijian radar staff continue to have access to technical support from BOM to maintain their expertise. This will ensure that the radars can be utilised in the most effective manner.

New technical staff will need training. Training will also be required when changes in staff are necessary due to promotions, changes in roles, loss of staff to other employment (including options overseas), and when the FMS takes on responsibility for equipment maintenance.

### **3.5.3 Technical Issues**

A number of technical issues need addressing to ensure that the radars' performance is sustainable. First, the timely availability of spare parts must be improved. Fiji cannot afford to be without its radars, particularly during the cyclone season. Second, it is recognised that the mains power supply to the Nausori radar is not reliable and that there will be a need to rely on the standby generator for the foreseeable future. The FEA indicated that there are no plans to upgrade this power line. Care must therefore be taken to ensure that the standby equipment, including switching mechanisms, is always in working order. Third, it is vitally important to keep learning about the systems. The CAAF takes a responsible approach towards the updating of technical maintenance manuals, both from its own experience and that obtained from other users such as BOM. This must continue.

## **3.6 Key Issues and Lessons Learned**

### **3.6.1 Conclusions**

The FMRP has proved to be an excellent development project with enormous potential social and economic benefits. It was a

technology transfer and skills upgrading project. All persons interviewed during the field mission strongly supported the project.

The project succeeded in meeting all of its objectives. The utilisation of the radars is expected to improve cyclone warning and national preparedness. The potential social and economic benefits are huge and achievable. Although a formal benefit-cost analysis was not possible because of difficulty in quantifying longterm social and economic benefits, assuming even a small incremental net benefit annually through potential losses averted could reasonably be expected to generate a highly favourable benefit-cost ratio. The project was a sound investment by Australia and Fiji.

### 3.6.2 Key Issues and Lessons Learned

**Technology Transfer.** A strong positive lesson learned is that there are benefits in having a simple project design and implementation plan for targeting a very specific need in a technical area. The project was very relevant, highly sought by Fiji, the technical knowledge base of the trainees was relevant and had the potential to be quickly upgraded, the equipment was appropriate and the project activities were successfully integrated with the day-to-day activities of the FMS and CAAF. These factors contributed to the reduction of project risk, increased sustainability, and provided the conditions for positive longterm development impact.

**Institutional Cooperation.** Institutional cooperation between recipient government agencies is one of the prerequisites for successful projects. The achievement of the project's goal required close cooperation between the FMS (responsible for weather forecasting, including cyclone warning) and CAAF (responsible for providing aviation data). Throughout project implementation and to date there has been good cooperation between the two agencies.

However, both agencies fear that this type and level of cooperation, often at personal level which is common in the South Pacific, is likely to be threatened by the forthcoming plans to corporatise each agency under the public service reforms. Presently, the radars are maintained by CAAF but are owned by FMS. The corporate strategy requires FMS to maintain its own equipment. There is a perceived risk by the CAAF that such corporatisation and the inherent cost cutting plans may compromise some aspects of aviation safety.

**International Networking.** The role of BOM was crucial during implementation of the project. BOM has played a significant role in providing technical support to both the FMS and CAAF since

commissioning. While most development projects aim for complete localisation after project completion, this project has and will continue to derive significant benefit from international support, principally from BOM, due to the nature of the equipment provided and the vital international functions derived from radar utilisation.



# Vila Primary Schools and USP Sub-Centre Project

# Abbreviations

|      |   |
|------|---|
| AMC  | Australian Managing Contractor                    |
| DOE  | Department of Education                           |
| GOA  | Government of Australia                           |
| GOV  | Government of Vanuatu                             |
| GTC  | Government Training Centre                        |
| INTV | Vanuatu National Institute of Technical Education |
| MOE  | Ministry of Education                             |
| NPO  | National Planning Office                          |
| PDD  | Project Design Document                           |
| PEO  | Provincial Education Office                       |
| PID  | Project Implementation Document                   |
| PCR  | Project Completion Report                         |
| SMEC | Snowy Mountains Engineering Corporation           |
| USP  | University of the South Pacific                   |

# Basic Project Data

|                             |  |
|-----------------------------|--|
| <b>Project Name:</b>        | Vanuatu: Vila Primary Schools and USP Sub-Centre Project |
| <b>Executing Agency:</b>    | Department of Education/ USP/ Government Training Centre |
| <b>Managing Contractor:</b> | Snowy Mountains Engineering Corporation                  |

|  | Planned                     | Actual |
|--|-----------------------------|--------|
| <b>Technical Assistance</b><br>(Person months) |                             |        |
| Long term advisers                             | 58 months                   | n/a    |
| Design team                                    | 7 months                    | n/a    |
| <i>Total</i>                                   | <i>65 months</i>            |        |
| <b>Project Costs</b>                           |                             |        |
| AusAID   | AUD8,196,000                | n/a    |
| GOV  | n/a                         | n/a    |
| <i>Total project costs</i>                     |                             |        |
| <b>Key Dates</b>                               |                             |        |
| AusAID Feasibility Study                       | April 1992<br>November 1992 |        |
| Appraisal                                      | October 1993                |        |
| Contract Award                                 | May 1994                    |        |
| Effective Completion                           | August 1996                 |        |
| Project Completion Report                      | December 1997               |        |

Note: PCR not yet submitted.

## 4.1 Summary

**Objectives and Scope.** The goals of the Vila Primary Schools and USP Sub-Centre Project were:

-  For the Vila Schools, the goal was to increase the availability of primary school facilities in the urban area of Port Vila and so to increase the literacy level of children.
-  For the USP Sub-Centre Santo, the goal was provision of new and consolidated physical facilities in Santo to provide extension programs and vocational and further education opportunities for the northern region.
-  For the Government Training Centre, the goal was to provide more appropriate training facilities.

For the implementation contract, the three sub-projects were integrated into a single project which had the following four components: design and document preparation, facilities construction, training and equipment, and project management.

**Implementation.** The four components of the contract were completed satisfactorily by the managing agent. When the draft PCR is submitted to AusAID by the AMC, the last contractual requirement will have been met and the project completed.

Three primary schools were upgraded at Vila North, Anabrou and Ecole Centre Ville (formerly known as Ecole Publique). A new primary school was provided at Fres Wota on a greenfield site to provide primary education facilities for a new developmental area. In total, 32 new classrooms were provided and some existing classrooms were refurbished.

Major construction was undertaken at USP Sub-Centre, at Santo to provide an integrated complex of core academic and service buildings. These included a library, general office, satellite tutorial room, computer room, three lecture rooms, a toilet block, covered assembly area, and a central breezeway between the library and the service components.

Refurbishment of the Government Training Centre in Port Vila was also undertaken.

## Conclusions and Key Issues

**Vila Primary Schools.** The facilities provided for the Vila Primary Schools meet the overall goal of providing additional capacity to the primary school system in Port Vila. All facilities provide a greatly improved teaching and learning environment which is of benefit to both teachers and students.

There are concerns at the current level of maintenance of the schools. These relate to shortage of funds and the non-use of the maintenance manual provided by the project.

Four key lessons learned were identified:

- ④ the need for effective consultation during the design process
- ④ appropriate selection of materials and fittings with due regard to maintenance requirements and the availability of spare parts
- ④ the need to consider involvement of national contractors
- ④ the need for a firm commitment to maintenance.

**USP Sub-Centre, Santo.** Overall this sub-project was excellent, the detractions being some small but significant design faults. It is an effective and timely contribution to education and training and provides the best educational resources in northern Vanuatu. The high-pitched roof covering the central complex raised the cost of construction. Any additional construction, even if built to integrate with the initial complex, would be at lower unit costs than this project.

The resources of the USP Sub-Centre are used by students enrolled in vocational and tertiary courses and by the wider community.

Four key lessons learned were identified that may have applicability to other projects:

- ④ consultation processes need to involve all stakeholders effectively
- ④ concentration of investment in key institutions
- ④ a study of comparative costs of options for higher education should be undertaken
- ④ means of funding to support, upgrade or replace critical resources after completion of a project, need to be examined at project design.

**Government Training Centre.** The rehabilitation and refurbishment of the Government Training Centre has provided a dynamic institution with improved capabilities to deliver appropriate training to both the public and private sector. GTC staff believe the project has made a significant contribution to a greatly improved learning environment. Demand for training exceeds supply and options are currently being reviewed to increase utilisation and capacity. The Centre is managed well.

While some of the lessons learned in the two other sub-projects also apply to the GTC, it is clear that relatively small strategic inputs as were provided to the GTC can make a disproportionate difference to the learning environment of an institution, raising the motivation of staff and increasing organisational effectiveness.

## 4.2 Project Description

Education, training and human resource development are fundamental components of the development program pursued by the Government of Vanuatu (GOV) with Government of Australia (GOA) support. Increased access to formal education at all levels

and also to vocational training and continuing education activities remain priorities of this program. Even though primary education in Vanuatu is compulsory, many children cannot enrol for lack of classrooms among other reasons. The literacy level in Vanuatu is one of the lowest in the South Pacific. It was reported in 1995 that literacy in Port Vila is worse than in some rural areas.

### **4.2.1 Rationale**

The GOV is committed to increasing progressively the proportion of children able to enrol in basic education and to improving the quality of education provided. National population growth in 1995 was reported to be of the order of 2.8 per cent pa and somewhat higher in Vila. The primary school age population in Port Vila was, by some estimates, expected to grow at 12 per cent annually in the immediate future, mainly through urban migration. Construction of new primary school classrooms and associated facilities and renovation of existing school buildings were seen as a way of addressing these needs.

The upgrading of the University of the South Pacific (USP) Sub-Centre in Luganville on Espiritu Santo aimed to assist more effective provision of higher education, and technical and vocational training for people in the northern region of Vanuatu. Improvement of these facilities should encourage greater participation by provincial residents and particularly women in these levels of education and training.

In recent years, the GOV has been reviewing the organisation, management and quality of services provided by government departments and agencies. The renovation of buildings and the upgrading of equipment at the Government Training Centre (GTC) in Vila were identified as a key element in the process of human resource development in this area.

### **4.2.2 Formulation**

In 1992, the GOV requested assistance from the GOA for facilities to meet the expected growth rate in the primary school age population in Port Vila. In April 1992, AusAID carried out a pre-feasibility study of the request and identified some concerns including: budget support for the maintenance of facilities to be constructed; the reliability of projected population growth rates; the part new primary schools in Vila might play in urban migration and

issues of social equity; and the GOV capability to furnish personnel and material support for new facilities.

A project appraisal study was completed in 1993. The original requests for new primary schools at Fres Wota and Numbatri and alterations to schools at Anabrou, Vila North and Ecole Publique were assessed. Assistance to upgrade facilities at the USP Sub-Centre at Santo was also proposed for inclusion in the project. Assistance to renovate the Government Training Centre in Port Vila was negotiated and formally added to the project in December 1994. A Project Design Document (PDD) was prepared and, subsequent to the appointment of the Australian Managing Contractor (AMC), a further visit was made to Vanuatu for site survey work and general consultations with relevant authorities.

The project commenced in May 1994 and construction finished in August 1996 when the school at Fres Wota was handed over to the Department of Education (DOE). The building warranty and defects liability period concluded in August 1997. The Project Completion Report (PCR) is scheduled for submission at the end of November 1997 and at the time of this evaluation it was not available.

### 4.2.3 Objectives and Scope

The goals of Vila Primary Schools and USP Sub-Centre Project were:

- ④ For the Vila Schools, the goal was to increase the availability of primary school facilities in the urban area of Port Vila and so to increase the literacy level of children.
- ④ For the GTC, the goal was to provide more appropriate training facilities.
- ④ For the USP Sub-Centre Santo, the goal was provision of new and consolidated physical facilities in Santo to provide extension programs and vocational and further education opportunities for the northern region.

The three sub-projects were integrated into a single project which had the following four components:

- ④ design and document preparation
- ④ facilities construction
- ④ training and equipment

🌐 project management

#### 4.2.4 Project Cost

In the Project Implementation Document (PID) the total cost for the project was estimated to be about AUD8.2 million, with the GOA contributing about AUD7.0 million and the GOV contributing about AUD1.2 million. These amounts may have varied because of exchange rate fluctuations and other factors.

### 4.3 Implementation Performance

The four components of the contract were completed satisfactorily. When the draft PCR is submitted to AusAID by the AMC, the last contractual requirement will have been met and the project completed.

Design options were required to be reviewed and approved by both AusAID and the DOE. While approval was obtained, it is clear that some features of the design have proved to be inappropriate. Detailed consultations with DOE and USP may have improved project design and conferred ownership of the implementation process.

The expertise of local contractors is well developed. New projects, such as the provision of buildings at the Vanuatu Teacher Training College, funded jointly by Australia, New Zealand and France, are being constructed by local firms under the direction of a local architect. The management structure of the Vila Schools project may have been top heavy, with the involvement of a foreign managing agent plus a foreign lead contractor.

All primary school facilities are the responsibility of the DOE. Responsibility for the USP Sub-Centre at Santo is vested in the USP and its governing bodies in Vanuatu. The renovated GTC facilities continue to be managed by the GTC as a unit of the Public Service Commission.

#### 4.3.1 Vila Primary Schools

The need for an increase in the primary school capacity was established during the project design. In addition to achieving this objective, training was provided to improve the capabilities of DOE staff in construction and care of school infrastructure. Training was also provided to the local construction industry through on-the-job training by the building contractor.

Three primary schools were upgraded at:

- ④ Vila North;
- ④ Anabrou; and
- ④ Ecole Centre Ville (formerly known as Ecole Publique).

New primary schools were planned at Fres Wota and Numbatri but that at Numbatri was not included in the project because of land acquisition difficulties. The school at Fres Wota was constructed on a greenfield site to provide primary education facilities for a new developmental area.

A total of 32 new classrooms were provided and some existing classrooms were refurbished. Assembly areas, ablution blocks, absorption pit systems, covered walkways, staff housing, and administration blocks were constructed. Equipment and furniture, and consumables for one year's operation, were also provided at each school.

#### **4.3.2 USP Sub-Centre Santo**

Major construction was undertaken to provide an integrated complex of core academic and service buildings for the Sub-Centre. These included a library, general office, satellite tutorial room, computer room, three lecture rooms, a toilet block, covered assembly area, and a central breezeway between the library and the service components. A high-pitched colourbond roof supported by massive timber poles, covers the central breezeway area.

Renovation was undertaken to convert an existing house, previously an office and teaching space, to a male dormitory. A new female dormitory was built. An amenities block with ablutions and a kitchen/dining room were constructed between the two dormitories.

All works were executed by the contractor according to approved designs and specifications. The construction of the USP Sub-Centre Santo complex is a notable addition to modern buildings in Santo.

#### **4.3.3 Government Training Centre**

Rehabilitation and improvements to buildings at the GTC were completed according to contract. Equipment was also procured and provided. Rehabilitation comprised similar works to those provided for rehabilitation of primary schools. Given that no new structural works took place, the task was relatively straightforward.

### 4.3.4 Organisation and Management

The PID indicated an Australian input of 42 months for the AMC, seven months for the design team for preparation of contract documents, and 16 months for the site superintendent. The contractor was the Snowy Mountains Engineering Corporation (SMEC) in association with Alexander and Lloyd Australia Pty Ltd, Architects.

## 4.4 Impact Assessment

### 4.4.1 Operational Performance

#### Building Suitability

**Vila Primary Schools.** The facilities provided by the project are of a higher quality than those usually constructed by the DOE. Apart from increasing the capacity of the primary schools system, it is generally acknowledged that the provision of these new facilities has improved the quality of the learning environment.

The covered assembly areas represent a significant investment. It could be argued that additional classrooms could have been constructed in place of the covered assembly areas. The DOE, however, believe the provision of the assembly areas is important to the basic school infrastructure and is necessary for events such as meetings, assemblies, drama productions and speech days. It is clear that they are used on a regular basis for these purposes and by the students during recess taking advantage of an environment sheltered from both sun and rain.

The evaluation team noted that a high proportion of construction materials and equipment had been imported. Many of these materials are not available locally, which is unfortunate as local support of materials and equipment is important for longterm sustainability. An example of this is the use of laminated glass classroom louvres and use of high quality door locks. Neither is supported in the local market place and spares are not available.

The addition of fly screens to all windows is an obvious public health benefit but they are very vulnerable to accidental damage mainly through students leaning on them. All of the schools reported damage and difficulties in finding adequate funds for repair. Damage is mainly in the lower parts of the screens, a problem that could be avoided if the standard DOE classroom design was adopted, utilising block work in this area.

Operational staff identified positive aspects of the project during the rapid field evaluation. These included the design and quality of furniture and the provision of much improved ablution facilities. In general, the design of the classrooms and the administration blocks is considered favourably. With the benefit of hindsight and experience, the following issues were identified as examples of areas where improvements could have been made:

- ④ The tinted glass louvres can make the classrooms dark, requiring the use of electric lights; noted at Vila North and Fres Wota.
- ④ There are drainage problems at all three upgraded schools, admittedly during heavy rain. The timely removal of runoff is a problem that can be solved with some basic landscaping and attention to grade. In general, there are adequate falls on all sites to provide effective drainage. The drainage system at Fres Wota has yet to experience heavy rainfall to test the system.
- ④ The design of the ablution blocks incorporates large ventilation gaps at floor level where the waste pipe exits the building, and above the rear toilet walls. These features do not provide adequate privacy.
- ④ Classroom walls have louvres to ground level. When open, the modesty of the female students is threatened. As a result, these louvres are permanently closed, rendering the lower louvres redundant (refer also to the problem of the fly screens discussed above).
- ④ Blackboards are too high for some of the teaching staff.
- ④ Sophisticated locks have been provided on doors and some have broken. Simple, locally available locks would have been more appropriate. This was evident at Anabrou and Fres Wota.

**USP Sub-Centre Santo.** Staff of the USP Sub-Centre expressed great satisfaction with the facilities overall. The new buildings have enabled education and training courses in northern Vanuatu to be expanded and diversified in response to increasing demand. However, several design features have proved to be inappropriate. Two relate to significant volumes of rainwater flooding onto the central breezeway:

- ④ Six sets of corrugated iron flanges fitted at each end of the main roof gable to assist ventilation, trap rain which is driven

by wind into the walkway. Design changes are needed to improve the usefulness of this breezeway.

- ⊗ Rain overshoots the recessed gutters on the interior roof slopes and floods into the central breezeway. Improved design is needed to prevent ingress of water.

Toilet blocks are open to public view at the base of pedestals. One block backs onto an open meeting place. Rough shields have been erected to improve privacy. An additional course of concrete could have resolved this problem.

Tables in the Computer Training Room are inappropriate for instructional activities and waste desktop and floor space. Smaller tables of approximately 600 mm by 2000 mm would have allowed more efficient space utilisation.

**Government Training Centre.** Staff at the GTC regard the improvements very positively. They believe that the improvements significantly enhance the learning environment. Only two aspects were of concern. The wooden verandah gets wet during heavy rain and despite due care and attention, the staff fear that it may soon rot. The drainage from the verandah roof was directed to a soakaway pit provided by the project. The pit proved inadequate and a larger pit has been constructed. These are minor points in an otherwise successful component of the project. The Centre considers the tinted glass in the louvres as appropriate and does not find lecture rooms too dark when they are closed. The maintenance problems experienced with the fly screens in the Vila Primary Schools do not occur at the college mainly because the screens are on conventional windows well above floor level.

## Operation and Maintenance

**Vila Primary Schools.** The responsibility for operation and maintenance of the schools lies with the Provincial Education Offices (PEOs). No information is available on funding for school maintenance for past years or for future years. However, an allocation of Vt3.0 million is available for schools in the Port Vila Municipal Urban Area for 1997. The facilities provided by the project are still new and are experiencing a maintenance holiday. The maintenance requirement will increase over time. The project's maintenance manual was designed to give guidance for emergency, preventative and corrective maintenance. In general, maintenance is requested by school headmasters and those requests are processed by the PEOs. The field evaluation found that:

- ④ The maintenance manual is not being used.
- ④ No preventative maintenance is currently undertaken.
- ④ Requests by headmasters for corrective and emergency maintenance are only partially met because of inadequate funding.

Each school raises local income from student contributions. The amount varies between schools and is fixed by each school committee. Table 1 summarises the contributions requested from students' families.

**Table 1: Student Contributions**

| SCHOOL             | CONTRIBUTION  |
|--------------------|---|
| Vila North         | 6,000 Vt per student per year   |
| Anabrou            | 6,000 Vt per family per year, 2,000 of which specifically for maintenance             |
| Fres Wota          | 6,000 Vt per student per year   |
| Ecole Centre Ville | 4,000 Vt per student per year (1st child)<br>3,200 Vt per student per year (siblings) |

The student contributions represent a significant addition to funds for operation and maintenance of the schools, increasing the amount available by up to 100 per cent in many cases.

Expenditure of student contributions is usually at the discretion of the school committee. Effective use of the money depends on the management capabilities of headmasters and school committees and there are obvious variations between schools. Vila North, for example, budgets for operation and maintenance on an annual basis, making allowance for the wages of two full-time maintenance staff, utilities, transport, and stationery. The planning of maintenance depends on the success in raising contributions, which are voluntary. The school has used these funds to undertake repairs to the sanitation and drainage system. Fres Wota also employs two maintenance and cleaning staff to undertake general, non-specialist duties.

As the responsibility for maintenance rests with the schools themselves, some instruction for headmasters and school committees in preventative and corrective maintenance, based on the maintenance manual, may have been appropriate. Provision of texts on basic procedures in all three Vanuatu languages (English, French

and Bislama) is desirable. This has been done in the concurrent European Union Primary Schools Project.

The following were noted as concerns during the inspection of the schools:

- ⊗ The heavy requirement for painting the concrete block walls.
- ⊗ The unavailability of spare laminated and tinted glass for the louvres.
- ⊗ The regular accidental damage to fly screens.
- ⊗ Unavailability of spare parts for door locks.
- ⊗ The development of cracks in the assembly area floor slabs. These appear to be superficial and probably due to cold joints formed during the placement of the concrete. It was noted that formal construction joints were not provided.

The requirement for painting the walls of facilities provided by the project is in fact less than that for the standard DOE classrooms due to the provision of louvres to ground level.

**USP Sub-Centre, Santo.** Maintenance funds are allocated from the Suva campus of USP. The buildings, gardens and grounds are generally well maintained. Supervision of maintenance and periodic inspection visits are also undertaken by facilities management staff in Suva. Staff at the USP Sub-Centre are unaware of a maintenance plan or maintenance manual.

The fact that the project did not provide any storage facility for maintenance tools and gardening equipment was noted. Failure to have a telephone line installed in the Tutorial Satellite Room has precluded tele-conferences with USP Suva. This contract omission has been reported several times to the contractor and the telephone authority. The continuing lack of this facility inhibits components of effective distance education in the Sub-Centre.

**Government Training Centre.** It was encouraging to see the maintenance manual in the office of the college. The team was advised that the manual is used regularly and that preventative maintenance is undertaken. The computers provided by the project are serviced and repaired by the staff who are largely self taught but evidently competent. An Information Technologist has recently been recruited to assist and will shortly undergo training in Australia. The furniture provided is considered highly appropriate, being flexible enough to accommodate changing classroom layouts for different

functions such as lectures, discussions, work groups etc. The Centre is clearly managed well with a view to taking care of its assets for the long term.

#### 4.4.2 Institutional Development

**Vila Primary Schools.** The provision of additional capacity in the primary school system has helped meet the demand for enrolment. The schools at Vila North and Anabrou are full and demand for places exceeds capacity. The situation at Ecole Centre Ville is contrary to the trend in other Vila schools. This school has experienced a drop in enrolments and two of the new classrooms are not used. The provision of new and upgraded facilities to the school has failed to arrest this trend and there appear to be other overriding factors responsible for falling demand. The new school at Fres Wota is at approximately 80 per cent capacity with expectations of reaching full capacity next year. Table 2 summarises the current enrolments at the four primary schools.

**Table 2: 1997 Enrolment at Project Primary Schools**

| SCHOOL             | 1997 ENROLMENT |
|--------------------|----------------|
| Villa North        | 510            |
| Anabrou            | 324            |
| Fres Wota          | 538            |
| Ecole Centre Ville | 432            |

Total enrolment at primary schools in the Port Vila Municipal Urban Area is currently 2438. Enrolment at the four schools included in the project represents 74 per cent of this total. The team estimates that there is currently a surplus capacity in the four schools of approximately 120 places. More than half of these places will be filled by projected enrolment in 1998.

While this project focused on construction, the provision of high quality facilities and equipment and associated improvement in physical environment has had a positive effect on the quality of education. The headmaster at Vila North has noted improvement in the number of students gaining admission to high school since the new facilities were handed over. He also stated that the improvement in the administration block, principal's office and staff room have had a positive effect on staff morale and hence performance.

Direct human resources development in construction methods and practice was provided by the project, resulting in the production of a maintenance plan. Staff from the DOE were provided with training in the following areas:

- ⊗ contract administration
- ⊗ contract superintendence
- ⊗ construction techniques

While this training was conducted during the project, there is little evidence that it has been applied. The maintenance plan and manual provided to the DOE was not readily available. In addition, there have been staff changes since the project and much of the benefit from training has left the DOE. No ongoing training in the area of maintenance has taken place and no enhancements have been made or documented.

The project construction contractor also provided on-the-job training. It has not been possible to ascertain its benefit although some skills transfer should have occurred, to be used on future projects.

**USP Sub-Centre, Santo.** The facilities act as a catalyst in the use of USP resources. Total enrolments - Preliminary, Foundation, Vocational and Degree - have risen substantially since project completion:

|                   |      |      |      |      |      |
|-------------------|------|------|------|------|------|
| <b>Year:</b>      | 1993 | 1994 | 1995 | 1996 | 1997 |
| <b>Enrolment:</b> | 175  | 134  | 139  | 201  | 247  |

Centre staff is small, comprising a coordinator, secretary, librarian, two cleaners and a groundsman. In 1997, seven tutors, engaged on a sessional basis from the local community, are assisting USP students with their distance education courses. Non-formal education courses which range from computing and basic mechanics to language and cooking classes are offered on demand on a cost-recovery basis using specifically engaged teachers. Enrolments in these courses fluctuate. Totals in recent years were:

|                   |      |      |      |      |      |
|-------------------|------|------|------|------|------|
| <b>Year:</b>      | 1993 | 1994 | 1995 | 1996 | 1997 |
| <b>Enrolment:</b> | 185  | 213  | 62   | 223  | 73   |

Community linkages are formally well established through a USP Sub-Centre Advisory Committee. Another measure of local institutionalisation is the operation of the Centre's library. The previous town library, which opened for one hour on Wednesday

and Saturday, transferred its collection to the new library which is open to the public for a total of 45.5 hours each week. The library of the USP Sub-Centre, with its small collection of 2,800 items, is a vital learning resource serving a range of educational and training activities. In 1997, in addition to its own students, there are more than 700 active borrowers among the community, the majority being primary and secondary school students. The Santo Municipality has not yet provided support for library staffing which was a component of planned community operations.

The renovated male and new female dormitories have not been used for longterm USP students as planned, largely because of the costs and responsibilities involved. Rather, these facilities are frequently used for rural and other island participants in short training courses, such as a recent teacher upgrading program sponsored by the World Bank. The open meeting place facility, intended also for institution-community interaction, has never been used apart from the official opening ceremony. The USP Centre Director in Vila and the local Sub-Centre Coordinator unsuccessfully asked the contractors to enclose the area to provide additional teaching space. This remains a priority request.

### **Government Training Centre**

The provision of much improved facilities at the GTC has significantly lifted staff morale. The staff are proud of their Centre. They claim that their motivation has increased and their performance has improved. The new facilities, aided by flexible furniture arrangements, make it possible to conduct various group learning activities which are highly valued. The provision and equipping of a computer room has enabled the Centre to introduce computing courses, including computing for senior government staff up to departmental head level.

Apart from computing, the range of courses on offer to the public sector has not significantly changed. However, improvements to the Centre have enabled it to offer courses to the private sector on a cost-recovery basis. Demand substantially exceeds the Centre's capacity and as a result the Centre is often open at weekends.

Since completion of the sub-project, GTC staff have conducted annual management and computing courses in provincial centres. The course in Santo is for six weeks and uses facilities of the USP Sub-Centre. Means of further increasing the utilisation of the Centre are under consideration. During the wrap-up meeting at the High

Commission, the GTC Principal Training Officer and the Acting Director of Education discussed the prospect of management programs being offered by the GTC for school principals and other MOE personnel. These could be held at the GTC and in provincial centres.

### 4.4.3 Cost Effectiveness

Both the USP Sub-Centre, Santo and the Vila primary schools are relatively high cost constructions in terms of the number of student places they currently provide. Therefore it is necessary to consider the alternative of using lower cost designs in the interest of creating a larger number of places.

The Project Implementation Document (PID) refers to alternative designs and a process of consultation between the AMC, AusAID, DOE and USP under which the present designs were selected and approved. Staff turnover in DOE has meant that none of the present staff have any recollection of the consultation process. The current Coordinator of the USP Sub-Centre, Santo was in place at the time of project preparation but does not recall a consultative selection process.

On the basis of claims in the PID of an extensive consultation and approval process, the evaluation team assumes that, at the time, all relevant parties were satisfied with the process and the designs, and accepted the cost estimates.

It is relevant, however, to consider the opportunity cost of the selected designs, given that the cost of a standard classroom, designed and constructed locally is about Vt1.6 million (AUD20,000). However, it is not possible to make direct comparisons without a more detailed breakdown of construction methods and materials, and construction costs. For example, the cost of a single new project class room cannot be separated out from the total cost of project works at a particular school. These works include other structures such as ablution blocks and assembly areas, paving and drainage. Nevertheless, it is evident that project classrooms are substantially more costly than locally constructed ones. At Vila North Primary School, for example, if the five classrooms can be assumed to comprise 40 per cent of the total construction cost of AUD820,000, then the cost of each class room would be AUD65,600 or about three times the cost of a locally built class room. Alternatively, at least one, if not two additional local standard classrooms could have been built for a similar cost.

It should be noted, however, that the project schools are built to higher but not excessive specifications, and therefore can reasonably be expected to have a longer life and lower maintenance costs than standard buildings. Direct comparisons are difficult because the standard of construction of the locally built classrooms is unknown. Vanuatu does not license builders nor require building inspections. It is clear, however, that the Vila Schools were not designed with maximisation of the number of student places as the overriding criterion. The project objectives refer to “increasing the sustainable education capacity...” implying that the future maintenance cost was also a criterion. The resulting structures are a compromise between these criteria with the balance leaning towards durability.

At the USP Sub-Centre, Santo, it has been observed that the main building is more elaborate than necessary to provide the required amount of associated lecture room accommodation. The view of the evaluation team is, however, that the new central building will form the nucleus of an expanding campus to serve an increasing enrolment over the next few years, as outlined in Section 4.4.4 below. Given the likely future demand for places in this institution, the design is considered to be appropriate with the exception of some minor aspects discussed in Section 4.4.1.

#### **4.4.4 Future Requirement for Student Places**

Efforts were made to obtain current demographic data, particularly those relating to projections for the primary school population in Port Vila. The PID indicates an expected growth rate in the primary school age population in Vila of 12 per cent per year. No source for this figure was given or could be substantiated in inquiries of the National Planning Office (NPO) or Ministry of Education (MOE) officials. The last census was conducted in 1989 and the next should be held in 1999. The national growth rate for the primary school age population is reportedly 4.5 per cent per year. Based on enrolment demand, headmasters of Port Vila primary schools estimate the growth rate in demand for school places in Vila to be of the order of 8 and 10 per cent annually through a mix of natural increase, urban migration, and closure of some facilities through land and other disputes.

Both Vanuatu and Port Vila have a continuing unmet demand for school places and concomitant need to obtain the greatest number of places from any construction expenditure. For any future construction, it will be important to consider the efficiency of building design. Another approach, appropriate to city locations like

Vila, is to examine whether two school shifts each day would utilise existing classrooms and other capital investment more efficiently. This approach has been used in many countries experiencing a demographic bulge in school age population. It invariably requires inservice and pre-service teacher upgrading programs to sustain quality.

Demand for services provided through the USP Sub-Centre is already expanding rapidly. Changing patterns of education at the secondary level indicate that larger numbers of students are likely to be seeking some kind of post-secondary education. There is also the expanding community service role actively discharged by the library. In these circumstances, the team believes that the standard of building is acceptable and that any additional teaching facilities will be built at a lower unit cost than those in the initial integrated construction.

#### 4.4.5 Environmental Impact

**Vila Primary Schools.** The project was expected to have a net positive effect on the environment. Improvements were expected in the areas of sanitation, drainage and landscaping.

The provision of much improved sanitation facilities has reduced the risk to public health significantly. The facilities seem in good order and appear to be cleaned regularly. None of the schools reported the need to desludge the tanks since construction but pump-outs are easy to arrange, provided funds are available.

Site development at the four schools was designed to retain existing trees where possible. This was achieved in most cases and some active tree planting is now occurring at the schools to provide a softer environment.

Some of the landscaping, however, has resulted in flatter areas which hold water during heavy rainfall. There are locations from which there are no discharge routes and water collects until it either evaporates or seeps into the ground. These occur at the assembly area at Vila North and Anabrou Primary Schools. Minor additional grading is required to improve this situation so that floodways are established. It has to be remembered that this is not large-scale flooding but it is unnecessary and inconvenient.

**USP Sub-Centre, Santo.** The sub-project has no apparent negative environmental consequences. As an integrated complex with landscaped site works and carefully tended gardens, it makes a

positive contribution to the municipal environment of Santo. Given the real prospect of significant enrolment growth and associated diversification of courses, negotiations should begin to access more land to preserve the present balance between built and other environments.

**Government Training Centre.** The sub-project has no apparent negative environmental consequences.

#### 4.4.6 Social and Gender

**Vila Primary Schools.** By providing additional school places, the project has increased the opportunities for both girls and boys equally. These opportunities are available in both Anglophone and Francophone schools assisted by this project.

**USP Sub-Centre Santo.** There are important social and gender implications arising from the success of the project and its potential. These include high rates of participation by females and rural residents whose access to postsecondary education would otherwise be limited. Without an educational masterplan, there may be difficulty in the GOV, the USP, or any other body in appreciating fully these implications. Enrolments in USP courses at the Sub-Centre in the five years since 1993 total 819 of whom 49 per cent were female. Enrolment in these higher education courses has increased strongly since the project facilities were completed. In 1996, enrolment increased by 45 per cent and in 1997, it increased by 23 per cent.

A factor that has suppressed or deferred the full demand for USP courses in Santo in recent years has been the establishment of three higher secondary schools in the northern region. Enrolments at these three secondary schools, including the higher secondary Grades 11 and 12 and for Matevulu College also Grade 13, total 951 students in 1997 of whom females are 47 per cent. In 1995, a national total of 507 students were enrolled in higher secondary. The NPO advises that about 90 scholarships are available annually for Ni-Vanuatu to study overseas at the postsecondary level. Not all graduates of higher secondary schools will proceed directly to university level studies. But it is evident that a vastly increased number of students in the northern islands will seek enrolment in courses at the USP Sub-Centre Santo in the next few years. It can be expected that the representation of women will be equal or higher than it has been since 1993.

The project has helped to meet and also to create a demand for postsecondary education and training in northern Vanuatu. For families who wish their children, and in particular their daughters, not to go to Vila or overseas for higher education studies immediately after completing high school, the USP Sub-Centre Santo represents a viable alternative.

**Government Training Centre.** A disaggregation of course participants by gender was not available. In November 1997, four of the total of eleven GTC staff or 36 per cent were female.

#### 4.4.7 Occupational Health and Safety

**Vila Primary Schools.** There are no significant occupational health and safety (OHS) issues associated with the provision of the primary school facilities. Public health risks associated with sanitation have been reduced with the provision of septic tank and soil absorption systems. The schools seem aware of the need for septic tank cleaning.

**USP Sub-Centre Santo.** No OHS issues have been identified as resulting from the project. It was reported that during construction, workers involved in raising the massive poles to hold roof trusses may have been placed under physical stress and even danger because no suitable crane was available on Santo. Criteria for design and quantities specification should consider these issues which are common in provincial and rural locations.

**Government Training Centre.** No OHS issues have been identified as resulting from the project.

### 4.5 Sustainability

**Vila Primary Schools.** The primary schools have been provided with high quality buildings, furnishings and equipment. These will need to be cared for according to the maintenance plan and manual. It is a concern that these documents are not yet part of the day-to-day operation of the schools. Without maintenance, the condition and function of the facilities will decline once the initial maintenance holiday comes to an end. It is essential that the maintenance plan and manual are used to ensure that the facilities provided stand the test of time and serve the DOE for many years to come. Their importance and use must be stressed. Given this situation, it is highly probable that further training in maintenance will be required. This is now a GOV/DOE responsibility but it should be

recognised that Australia's investment in the education sector is at risk.

Related to the above is the financial commitment of DOE to maintenance of all of its school infrastructure. While no information is available on recurrent costs, it would seem that increased funding for school maintenance is required for all schools.

**USP Sub-Centre Santo.** Buildings and fittings have been provided to project specifications and subject to several design shortcomings, operate quite effectively. Spalling concrete possibly indicating dampness in a wall of the male dormitory was one example of the need for repairs. The USP has three decades of experience in the operation of regional centres. A strong beginning has been made in the sustainable use of facilities in accord with project objectives.

**Government Training Centre.** Renovations and alterations in accord with project requirements were completed. With the provision of appropriate furniture, training room fittings, and equipment such as computers, the prospects for responsible management of this sub-project are excellent. The maintenance manual was evident on the desk of the Principal Training Officer. The GTC's commitment to sustaining facilities provided by the project was supported by budget figures showing projected annual increases in the amount allocated to maintenance over the next three years.

## 4.6 Key Issues and Lessons Learned

### 4.6.1 Conclusions

Overall, the project succeeded in meeting most of its objectives.

**Vila Primary Schools.** The facilities provided for the Vila primary schools are of high quality and meet the overall goal of providing additional capacity to the primary school system in Port Vila.

The facilities provide a greatly improved teaching and learning environment which is of benefit to both teachers and students. It is expected that these facilities will help increase the number of primary students graduating to high school.

Some aspects of the design are inappropriate. It is vitally important that the design of infrastructure makes proper allowance for local cultural sensitivities.

There are some concerns regarding the level of maintenance being undertaken. The facilities are currently enjoying a maintenance

holiday, however, and significant maintenance is not expected to be required in the short term. However, preventative maintenance is vital to ensure the design life of the facilities is achieved. There are already difficulties in replacing some door furniture and fittings, which are not available in the local market. It is noted that the maintenance plan and manual are not being used.

Some relatively minor drainage problems are being experienced at the schools. This can be easily corrected with some minor local landscaping.

**USP Sub-Centre, Santo.** Overall this sub-project was excellent, the detractions being some small but significant design faults. It is an effective and timely contribution to education and training and provides the best educational resources in northern Vanuatu. The high pitched roof covering the central complex raised the cost of construction. Any additional construction, even if built to integrate with the initial complex, would be at lower unit costs than this project.

The resources of the USP Sub-Centre are used by students enrolled in vocational and tertiary courses and by the wider community.

The project facilities provide a site for de facto full-time studies for increasing numbers of young people in Santo and the northern islands taking USP courses. Participation of females at almost 50 per cent is notable. This needs to be consolidated in terms of numbers and also by positive interventions to ensure that women students complete their studies.

Use of teaching space for vocational and community education programs on a self-funding basis is exemplary. The viability of the USP Sub-Centre Santo would be increased if it developed further as either a base or a joint provider of educational services for the Vanuatu National Institute of Technical Education (INTV). This could be for upgrading trade instructors and technical teachers or for students engaged in intensive courses for distance or mixed mode education.

**Government Training Centre.** The rehabilitation and refurbishment of the Government Training Centre has provided a dynamic institution with improved capabilities to deliver appropriate training to both the public and private sector. GTC staff believe the project has made a significant contribution to a greatly improved learning environment. Demand for training exceeds supply and

options are currently being reviewed to increase utilisation and capacity. The Centre is managed well.

## 4.6.2 Key Issues and Lessons Learned

**Vila Primary Schools.** Four key lessons have been identified:

- 🌐 **Design Option Consultations.** The design of the Vila Primary Schools appears to have been undertaken with little or no input particularly on optimising design criteria and maximising cost efficiency from the DOE or other stakeholders. While design options and details may have been discussed, reviewed, appraised and approved, the team has not been able to find documentary evidence of this. Given that some inappropriate designs have been adopted and ultimately incorporated into the buildings, cooperation between the designers, the executing agency and school community groups could have been better. It is recommended that improved consultation occurs in the design of future projects of this type.
- 🌐 **Materials and Equipment.** Selection of materials and equipment at the design phase must minimise future maintenance requirements. The high quality of the buildings achieves this goal. However, it is important to use fittings and fixtures that are readily available in the local market place. The importance of this is clearly illustrated by the problems with the door locks provided.
- 🌐 **Local Contractor Capabilities.** The project was undertaken by an AMC, with construction work managed by an international contractor selected through an established competitive bidding process. Careful consideration should be given to increased involvement of the local construction industry, which has some of the required skills to undertake construction and rehabilitation work. There are several advantages to this approach. First, there is an opportunity to build on those skills, in technical capabilities and in construction planning and management, under the direct supervision of the AMC. Second, there should be a reduction in the overall project costs with the smaller foreign input associated with the use of local labour. Third, it is possible that with increased local involvement of this nature, coordination and cooperation with stakeholders would improve with the potential to avoid culturally sensitive design errors. However, it

is clear that an increase in the level of supervision would be required to ensure that the full benefits of the design minimising future maintenance would be realised. The AMC could provide training in construction management and techniques throughout the construction contract period. Careful contract packaging would be required to target local contractors' capabilities. The team believes that skills in the local industry are increasing. However, at the time this project was undertaken, the local industry was probably not able to provide major inputs.

- ⊗
**Maintenance.** Infrastructure in Port Vila exists within a high maintenance environment. This was clearly recognised during the project design and implementation phase and the buildings provided will significantly assist in minimising maintenance. However, maintenance is required on a regular basis to ensure that the investment made in infrastructure stands the test of time. The project prepared comprehensive maintenance manuals and training was provided to relevant DOE staff in the conduct of preventative, corrective and emergency procedures. The manuals are not being used and staff trained during the project have moved to different functions. A binding commitment to effective maintenance funding must be obtained from the recipient Government prior to project implementation.

**USP Sub-Centre, Santo.** Four key lessons are identified that have applicability to other projects in Vanuatu and comparable countries:

- ⊗
**Consultative Procedures.** Formal consultative procedures should be implemented at critical points in the project cycle such as at project design and mid-term reviews. These procedures could include consultation at several levels including government to government, implementing agencies, line ministry and some form of users consultative group.
- ⊗
**Concentration of Investment in Key Institutions.** For major capital investment projects in postsecondary education, there should be a rigorous analysis to examine whether to co-locate a proposed project with existing or planned educational infrastructure. Such an analysis should include capital and recurrent costs, increasing capability to serve different education and training modes of institutions, and the goals of enhanced postsecondary education and community-based lifelong learning. The USP Sub-Centre, Santo presents these

elements by providing resources for a vertical range of education and training activities.

- ④ **Comparative Costs of Higher Education.** A study of comparative costs involved in providing higher education in three locations, home country, donor country, and third country should be undertaken by AusAID. In Vanuatu, such evidence would assist the government in planning of investment in locations such as the USP Sub-Centres in Santo and Tanna.
- ④ **Funding Critical Operations.** Means of funding to support, upgrade or replace critical resources after the conclusion of a project, need to be examined in project design. Legal and social factors affecting each project should be scrutinised to identify sources of support. At the USP Sub-Centre, Santo, for example, the library collection of 2,800 items will rapidly deteriorate, particularly in the case of materials borrowed by school age children. Funding for acquisitions on a regular basis, even if small and from several sources, is imperative. Efforts should also be made to have the Santo Municipality provide the staffing support reportedly committed to the joint library venture.

### **Government Training Centre.**

- ④ **Small Strategic Inputs.** Relatively small strategic inputs can make a disproportionate difference to the learning environment of an institution, raising the motivation of staff and increasing organisational effectiveness.



# **Vanuatu Cocoa Development Project - Phase II**

# Abbreviations

|       |   |
|-------|---|
| ADB   | Asian Development Bank  |
| AEO   | Agricultural Extension Officer  |
| AES   | Agricultural Extension Service  |
| AFA   | Agricultural Field Assistant  |
| AFSP  | Australian Foundation for the South Pacific   |
| AMC   | Australian Managing Contractor  |
| CDA   | Community Development Approach  |
| CDS   | Community Development Specialist  |
| CIRAD | Centre de Cooperation Internationale en Recherche Agronomique Pour le Developpement |
| DAH   | Department of Agriculture and Horticulture  |
| EIRR  | Economic Internal Rate of Return  |
| FSP   | Foundation for the Peoples of the South Pacific                                     |
| GOA   | Government of Australia   |
| GOV   | Government of Vanuatu   |
| MOU   | Memorandum of Understanding   |
| NGO   | Non Government Organisation   |
| PAEO  | Principal Agricultural Extension Officer  |
| PDD   | Project Design Document   |
| PID   | Project Implementation Document   |
| VARTC | Vanuatu Agricultural Research and Training Centre                                   |
| VCMB  | Vanuatu Commodities Marketing Board   |

# Basic Project Data

|                             |  |
|-----------------------------|--|
| <b>Project Name:</b>        | Vanuatu Cocoa Development Project,<br>Phase II |
| <b>Executing Agency:</b>    | Department of Agriculture and<br>Horticulture  |
| <b>Managing Contractor:</b> | MACAV Pty Ltd                                  |

|                                  | Planned       | Actual       |
|----------------------------------|---------------|--------------|
| <b>Technical Assistance</b>      |               |              |
| Long term advisers (pers. mths)  | 24            | 31           |
| Short term advisers (pers. mths) | 23            | 26           |
| <i>Total</i>                     | <i>47</i>     | <i>57</i>    |
| <b>Project Costs</b>             |               |              |
| AusAID (AUD'000)                 | 1,080         | 1,320        |
| GOV (AUD'000)                    | 259           | 259*         |
| <i>Total project costs</i>       | <i>1,339</i>  | <i>1,579</i> |
| <b>Key Dates</b>                 |               |              |
| Project Request                  | March 1991    |              |
| Project Design Document          | July 1991     |              |
| Project Award                    | March 1992    |              |
| Mid-term Review                  | July 1993     |              |
| Project Extension                | Jan-June 1995 |              |
| Actual Completion                | June 1995     |              |

Source: PCR dated June 1995

\* to be confirmed

## 5.1 Summary

**Objectives and Scope.** The project was designed to address a serious shortfall in the quality of cocoa exports. It built on ground work laid by the 1979 UNDP/FAO Cocoa Development Project and the AusAID Cocoa Development Project, Phase I. It forms part of the Government of Vanuatu's (GOV) strategy to increase export earnings through improvements in cocoa quality. The goal of the project was to contribute to economic self reliance by increasing the value of Vanuatu's exports through improved quality of smallholder cocoa produced under sustainable production systems. The target was to improve export cocoa quality from 20 per cent Grade 1 at the start of the project to 60 per cent Grade 1 by year four.

The project's five components aimed to: improve extension effectiveness, optimise production systems, improve processing

capability; improve cocoa marketing and provide efficient and effective management. The Department of Agriculture and Horticulture (DAH) was the implementing agent for the Government of Vanuatu. The Australian Managing Contractor was MACAV Pty Ltd.

**Implementation.** Project implementation was delayed on three accounts. Early in project implementation, there was a delay in finalising cocoa processing techniques to be promoted by the project. Secondly, the time required to obtain grower participation through the community development approach had been underestimated in the project design. Thirdly, a public service strike resulted in dismissal of most of the project's DAH staff and delayed implementation for seven months from June 1994 to December 1994. Some staff were gradually re-employed but all positions were not filled. The Mid-Term Review in July 1993 found that "the project was up to a year behind schedule in some activities" but concluded that the design remained valid. With some modifications, the project was completed on time and within budget.

**Conclusions and Key Issues.** The project largely achieved its goal of increasing the value of Vanuatu's exports through improved quality of smallholder cocoa. Overall, most of the projects objectives were achieved. Moderate incremental benefits were obtained through the smallholder adoption of cocoa hybrids and by better design and knowledge of the fermentation process. Hybrids have the potential to increase yield by up to 50 per cent while at the same time improving quality by increasing average bean size. Improved fermentation practice has reduced the proportion of "slaty" beans. The combined effect of higher yield and quality has the potential to significantly increase household incomes.

The marketing component was the weakest part of the project. Purchasing practice of Vanuatu Commodities Marketing Board (VCMB) was improved through the introduction of an internationally recognised grading system. However, no action had been taken to establish a purchasing depot on Malekula, required to reduce transport costs and improve smallholder access to price-for-grade marketing and thereby incentives for quality improvement.

The extension component, in particular the Community Development Approach (CDA), has resulted in a more integrated uptake of on-farm cocoa technology. In addition, the CDA has the potential to be adopted and institutionalised throughout the

extension programs of the DAH. The potential longterm social and gender benefits of CDA are enormous.

## 5.2 Project Description

Cocoa is an important cash crop in lowland parts of Malekula, Espiritu Santo, Malo, Ambae and Maewo Islands of central north Vanuatu. All cocoa production is exported. Copra, cocoa and beef account for 95 per cent of Vanuatu's total exports and approximately 20 per cent of GDP. Seventy per cent of Vanuatu's cocoa is produced by smallholders.

Over the past decade, production has fluctuated, mainly on account of drought in 1992, 1994, 1995 and 1996, and because of uncertainties affecting the future of the large Government owned cocoa plantation on Malekula ( Metenesel). The overall production trend, however has remained relatively flat. Estimated production in 1997 is 2,130 t.

### 5.2.1 Rationale

This project was built on the ground work laid by the 1979 UNDP/FAO Cocoa Development Project and the 1983 AusAID Cocoa Development Project, Phase I. It is part of the GOV strategy to increase export earnings. Cocoa was selected as having potential for increasing export revenue through increases in both quality and quantity. Cocoa quality had been falling and its marketing needed to be improved. The Agricultural Extension Service (AES) had received assistance through the ADB-funded Agricultural Extension and Training Project which provided a basis for further institutional development.

Improvement in cocoa quality and marketing, particularly if payment by grade could be introduced, would create potential for significant improvement in smallholder incomes. If cocoa yields were also increased as part of the same process, smallholder incomes would be further improved.

The project design postulated that quality improvement could be achieved by use of hybrid cocoa to increase bean size, and by improved fermentation practices to reduce "slatiness". Use of hybrid cocoa and improved husbandry practices would not only help increase bean size but would also increase yields. Improved extension performance by the DAH would be the catalyst. The Vanuatu Agricultural Research and Training Centre (VARTC) would provide

technical underpinning and be the source of supply for cocoa planting material.

### 5.2.2 Formulation

DAH submitted a request for Australian funding in early 1986. Following this request, AusAID undertook a feasibility study, including a review of earlier support programs to the cocoa industry. The resulting document was accepted by both governments during 1988. In the interim, the low quality of Vanuatu cocoa had come to be recognised as a more serious issue than the expansion of production. DAH prepared a revised request which it submitted in March 1991.

A Project Design Document (PDD) was prepared by AusAID in July 1991. In January 1992, the terms of reference for the project were amended to provide additional emphasis to community participation and inclusion of an additional position of Community Development Specialist (CDS). The project commenced in March 1992. A Project Implementation Document (PID) was completed in October 1992.

### 5.2.3 Objectives and Scope

The goal of the project was to contribute to economic self reliance of Vanuatu by increasing the value of exports through improved quality of smallholder cocoa produced under sustainable production systems. Accordingly, the project adopted a target for increasing the quality of cocoa exports from 20 per cent Grade 1 at the start of the project to 60 per cent Grade 1 by year four.

### 5.2.4 Project Components

- Improved Extension Effectiveness.** This component focused on the development of an extension strategy and program to be incorporated into annual AES plans, development of extension materials for cocoa husbandry and processing techniques, training of extension staff and development of a data base of producers and processors.
- Optimal Production Systems.** Key elements of this component included development of recommendations for cocoa planting material and husbandry practices, preparation of a strategy for multiplication of recommended planting material, and strengthening of the linkages between DAH and VARTC. Additional on-farm trials were planned for testing planting material bred specifically to meet smallholder requirements.

- ④ **Improved Processing Capability.** This component comprised development of effective linkages between DAH, farmer interest groups, cooperatives, financing institutions and the private sector; improved extension recommendations for cocoa fermentation and drying; enhancing the skills of DAH and NGO field staff in cocoa fermenting and drying, and in extension methods. A data base of cocoa processing facilities was also planned.
- ④ **Improved Cocoa Marketing.** Under this component the project planned to introduce a grading system which would provide incentives for quality improvement, together with training in the grading system, legislative issues and international marketing for staff of DAH. It was also planned to develop recommendations for improvements to the existing marketing system.
- ④ **Project Management:** The Australian Government engaged MACAV Consultants Pty Ltd to undertake its responsibilities under the Memorandum of Understanding (MOU). MACAV supplied 31 person months of longterm adviser inputs (Cocoa Extension Adviser) and 26 months of short-term adviser inputs.

DAH implemented the project through the AES. It provided a Cocoa Extension Specialist (CES) for 36 months, Agricultural Extension Officer (AEO) inputs of 43 person months, and Agricultural Field Assistant (AFA) inputs of 207 person months. Specialists in various disciplines were provided as required. VARTC had responsibilities in research, information dissemination, development and supply of improved planting material.

The overall direction of the project was the responsibility of the Director of Agriculture, with management responsibility being with the Principal Agricultural Extension Officer (PAEO), who was designated project manager. DAH personnel working on the project occupied in-line positions.

The Australian Foundation for the South Pacific (AFSP) was subcontracted by the AMC to provide a Community Development Specialist (CDS) for the project. The CDS worked through the Foundation for the Peoples of the South Pacific (FSP) in Vanuatu to establish a network of non-government organisations to undertake community development and provide training for AFAs. Networking also involved the Vanuatu National Council of Women, the

Department of Women’s Affairs, the Department of Youth and Sports, and the Vanuatu Rural Development and Training Centres Association.

### 5.2.5 Project Cost

Project costs by component were:

| Component  | GOA<br>(AUD'000) | GOV<br>(AUD'000) |
|--|------------------|------------------|
| Improved Extension Effectiveness                       | 322              | 88               |
| Optimal Production Systems                             | 40               | 38               |
| Strengthening Processing                               | 172              | 37               |
| Improved Marketing                                     | 138              | 48               |
| Project Management                                     | 367              | 48               |
| Additional funds for project extension and other items | 281              | na               |
|  | 1320             | 259+             |

## 5.3 Implementation Performance

### 5.3.1 Implementation Process

The project could not be completed on time because of the public service strike and other delays. The strike lasted for seven months and resulted in the dismissal of most public servants in DAH in November 1993, especially AFAs. Some staff were gradually re-employed after March 1994 but all positions were not filled, especially the key supervisory positions at the regional level. The strike resulted in a suspension of the project from June 1994 to December 1994.

A mid-term review in July 1993 found that “the project was up to a year behind in some activities. The reasons for the delay were identified as indecisiveness over the extension approach and the processing technology to be promoted as recommended practice.” To allow time for experimental work in scaling down established technology to suit smallholders and to provide the necessary training to AFAs, the review recommended a seven months extension. It found that the project design remained valid with some small modifications and recommended additional funding of AUD240,000 to cover the extra time. With these modifications, the project was completed on time and within budget.

### 5.3.2 Achievement of Objectives

The project has largely achieved the goal of increasing the value of Vanuatu's exports through improved quality of smallholder cocoa produced under sustainable production systems. However, the target of increasing export cocoa quality from 20 per cent Grade 1 to 60 per cent Grade 1 by year four, was not fully met. Based on national purchasing statistics from the VCMB, the proportion of cocoa in Grade 1 rose from an average of 20 per cent in 1991, to 32 per cent between 1992 and 1995 before reaching 55 per cent in 1996. Final figures for 1997 are not yet available but on the basis of purchases to the end of October, it appears that the result will be about 49 per cent. Field observations and reports from AFAs suggest that the effort towards quality improvement is continuing and that the target level for quality will be attained.

Associated with the use of cocoa hybrids to improve bean size and hence cocoa quality, it was expected that cocoa yields would increase. While there is not yet evidence of this in VCMB's statistics, there is evidence from field reports by AFAs of optimistic planting intentions for high yielding hybrids that would support this expectation in future.

### 5.3.3 Completion Report

The Project Completion Report was prepared in June 1995. The Report makes the claim that "the project achieved the cocoa quality goal convincingly as the percentages of bags of Grade 1 cocoa delivered to VCMB has almost doubled increasing from 18 per cent to 37 per cent .." Furthermore, "by project completion the slatiness problem had almost been eliminated, and the bean size/weight problem was showing clear signs of reversal in the short term. Production of hybrid planting material, which produces large beans, was successfully tested on smallholder farm trial plots and programs are under way to ensure that in the long term the bean size problem will be eliminated."

The report gives final total costs for the Australian contribution. Final expenditure by the GOV was not made available.

## 5.4 Impact Assessment

### 5.4.1 Operational Performance

**Improved Extension Effectiveness.** Following lengthy deliberation, it was agreed between the AMC and DAH that the CDA should be used for the extension program.

Farmers had not been responding to the traditional top-down extension approach and the quality of cocoa was continuing to decline. The lack of response was attributed to the type of extension being used which had little regard for motivating farmers to make necessary changes. Farmers felt that they could not rely on the level of knowledge of the AFAs. To motivate farmers, it was decided to involve the wider community in problem identification and solving followed by exercises in setting activities and implementation schedules. The procedure conferred a sense of belonging to the cocoa quality improvement activities and committed participants to making the activities work. Once successful trials and demonstrations had been observed by the community, their confidence in the AFAs grew and adoption of their recommendations followed much more readily. Faster than usual adoption rates were obtained from the use of these group techniques.

Under the CDA, farmers also learned to take some responsibility for their own training. Training had been available to them through DAH but had been poorly utilised. As a result of the CDA, the demand for training increased and growers became much more specific about their training needs. Training programs were modified by DAH and became much more relevant.

An important aim of the CDA was the involvement of women and youth in the decision-making processes about cocoa. This aspect of the approach was highly successful.

Plans and schedules of activities from 15 villages were obtained initially and incorporated into the annual extension plans of DAH. This procedure has become institutionalised and continues to be a regular part of DAH planning. DAH has now adopted the CDA as its standard field extension practice, not only for cocoa but for all extension programs. This is a major development for DAH, which is expected to have far-reaching effects on the operation and outcomes of agricultural extension in Vanuatu.

Essentially, all the community groups established under the project are still operating although not all send in annual plans. New groups

have been set up by AFAs. For example, in Malekula seven groups were established under the project and a further five have been established since then, although not all for cocoa. In South Santo, two new CDA groups have been formed since the project was completed. Developments are similar in other areas.

The extension program has been effective in promulgating extension messages on cocoa quality. Extension messages included the use of hybrids and improved management to increase bean size and overall production, and improved fermenting techniques to reduce “slaty” bean. Improved drying methods were also included. Effective use was made of extension materials devised by DAH field staff and imported from PNG. The process of grower training was assisted by holding field days, on-farm trials and development of a gender disaggregated data base.

**Optimal Production Systems.** Linkages between DAH and VARTC (operated under an agreement between the GOV and the Centre de Cooperation Internationale en Recherche Agronomique Pour le Developpement (CIRAD), have been strengthened. VARTC has developed high yielding hybrids which have the potential to increase bean size and improve yields, and are supplying both hybrid seed and seedlings.

There remains, however, a persistent problem in the supply of hybrid planting material. VARTC is the only source. Six months are needed for the supply of seeds and more for the production of seedlings. VARTC claims that its resource is underutilised and DAH counter claims that the slow supply of planting material by VARTC is constraining the planting program of hybrid cocoa. There is evidence from DAH field staff of substantial orders having been placed with VARTC for supplies for their regional nurseries. There is also evidence that farmers are buying seed directly from VARTC and establishing their own nurseries. The discrepancies in these claims need to be addressed by both VARTC and DAH and any outstanding issues resolved.

AFAs provided training to growers in cocoa husbandry practices as a means of both increasing yields and improving bean size.

**Improved Processing Capability.** The overall improvement in the quality of cocoa sold to VCMB provides hard evidence that smallholders and licensed processors have been adopting the project’s fermentation recommendations. The quality target has not

yet been reached. There remains scope for improvement in the proportions of cocoa Grades 1 and 2.

**Improved Cocoa Marketing.** Legislative changes have given VCMB responsibility for grading of cocoa at the point of purchase. Under the project, a grading system providing incentives for quality improvement was successfully introduced together with associated training. In theory, all producers should be able to avail themselves of the premium payable for improved quality. In practice, however, there are still many smallholders who must sell “wet” beans to processors/buyers who pay only Grade 3 rates or less minus the cost of processing. These farmers receive no incentive to improve quality or production. On Malekula, the proportion of farmers in this position is estimated at 20 per cent.

Farmers who live close to transport, licensed processors and other buyers of processed beans (such as ship owners) who deliver direct to VCMB on Espiritu Santo do receive full price for Grade but pay extremely high prices for sea transport. The project identified a need for VCMB to establish a point-of-sale storage facility at Lits Lits on Malekula supported by a grading officer and a grading machine to provide direct pick up by ship. A grading machine on Santo is available for transfer to Malekula. No progress has been made on the other issues.

**Project Management.** DAH managed the project effectively through their Principal Agricultural Extension Officer (PAEO) ( discounting the effects of the strike) and all Australian inputs were delivered successfully. The project was successfully monitored and an effective monitoring system was established.

### 5.4.2 Institutional Development

Any assessment of project outcomes for institutional development must be tempered by the effect of the strike by public servants in 1993-94. This strike, the subsequent dismissal of a large number of DAH personnel, and the reinstatement of only a few strikers diminished the thrust of the project in specific areas. One effect, in the short term, was the suspension of project activities from June to December 1994. Another was to see activities formally supported by DAH extension officers, most of whom were not reappointed, drastically reduced and significantly changed. One such change resulted in a strengthening of the CDA to extension. This positive outcome was both explicitly for cocoa production and also more broadly for farmer and rural development activities. Despite the loss

of experienced personnel, the DAH has benefited through the adoption of a different orientation in extension activities.

A more tangible institutional outcome is the change in legislation affecting responsibility for grading and certification of cocoa beans at the time of local purchase. In 1994, a measure of industry rationalisation occurred when this responsibility passed from the Quarantine Service to the VCMB. Further reform, beyond the objectives of the project, is needed, particularly related to post-harvest storage, transport and marketing. Another development, concurrent with emerging producer demand stimulated by the project, is a shift in emphasis by the VARTC and its principal agency, CIRAD, from pure research to applied research including farm trials and distribution of hybrid plant materials to smallholder cocoa producers.

### 5.4.3 Economic and Financial Impact

The project assumed that:

- ⊗ increased knowledge and skills in target groups and improved planting material would translate into improved quality of cocoa and better returns for producers. As a result of better returns, cocoa production would increase
- ⊗ in the absence of the project, cocoa production would increase by only 2 per cent per year
- ⊗ with the project, cocoa production would increase by 3 per cent per year over and above the rate of growth that would occur without the project, from year 8 onwards.

In an analysis undertaken during the Implementation Study, use of these assumptions yielded an economic internal rate of return (EIRR) of 12 per cent. The present evaluation study, using more recent production, grade and price data, shows that the economic rate of return is now higher at 22 per cent. The increase in the EIRR is due mainly to the higher world price used in this later analysis. The world price increased from USD960 per tonne in 1993 to USD1174 in 1997 in line with longterm trends. VCMB was obtaining spot prices between USD1200 and USD1400 in late 1997. Activities that increase cocoa quality and production represent a very attractive investment from the national viewpoint and will also represent an attractive investment for growers once VCMB begins to pass on the price increases to growers. The decision to do this has not yet been taken by the VCMB Board.

The total value of cocoa production in 1997 is estimated to be AUD3.75 million. At year 10 from the start of the project ( 2001), the additional production attributable to the project would be 560 tonnes per year valued at AUD0.9 million, over and above the production that would have occurred if the project had not taken place.

Individual producers who can sell their cocoa direct to VCMB are already benefiting significantly from the improvement in cocoa quality. Further benefits are expected as the proportion in Grade 1 approaches or exceeds the project design target of 60 per cent.

#### **5.4.4 Environmental Impact**

In general, the project appears to be environmentally neutral. Two environmental audits undertaken during the project confirmed this. Assessment of factors such as effluent from fermentaries, disposal of an increasing volume of shelled pods and leafy matter from early extensive pruning present no hazard or imbalance to soils, water, or animal life and health in farm and village environments. Trials of biological controls against the rose beetle (*Adoretus versutus*) which devastates tree foliage has been adopted by some project participants as an alternative to other or no control measures. In these smallholder trials, perimeter plantings of she-oaks (*Casuarina equisetifolia*) and lobster claw ginger (*Heliconia*) serve as barrier to protect cocoa trees and maintain crop production.

#### **5.4.5 Social and Gender Impact**

One of the most significant outcomes of the project is the CDA. From documentary evidence and from field interviews, the multiplier effect of this approach seems to be growing and to encompass more than a singular concern for cocoa farming. The bottom-up approach to community concerns and development has successfully engaged women and also youth. Evidence includes, for instance: an increase in the participation of women to at least two on each community committee of seven persons; the formation on Malo, of one CDA group during the project and three after the project of which two were formed in 1997; and the formation of two CDA groups in South Santo, both after the end of the project. The potential for this approach is considerable and may be seen as a positive outcome in terms of the overall objectives of the project.

Involvement of women in several aspects of adding-value to cocoa production through improved quality control practices was reported

as a positive outcome of the project. Women have assumed increasing responsibility for the smallholder fermentaries which require some care in monitoring temperatures to achieve optimal results. On Malekula it was reported that women have become adept at sorting cocoa beans in an on-farm grading exercise to remove defective and low grade beans. The general recognition of quality developed by the project with a significant increment between Grade 3 and Grade 1 prices of 60 per cent as an incentive, is being consolidated by female members of cocoa producing households. Wider social benefits of improved quality in cocoa production through consistently higher prices being achieved by smallholders are dependent on further reforms in marketing.

#### **5.4.6 Occupational Health and Safety**

No apparent issues in OHS were reported or noticed. Some incidents may exist, possibly in relation to transport either by small coastal trading vessels not designed specifically to carry one form of cargo or by flag of convenience international freighters. Each such concern is beyond the ambit of the project. In the country's principal cocoa warehouse which was inspected, appropriate use is made of a belt elevator (incidentally imported from Australia by VCMB) for storage of bags to roof height.

### **5.5 Sustainability**

Outcomes indicating sustainability are mixed, generally for reasons outside the project's influence or control. Acceptance by smallholders of new hybrids and their adoption on farm is at a high level and increasing. One moderating factor is the availability of sufficient volume of both hybrid seed and plant material. Enhanced cooperation in this area between the propagation capability of VARTC and the DAH extension services seems much more likely in the future than previously. According to VARTC reports, the high cost of transport from the Centre to dispersed smallholders is an inhibiting factor in more rapid replacement of Amelanado cocoa trees with the heavy bearing hybrid stock. Dissemination of seed rather than seedlings from VARTC and the further establishment by both DAH and individual farmers of greater numbers of seedling nurseries closer to producers will increase plantings of hybrid trees at a faster rate. Planned integration by village farmers of small scale cocoa production with other cash and subsistence crops was seen in site visits. This accords with DAH policies on diversified smallholder farm production and will assist longterm sustainability.

Recognition of quality assurance practices in crop production and fermentation, and an awareness of the premium earned by higher grade beans is widespread. This powerful motivator is mitigated by the base prices often paid at the farm gate by intermediate buyers. A marketing regime that has obvious incentives for smallholders to produce quality cocoa beans is needed for longterm sustainability.

The increasing pervasiveness of the CDA, often initiated by the concerns of cocoa producers is likely to be key factor in sustainability of project outcomes. It is likely that this intervention, which is assisting both rural communities and DAH extension methods, will be seen as one of the outstanding development benefits of this project. The continuing formation of new CDA groups since the project seems to confirm the usefulness of this approach.

Staffing of DAH field and extension services and the slow pace of reform of responsibilities and changes in post-harvest storage, transport and marketing are constraints on the sustainability of smallholder cocoa production.

## 5.6 Key Issues and Lessons Learned

### 5.6.1 Conclusions

Overall, the project succeeded in meeting most of its objectives. The extension component, in particular the CDA, has resulted in a more integrated uptake of on-farm cocoa technology. In addition, the CDA has the potential to be adopted and institutionalised on a wide scale in other crops such as copra and kava. Senior staff of DAH consider CDA as a worthwhile practice and are supportive of its adoption in AES. The longer term social and gender benefits of the CDA are enormous.

Significant incremental benefits have been achieved in cocoa quality through the adoption of hybrids, and by better design and knowledge of the fermentation process. The hybrid cocoa being extended to the farmers has the potential to improve yields by 50 per cent. In addition, the large bean size and a lower proportion of 'slaty' beans makes possible an additional 50 per cent improvement in cocoa gross margins. In combination, the potential improvement in yields and prices means that large numbers of smallholder cocoa farmers are in a position to improve household incomes. The project has successfully demonstrated this potential.

The marketing component was the weakest part of the project. No action was taken to establish a storage facility at Lits Lits, Malekula

supported by a grading officer and a grading machine as proposed in the project.

### 5.6.2 Key Issues and Lessons Learned

**Cocoa Marketing.** Some aspects of marketing continue to limit potential gains in cocoa quality and production. First, there is the clear need to extend the benefits of the grading system to as many of the producers as possible, for incentive purposes as well as for economic efficiency. Second, cost efficiencies should be sought wherever possible in the industry. An outstanding example is the proposal arising from the project that a storage and purchasing point should be established by VCMB on Malekula, the island where most of the industry is located. For this purpose a trained inspector/grader would have to be stationed on Malekula, a storage facility would need to be constructed and a grading machine (in storage at Luganville) installed. Such an establishment would both increase access by smallholders to price-for-grade marketing and create opportunities for lower shipping costs. Establishment costs would need to be weighed against the savings on extremely high cost freight between Malekula and Santo (AUD80/t), as well as the increase in the value of cocoa by bringing the price-for-grade arrangements, currently available in Santo, to Lits Lits.

**Gender Equity.** In the smallholder cocoa industry, early attempts to encourage more equitable sharing of responsibility and benefits between genders were directed towards separating out women and providing them with separate meetings and training organised and run by a woman. This drew criticisms from Government departments for resource wastage and also drew criticisms from both women and men claiming that it stirred up bad feelings. When dealing with women's issues in Vanuatu, communities prefer that women are not separated out from the men. Ways need to be found which include women in the various activities as part of the whole community. Resentment generated by separating the genders can become a serious impediment to the integration of change.

**Community Rate of Change.** This aspect of the project was either underestimated or not adequately understood at the time of project design. Insufficient time was allowed in the project design for the process of change and development in communities. The project design called for some quite profound changes particularly in community decision making and planning.

In the planning of future projects involving community change/development activity schedules, adequate time should be allowed for change to take place. In this project, the additional time recommended by the Mid-Term Review was well invested.

**Role of NGOs.** NGOs often have specialised skills in the handling of community change and development. Their involvement in projects calling for this type of development should generally be a consideration.

### **Ongoing Training for DAH Staff in the Community**

**Development Approach.** The success of the CDA depends on the competency of staff in the techniques for working with farmer groups. New staff coming into the AES need initial training and existing staff can benefit significantly from refresher courses. It is understood that DAH recognise this need. A possible solution which would avoid having to increase the numbers of DAH permanent staff, would be to engage the services of an NGO such as FSP on an as-required basis to provide this training.

The introduction of the CDA, training of staff and the development of good quality extension materials has improved the capacity of DAH to support the industry. The public service strike and its aftermath has, however, adversely affected this capacity putting some of the project outcomes in doubt. Important benefits have been achieved for women through the CDA process creating opportunities for their greater involvement in community decision on cocoa and other matters.

## Appendix A

# Vanuatu Cocoa Development Project - Phase II - Economic Analysis

This analysis seeks to determine whether or not the project continues to represent a sound investment. The analysis first examines the project's assumptions about quality improvement and increases in production.

The project goal placed most emphasis on increasing the economic returns from cocoa through improvements in quality. As quality improvement depends heavily on the use of hybrid cocoa to increase bean size, there is concomitant potential for yield increases. Another factor leading to improved production is project extension messages that stress better cocoa husbandry.

A modified form of economic analysis, based on both quality improvements and yield increases, was undertaken to assess the economic efficiency of the project. The analysis depends not only on improvements in cocoa quality and yield but also on the background environment in which the project took place and subsequently. The key back ground factors are:

- ④ the rate of growth of exports which would have taken place without the project, and
- ④ world cocoa prices which the project predicted would rise. World prices did in fact rise from USD960/tonne in 1993 to an average of about USD1200/tonne in 1997 with spot prices for individual shipments reaching over USD1400/tonne.

These prices have not yet been passed on to growers by VCMB and therefore have not yet provided any production incentive. It is likely, however, that the price increases will soon be passed on and that the effects on cocoa production will be seen in about three years, once

new plantings come into production. In the meantime, there is evidence in the form of seed purchases and nursery establishment that would suggest that existing Amelanado trees are being replaced by hybrids and that some new plantings of hybrids are being made.

This analysis uses actual production figures for 1992 to 1997. The assumptions are that:

- ⊗ The quality of cocoa produced can be raised from 35 per cent Grade 1 and 50 per cent Grade 2 in 1992, to 60 per cent Grade 1 and 25 per cent Grade 2 by year eight. This represents and upgrading of 25 per cent of Grade 2 to Grade 1.
- ⊗ An increase in total production, with the project, by 3 per cent per year over what would have occurred without the project, from year eight onwards.
- ⊗ These increases would occur in a situation of overall cocoa production increasing at the rate of 2 per cent per annum.
- ⊗ The world price would remain constant at USD1174 per tonne in real terms.

There are reasonable grounds for these assumptions. By 1996 the percentage of Grade 1 cocoa in purchases by VCMB at Santo had reached 55 per cent compared with 20 per cent pre-project (1991). Assumptions of production increases are not large. For the without-project scenario, production would reach only 2410 tonnes by year 20, an increase of only 13 per cent on the expected production for 1997. This would result from the incentive effect of the overall price increase and the availability of high yielding hybrids from VARTC. In the with-project scenario, production is projected to increase from 2129 tonnes in 1997 to 4132 tonnes in year 20, an increase of 94 per cent. Under this scenario, there would be an accelerated adoption of high yielding hybrids as growers seek to take advantage of the price-for-grade purchasing now available. Husbandry practices would also improve as a result of the price-for-grade purchasing as bean size (criterion for Grade 1) is partly a function of good husbandry. Improved extension services and improved supply of high yielding planting material will lead to higher yields.

Table 1 shows the derivation of the economic price for cocoa. Table 2 shows cocoa purchasing by VCMB at Santo from 1990 to 1997. Table 3 shows cash flows for project costs, and for the net increase in production with the project, over and above the level of production without the project. Table 4 shows cocoa production and value projections to year 20.

These data result in an EIRR of 22 per cent indicating that the project as implemented can be regarded as a sound investment.

**Table 1: Derivation of the Economic Price for Cocoa**

| COMPONENT   | PRICE PER TONNE, NOVEMBER 1997, (Vt) |
|---|--------------------------------------|
| World cocoa price, US\$ CIF London/tonne -<br>less 5% for lower Vanuatu quality | 1,174<br>1,115                       |
| Converted to Vatu   | 130,490                              |
| Less shrinkage  | 3,915                                |
| Export duty 4%  | 5,220                                |
| Superintendence   | 43                                   |
| Stevedoring   | 2,246                                |
| Agency and bagging  | 7,020                                |
| VCMB administration   | 1,393                                |
| Freight, international  | 20,747                               |
| Insurance   | 384                                  |
| FOB Vanuatu   | 89,679                               |
| Internal shipping   | 7,020                                |
| Road transport  | 4,968                                |
| Shipping to Luganville  | 3,240                                |
| Farm gate price to nation (duty added back)                                     | 77,429                               |

Note: An average price of Vt 77,500 was used for ease of calculation. In the purchasing of cocoa, this price was assumed, on a pro rata basis, to represent:  
 Vt 87,350 for Grade 1  
 Vt 79,226 for Grade 2  
 Vt 54,850 for Grade 3

**Table 2: Cocoa Purchases by VCMB at Santo**

| YEAR              | GRADE 1  |    | GRADE 2   |    | GRADE 3 |    | TOTAL     |
|-------------------|----------|----|-----------|----|---------|----|-----------|
|                   | tonnes   | %  | tonnes    | %  | Tonnes  | %  |           |
| 1990              | 420.405  | 20 | 1,162.956 | 56 | 503.408 | 24 | 2,086.769 |
| 1991              | 431.226  | 20 | 1,105.966 | 52 | 587.468 | 28 | 2,124.66  |
| 1992              | 514.172  | 34 | 778.471   | 51 | 222.286 | 15 | 1,514.929 |
| 1993              | 633.771  | 30 | 1,081.234 | 51 | 402.716 | 19 | 2,117.72  |
| 1994              | 412.617  | 35 | 540.758   | 46 | 217.124 | 19 | 1,170.499 |
| 1995              | 506.941  | 29 | 398.368   | 23 | 832.092 | 48 | 1,737.401 |
| 1996              | 462.629  | 55 | 148.783   | 18 | 233.991 | 27 | 845.403   |
| 1997 <sup>a</sup> | 763.630  | 49 | 582.667   | 38 | 194.419 | 13 | 1,540.716 |
| 1997 <sup>b</sup> | 1053.384 | 49 | 805.282   | 38 | 268.699 | 13 | 2,129.365 |

## Notes:

a. Actual monthly purchases to October 1997

b. Projection based on previous three years.

1. Amounts are actual tonnes of cocoa beans purchased by VCMB Espiritu Santo on a monthly basis totalled for each year.

2. These amounts are not necessarily the same as those exported. After storage, Cocoa is regraded by VCMB just prior to export. Quarantine officers of DAH may also regrade cocoa before export typically downgrading about one per cent of it.

**Table 3: Vanuatu Cocoa Development Project - Cash Flows (Vt million)**

| YEAR | WITHOUT PROJECT VALUE OF PRODUCTION | WITH PROJECT VALUE OF PRODUCTION | INCREMENTAL VALUE OF PRODUCTION DUE TO PROJECT | PROJECT COSTS | NET CASH FLOW |
|------|-------------------------------------|----------------------------------|--|---------------|---------------|
| 1992 | 118.9                               | 118.9                            | 0  | 36.6          | -36.6         |
| 1993 | 163.0                               | 163.0                            | 0  | 39.4          | -39.4         |
| 1994 | 90.9                                | 90.9                             | 0  | 17.6          | -17.6         |
| 1995 | 121.4                               | 121.4                            | 0  | 32.6          | -32.6         |
| 1996 | 65.4                                | 65.0                             | 1.0  |               | -0.4          |
| 1997 | 165.5                               | 170.7                            | 1.9  |               | 5.2           |
| 1998 | 140.1                               | 175.8                            | 35.7   |               | 35.7          |
| 1999 | 142.7                               | 185.0                            | 42.3   |               | 42.3          |
| 2000 | 145.5                               | 194.5                            | 49.0   |               | 49.0          |
| 2001 | 148.5                               | 204.0                            | 55.5   |               | 55.5          |
| 2002 | 151.6                               | 214.2                            | 62.6   |               | 62.6          |
| 2003 | 154.4                               | 225.1                            | 70.7   |               | 70.7          |
| 2004 | 157.7                               | 236.4                            | 78.7   |               | 78.7          |
| 2005 | 160.7                               | 248.2                            | 87.5   |               | 87.5          |
| 2006 | 163.9                               | 260.6                            | 96.7   |               | 96.7          |
| 2007 | 167.3                               | 273.6                            | 106.3  |               | 106.3         |
| 2008 | 170.7                               | 287.3                            | 116.6  |               | 116.6         |
| 2009 | 174.1                               | 301.7                            | 127.6  |               | 127.6         |
| 2010 | 177.6                               | 316.8                            | 139.2  |               | 139.2         |
| 2010 | 181.1                               | 332.6                            | 151.5  |               | 151.5         |

EIRR=22 per cent

Table 4: Cocoa Purchases by Grade and Value

| Year | PRODUCTION WITHOUT PROJECT |         |         | VALUE OF PRODUCTION WITHOUT PROJECT |         |         | TOTAL VALUE | PRODUCTION WITH PROJECT |                 |         | VALUE OF PRODUCTION WITH PROJECT |            |         | TOTAL VALUE |         |
|------|----------------------------|---------|---------|-------------------------------------|---------|---------|-------------|-------------------------|-----------------|---------|----------------------------------|------------|---------|-------------|---------|
|      | thousand tonnes            |         |         | Vt million                          |         |         |             | Vt million              | thousand tonnes |         |                                  | Vt million |         |             |         |
|      | Grade 1                    | Grade 2 | Grade 3 | Grade 1                             | Grade 2 | Grade 3 |             |                         | Grade 1         | Grade 2 | Grade 3                          | Grade 1    | Grade 2 |             | Grade 3 |
| 1992 | 514                        | 778     | 222     | 44.9                                | 61.6    | 12.2    | 118.9       | 514                     | 778             | 222     | 44.9                             | 61.6       | 12.2    | 118.7       |         |
| 1993 | 634                        | 1081    | 402     | 55.4                                | 85.6    | 22.0    | 163.0       | 634                     | 1081            | 402     | 55.4                             | 85.6       | 22.0    | 163.0       |         |
| 1994 | 413                        | 541     | 217     | 36.1                                | 42.9    | 11.9    | 90.9        | 413                     | 541             | 217     | 36.1                             | 42.9       | 11.9    | 90.9        |         |
| 1995 | 507                        | 398     | 832     | 44.3                                | 31.5    | 45.6    | 121.4       | 507                     | 398             | 832     | 44.3                             | 31.5       | 45.6    | 121.4       |         |
| 1996 | a279                       | a414    | a152    | 24.3                                | 32.8    | 8.3     | 65.4        | 462                     | 149             | 234     | 40.4                             | 11.8       | 12.8    | 65.0        |         |
| 1997 | a702                       | a1043   | a383    | 61.3                                | 82.6    | 21.6    | 165.5       | 1055                    | 805             | 269     | 92.1                             | 63.8       | 14.8    | 170.7       |         |
| 1998 | b506                       | b878    | b480    | 44.2                                | 69.6    | 26.3    | 140.1       | 1086                    | 829             | 277     | 94.9                             | 65.7       | 15.2    | 175.8       |         |
| 1999 | 515                        | 895     | 489     | 45.0                                | 70.9    | 26.8    | 142.7       | c1381                   | c575            | c345    | 120.6                            | 45.5       | 18.9    | 185.0       |         |
| 2000 | 526                        | 913     | 499     | 45.9                                | 72.3    | 27.3    | 145.5       | 1450                    | 604             | 362     | 126.7                            | 47.9       | 19.9    | 174.6       |         |
| 2001 | 536                        | 932     | 509     | 46.8                                | 73.8    | 27.9    | 148.5       | 1522                    | 634             | 380     | 132.9                            | 50.2       | 20.8    | 203.9       |         |
| 2002 | 547                        | 950     | 519     | 47.8                                | 75.3    | 28.5    | 151.6       | 1599                    | 666             | 399     | 139.7                            | 52.8       | 21.9    | 214.4       |         |
| 2003 | 558                        | 969     | 529     | 48.7                                | 76.7    | 29.0    | 154.4       | 1679                    | 699             | 419     | 146.7                            | 55.4       | 23.0    | 225.1       |         |
| 2004 | 569                        | 989     | 540     | 49.7                                | 78.4    | 29.6    | 157.7       | 1762                    | 734             | 440     | 153.9                            | 58.2       | 24.1    | 236.2       |         |
| 2005 | 580                        | 1008    | 551     | 50.7                                | 79.8    | 30.2    | 160.7       | 1851                    | 771             | 462     | 161.7                            | 61.1       | 25.3    | 248.1       |         |
| 2006 | 592                        | 1028    | 562     | 51.7                                | 81.4    | 30.8    | 163.9       | 1943                    | 809             | 485     | 169.7                            | 64.1       | 26.6    | 260.4       |         |
| 2007 | 604                        | 1049    | 573     | 52.8                                | 83.1    | 31.4    | 167.3       | 2040                    | 850             | 509     | 178.2                            | 67.3       | 27.9    | 273.4       |         |
| 2008 | 616                        | 1070    | 585     | 53.8                                | 84.8    | 32.1    | 170.7       | 2142                    | 892             | 535     | 187.1                            | 70.7       | 29.3    | 287.1       |         |
| 2009 | 628                        | 1091    | 576     | 54.9                                | 86.4    | 32.7    | 174.1       | 2249                    | 937             | 562     | 196.5                            | 74.2       | 30.8    | 301.5       |         |
| 2010 | 641                        | 1113    | 608     | 56.0                                | 88.2    | 33.3    | 177.6       | 2362                    | 984             | 590     | 206.3                            | 77.9       | 32.4    | 316.6       |         |
| 2011 | 654                        | 1136    | 620     | 57.1                                | 90.0    | 34.0    | 181.1       | 2480                    | 1033            | 619     | 216.6                            | 81.8       | 33.8    | 332.2       |         |

a Derived from actual total purchases for 1996 and estimated total purchases for 1997 but allocated into grades in the proportions occurring from 1992 to 1994 inclusive.

b Production for the years 1998 to 2011 is assumed to increase by 2% per year

c Production for the years 1999 to 2011 is assumed to increase by 3% per year over and above production without-project