

Country Profile

East Timor

November 2006

The Australian Centre for International Agricultural Research (ACIAR) operates as part of Australia's international development cooperation program, with a mission to achieve more productive and sustainable agricultural systems, for the benefit of developing countries and Australia. ACIAR commissions collaborative research between Australian and developing country researchers in areas where Australia has special research competence. It also administers Australia's contribution to the International Agricultural Research Centres.

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Preface

The ACIAR Country Profiles are designed as a snapshot of the collaborative research being carried out between Australia and our key partner countries and regions. This publication contains short summaries of bilateral and multilateral projects involving East Timor that were active at 30 June 2006. At that time there were three active bilateral projects and one active multilateral project, the latter being led by an international agricultural research centre. There are also summaries of two bilateral projects completed in 2005–06. There was one other project under development, which is expected to commence in 2005–06 financial year.

This publication also sets out the key outputs and outcomes from two projects completed at 30 June 2006.

In addition to these project summaries, the publication provides an extract from our 2005–06 Annual Report covering East Timor, and our near-term program as set out in the 2006–07 Annual Operational Plan.

ACIAR updates this profile each year and distributes it to key stakeholders in East Timor and Australia.

We hope you find the publication useful as a record of the ongoing progress and achievements of ACIAR's collaborative agricultural research and development program with East Timor. For information on ACIAR's overall program, our website at www.aciar.gov.au is a key gateway to our operations.



Peter Core
Director

October 2006

East Timor Report 2005–06

(extract from ACIAR Annual Report 2005–06)

Active projects in 2005–06	8
AOP budgeted expenditure in 2005–06	\$558,000
Actual bilateral country expenditure in 2005–06	\$1,870,139*
Bilateral country expenditure in 2004–05	\$522,340
Bilateral country expenditure in 2003–04	\$285,402

*Increased expenditure associated with a new major project with AusAID: Seeds of Life 2

Key performance indicators	Performance 2005–06
<ul style="list-style-type: none"> Implementation arrangements for scaled up 'Seeds of Life' program successfully undertaken 	The implementation and commencement of the new program, involving the Ministry of Agriculture Forestry and Fisheries, in collaboration with University of Timor Loro Sa'e and NGOs in East Timor, has been successful. Main achievements in 2005–06 have been planning for the research, planting and harvesting of a large number of on-farm demonstration trials along with the training of the new East Timorese.
<ul style="list-style-type: none"> New small projects facility established to support leading agricultural researchers 	Project LPS/2003/004 <i>Building agricultural knowledge and R&D capacity in Timor Leste: a small projects facility</i> designed with an initial set of three small projects involving staff from the National University and the Ministry of Agriculture, Forestry and Fisheries. Implementation delayed due to civil unrest in May–June 2006.
<ul style="list-style-type: none"> Initial successful production of weed biocontrol insects in East Timor 	A population of the stem gall fly <i>Cecidochoares connexa</i> has been established in permanent plots in East Timor, and wider releases from this colony are planned for the 2006–07 wet season.

Position

Agriculture provides the livelihoods for over 80 per cent of East Timorese. Australia has a comparative advantage in East Timorese agriculture in several ways, including proximity, similarity of climatic systems to Australia's semi-arid and humid tropics, and relevant experience of Australian agricultural scientists in nearby regions.

Two projects—*Improved crop production through introduction, testing and distribution of improved planting material of major staple crops*, and *Rehabilitation of the agriculture faculty at East Timor University*—commenced in early 2001. ACIAR has built on these initial investments, and a major collaborative effort with AusAID, extending the work on planting material of major crops, is under way. New projects on Siam weed control and cassava production have commenced.

Achievements

ACIAR's initial Seeds of Life (SOL) project trialled varieties of maize, groundnut, cassava, sweet potato and irrigated rice, identifying those that were better adapted to local conditions and tolerant of biotic (pests, diseases) and abiotic (drought, fertility) stresses. The project also began establishing, within the Ministry of Agriculture, Forestry and Fisheries (MAFF) a small scientific and extension base for cropping. Now a **scaling-up project, SOL 2**, undertaken in conjunction with AusAID and implemented as a major program in MAFF, is building on the earlier work by continuing to test new lines to find those most suitable for local farming systems. Over 600 on farm demonstration trials were planted in 2005-06 and results (maize only) indicated a 50 per cent increase in farmers' yields with the improved varieties. The on-farm trials are ensuring that farmers have input into the development and adaptation of farming systems to support new varieties. This work dovetails with activities designed to strengthen seed production, storage and distribution. Medium-scale seed production is being undertaken to support dissemination, with 10 per cent of farmers in selected districts expected to receive seed by the end of the project.

Progress continued in efforts to restore the **Agriculture Faculty at the University of East Timor**. Timorese and Australians together are conducting mini-projects, involving university staff, MAFF and the NGO sector, with Australians as mentors to individual mini-projects. The project is also sponsoring an annual R&D workshop to showcase work from this project and from other donors. Much effort is going into solving some major production and marketing constraints and finding innovative ways to lift the capacity of the East Timorese through involvement in the mini projects.

Another project also draws on findings of the earlier work in the SOL project. The project seeks to enhance the **adoption of improved cassava** production and utilisation systems in both East Timor and Indonesia, aided by the International Centre for Tropical Agriculture (CIAT) which has been involved with cassava selection and improvement for developing countries since the mid-1970s. The main barriers to farmer adoption—poor linkages between research and extension organisations—are being addressed through farmer participatory research (FPR) and extension. Farmers are already conducting some FPR variety trials on their own fields. These approaches are promoting new varieties as well as improvement to production technologies, reduced soil erosion and improved fertility maintenance. It is hoped that the farmers, seeing how well these new varieties and improved production practices perform on their own farms, will adopt them and reap the benefits of increased yields and incomes.

Land use practices in East Timor have led to the **incursion of many common tropical weeds**, the most common and problematic being *Chromolaena odorata* and *Mimosa diplotricha*. Biological control is the only practical solution to the problem. ACIAR is supporting, through MAFF, the introduction of the gall fly (*Cecidochara connexa*) and psyllid (*Heterpsylla spinulosa*) for this purpose given that they have been successful in controlling *Chromolaena* and *Mimosa*, respectively, in other similar tropical regions. One year after release the establishment of gall fly at the release sites ranges from very good to modest, with fire playing a major role in the persistence of the fly over the dry season. The successful sites will be used as a source of gall fly for future releases. The psyllid program has been delayed as security issues prohibited the establishment of a psyllid colony, but staff has been trained and infrastructure is in place.

East Timor Plan 2006–07

(extract from ACIAR Annual Operational Plan 2006–07)

GNI per capita ¹		Bilateral actual 2004–05	\$0.52m
Population ²	1 million	Bilateral forecast 2005–06	\$0.56m
Population 2015/2050 ³	1.5 / 3.3 million	Bilateral budget 2006–07*	\$1.87m
Active bilateral projects	3	Bilateral + Multilateral	
Active multilateral projects	1	budget 2006–07	\$1.94m

* Includes AusAID co-investment of \$0.98m (budget 2006–07) in 'Seeds of Life 2' project.

Medium-term strategy

ACIAR has a program in East Timor focused on food security, poverty reduction, and capacity building. These are immediate needs for East Timor to support recovery from the trauma of the 1999 independence struggle and the development of a new nation. The focus is on applied assistance as R&D capacity and infrastructure are being developed. The outcomes from the initial projects on introduction and evaluation of higher-yielding staple crops and on rehabilitation of the University agriculture faculty will provide a base for further development efforts supported by Australia (ACIAR and AusAID) and other donors, and aligned with the Sector Investment Programs of the East Timor government.

Key performance indicators (2006–07)

- Successful implementation of jointly-funded ACIAR-AusAID 'Seeds of Life 2' program in close partnership with Ministry of Agriculture, Forestry and Fisheries
- At least four demand-driven small projects commissioned to leading agricultural researchers

Position

Agriculture provides livelihoods for more than 80 per cent of East Timorese. The similarities of East Timorese and Northern Australian environments offer Australia a comparative advantage in applying its research, development and extension skills to assist this new country. ACIAR began collaboration with East Timorese institutions in 2000, and current projects aim to help achieve food security, reduce poverty and build local agricultural research capacity. Two ACIAR projects commenced in early 2001:

- The 'Seeds of Life' project, which aimed to improved crop production through introduction, testing and distribution of planting material of major staple crops that was better adapted to Timorese conditions; and
- Rehabilitation of the agriculture faculty at the National University of East Timor.

¹ Source: Commonwealth of Australia, *Australia's Overseas Aid Program 2006-07*, Statement by Minister Alexander Downer, May 2006.

² Source: United Nations Population Division, 2005, *World Population Prospects: The 2004 Revision*, http://www.un.org/esa/population/publications/WPP2004/World_Population_2004_chart.pdf.

³ Source: United Nations Population Division, 2005, *World Population Prospects: The 2004 Revision*, http://www.un.org/esa/population/publications/WPP2004/World_Population_2004_chart.pdf.

The first phase of the 'Seeds of Life' project has now concluded. A number of improved varieties of staple food crops have been identified in field trials in a variety of lowland and highland settings around East Timor. Suitable varieties of sweet potato, maize, rice, peanut and cassava have been identified. Many of these have been tested or are in the process of being tested in farmer participatory research. Some varieties appear well adapted to local conditions, have tolerance or resistance to pests and diseases and have demonstrated a sufficient level of tolerance to drought and soil stresses.

A major successor program, 'Seeds of Life 2' is being co-funded by AusAID and ACIAR and delivered in close partnership with the East Timor Ministry of Agriculture, Forestry and Fisheries (MAFF). The program, which has a budget of almost \$ 8m over five years commenced in late 2005 and is expected to continue the introduction and evaluation of improved crop varieties, while devoting more resources to seed production, the identification of improved crop management techniques, to farmer participatory extension of identified cropping improvements, and to the training of MAFF and other staff in seed production as well as crop research and extension. Five international CGIAR centres will continue to supply crop materials and expertise, while NGOs will be involved in the extension where possible. By project end, it is expected that many East Timorese farmers will have adopted improved varieties and cropping technologies, and that the MAFF will be able to manage field crop research and development activities with its own resources.

Rehabilitation of the Agriculture Faculty at the National University of East Timor has been important in providing facilities for applied agricultural research, and in training East Timorese in agriculture. The project team have developed a new agriculture curriculum that aims to equip students to identify and solve problems in a farming systems context. Laboratory facilities at the Hera Field Station have been restored to provide practical sessions for science and agriculture students. This facility is the only working agricultural laboratory in East Timor, and a number of foreign donors are also using the laboratory in their project activities.

New projects on Siam weed control and cassava production commenced in 2004–05 and in early 2006 a small R&D projects funding and management facility was established to support focussed activities addressing high priorities in agriculture.

Relationship to the AusAID East Timor strategy

The overarching goal of AusAID's future development cooperation program will be to assist the Government of East Timor to achieve stability and prosperity. Support over the medium term is expected to focus on governance—capacity building through enhancing stability and security and improvement public sector management to deliver services and basic service delivery, including further support for rural water supply and sanitation, food security, and health.

ACIAR's program in East Timor focuses on the food security aspect of this strategy, with AusAID co-funding the largest project in the portfolio ('Seeds of Life 2'), and several other projects addressing other aspects of food security. Long-term engagement of the relevant government ministry (MAFF) and the University of Timor Loro Sa'e contributes to the governance objective, particularly in terms of capacity building to deliver tertiary education and agricultural extension and research service delivery.

Indicative priorities

Priorities for collaboration are determined through discussions, interactions and visits between scientists and research managers from East Timor, ACIAR and Australian research institutions. ACIAR and AusAID also sponsored an international conference in East Timor in October 2002, which discussed priorities for collaboration in cropping, livestock, fisheries and forestry. We will address a small number of priorities within this framework, and partner capacity will be crucial in determining future collaboration. Whilst the program will remain small, further assistance may be considered in special areas of need, particularly addressing food security, resource protection and capacity development.

The program will continue to emphasise applied research, together with the development of local capacity for applied research and development to underpin the reduction of food insecurity. Possible new areas for collaboration to be developed in 2006–07 may include:

- constraints on production and analysis and improvement of market chains for major commodities
- assessment and development of management plans for offshore fisheries resources
- development of feed resource and reproductive management strategies for cattle and goats
- land capacity assessment and mapping to reduce risk in cropping and grazing
- integrated control of weeds affecting food crop production and grazing

Key program managers

Dr Paul Fox, Crop Improvement and Management
Dr Bill Winter, Livestock Production Systems

Active projects

at 30 June 2006

Bilateral

CIM/2003/014	Seeds of Life 2	13
CIM/2005/079	Seeds of Life 2—Technical Advisory Committee	17
LPS/2003/028	Biological control of two major weeds affecting crop and livestock production in East Timor	18

Multilateral

CIM/2003/066	Enhancing the adoption of improved cassava production and utilisation systems in Indonesia and East Timor	21
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CIM/2003/014: Seeds of Life 2

Overseas Collaborating Countries	East Timor
Commissioned Organisation	University of Western Australia, Australia
Project Leader	Dr Harry Nesbitt Phone: 08 6488 2505 Fax: 08 6488 1140 Email: h.nesbit@bigpond.net.au
Collaborating Institutions	Australian National University, Australia Ministry of Agriculture, Forestry and Fisheries, East Timor Seeds of Life 2 Program, East Timor
Project Budget	\$7,492,300
Project Duration	01/09/2005 to 31/08/2010
ACIAR Research Program Manager	Dr Paul Fox

Project background and objectives

The majority of households in East Timor experience food shortage each year. A contributing factor is that varieties of crops are low in yield and productivity, many being poorly suited to the growing environments where they are planted. The relatively small area of cropping (about 336,000 ha) for 140,000 households, and the loss of seed and planting material during the upheaval associated with independence in 1999, have exacerbated the problem.

The initial ACIAR Seeds of Life project, which operated from 2000 to 2005, evaluated superior varieties of maize, cassava, sweet potato and irrigated rice, identifying those that were better adapted to local conditions and tolerant of biotic (pests, diseases) and abiotic (drought, fertility) stresses. This project also began establishing a small scientific and extension base for cropping within the Ministry of Agriculture, Forestry and Fisheries.

This follow-on project, undertaken in conjunction with AusAID, will build on this foundation to continue testing new lines for those most suitable to fit local farming systems. How well they will perform under farmer-managed conditions is important for future adoption. On-farm trials are a key objective of the project to ensure that farmers have input into the development and adaptation of farming systems to support new varieties. This work will dovetail into activities designed to strengthen seed production, storage and distribution. Medium scale seed production will be undertaken to support dissemination, with 10 per cent of farmers in selected districts expected to receive seed by the end of the project. The involvement of farmers, plus researchers from MAFF and Australia, in the evaluation of these crops will also help in identifying and developing improvements in crop management, and will significantly boost East Timor's research and extension capacity in cropping. Project personnel from East Timor and Australia will also coordinate relevant activities to correspond with and enhance those of other aid and development initiatives.

Project progress**Year 1 (01/09/2005-31/08/2006)**

Seeds of Life managed a flying start by engaging an Australian team leader and two research/extension advisors prior to the official commencement date. This allowed the Australian and MAFF team members to develop an activity plan before the start of the main cropping season in collaboration with other stakeholders. Within a few months, field staff were employed by MAFF to conduct on-farm and on-station trials, the office was established and a set of office procedures in place, a network of SoL collaborators developed, a number of training courses conducted and district personnel had been coached on the installation of replicated and on-farm demonstration trials. Most research activities were concentrated in the districts of Liquica, Baucau, Alieu and Manufahi during the first year of operation. A brief summary of progress by component follows:

Component 1: Seed production and storage and distribution.

Activities in this component include the rehabilitation of Betano and two other research stations; utilisation of the Alieu research site; seed production and storage at MAFF stations and districts, training in seed production, storage and testing; formulation of a seed certification, seed import and variety release policy.

A comprehensive farm plan for Betano station was developed and a perimeter fence constructed during 2005–2006. Buildings were designed and their construction tendered out to contractors who visited the site in July, 2006. It is envisaged that construction will commence in September. The Alieu research site was well managed in 2005–2006 and will continue conducting research and being involved with a small amount of seed production for the foreseeable future.

Seed production remained part of the SoL program during 2005–2006 and sufficient seed was produced with the assistance of farm production to fulfil the requirements of the SoL program. Training on seed production, storage and testing was provided by SoL personnel and by CGIAR centres.

A scheduled consultant input due early in 2006 to develop policy/guidelines on seed certification, seed import and variety release will be delayed until later in the year. In the meantime, SoL drafted guidelines for the establishment of a variety release committee. This will be finalised with the MAFF in 2007 and the first SoL varieties of rice, sweet potato and maize released early in the year.

Component 2: Evaluation of new germplasm and associated technologies.

Activities in this component include the introduction, evaluation and maintenance of new varieties, training of staff, the development of an inventory of local varieties and the integration of agricultural information with the Agricultural Land Geographical Information System (ALGIS) system.

All five CGIAR centres collaborating with SoL provided well-adapted breeding lines and varieties of maize, cassava, sweet potato, rice, peanut and pigeon pea for evaluation in TL during 2005–2006. Twenty-three replicated trials were installed in the main season. These were cultivated at Corluli (Maliana), Betano (Manufahi), Quinta Portugal (Aillieu) and Fatumaca (Baucau), as well as at the University of Timor Lorasae, Hera. An additional two replicated trials of maize (at Betano and one farmers field) and one of peanuts (at Betano) were installed during the second season in 2006. Included in the germplasm were 20 maize (mainly from CYMMYT), 20 peanut (mainly from ICRISAT), six pigeon peas (mainly from ICRISAT) and 40 cassava clones (mainly from CIAT). IRRI and CIP also provided germplasm for evaluation. Within each trial were at least two local varieties. In addition, five varieties of locally available velvet beans were compared.

Select maize varieties demonstrated yield advantages in excess of 100% over locals. LYDMR (Late Yellow Downey Mildew resistant) and Suwan5, which proved to be superior yielding selections in previous years, will continue to be included in on-farm trials. Two white varieties (HAR05 and HAR12), which showed superior weevil tolerance during initial trials, will also be included.

In the sweet potato trials, the introduced sweet potato clones coded as CIP1, CIP6, CIP7 and CIP8 all possessed yield advantages in excess of 130% over the local varieties in previous years. They are also good eating. In 2005–2006 similar yield advantages were demonstrated. Two clones will be included in on-farm trials.

The top five cassava clones out yielded local varieties by 40–60% over a number of years in SOL1. Two varieties (CA14 and CA15) illustrated similar yield advantages in 2005–2006. However, local farmers cultivate cassava for personal consumption and sweetness is preferred over yield. From the trials, sweet introduced varieties were identified which possess yield advantages of 20–65% over locals. These will be evaluated further in 2006–2007.

Replicated rice trials spread over a number of sites and years during SOL1 did not identify new varieties with significant yield advantages over local varieties. No replicated rice trials were conducted in 2005–2006. However, farmers have identified PSB RC 54 as a preferred rice type because of its consistent good yielding and good taste. Seed of this variety will be released in for commercial multiplication in 2007.

New peanut lines performed inconsistently across ecosystems in 2005–2006—one line out-yielded a local variety (PT14) by 94%, while others underperformed. Further trials need to be conducted to identify specific varieties for particular environments. In the meantime, farmers have expressed a desire to grow PT5 as a preferred peanut because it is large-seeded and good yielding. This variety was included in on-farm trials and will be released in 2007.

The results of the pigeon pea and velvet bean trials were not available for comment prior to publication.

Training of MAFF staff and other members of the RDUs was an important part of the overall program in 2005–2006. Included were a large number of short courses provided by Australian staff, CARE, OXFAM, visiting scientists from CGIAR centres and consultants. English language training was also provided.

Component 3: On-farm demonstrations and trials (OFDTs)

Component 3 contains elements of social research, Research and Development Unit (RDU) training, development of OFDT material, implementation of OFDTs and the development of improved crop production packages.

A social scientist from the Australian National University (ANU) and two social science graduates from UNTL commenced collecting information from farmers to formulate a farm practice calendar and to investigate food security issues in agricultural areas. Their studies will continue into 2006–2007 for completion in 2008. Other monitoring of impacts will be done through RDU members.

Formal training of RDU members included FPR techniques, English language training, statistics, cassava production, implementation of OFDT's, proposal writing, seed production and storage, and maize production. Informal training accompanied the implementation of the OFDTs through the ATL, R/EAs and visiting scientists.

OFDT training material developed and disseminated in 2005–2006 included Fact sheets on sweet potato, maize and peanuts. A draft of a FPR manual was also prepared. This manual will be completed and distributed for use by RDUs in 2006–2007. SoL material continues to be circulated through MAFF Agriboletins.

Improved crop production packages were under development in 2005–2006. In addition to improving yield through the testing of improved varieties, other challenges to overcome include storage problems and weed control. Both of these aspects will be further investigated in detail during 2006–2007 in addition to evaluating disease and soil fertility issues.

654 OFDT's were installed during the main growing season spanning from October 2005 to April 2006. Included were 196 maize, 146 sweet potato, 41 cassava, 187 peanut, 4 velvet bean and 80 rice trials. By district, the number equalled 257 in Alieu, 164 in Baucau, 166 in Manufahi and 108 in Liquica. In addition, 23 Maize and 23 peanut OFDTs were established during the second season. Gender disaggregated views on the new varieties were collected.

The yield advantage for introduced composites identified in replicated, on-station trials were also illustrated under farmers conditions for maize. LYDMR and SW5 out-yielded local varieties by approximately 50%.

The OFDT's for rice, sweet potato, velvet bean and cassava were not harvested at the time this report was compiled. These data will be available at a later date. Both test peanut varieties of PT5 and GN11 yielded more than the local check in seven of the eight sub-districts. The highest yield advantage of 71.4% was reported at Aileu Vila. PT5 consistently yielded more than both the local check and GN11 with a yield advantage of approximately 30% across the sub-districts. A sub-district and agro-ecological zone (AEZ) effect was also evident.

Support for the OFDTs was provided by NGOs including the local NGO Rai Maran in Liquica, Austcare in Maliana, CARE International in Liquica, CONCERN in Manufahi and with the Peace Corps and OXFAM. An extra 262 OFDTs were installed by Austcare, Concern and CARE Australia using SoL protocols. Included were 122 velvet bean, seven cassava, 37 maize, 46 sweet potato and 43 peanut trials. The US Peace Corps also installed nine OFDTs in the district of Los Palos. Results of these trials were pending prior to completion of this report.

Component 4: Program management and coordination and institutionalisation of crop research and extension in MAFF.

Component 4 includes elements of office staffing, coordination of activities, the development of a national extension strategy, progress reviews and planning, reporting, TAG visits and the M&E framework.

SoL was fully staffed by the end of the initial year. Four expatriate staff members filling team leader, research/extension advisor (2) and office manager positions were hired, as well as one local research assistant for each of the eight sub districts. Office support staff and drivers were also engaged. The office was fully operational and possessed efficient operational procedures. An internal audit system has been developed for implementation.

SoL advisors and MAFF personnel plus other members of working groups in the districts worked closely throughout the initial year of implementation both verbally and with written reports. Collaborated during the compilation of monthly reports was also good, MAFF employed all SoL-engaged research staff and drivers, included RDU members in training courses and held regular meetings. Collaborators were kept informed with monthly reports, informal and formal meetings and via email.

CIM/2005/079: Seeds of Life 2 - Technical Advisory Committee

Overseas Collaborating Countries	East Timor
Commissioned Organisation	University of Western Australia, Centre for Legumes and Mediterranean Agriculture, Australia
Project Leader	Dr Harry Nesbitt Phone: 08 6488 2505 Fax: 08 6488 1140 Email: h.nesbit@bigpond.net.au
Collaborating Institutions	
Project Budget	\$270,000
Project Duration	01/09/2005 to 31/08/2010
ACIAR Research Program Manager	Dr Tony Fischer

Project background and objectives

AusAID and ACIAR fielded an independent Technical Assessment Group (TAG) to provide advice to the Seeds of Life (SOL) program on an annual basis. The TAG comprises two externally-sourced consultants, with expertise in agricultural research participatory agricultural extension and institutional strengthening, and representatives from AusAID and ACIAR. The TAG visited the project area prior to preparation of the Annual Operating Plan to review the progress of SOL in the preceding year. There were also other visits by TAG as required, to evaluate the outcomes and impact of the program.

Project progress

First progress report due in late 2006.

LPS/2003/028: Biological control of two major weeds affecting crop and livestock production in East Timor

Overseas Collaborating Countries	East Timor
Commissioned Organisation	Charles Darwin University, Australia
Project Leader	Ms Tania Paul Phone: 08 8946 6176 or , or mobile 0438 617 600 Fax: 08 8946 6690 Email: tania.paul@cdu.edu.au
Collaborating Institutions	National University of Timor Loro Sa'e, East Timor Ministry of Agriculture, Forestry and Fisheries, East Timor CRC for Australian Weed Management, Australia Department of Infrastructure, Planning and Environment, Australia
Project Budget	\$327,384
Project Duration	01/07/2004 to 31/12/2007 (Project extended from 01/07/2007 to 31/12/2007)
ACIAR Research Program Manager	Dr Bill Winter

Project background and objectives

Agriculture is the main source of food security and income for the majority of people in East Timor. Cropping and livestock productivity are threatened by the encroachment into cropping and pasture lands of two invasive weeds; *Chromolaena odorata* and *Mimosa invisa*. Both weeds 'choke' productive lands by forming dense thickets and by spreading rapidly once established in an area.

Chromolaena (also known as Siam weed) rapidly invades grasslands and if left unchecked will completely replace native vegetation. Cattle and goats cannot be left to feed on Siam weed as the presence of pyrrolizidine alkaloids (naturally occurring chemical compounds) in the weed progressively destroy the animals' liver. This results in eventual death. *Mimosa invisa* is a serious pest and threat to croplands, especially the staple food maize. Livestock grazing on the weed have also been reported to have been poisoned. Both weeds are a serious threat to native plants and biodiversity, including in natural *Eucalyptus alba* savannas and open grasslands of the Los Palos district.

Biological control agents against both weeds exist and have been proven to be effective elsewhere in Southeast Asia. The stem gall fly, *Cecidochares connexa* for Siam weed and a sap sucking psyllid *Heteropsylla spinulosa* for *M. invisa* will be collected from sites in West Timor and Queensland respectively. Both will then be distributed and monitored with the psyllid first established at the University Agricultural Farm in Hera, prior to release.

The project aims to provide long term control of two serious weeds (*Chromolaena odorata* and *Mimosa invisa*). An associated goal is to develop the scientific capacity of MAFF and UNTL staff and students in biological control technologies, and to enhance rural community knowledge and understanding of biological control as a pest management option, by implementing an efficient, low technology method of collecting and disseminating the stem gall fly for chromolaena and the sap sucking psyllid for *M. invisa* control.

Project progress

Year 2 (07/01/2005–06/30/2006)

Activity 1—Training of MAFF and UNTL staff and students in biological control theory and practice

- UNTL students and staff and MAFF staff were involved in surveying and monitoring to gather the first data on the gall fly releases. Monitoring methods used were transects and quadrats at the Baucau airport release site, Tibar / Rai Mate and other sites. Participants were trained in monitoring & surveying techniques during March 2006.
- MAFF staff were trained in procedures for rearing and maintaining colonies of *H. spinulosa* at Triloka (Baucau) by Michael Day. Colin Wilson and Michael Day also trained MAFF staff in selecting suitable sites for the release of biocontrol agents. As East Timor has a long dry season and variable conditions throughout the country, suitable site selection is critical to the survival and establishment of released agents.
- Planned on-the-job training with the Weeds Branch of NT Government has been postponed until October 2006.
- Compact discs containing photos of weeds in Timor and information and photos on chromolaena, the gall fly and damage, were given to MAFF and UNTL staff for their own information and for preparing teaching materials, extension activities and the production of brochures and leaflets.

Activity 2—Community socialisation/awareness raising of biological control program

Community socialisation/awareness activities were carried out throughout the reporting period up to March 2006 at several locations using adult learning techniques and visual aids. Locations included Maubara, Rai Mate (Liquiça), Cribas Village (Manatuto) and Triloka Village (Baucau).

After each session, the participants engaged in discussion about the program, some agreeing to the implementation of the program and others expressing doubt. Most farmers believe that chromolaena has reduced the production of corn, potatoes, and other consumable vegetables as well as grass used for feeding animals, while others believed that it was of benefit as a traditional medicine for humans and animals as well as organic pesticide and fertiliser. However, most participants expressed a commitment to control chromolaena.

Some people were concerned that the flies might attack humans and animals or damage their crops. The project team explained how biological control worked and highlighted the success of the biocontrol agents in other countries and the evidence that they do not cause damage to any other plants or animals in order to allay any concerns.

The sessions also highlighted the importance of protecting release sites from burning, explaining that it can kill gallflies recently released. Farmers were asked to inform a district crops officer in their area if they needed to burn a certain area to cultivate. MAFF will place announcement boards in four main places that the gall flies have been released to advise the general public of the project; a poster and a brochure to distribute around the districts are in preparation.

*Activity 3—Introduction of Stem Gall Fly, *C. connexa**

During the beginning of the wet season (Nov–Dec) areas around the border region were surveyed for the presence of the gall fly. As releases were made near Atambua over five or more years ago, there was the possibility that the gall fly had established along the south coast of Timor. There were also reports from MAFF staff and AQIS/NAQS staff of the presence of gall fly-like insects at Viqueque and Same and Tutuala. Surveys of the border area and south coast found that the gall fly was not present in any of these areas and no galls were sighted in any of the infestations checked along the south coast. A specimen of the insect was sent to an Australian taxonomist who determined that it was not *Cecidochares connexa*.

In February the team travelled to Kupang to collect galls of *Cecidochares connexa*. Dr Wayan Mudita from Nusa Cendana University in Kupang met the team on arrival in Kupang and provided logistical assistance for the collection of the gall flies. The team collected over 2000 galls and transported these back to East Timor. These galls were released at Betano, Soibara, Mehara, and Hatu-Udu.

An attempt was made to import gall flies from PNG without success, due to the failure of the agent to connect through Denpasar to Dili. It is likely that the gall fly will be in reasonable numbers at Tibar/Rai Mate and Baucau in early 2007, so that the insect will be collected from these sites and released elsewhere.

During April 2006 the team also surveyed the enclave of Oekussi and found gall flies present around the border areas and at Lifau village subdistrict. Future collections will be made from Oekussi or West Timor, depending upon logistics.

Surveys of the Baucau airport site had one or two galls present on about half the plants, although some plants had about five galls. While the gall fly typically spreads quite quickly, it is expected to spread slower at this site due to the enormity of the infestation at this site. The gall fly has been successfully established at Tibar/Rai Mate site, while the Cribas river site has not shown establishment as it was extensively burnt in the late dry season (August 05), though there may still be a residual population present. The site at Maubara has not been successful possibly due to its exposed aspect near the sea. Two of the four original sites have had establishment. The team has selected four new sites for future releases and will conduct socialisation sessions with farmers at these locations (listed above). Some sessions have been held in these locations but further activities have been delayed due to the security situation.

Activity 4—Introduction of Sap Sucking Psyllid, H.spinulosa

During January 2006 the team prepared ministerial papers and a cabinet submission on the psyllid in order to gain approval for the importation and release of the insects. Unfortunately the permits were not ready in time for the consignment to be transported by Michael Day in March, and a later shipment for May was further delayed by the security situation. When possible, a shipment will be sent from Queensland via Darwin.

The project team had prepared a mimosa nursery at the Comoro compound in preparation to receive the psyllids, however this has been destroyed along with other equipment in the compound. Mimosa infestations at Hera University farm and Triloka and at Tibar were also chosen as release sites, however travel outside of Dili is not safe at present.

Activity 5—Introduction of other biological control agents as required

Pending the success of the leaf miner fly introduced into Lae PNG, the East Timor project team will commence preparations to introduce the insect. When the Timorese team travel to Darwin in late 2006 it is hoped that they will be able to transport the biological control agent for *Sida* weed species, *Calligrapha pantherina*, back to East Timor. However, this will depend on the issue of import permits.

Members of the team plan to attend the next international workshop on the biological control of chromolaena, where they will be able to meet with South African researchers and determine the progress of research on biocontrol agents being carried out and the suitability of any of these agents for East Timor.

CIM/2003/066: Enhancing the adoption of improved cassava production and utilisation systems in Indonesia and East Timor

Overseas Collaborating Countries	East Timor, Indonesia
Commissioned Organisation	International Center for Tropical Agriculture, Thailand
Project Leader	Dr Reinhardt Howeler Phone: 66 2 5797551 Fax: 66 2 9405541 Email: ciat_bangkok@cgiar.org , r.howeler@cgiar.org
Collaborating Institutions	Brawijaya University, Indonesia Research Institute for Legumes and Tuber Crops, Indonesia Assessment Institute for Agricultural Technology, Indonesia Indonesian Center for Food Crops Research and Development, Indonesia Ministry of Agriculture, Forestry and Fisheries, East Timor Center for Soil and Agroclimate Research, Indonesia National University of Timor, East Timor
Project Budget	\$397,912
Project Duration	02/09/2004 to 30/06/2007
ACIAR Research Program Manager	Dr Paul Fox

Project background and objectives

Cassava is an important crop both in Indonesia and East Timor. In Indonesia it is grown mainly for off-farm sale to processors. In the past decade, however, Indonesia has gone from a net cassava chip exporter to importer. East Timorese farmers grow cassava for on-farm and household use, boosting food availability when needed. In both countries cassava is the third most important crop, after rice and maize.

Another trait common to both countries is that cassava yields well below expectations. On-station testing in Indonesia of improved breeding lines have yielded up to 58 t/ha on-station, compared to current varieties averaging around 14 t/ha on-farm. Similarly in East Timor, yields of around 40 t/ha have been achieved on-station, ten times above the average 4 t/ha on-farm. Yields of up to 100 t/ha, one of the highest for any region in the world, have been reported at one East Timorese experiment site.

Although originating in Latin America, cassava is well suited to Asian growing conditions. It is drought-tolerant and grows in poor soils, and is relatively disease- and pest-free. Despite this, low yields persist in Indonesia and East Timor. Delivery directly to farmers of improved varieties well suited to local growing conditions depends on demonstrating that improved yields are possible and achievable.

In East Timor a new cassava starch factory is scheduled to be built in 2006 along the south coast, possibly in Suai, with a daily capacity to produce 100 tonnes of starch. This requires at least 400 tonnes of fresh roots per day or 120,000 tonnes per year; three times East Timor's current production. This is the first major agro-industry in East Timor and is expected to change cassava's role from a minor food security crop to a major industrial and export crop, which can supply the country with foreign exchange, increase farmers' income, provide employment, and enhance rural development.

The overall goal of the project is to increase the productivity of cassava-based cropping systems through the widespread adoption of higher yielding cassava varieties of superior nutritional quality, and improved cultural practices that increase yields, while protecting the soil from erosion and nutrient depletion.

The specific objectives of the project are:

- to support national institutions in conducting strategic and applied research in cassava production and on-farm utilisation that will overcome important constraints identified at the farm level.
- to develop, with farmers, new high-yielding cassava varieties of superior nutritional quality, improved crop management practices that increase yields and maintain the soil resource, and better utilisation through on-farm animal feeding of roots and leaves.
- to disseminate new technologies at the local, provincial and national level using farmer participatory extension methodologies.
- to strengthen inter-institutional collaboration and the capacity for farmer participatory research in national institutes and selected farm communities.

Project progress

As at October 2006 the progress report is forthcoming, the previous report has been included for information.

Year 1 (09/02/2004-09/01/2005)

The first year of the project was initially devoted to making the necessary institutional arrangements for implementing the project. In Indonesia this now involves five research institutes and universities, i.e. Brawijaya University, Research Institute for Legumes and Tuber Crops (RILET), Assessment Institute of Agric. Technologies (BPTP)—East Java, the Central Research Institute for Food Crops (CRIFC) and the Soil Research Center (SRC); an NGO, Budi Mixed Farming, will join the project in the second year. In East Timor this involves mainly the Center for Research and Extension and the Food Crops Department, both under the Ministry of Agric., Forestry and Fisheries (MAFF), as well as the National University of Timor Leste (NUTL).

In Indonesia the project builds on previous collaborative cassava experiments and farmer participatory research (FPR) activities, while in East Timor it builds on four years of participation with cassava in the Seeds-of-Life project. Thus, previous experiments were used as 'demonstration plots' where farmers from the surrounding area could participate in the evaluation and selection of the varieties or technologies being tested, using their own criteria for selection. In Lampung Province of Indonesia, where cassava is used mainly for starch extraction, farmers selected mainly for high yield and, to a lesser extent, high starch content. Unfortunately most of these selected varieties or breeding lines still had insufficient planting material for wide-spread testing in FPR trials.

In Yogyakarta Province, where cassava is grown for human consumption and some processing, farmers selected mainly for high yield and good taste (sweetness). In the two sites in East Timor where cassava is almost exclusively used for human consumption, farmers selected mainly sweet varieties with good taste and texture, almost irrespective of yield or starch content. Their selection criteria may change in the future as the utilisation of cassava roots (and leaves) diversifies. The experience pointed clearly to the importance of involving farmers, and possibly traders, in the selection of new varieties. In Lampung farmers also evaluated the treatments in a long-term fertiliser trial, which clearly showed the importance of application of K, and to a lesser extent N and P, to maintain high yields of cassava and prevent nutrient depletion of the soil.

The two cassava variety trials harvested in East Timor produced high yields and fairly high starch contents at the high-elevation site in Aileu, and very high yields but low starch contents at the low elevation site in Betano. The soil in the latter site is extremely deficient in micronutrients, especially Fe and Zn, which seriously affects the growth of some varieties, especially the two local ones, but not that of others. At this site there are also serious problems of low plant stand, either due to poor or poorly conserved planting material, extreme micronutrient deficiencies, inadequate soil moisture after planting, or excessive weed competition due to untimely weeding. This needs further investigation and improvement. The good soil, high temperatures and a shorter dry season makes this a near optimum site to produce high cassava yields. In Fatomaca, in the northeastern part of East Timor, cassava growth was very poor this year, most likely due to a heavy infestation of termites in the original planting material. Research may be needed to develop better ways of storing planting material during the long dry season to prevent termite infestations.

The FPR trials planted with farmers in this first year of the project were generally not too successful. In Indonesia this was mainly due to a lack of planting material of the farmer-selected varieties and breeding lines, especially in Lampung and Yogyakarta, and in East Timor due to lack of experience in conducting this type of trials with farmers. This is usually the case during the first year in a new country. After the two cassava and FPR courses planned for Jan 2006, the objectives and the methodology of farmer participatory research will become much clearer, and both the number and quality of those trials should improve. Besides FPR variety and fertiliser trials, it is likely that FPR pig or goat feeding trials using cassava roots and leaves will be initiated in East Timor and Indonesia, respectively.

Concluded Projects

30 June 2006

Bilateral

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CIM/2000/160: Seeds of Life—East Timor

Overseas Collaborating Countries	East Timor
Commissioned Organisation	Seeds of Life 2 Program, c/o Ministry of Agriculture, Forestry and Fisheries, East Timor
Project Leader	Mr Rob Williams Phone: +670 7234601 Fax: +670 390325121 Email: robwilliams1@iinet.net.au
Collaborating Institutions	Department of Agricultural Affairs, East Timor International Maize and Wheat Improvement Center, Mexico International Center for Tropical Agriculture, Colombia International Rice Research Institute, Philippines International Crops Research Institute for the Semi Arid Tropics, India International Potato Center, Peru
Project Budget	\$935,559
Project Duration	01/07/2000 to 30/09/2005 (Project extended from 01/07/2003 to 30/09/2005)
ACIAR Research Program Manager	Dr Paul Fox

Project background and objectives

East Timor has a population of almost one million people, occupying half the island of Timor. Eighty per cent of the population, an estimated 139,000 households, rely on agriculture, with cropping providing most of the staple food intake.

Food security is fragile, primarily because crop yields are well below that of comparative regions. Improving crop yields would be a significant step towards reducing widespread malnutrition. Crop yields are low due to the varieties grown being poorly adapted to local growing conditions. Many of these varieties are local varieties or of Indonesian origin, but without the benefits of recent breeding improvements.

The civil disruption and damage to infrastructure, institutions and research facilities following independence also extended to seed stocks. The resulting shortage of planting material and poor suitability of emergency supplies revealed the need to find improved varieties.

The project aimed to improve food security through the introduction, testing and initial distribution to farmers of improved germplasm of the major food crops: sweet potato; maize; cassava; peanuts, and irrigated rice. It evaluated improved lines of these staple crops across East Timorese agroecologies, mainly supplied by the relevant CGIAR institutions (CIMMYT, IRRI, CIP, CIAT and ICRISAT), with a view to identifying and multiplying the best cultivars of each crop, and improving farmers' access to good seed of these. At the same time the project aimed to build East Timorese capacity in the production and distribution of improved germplasm.

Project outcomes

The project commenced in July 2000, soon after the chaos of independence in 1999, and the ensuing loss of agricultural research human resources and infrastructure (and even of seeds). Although the project commenced working collaboratively with the East Timor Transitional Administration/United Nations Administration for East Timor, it was anticipated that a new Ministry of Agriculture would become the principal collaborator, and this took place in 2002 with the formation of the Ministry of Agriculture, Forestry and Fisheries (MAFF). Throughout the project it was staffed by one or two Australian advisers, initially an AVI (Dr Brian Palmer) and later Mr Brian Monaghan and Mr Rob Williams. They worked with local staff including, after 2002, MAFF collaborators and significant collaboration from NGOs operating in East Timor.

Several lines of each crop, suitable for local conditions and with improved yield for the characteristics of particular areas, have been identified. Many of these have been tested or are in the process of being tested in farmer participatory research. This is based on formulating 'best-bet' varietal recommendations with those farmers involved in the evaluation.

Wider-scale bulking up of seed for suitable varieties will be undertaken in the follow-on Seeds of Life 2 project. Some farmers have, however, already gained access to improved seed through involvement in the project.

Sweet potato—three varieties yielding between 33.7 t/ha and 19.7 t/ha have been identified. These yields are the highest recorded in East Timor. Based on research conducted during the project, four varieties that performed well in local conditions have been selected for initial bulking up of seed stocks and later evaluation.

Maize—local yields of the maize traditionally grown in East Timor average around 1.5 t/ha. Varieties tested during the project have yielded as high as 6 t/ha. In some areas varieties resistant to downy mildew disease have been trialled, resulting in yields between 4.5 and 6.5 t/ha, dependent on the agro-ecological zone. Downy mildew is a major disease that can substantially reduce yields. Both the white maize traditionally grown and newer yellow varieties have been trialled.

Rice—trials are underway at both upland and lowland irrigated sites of suitable varieties. Many varieties have yielded well, the best those with resistance to stem borer, indicating the need for this resistance. One borer-resistant variety has been well received in a number of field trials.

Peanut—two varieties, one suitable for cultivation throughout the country and a second suitable for the Baucau region where iron chlorosis is widespread, have been identified.

Cassava—several suitable varieties, based on a combination of yield, taste and starch content, have been identified. Farmers have been involved in growing and taste-testing varieties, with a number of varieties identified for future trials and use.

Selection of potato and bean varieties has been delayed, to allow the under-resourced partners in East Timor to focus on the main staple crops.

Many of the suitable varieties identified are being recommended to the Ministry of Agriculture, Forestry and Fisheries, for scaling up and distribution. These varieties appear well adapted to local conditions, have tolerance or resistance to pests and diseases (biotic stresses) and have demonstrated a sufficient level of tolerance to drought and soil (abiotic) stresses.

A number of MAFF staff also received training and grounding in crop evaluation and trial methodology. This has provided a foundation from which further cropping research capacity can be built. The project also coordinated the first national congress on agriculture in October 2002, in collaboration with scientists from the International Crop Centres, the University of Timor Leste and MAFF. Five seasons of weather data have been recorded.

ACIAR, together with AusAID, will use this foundation in Seeds of Life 2 (the follow-on project), which aims to disseminate the best varieties, and trial these along with crop management methods and improvements on research stations and farms. This is a critical step in making the best available seed widely available to farmers throughout East Timor and beginning to improve the food security situation in the country.

LPS/2000/164: Rehabilitation of the Agriculture Faculty of the National University of East Timor

Overseas Collaborating Countries	East Timor
Commissioned Organisation	Curtin University of Technology, Muresk Institute, Australia
Project Leader	Associate Professor John Janes Phone: 08 9690 1584 - W, 08 9255 2815 - H Fax: 08 9690 1500 Email: j.janes@curtin.edu.au
Collaborating Institutions	University of Queensland, Australia Charles Darwin University, Australia University of Sydney, Australia University of Timor Loro Sa'e, East Timor
Project Budget	\$1,612,361
Project Duration	01/01/2001 to 31/12/2005 (Project extended from 01/01/2004 to 31/12/2005)
ACIAR Research Program Manager	Dr Bill Winter

Project background and objectives

Rehabilitation of the National University of Timor Lorosa'e (UNTL) was a priority for the Government of Timor Leste after the independence referendum in 1999. That rehabilitation included repairs to the infrastructure, purchase of new equipment and the development of staff and curricula. ACIAR supported this initiative in the Agriculture Faculty through this project, which brought members of Curtin University, Charles Darwin University and the University of Queensland together with UNTL staff to rehabilitate the Hera field station, to revise the Agriculture Faculty curriculum and to develop study guides. Also through this process the collaborators helped the staff to enhance their teaching skills. The project commenced in October 2001, with progress reviewed in March 2004. During that period the Agriculture Faculty developed the Departments of Agronomy, Animal Production and Socioeconomics with 21 full-time staff, most of whom have only first degrees from the Indonesian system, and six part-time staff, some of whom have post-graduate training from Australia. Demand for student places is high, with over 1000 students now enrolled across the four years.

A key objective of the project included: development of an institutional capacity base to sustain the University for long-term and effective engagement of East Timorese academic staff and students in the promotion of innovative research and development.

Project outcomes

The project assisted in further revising the curriculum, aiming to move teaching to a more learner-centred approach and producing graduates who have good problem-solving skills. The educational development and training program was closely linked to the process of identifying graduate attributes required by stakeholders; developing staff skills through their participation in workshops and tasks; production of curriculum and educational material and methodologies that facilitate student learning; and development of graduates with the required skills. Teaching skills in all departments, but particularly in socioeconomics, have significantly improved. The graduate attribute survey conducted in 2005 indicates that the revised curriculum design and delivery developed by the project has produced graduates with the priority skills needs of the stakeholders.

The project also successfully assisted in developing staff skills in the conduct of research and development by involving them in the research cycle. Staff participated in the process of problem identification and priority allocation, experimental design, writing a proposal, conducting the planned experiment, collecting and analysing data, producing a report or publication to be presented at a workshop and/or submitted for publication to an appropriate journal.

English comprehension has improved over the life of the project. Staff progress was limited by high teaching loads and the national requirement that staff learn the Portuguese language. Nevertheless, the majority of teaching staff have developed a basic understanding of English.

Capacity building staff in curriculum development and educational methodology

Curriculum development is an ongoing process. Two curriculum workshops were conducted during the project extension, recommending curriculum modification to encourage student problem-solving skills through implementation of a student-centred approach to teaching. An important part of the changes was to facilitate student understanding of Timor Leste farming/agribusiness systems and to develop problem-identification and problem-solving skills by relating the teaching theory to real-world problem examples to be found in the local farming systems. Thus, the material presented in the lecture room can be considered and debated in terms of what contribution it can make to understanding or improving local farming systems. The unit outlines and study guides produced align the course learning outcomes (required professional and generic skills) with the content, activities and assessment. Consequently the students are aware of the course and unit requirements and have the necessary study guide and material provided to become independent learners.

The units introduced into the curriculum of all departments include:

- Farming Systems—this unit provides an introduction to farming systems and requires students to describe the major farming systems of Timor Leste. This syllabus will provide a valuable tool for change. It replaces a teacher centred passive unit, Introduction to Agriculture, with a student-centred unit that facilitates active student participation, thereby enhancing their cognitive development.
- Comparative Farming Systems is a second year unit that requires students to compare and contrast farming systems in Timor Leste with those in similar environments in other countries. Agricultural Systems has been developed.
- Professional Agricultural Systems Analysis is a third year project-based unit which provides students with the analytical tools to research agricultural systems and requires them to undertake a small agricultural or farming systems research project.

Within the Agronomy and Animal Science curriculum some units have been consolidated to reduce curriculum fragmentation, reduce duplication, and present a more holistic approach in which interactions between elements can be explored.

Outlines have been developed in 75–80% of units as a result of this program and, more recently, to satisfy the University requirement to meet higher education certification standards.

In the period July–December 2005 a further 32 study guide units were developed, made up of the agronomy department four units, animal science department 16 units and the socioeconomics department 13 units. A further four units are under development in the Faculty.

Research Capacity Development

The development of research capacity has included UNTL staff participation in defining industry needs through consultation with stakeholders at the 1st National Agricultural R&D workshop conducted at Hera in July 2004. Staff selected research topics by allocating research priorities and considering the available equipment and funding. Each department at the end of the workshop defined two small research projects and one was defined at the faculty level. Proposals for each of the projects were written, presented and discussed at a workshop then submitted to the relevant Australian adviser for approval. Following approval the projects were implemented according to plan. Data were collected and analysed, with preliminary or final results presented and discussed at the 2nd National Agricultural Research and Development Workshop of stakeholders that included representatives from MAFF (Ministry of Agriculture Fisheries and Forestry), NGO's and other donor organisations conducted on 14–15 December 2005 at Hera.

Small projects

Agronomy

- Baseline data on soils in alley cropping along a slope transect. The first year of the project has been completed and reported.
- Identification of high yielding and suitable local varieties of corn. Initial stage completed and preliminary report presented. The ACIAR Seeds of Life 2 (SOL2) program will support the remaining work.

Animal Science:

- A study of the nutrition of scavenging village chickens. Completed, report written and presented.
- A study of the meat production chain. Completed, report completed and presented. Being written up for submission for publication.

Socioeconomics:

- Analysis of farmers' behaviour and adoption of technology in rice farming systems in Maliana and Manatuto. Completed and report written. Being written up for submission for publication.
- Prospects for vanilla agribusiness development in Ermera and Manufahi. Completed and reported. Being written up for submission for publication.

Faculty project

Graduate attribute survey. This project examined the graduate attributes that stakeholders (employers, students and staff) are seeking in agriculture graduates. The main objective of this research is to determine desired skills and graduate attributes that employers require guiding the development of the curriculum in the faculty of agriculture of UNTL. The results of this comprehensive survey of stakeholders were reported at a curriculum workshop held in Dili on 6 December 2005.

Training workshops

R&D training workshops were run to coincide with information and techniques required by the researchers in processing data and generating output and in the presentation of results. The training covered:

(1) Data entry and analysis using SPSS

- How to enter data in SPSS
- Identifying types of data (quantitative/ qualitative)
- Generating and interpreting frequency tables,
- Generating and interpreting numerical summaries of descriptive statistics (Mean, mode, median, standard deviation, range, variance, etc).
- Generating and interpreting box-plots
- Performing analysis of variance (ANOVA) and interpreting results
- Post-hoc analysis
- Generating and interpreting graphs (bar charts, histograms, pie charts, mean plots)

(2) PowerPoint Presentations—preparing presentation slides in Microsoft Powerpoint computer program.

To strengthen the teaching skills, particularly in socio-economics, and English comprehension

Dr Fay Rola-Rubzen was appointed as project collaborator to work with Socio-economics staff to develop teaching and research skills in socio-economics. Initially Dr Rola Rubzen conducted two needs surveys of staff—one on improving teaching and learning and the other on improving research capacity. Training programs designed to assist staff development in the two areas, based on the survey results, were delivered by Dr Rola Rubzen and Assoc. Prof. John Janes.

English training

Three levels of English language training were conducted to match the levels of proficiency to be found among faculty staff. This training has assisted several members of staff in their application for postgraduate training, including Flaviano Soares, Dean of Agriculture, and Acacio da Costa Guterres, Head of Agronomy, for ACIAR John Allwright Fellowships, and Mateus Tavares, lecturer in animal science, for an ADS scholarship to study at the University of Queensland.

To provide advice on the improvement of academic administration systems

Improvement of academic administration systems is currently the focus of the Ministry of Education and the University. Administrative standards have been introduced by the Ministry for registration of university and other higher education institutions in Timor Leste. Professor Dr. Benjamin de Araujo e Corte Real, Rector, indicated at the National University Timor Loro Sa'e National Workshop in December 2005 that the Agricultural Faculty has led the University in the development of curriculum, educational methodology and research. The Rector also stated that he was confident that Agriculture would be the first faculty to satisfy standards required for course certification required for registration. He commended the support that the Faculty of Agriculture has received from the ACIAR project in education and research capacity development.

The Faculty of Agriculture has demonstrated a considerable improvement of academic administration systems in the last 12 months. Management of staff and students has improved. Inventories and records of equipment and consumables are being kept and used to assist the budgeting process. The 2005 Faculty of Agriculture annual report reflects this improvement.

Projects under development

at 30 June 2006

Bilateral

LPS/2003/004 Timor Leste agricultural R&D facility

ACIAR publications

This list is a selection of titles from ACIAR's range of scientific publications which are available in hard copy by emailing comms@aciar.gov.au, and may also be downloaded from ACIAR's website, www.aciar.gov.au.

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- 06 Pigeon pea improvement
- 07 Reducing fish losses due to Epizootic Ulcerative Syndrome
- 09 Sulphur test KLC-40 and growth of the Australian canola industry
- 12 Economic benefits to Papua New Guinea and Australia from the biological control of banana skipper (*Erionota thrax*)
- 19 Measuring the poverty impact of ACIAR projects: a broad framework
- 20 Mama Lus Frut scheme: an assessment of poverty reduction
- 21 Improving methods in diagnosis, epidemiology, and information management of foot-and-mouth disease in SE Asia
- 22 Saving a staple crop: impact of biological control of the banana skipper on poverty reduction in Papua New Guinea
- 31 Review of ACIAR's research on agricultural policy
- 34 Identifying the sex pheromone of the sugarcane borer moth
- 35 Review of the returns to ACIAR's bilateral R&D investments
- 37 Management of fruit flies in the Pacific
- 39 Benefits to Australia from ACIAR-funded research

Monographs

- 06 Chemistry of Tropical Root Crops: significance for nutrition and agriculture in the Pacific
- 12 Biological Control—Pacific Prospects: Supplement 1
- 20 Biological Control—Pacific Prospects: Supplement 2
- 28 The Economics of Papua New Guinea Tuna Fisheries
- 32 Working with Mycorrhizas in Forestry and Agriculture
- 33 Illustrated Guide to the Identification of Banana Varieties in the South Pacific
- 40 Essential Oils of Tropical *Asteromyrtus*, *Callistemon* and *Melaleuca* Species
- 44 The Major Invertebrate Pests and Weeds of Agriculture and Plantation Forestry in Southern and Western Pacific
- 45 Report on ACIAR-Funded Research on Viroids and Viruses of Coconut Palm and Other Tropical Monocotyledons 1985–1993
- 48 Nutrient Disorders of Sweet Potato
- 52 Improving Smallholder Farming Systems in *Imperata* Areas of Southeast Asia
- 54 Survey Toolbox for Livestock Diseases: practical techniques for developing countries
- 58 Understanding Animal Health in Southeast Asia
- 66 A Review of Papua New Guinea's Red Meat Industry
- 76 Plant Genetic Resources in the Pacific
- 80 Setting Policy Priorities for the Development of Tree Crop Industries in Papua New Guinea
- 81 Policy Options for the Tree Crop Industries in Papua New Guinea
- 83 How to Unravel and Solve Soil Fertility Problems
- 85 Fruits of Oceania
- 94 Survey Toolbox for Aquatic Animal Diseases: A Practical Manual and Software Package
- 99 Developing agricultural solutions with smallholder farmers
- 101 The Coconut Odyssey: the bounteous possibilities of the tree of life
- 102 Lantana: Current Management, Status and Future Prospects
- 108 Pig Husbandry in New Guinea: a literature review and bibliography
- 109 Community Based Resource Planning: Studies from Zimbabwe and Northern Australia
- 113 Worm Control for Small Ruminants in Tropical Asia
- 114 Diversity and management of *Phytophthora* in Southeast Asia
- 115 Nitrogen fixation in Acacias
- 119 Guidelines for surveillance for pant pests in Asia and the Pacific
- 120 Better-practice approaches for culture-based fisheries development in Asia
- 121 Planters and their components: types, attributes, functional requirements, classification and description

Proceedings

- 13 Bacterial Wilt Disease in Asia and the South Pacific
- 53 Coconut Improvement in the South Pacific
- 57 Leucaena—Opportunities and Limitations
- 66 Bluetongue Disease in the Asia-Pacific Region
- 69 South Pacific Indigenous Nuts
- 91 Fire Management
- 97 *Hypsipyla* Shoot Borers in Meliaceae
- 99 Food Security for Papua New Guinea
- 112 Breeding for Drought Resistant Peanuts
- 113 Agriculture: New directions for a new nation East Timor (Timor Leste)
- 116 Water in agriculture
- 119 Agriproduct supply-chain management in developing countries
- 120 Spiny lobster ecology and exploitation in the South China Sea region

Technical Reports

- 14 Transport of Vegetables in Papua New Guinea
- 15 Marketing Perspectives on a Potential Pacific Spice Industry
- 18 Post-Flask Management of Tissue-cultured Bananas
- 21 Production of Pathogen-tested Sweet Potato
- 50 Mapping Land Resource Potential and Agricultural Pressure in Papua New Guinea
- 55 *Chromolaena* in the Asia-Pacific Region
- 58 Evaluation of international provenance trials of *Casuarina equisetifolia*
- 59 Using seasonal climate forecasting in agriculture: a participatory decision-making approach
- 62 Pest and disease incursions: risks, threats and management in Papua New Guinea

Working Papers

- 53 Priorities for pig research in Southeast Asia and the Pacific to 2010
- 56 Agricultural research and poverty alleviation: some international perspectives
- 60 Economics and marketing of the live reef fish trade in Asia-Pacific
- 61 The seaweed industry in the Pacific Islands