

Timor-Leste Agricultural Rehabilitation,
Economic Growth and Natural Resource
Management Project

Quarterly Report
January to March 2004

University of Hawaii at Manoa
Honolulu, Hawaii USA
Soil Management Collaborative Research Support Program,
SM CRSP
LAG-G-00-97-00002-00

Executive Summary

In January 2004, farmers from four Baucau District villages participated with MAFF staff and University of Hawaii faculty in a joint appraisal of constraints and opportunities that typical households would encounter in transforming the current subsistence farming into a more market-oriented economic system. In November 2003, these same villages, with the help of MAFF staff and District Officers, had installed demonstration trials to assess the economic benefits of applying fertilizers to their corn crop. Through interviews, it was established that virtually every farmer knew the value of fertilizers, but none knew what type of fertilizer was needed for their farms. Educating farmers to buy and use the proper fertilizer for each farm is now possible because MAFF and District Officers have been trained and provided with soil test kits to enable them to diagnose farmer fields for nutrient deficiencies and prescribe cost-effective options to deal with soil fertility constraints.

Through interviews with villagers, MAFF and District Officers were able to learn new problems facing rural communities including earning income to pay for fertilizers, finding new markets for farm produce, finding effective ways to control a new weed infesting village pastures, adding value to local products such as candle nut, and establishing nurseries for trees that villagers prefer rather than those promoted by MAFF. These community priorities have now become MAFF and project priorities.

Since the January meeting with villagers, their corn trials have produced results which show that for every dollar of fertilizer applied, \$5 to \$10 worth of additional corn is produced. This high return on investment is possible because MAFF researchers trained in the use of soil test kits have discovered that an expensive nutrient element, previously recommended to farmers, need not be applied to East Timor soils. Recognizing the contribution that sound fertilizer management can make to the economy of rural communities, MAFF has taken the initiative to train users of the soil test kit in all districts of the country including the isolated enclave of Oecussi. The project has also uncovered, and reported to MAFF, the sale of mislabeled and adulterated fertilizers in Dili, and provided test kits that enable MAFF to henceforth, verify the chemical content of fertilizers.

In collaboration with CCT and MAFF, the project has introduced a fast growing, nitrogen fixing, multi-purpose tree to serve as fodder for livestock, fuel wood for household energy and shade tree to replace the diseased and dying albizia. This variety of *Leucaena leucocephala*, developed in Hawaii, is adapted to the cool, coffee growing region of East Timor. One aim of this effort is raise rural incomes by establishing village fodder banks to feed beef cattle for processing and marketing by CCT.

Finally, the project shares responsibility with the State Department and East West Center to train and educate a cadre of future leaders of East Timor. The project enables East Timorese students and their faculty advisors to participate in project activities and contribute to attainment of project objectives. An important goal of this program is to enable each student to explore career opportunities so that they can contribute immediately to their country's development upon graduation.

Highlights

Participatory Rural Appraisal implemented in 3 communities in Seical Watershed

Time frame: January 2004

Location: 4 villages in the Seical Watershed

Objective: 1) Provide a mid-course assessment of the project's agronomic trials;
2) Train MAFF in PRA tools and techniques;
3) Introduce PRA to a group of Dili-based East Timor college students;
4) Establish a collaborative partnership with the U.S. Peace Corps.

Outcomes: 1) The 10-day PRA resulted in the generation a number of key findings and recommendations that have led to modifications of the current Action Plan. Based on these findings and recommendations the project will:

- Develop management recommendations to improve yields of the inter-cropped home garden complex;
- Conduct assessment of the availability, cost and quality of fertilizer;
- Expand the food security component to include marketable vegetable crops such as onions and garlic;
- Assist Hawaii entrepreneurs in economic feasibility and marketing plans for establishment of a candlenut oil extraction plant in Baucau and the future export of vanilla to Hawaii.
- Establish high-yielding leucaena varieties in collaboration with local farmers;
- Conduct workshops on tree nursery productions and methods of erosion control;
- Explore farmers' willingness to plant trees or improved grasses in fallow land
- Determine best way to combat Chromolaena infestation;
- Develop a set of video and slide training modules in Tetun and other local languages for training of district-level MAFF staff in PRA tools and techniques.

2) Trained 18 MAFF staff (2 from Extension and Research in Dili, 4 from the Crops Div in Dili, 4 from Crops Div in Baucau, 2 livestock specialists-- one each from Dili and Baucau, 3 forestry specialists--1 from Baucau and 2 from Viqueque, plus two fisheries specialists from Baucau and one Irrigation specialist from Baucau).

3) Introduced PRA methodology and concepts to four university students-2 from the National University of Timor Leste (UNTIL) and 2 from the University of Dili (UNDIL)

4) Involved three Peace Corps Volunteers in the PRA exercise in a manner that will provide a base for further mutually beneficial collaboration between Project Staff, Project team members and MAFF staff.

Agronomist assumes post in Baucau

After a national search, Dr. Andre du Toit, an experienced researcher and farmer who helped manage his family farm in his native South Africa, was hired as project agronomist in January 2004. Dr. du Toit was on a study leave at the University of Florida and saw and applied for the East Timor position while attending the annual meeting of the American Society of Agronomy in Denver, Colorado.

Dr. du Toit's first task as project agronomist was to help organize and participate in the PRA. His extensive knowledge of insect and diseases of corn was appreciated by MAFF personnel and villagers alike during the PRA. In addition to his normal duties of training MAFF and District Officers to assist villagers adopt income generating farming practices, Dr. du Toit is working with MAFF personnel and University of Hawaii faculty to combat a weed (*Chromolaena ordata*) that is overtaking East Timor's pastures and farm lands. This weed greatly diminishes the grazing area for village livestock and threatens an important source of food and income for villagers. Dr. JB Friday has arranged with Australian scientists and with the approval of MAFF, to release insects that attack the weed, *Chromolaena ordata*. In addition, John Powley, extension agent from Maui, Hawaii, will work with Dr. Du Toit to introduce controlled, intensive, multi-species grazing to villagers as a way to suppress the weed and increase animal productivity.

The Associate Country Coordinator position was filled with the appointment of a Timor-Leste national, Mr. Fernando Sousa. After serving nearly 6 months as country coordinator for the project, Dr. Leon Watson resigned his post and returned to the U.S. at end of February 2004. Mr. Sousa established the project office at MAFF headquarters in the Fomento Building in Dili. He appointed Maria (Nina) Amaral as receptionist/secretary and Francisco Soares as an administrative assistant. Email, telephone and Internet links were established for the project at MAFF through efforts of both Sousa and du Toit. Email and Internet links were also established at the MAFF district office in Baucau through a land line installed by Timor Telecom. There was no cost to the project for this installation in Baucau.

Collaborative activities on tree nurseries initiated with CCT

A new, fast growing, nitrogen fixing *Leucaena leucocephala* trees adapted to the cool, arabica coffee zone of East Timor has been introduced from Hawaii to serve as fodder, fuel wood and shade tree to replace the diseased and dying *albizia* trees of East Timor. Dr. JB Friday, Extension Forester, working with MAFF personnel and Mr. Shane McCarthy of Coffee Cooperative Timor (CCT) intend to use the mature trees to enable villagers to feed Bali cattle for beef production. During the past quarter, University of Hawaii staff has been preparing material and planning for a workshop scheduled for the next quarter to train MAFF personnel and villagers to establish and maintain nurseries for these and other tree species.

Soil test kit used to diagnose fertilizer needs

Information generated by the soil test kit will be worth many millions of dollars to the Timor-Leste economy over the years ahead. The benefit will accrue not only from returns on investments in fertilizer use, but also from savings achieved through avoidance of applying unneeded inputs. A case in point is potassium fertilizer.

The soil test kits show that potassium, the most expensive of the three nutrient elements, is naturally abundant in East Timor soils. During Indonesian times and up to the present, equal amounts of nitrogen, phosphorus and potassium fertilizers were recommended for all crops and soils. Today, MAFF recommends fertilizer use based on need. Up to now, farmers have suffered from inadequate and false information. While the soil test kit alone cannot transform East Timor's agriculture, the evolution of the traditional farming system into a modern, market-oriented economy will not occur without the information generating capacity of tools such as the soil test kit that enables MAFF and its customers to make sound economic choices.

Proper diagnosis doubles and triples corn yields for greater farm profit

Farmers in East Timor obtain one to two metric tons of corn grain per hectare without the use of fertilizers. Corn yields can easily be doubled or tripled with fertilizer but the risk and cost of adding fertilizer discourages farmers from using it. The soil test kit adopted by MAFF for making fertilizer recommendations enables farmers to add only those nutrients that are deficient can change farmers' attitude towards fertilizers. Corn fertilized according to soils test results produced \$5 to \$10 worth of additional corn for each dollar of added fertilizer. In trials conducted by farmers, \$80 worth of fertilizer added to a hectare of land produced from 2000 to 4000 additional kilograms of corn worth \$.0.20 per kilo in Dili markets. The aim is to work with MAFF personnel to enable them to combine soil test results with observed yields and knowledge of production costs to transfer lessons learned in the Seical watershed to other districts and watersheds in the nation. The training and testing phase must now be followed in the next growing season by widespread technology diffusion.

Initial corn demonstration trials harvested.

Two corn varieties, Arjuna and BISI2, were planted in trials planted as demonstration plots in Gariuai, Venilale, and Fatumaca. Soil test results were used to determine nutrient

levels in the soil prior to planting. For the demonstration, treatments were designed with 2 varieties and with and without benefit of fertilizers. The experiments were harvested in late Feb and early March. At all three locations, BISI2 outperformed the more commonly grown Arjuna by more than 1000 kg/ha. For both Gariuai and Venilale, fertilizer application improved yields by 2000 to 4000 kg/ha. At the Don Basco School in Fatumaca, where the fields have had a long history of fertilizer applications, yields from fields treated with N, P, and K fertilizer were no different from those obtained by applying only N. Soil test results had shown that soils at the Don Bosco School had more than adequate levels of K and P prior to planting indicating that N alone was needed to achieve high yields there.

Rice performance equally promising

Rice trials planted later in the rainy season have just been harvested and appear to show similar results as the corn trials. The goal for the rice crop is not simply to achieve high yields but to produce high quality rice at competitive prices to enable local producers to market their rice locally at prices that are equal to or lower than imported rice. MAFF and project personnel are concentrating on the agronomic and economic aspects of rice production and are working closely with the German project, which is focusing on milling and packaging of local rice.

Adulterated fertilizer detected

Fertilizers purchased in Dili were analyzed by the University of Hawaii Agricultural Diagnostic and Service Center to verify their chemical content. The results showed that two of the three fertilizers were not properly labeled or adulterated. Fertilizer labeled as TSP (Treble Super Phosphate) contained 36% instead of the required 45% P₂O₅, and the muriate of potash (KCl) turned out to be table salt (NaCl). To confirm these results, another set of samples was purchased from another dealer and analyzed. The second set produced similar results, indicating that the problem may reside with the wholesaler.

The Minister and staff in the Crops Division of MAFF have been informed of the situation and MAFF personnel will be trained to use a fertilizer test kit that enables MAFF to do its own fertilizer testing.

Minister visits demonstration trials

Minister of Agriculture, Forestry and Fisheries, Estanislau da Silva and a delegation of 25 guests visited the demonstration trials at Fatumaca on March 6, 2004. The Minister was pleased to see the effect of soil tests on fertilizer use efficiency and improved crop performance. He first learned about the soil test kit in Hawaii when he visited the state last year and strongly recommended that his staff be trained its use. A report of the Minister's visit can be found at the project's web site at <http://tpss.hawaii.edu/tl>.

Project website established

The project web site or URL was established on a University of Hawaii server to report on project activities. Access to the site is available at <http://tpss.hawaii.edu/tl>.

Community-based project in the works

The UH and MAFF team learned of the high priority placed on home gardens and vegetable production from villagers relative to food security and income generation during the PRA as noted above. Interactions with communities the sub districts of Venilale and Gariuai during the PRA raised their expectations of assistance and support from the MAFF and UH team. Mr. Antonio Lopes of MAFF/Baucau, Mr. Fernando Sousa and Dr. Andre du Toit of UH followed up with meetings with interested to plan implementation of village-led projects. Six land-use or community-based projects were designed and agreed upon by villagers and MAFF/UH staff. These projects included the use of chromolaena cuttings as compost to be placed at the bottom of dug-out plots for vegetable production in Uaitobono and Bubuanacala in the Venilale sub district, in Uatoua, Uatome, and Ostico in the Gariuai sub district and in Vemassee. The land area cleared of chromolaena was then suggested for multiple use by villagers. In Ostico, for example, the farmer, Mr. Alberto Ferreira, wants to raise broiler chickens for sale at the local markets. Another in Uatoua is considering raising hogs. Manure from both sources will be used for the vegetable plots. Edgar Marcel has prepared three ponds to raise fresh water fish, ikan mas in Uatome.

Objectives and Performance Indicators

QUARTERLY REPORT

Jan 01 to Mar 31, 2004

The following is our quarterly progress report of activities related to the 3 project objectives during the reporting period January 1, 2004 to March 31, 2004. The overarching activity involving all 3 objectives was the participatory rural appraisal (PRA) conducted by MAFF, Peace Corps, and University of Hawaii faculty at villages in Venilale, Fatumaca, and Gairuai in the Seical watershed of the Baucau District. A separate summary report of the PRA is attached to this report.

Specific activities and accomplishments achieved during the previous quarter and the past quarter are reported below and can be distinguished by color.

Objective 1. Increase agricultural productivity and food security.

A. First Cropping Season. (November 2003 to May 2004)

Estimated Performance Indicator:

- Maize and rice yields doubled in participating farmers fields relative to yields in non-participating farmers' fields employing traditional farming practices.

Accomplishments:

First Cropping Season—Performance Indicators:

- Communities for potential demonstration experimental sites in Seical, Gariuai, Fatumaca and Venilale identified in July 2003 by MAFF and UH team. Action item #2.1
- Training course on application of soil test kits to diagnose nutrient deficiency(ies) conducted at the Dom Basco School in Fatumaca in September 2003. Twenty-five participants from 10 of the 13 agricultural districts in the country were present. #2.1.
- Specific sites for demonstration plantings agreed upon in meetings with suco chiefs and farmers and prepared for planting in October 2003. Action item #2.1.
- Maize demonstration plots laid out and planted November 17 to 28, 2003 in Venilale, Gariuai, and Fatumaca. In Venilale, 16 farmer groups were identified and have been assigned to manage and oversee experimental plots. There are nearly 15 farmers per group. In Fatumaca, Father Locatelli of the Dom Basco School will oversee the management of the plantings on the school's farm. In Gariuai, the plantings are on the land of two landowners in the village. Management oversight provided by both owners. MAFF staff from the Baucau agricultural district office, Antonio Lopes, participated in the negotiations and implementation of plantings. Action #2.2.
- Rice demonstration trial planted in Uaitubono in Venilale February 2004 with assistance from Antonio Lopes of MAFF/Baucau.
- The rice demonstration treatment in Seical was designed with Deolindo da Silva, Claudino Nabais, and Justino dos Santos Silva, Crops Division, MAFF. The rice crop in certain parts of Seical incur salinity injury when fertilized. A treatment to add fertilizer in small doses will be included in the trial to see whether this reduces the injury and raises grain yield. The rice demonstration plots in Seical were not planted because there was no irrigation water available to start the nurseries. The broken irrigation intake will be repaired approximately February 21, 2004. The rice demonstration plots should be planted when water is available.
- Automatic recording weather stations for 4 sites shipped and received in November 2003. Five soil test kits were also received in November. Both shipments were cleared from customs in December 2003. Weather stations are to be installed in January to February. #2.2 and 2.3.
- Four weather stations were assembled and approval obtained from farmers for their placement on demonstration sites at Bubu Ana Cala, Uaitobonu, Fatumaca, and Seical in February 2004.
- Research agronomist for the watershed selected in December and is expected to be employed in January 2004. #2.2, 2.3 and 2.4.
- Research agronomist posted in Baucau in February 2004.
- Soil samples from 57 sites across the Seical watershed were collected for analyses of pH, soil nutrients and engineering properties by UH graduate student, Chiharu Takase.
- A one-day soil test kit workshop was held on February 18, 2004, at the Seminari Minor Beato Felipe Rinaldi, Venilale. Participants learned to collect and prepare soil samples, perform chemical analyses on the soils, and diagnose soil fertility problems. The participants included staff from Fatumaca and Venilale schools, farmers, an UNATIL student, and MAFF staff. The participants included:

Name	Address	Organization
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Francisco Gama	Badoho village	Farmer
Simplicio X. Sarmento	Gariuai village	Fatumaca staff
Teofilo Freitas	Gariuai village	Fatumaca staff
Antonio Pereira Do Rego	Fatulia village	Student UNATIL
Herman Nabo	Venilale	Fr. Virgilio staff
Constancio J. do Rego	Fatulia village	chefe de suco
Teotonio de J. Freitas	Gariuai village	MAFP Baucau
Antonio J. Lopes	Baucau	MAFP Baucau
Caren du Toit	Baucau	UH

Soil test kits were provided to both the Fatumaca and Venilale schools.

Objective 2. Diversify and intensify crop production to generate new income and employment opportunities.

A. First Cropping Season.

Estimated Performance Indicator:

- Economic feasibility of producing local rice of equal quality and price as imported rice established.

Accomplishments:

First Cropping Season—Performance Indicators.

- Availability and costs associated with producing locally grown local varieties of rice versus imported rice noted during site selection process (July 2003). Kent Fleming, UH extension farm management specialist, was part of the 4-people team to select sites in the watershed. In his meetings with representatives from GTZ (Kohl) and NCBA, import substitution with local rice of equal quality and price as imported rice was considered a possibility if productivity of local rice could be improved. Action item #5 and 5.1.
- Planning process of participatory rural appraisal (PRA) to be conducted at selected sucos in the Seical watershed in Jan 2004 implemented in Nov 2003 at UH. Meetings were organized to include other UH faculty and staff prepared to contribute. Timing of these meetings allowed for the full participation of Watson. At least 3 villages were identified for the PRA with others listed as possibilities. The 3 were Venilale, Gariuai, and Seical. Action item #4.
- PRA implemented for training of MAFF and information gathering in January 2004 by 5 UH faculty—McArthur, Friday, Chan-Halbrendt, Du Toit, Minerbi, and Powley. Four Peace Corps volunteers participated as interpreters and trainees of principals and methods used for the PRA. Eighteen MAFF staff members from Baucau and Dili participated. The PRA was conducted with the support of villages in Venilale, Gariuai, and Seical.

Objective 3. Improved watershed productivity and sustainability through the adoption of sound natural resource management practice.

A. First Cropping Season.

Estimated Performance Indicator

- Fodder and fuel wood banks established in three villages in Seical watershed.

Accomplishments:

First Cropping Season—Performance Indicators.

- Seeds for insect resistant varieties of *Leucaena leucocephala* were shipped from Honolulu to Dili in October 2003 for use in fodder and fuelwood banks. #7.3 and 7.4.
- Test plantings for germination implemented in October 2003. These seedlings would be available for distribution to farmers interested in planting the improved variety of *L. leucocephala* during the PRA in January. #7.3 and 7.4
- Seedlings of *L. Leucocephala* were germinated and maintained at CCT. These seedlings (2500) were transported to the Seical watershed for distribution to villagers. A training exercise on tree nurseries was determined as one of the needs of interested villagers and will be planned for the next quarter. #7.3
- J. Powley, extension specialist in animal science, will participate in the PRA to learn of interest and past management of livestock in the selected villages. Sources for feed and fodder will be examined #7.1 and #7.2
- Powley participated and learned of the interest of the Don Basco School in Los Palos in livestock and pasture management. He will follow up to determine the extent of this interest. #7.1

All Objectives.

- A. Participating National University faculty members adopt and incorporate lessons learned from project into the University's teaching, research and outreach programs.
 - MAFF (Mr. Claudino) informed UH of their plans to provide training to National University faculty on the use of the soil test kit to diagnose soil nutrient status in the spring of 2004. #2.6.
 - Fifteen soil test kits were shipped to MAFF to support their efforts to implement training and distribution of the soil test kits to the National University and to Agricultural District Officers. #2.6. (Unfortunately, the shipment requires customs clearance and was still not available to MAFF at the time of this writing.)
- B. Fifty percent of the returning East West Center students to fill key private sector and government positions after graduating from the University of Hawaii.
 - Five additional undergraduate students from Timor-Leste to enroll at UH through the East West Center for the Spring term 2004.
 - As part of the project's intern program, 7 current East West Center students from Timor-Leste participated in a visit to agricultural watersheds on the island of Hawaii during the Christmas recess. (#9.1)
 - At least 7 East West Center students from Timor-Leste have prepared proposals to participate in the internship program instituted by the project this coming summer. #9.1
- C. MAFF staff adopt and practice project methodologies in two other watersheds or districts.
 - MAFF (Mr. Claudino) reported conducting a training on the use of the soil test kit in Oecussie in November 2003. Follow up on #2.1.
 - MAFF installed demonstration farmer trials in Manatuto in March 2004. #2.1

1. Fiscal reports

A. Accrual report

Accrual Calculator

(1) Jul 07, 2002 to Jun 30, 2005 = 24 months

Period of Performance(P):	24
Months to date (M):	9
Quarters remaining (Q):	5

Obligated Total (A) \$ 2,400,000.00

Vouchered Total (B) \$ 502,931.00

Encumbrance Total (B1) \$ 75,000.00

(as of Mar 31, 2004)

Unliquidated Total [C] \$ 1,822,069.00

Estimated Accrual (D) \$ 397,069.00

A/P x M (used) - B

Modified Accrual (E) \$ 100,586.20

Calculations for Estimated Accrual

A/P \$ 100,000.00

A/P x M (used) \$ 900,000.00

Calculations for Modified Accrual

m1=Actual project to date expenditures: \$502,931.00

(Mar 31, 2004)

t1=Quarters remaining: 5

m1/t1= \$100,586.20

Estimated Project to Date Expenditures (m1+t1): \$603,517.20

Vouchered amount \$502,931.00

B. Expenditure report.

Timor-Leste Agricultural Rehabilitation, Economic Growth and Natural Resource Management Project

Expenditure report for the period ending 03/31//04

DESCRIPTION	1ST Qtr. 2004 (JAN - MAR)	Summary Total
Salaries & Wages	\$52,984	\$94,444
Fringe Benefits	\$9,230	\$17,413

Services	\$40	\$16,344
Materials & Supplies	\$19,677	\$43,154
Travel - Domestic	\$4,497	\$7,403
Travel - International	\$56,600	\$138,329
Print & Publications	\$673	\$673
Util & Communication	\$1,010	\$3,944
Rentals	\$9,020	\$11,085
Equipment	\$65,153	\$65,153
Others	\$19,224	\$20,429
Indirect costs	\$43,685	\$84,560
TOTAL	\$281,794	\$502,931

2. Written reports, news articles or other material

- PRA report. A draft report of the PRA was prepared for review among UH faculty and staff involved in the PRA. A final version is expected in the next quarter.
- Video report. With the written report, we anticipate having a video produced on the methods utilized in carrying out a PRA. The video production will be prepared in separate modules and will be produced in Portugese, Tetun, and English.

3. Implementation Issues/constraints

- A. Two 4WD Toyota Hilux trucks became available for project use in March 2004. The University of Hawaii's administrative procedure to purchase vehicles we found to be time consuming and inefficient. Nearly two months were required to issue a purchase order to Bridge Auto in Darwin. Our local staff had to clear the vehicles through Timor-Leste customs. This required 3 weeks of intensive follow-up contacts.
- B. Transmittal of documents has been via DHL. FedEx is listed as an available service but FedEx in the U.S. has thus far indicated they do not deliver to Dili. It is also possible to use regular airmail to send letters and documents to Dili. To do so requires establishing a post office box (PO Box) in Dili that was done by du Toit. Mail from the U.S. requires a minimum of 3 weeks.
- C. Importation of seeds. The Timor-Leste quarantine service is operational. In order for us to send *Leucaena leucocephala* seeds to Dili required an importation permit from Timor-Leste. We then were able to obtain a phyto-sanitary certificate from USDA-APHIS to ship the seeds for use in tree nursery training and test plantings.