

## **ACTION PLAN NARRATIVE**

### **Action No. 1**

#### **Train MAFF Staff in modern extension and research methods**

MAFF personnel will be trained in science-based extension, crop production, and land management practices that are essential for the transformation of the agricultural sector from subsistence farming to a market-oriented system. This modernization process will enable MAFF to replace trial-and-error technology transfer with knowledge-based technology transfer that will enable farmers to minimize weather-related risks and exercise choice in the crops and practices they adopt. The in country program coordinator and UH faculty will work with MAFF administrators and staff to institutionalize the adoption and use of science-based research and extension methods. This modernization process will involve assembling of natural resource databases (an ongoing effort of the MAFF GIS unit), and the development of knowledge-based tools (to be provided by UH), and information and communication technology. MAFF staff, with the advice and assistance of UH faculty, will install one knowledge-base tool in the first six months. MAFF will also be linked to an international network of users to keep the knowledge-based system updated.

Specific Actions by UH Faculty:

- Train MAFF in information-based technology transfer tools including crop modeling and decision support system tools.
- Assist MAFF in assembling and institutionalizing use of natural resource databases for decision support.

### **Action No. 1.1**

#### **Train MAFF staff in soil-plant-climate relations for Timor Leste conditions**

Soil, plant genes, and climate play a major role in crop production. Matching the plant's biological requirements to the environment lessens the need to modify the environment, making crop production more efficient. For rice, one benefit of better management is higher grain quality, which will facilitate milling, and marketing. A major economic constraint in the Seical watershed identified by GTZ is the low quality rice now being produced by the milling process.

A workshop on plant, soil and climate requirements will be held for the MAFF staff in Dili and Seical watershed in January 2004. The workshop will focus on plant, soil and climate interactions, management practices to mitigate imperfect crop-environment matches, and weather data collection.

### **Action No. 1.2**

#### **Train ALGIS staff and National University staff to use soil and climate data for crop yield forecasting and risk assessment**

Crop production depends on year-to-year changes in weather. Forecasting crop production levels provides a basis to implement strategic management practices that reduce risk, mitigate weather impacts, and stabilize crop yield. A workshop on yield

forecasting and risk assessment will be held in April 2004 for ALGIS staff, MAFF. The workshop topics include using crop forecasting tools, risk analysis, and managing the negative impact of weather.

### **Action No. 1.3**

#### **Train MAFF personnel to use multimedia tools to transfer new technologies to farmers**

Transferring new technologies to farmers requires effective communication. Video offers active visual and audio to transfer information on new technologies to farmers with high impact. Video production and presentation techniques will be introduced in a workshop held in Dili, in April 2004. Information generated from workshops in Objectives 1, 2, and 3 of this project will be recorded and used as examples for producing extension video.

### **Action No. 2**

#### **Train MAFF personnel to use soil fertility and nutrient management decision support tools**

Two MAFF personnel will participate in a soil fertility workshop in Thailand to learn and observe how the soil test kit and the nutrient management decision support tool are applied on a national scale to deal with nutrient management for profitable agriculture. These two individuals will serve as trainers when they return to Timor-Leste to train university staff and district officers with guidance from UH faculty in the use these tools.

Specific Actions of UH Faculty:

- Provide logistical and financial support for two MAFF staff to attend international workshop on use of portable soil test kit and nutrient management decision support tool.

### **Action No. 2.1**

#### **Soil Fertility Evaluation workshop**

- i. Who: MAFF staff, selected NGOs, selected district officers. Possible workshop total dependent on logistics
- ii. Where: Fatumaca, Father Locatelli's school
- iii. When: Probably September 15 or as soon as feasible thereafter
- iv. What will be done:
  - (1) Introduction to soil fertility evaluation and fertilizer requirement prediction using soil test kits
    - (a) Lectures on evaluating nutrient status and soil-based limitations
  - (2) Collection of soil samples from potential sites where experiments might be installed. This might be a two or more sample ideally at low, middle, and high elevation sites.
    - (a) Sites representative of crop growing conditions in the immediate surroundings and representative of the crop production area.
    - (b) Sites representative of the gradient in elevation and changes in farming practice and representative of apparent social and economic conditions and environment

- (3) Samples will be analyzed during the workshop; split samples will also be brought to UH for confirmatory analysis, and to Kasetsart University (Dr. Pongsan).
- (4) Discuss with MAFF staff, village leaders, and growers and propose that three experiments be installed including a check and all necessary nutrients added on respectively,
  - (a) Low elevation: rice and maize with fodder banks, include appropriate species comparison if soil nutrient status is not limiting, design based on soil test results
  - (b) Medium elevation: rice, maize and fodder banks, include comparison of species if soil nutrient status is not limiting, design based on soil test results
  - (c) High elevation, rice, maize, and fodder banks, include comparison of species if soil nutrient status is not limiting, design based on soil test results

#### **Action No. 2.2**

##### **Establish cropping system experiments at 3 seical watershed sites**

- a. What: Experiments will compare improved cropping practices, whether they be nutrient improvements, variety improvements, cropping alternatives, or new cropping systems, such as fodder banks.
- b. When: Experiments will be laid out and planted by late November to January in order to take advantage of the 2003-2004 rainy season

#### **Action No. 2.3**

##### **Workshop and training visits to experiments to illustrate principles and working technology**

- a. What: Visit and hold demonstration of soil test kits, variety comparisons, other technologies by District Officers, MAFF crop staff, NGO's
- b. Where: Workshops on carrying out economic feasibility and suitability studies for MAFF and District Officers of subdistricts of the Seical watershed.
  - i. Workshop on innovations in increasing crop productivity, visits to experimental sites, training in the use of soil test kits
- c. Who: MAFF staff trained in establishing and monitoring cropping systems experiments, Timor-Leste Project staff
- d. When: During growing season 2003-2004

#### **Action No. 2.4**

##### **Introduce alternative management options to local farmers**

This is a critical step in the project as the adoption of modern farming methods occurs at this point. Careful selection of farmers with leadership qualities is required to ensure success.

#### **Action No. 2.5**

##### **Data analysis workshop on decision-aids, GIS and economic analysis and planning**

- a. What: Workshop introducing and reinforcing existing knowledge, experience, and introducing new information technology for the identification of cropping zones, testing existing soils data
- b. Who: MAFF staff, Timor Project staff, Natural Resource Conservation Service, U.S. Department of Agriculture (NRCS) consulting staff, NCRS consulting staff, NGOs, interested USAID staff
- c. When: After cropping season (March 2004)

#### **Action No. 2.6**

##### **Soil test kit workshop for National University staff and students**

The lessons learned from earlier from workshops will be applied to train National University staff and students in the use of the soil test kit. The test kit enables a user to diagnose soil nutrient deficiencies and can be used to prescribe fertilizer recommendations to growers. The use of the kit should become part of the University's agriculture curriculum.

#### **Action No. 2.7**

##### **Train National University staff and students to use participatory methods to introduce modern farming techniques to farmers**

Virtually all agricultural development efforts use participatory methods to transform traditional agriculture to market driven economies. This project will train faculty and students from the National University in participatory methods with expectation that this method will become part of the University's curriculum.

#### **Action No. 3**

##### **Coordinate and partner with NGOs, international donors and other agriculture service providers in the Seical watershed to strengthen MAFF capacity**

Many donors are now assisting MAFF to strengthen its capacity help the agricultural sector become the engine for economic growth for Timor-Leste. No single donor covers all areas of capacity building. For this reason, it is essential that the donors work together to cover full range of capacity building, as well as to identify and to fill gaps that no donor now provides.

#### **Action No. 3.1**

##### **Delineate areas for expanded production of food, forest products and traditional crops**

The expansion of existing, and the introduction of new income generating crops can occur on a timely basis only if lands suitable for their cultivation are known and their boundaries delineated. Within the pilot watersheds the UH team will determine the best growing sites for key export crops. This will require matching the biological requirements of the crops to the physical characteristics of the land, appropriate technology incorporating traditional knowledge. MAFF personnel will be trained to in the use of knowledge-based technology transfer methods to perform this task for existing crops and future crops.

Specific Actions of UH faculty:

- Delineate areas within the watersheds suitable for maize and rice production and establishment of fodder and fuel wood banks.
- Train MAFF personnel in methodology to match crop requirements to land characteristics.

#### **Action No. 4**

##### **Train MAFF personnel in conducting PRA to assess the suitability and feasibility of farmers adopting alternative soil and crop management practices**

An interdisciplinary participatory rural appraisal (PRA) will be conducted to ensure farmer participation in project activities. In the process of training MAFF personnel to gather farmers' views on the socio-economic suitability and feasibility of alternative soil and crop management practices, MAFF personnel will learn to appreciate the value of indigenous knowledge in enhancing adoption of new technology.

#### **Action No. 5**

##### **Train MAFF personnel to intensify existing cropping systems for production of cash crops**

There is a year-round demand for fresh fruits and vegetables, but their production is constrained by location and seasonality. To sustain year-round supply of high demand cash crops MAFF extension personnel will be trained to advise growers within the watershed when and where key cash crops can be grown profitably. Project personnel will work with MAFF staff to specify locations and season for producing cash crops (beans, carrots, potatoes, leafy green vegetables, ginger, garlic, etc.) This will also include recommendations for irrigated cash crop production to expand the production area and extend the growing period.

Specific Actions by UH Faculty:

- Delineate areas suitable for cash crop production in the watershed.
- Train MAFF personnel in crop intensification techniques (multiple cropping, intercropping, etc.)
- Train MAFF staff on how to advise growers on where and when cash crops can be marketed.

#### **Action No. 5.1**

##### **Workshop on farm management to introduce farmers and MAFF personnel to the conditions required to transform subsistence agriculture to a market driven economy**

From Jan 2004 Fleming will collect information and data on farm management from the Seical watershed. In June 2004 or earlier, Fleming will conduct a practical strategic management workshop based on fundamental farm management concepts. These will include recognizing marketable production possibilities, analyzing the technical feasibility of a market-driven enterprise, enterprise budgeting (including identifying key variables & data collection), evaluating economic profitability and financial feasibility, managing associated production and marketing risks (especially using breakeven analysis), monitoring and controlling costs, evaluating economic performance, and adjusting a given strategy (especially utilizing partial budgets) for improved economic performance. While all of these procedures can be performed manually, the workshop

will to the extent practical utilize simple spreadsheets. All of the examples will be based on TL economic situations observed during the January 2004 work in market development. Dates of proposed workshops will be scheduled to avoid national holidays in Timor-Leste, coffee harvest schedules, and common vacation time for many MAFF personnel.

#### **Action No. 5.2**

##### **Workshop on marketing strategies for agricultural inputs and products**

Workshop on how market systems work for agricultural input supply, output disposition and trade. As the information is gathered from the project participants it will be used in the workshop as a case study to demonstrate how well the current market system works and evaluate how to remove the constraints for a more efficient market economy. The workshop will occur in June 2004. In January 2004, the team will explore economically feasible arrangements for input supply and potential marketable surplus from the participating farmers that are essential for sustainable adoption of the innovations. In January 2004 Fleming and Chan-Halbrendt will evaluate different input supply options to farmers to provide incentives adoption of recommended interventions. Fleming and Chan-Halbrendt will evaluate the consumption pattern and explore market options (specifically import substitution) for the marketable surplus. Arrangements will be discussed with local merchants to purchase the project's increased rice production, assuming the project rice is of comparable quality and price. Currently imports are more than the project's anticipated increase in production, making profitable import substitution a likely scenario. Discussions with GTZ on the possibility of packaging the project's rice and selling it in the Dili market will continue. Marketing options for other crops such as maize and candlenut oil will be explored and hopefully developed.

#### **Action No. 5.3**

**Train EWC/TL students to conduct inventory of vegetable and traditional crops cultivated in the watershed.** Watson, UH staff, East West Center students and MAFF personnel will inventory traditional crops and famine survival strategies. This will assist in determining compatibility of proposed innovations, explore the dynamics of the system and determine potential of new crops or forest products. Tied to 5.1 and 7.2

#### **Action No. 6**

##### **Workshop on project analysis and outlook**

The project analysis workshop will occur in June 2004, after the first growing season. The analysis of the first growing season will pull together information from the crop enterprise budgets, economic and financial assessments, household consumption survey, and market development options to determine the degree to which the project has met its objectives. The workshop will survey farmers to determine the level of subsidy on inputs (improved seed, fertilizer) required in Year 2 for continued farmer participation; assess the actual disposition of the marketable surplus of crop production stimulated by the project; report strengths and weaknesses of the first cropping season's activities and suggest changes in Year 2 activities.

**Action No. 6.1**

**Train MAFF staff to apply project results for policy advice** As information about our participating farmers are gathered, this information will be used to assess the impact of government policies on the performance of the agriculture sector. The project will repeat this assessment after each growing season to uncover reasons for success or failure to adopt new practices. Production inputs (especially fertilizers) need be available and affordable to farmers in the project area. While the project may supply these inputs at no cost to farmers during the initial trial stages of the project, the spread of the new technology beyond the project will depend on ability of farmers to purchase inputs. The project needs to determine what input supply and credit systems now operate in the area at present, and determine how existing systems can be strengthened or new ones created such as village organizations, cooperatives, or private initiatives.

**Action No. 7****Watershed PRA focused on sustainable natural resource management.**

Any forestry or agro forestry work in Timor Leste needs to be developed and adapted in the local context. While we could design any number of biologically feasible agro forestry systems from Hawaii, we need to work with Timorese farmers especially the women, to develop systems that make sense for them, economically and socially. The diagnosis of the local farming system is part of the design process in agro forestry. Diagnosis allows agro foresters, with participation of local farmers, to design appropriate technologies. This PRA will be held in conjunction with **Action No. 4**.

**Action No. 7.1****Train farmers, MAFF staff, and NGO staff in the establishment of fuel wood and fodder banks**

One possible agro forestry technology we might introduce is fodder banks. These are groups of trees that are planted to produce forage for grazing animals. Generally they are legumes with high protein leaves. In Timor, a mixture of *Leucaena leucocephala*, *Gliricidia sepium*, and *Sesbania grandiflora* or other species (e.g. *Zizyphus* in coastal areas) if locally available would work well. Other species recommended for fodder banks that I observed locally include *Albizia lebbek* and *Erythrina* spp. Improved fodder grasses, as locally available, could be planted between rows of trees. The system could be managed so that branches would be saved for use as fuel wood while the leaves would be used for fodder. Fuel wood could be used by the farm household or sold for additional income.

**Action No. 7.2****Train farmers, MAFF staff, and NGO staff in agro forestry technologies to control land degradation and forest protection**

Frequent fires, overgrazing, and soil erosion have all contributed to land degradation in Timor-Leste. A wide range of agro forestry technologies might be appropriate and useful to farmers to reverse these trends. Agro forestry technologies such as improved fallows, enriched fallows, living fences, farm woodlots, windbreaks, overstory shade crops, and

contour hedgerows all have been successful under some economic and ecological conditions. For example, nitrogen-fixing trees planted on fallow land might help to more rapidly restore soil fertility while providing an eventual harvest of fuel wood. Farmers would be trained in the species selection, propagation of trees, and planting techniques. We will work with the farmers of the Seical river watershed to design appropriate agro forestry systems for their farming systems and train MAFF and NGO personnel in the diagnosis and design of agro forestry technologies.

**Action No. 7.3**

**Train farmers, MAFF staff, and NGO staff in improved management of non-timber forest products**

Non-timber forest products such as palm leaves, sago palm, bamboos, rattan, and candlenuts form an important of rural people's livelihoods in Timor-Leste. Currently most non-timber forest products are gathered rather than cultivated. During the Participatory Rural Appraisal, we will work with the local farmers to design systems that increase production and sustainability of non-timber forest products. While many of these products may be sold, markets are currently lacking. We will investigate new markets for non-timber forest products and opportunities for increased production. Increased sales of these products will lead to increased income of rural households.

**Action No. 7.4**

**Train farmers, MAFF staff, and NGO staff in methodologies to foster smallholder tree planting and reforestation**

While the hydrology of the watershed would benefit from reforestation of the uplands, the MAFF has neither the budget nor the control over land use in remote areas to launch a massive reforestation program. Experience elsewhere has shown that farmers are capable of reforesting local areas if there is a market for timber and forest products and if they have the right to harvest the trees. We will train MAFF personnel in the methods that have successfully encouraged smallholder reforestation elsewhere in Asia and work with the farmer households in the Seical river watershed to work out appropriate incentives to plant and protect trees.

**Action No. 8**

**Train National University and EWC/TL students in watershed assessment and monitoring**

The continued participation of National University students in all aspect of project activities is necessary for them to learn the sequence of actions required to transform subsistence farming to a market economy. The National University student involvement with their counterparts from the East West Center will be beneficial to both groups.

**Action No. 9**

**Supervise EWC/ TL graduate students research connected with project activities in the watershed**

Under auspices of the State Department Timor-Leste Scholarship Program and the East West Center seven students from Timor-Leste are currently working towards Masters Degrees at the University of Hawaii in public health, education, public administration,



environmental engineering, biosystems engineering and urban and regional planning. The USAID/UH project plans to create an internship program for these students and to involve them and their faculty advisors in various training and project related activities during the summer months. During the first six months some of the students will be involved in monitoring the flow of human and biophysical resources and energy in the watershed. This includes the movement of water and soil from the top to the bottom of the watershed and the movement of people and crops and nutrients in and out of the watershed. It will also involve documentation of farming practices and the impact of key government services including education, health and extension activities within the watershed. In performing these activities the students will gain valuable practical experience and an important sense of ownership in the development of their country.

Specific Actions of UH Faculty:

- Train students in basic rapid rural appraisal (RRA) techniques prior to departure from Hawaii.
- Assign students to work as members of the project teams in each watershed.
- Students will be mentored by their respective faculty advisors and/or project staff.

#### **Action No. 9.1**

**Tour of State Research and Extension Station by TL EWC Students on Oahu, Maui and Hawaii to observe and technology transfer from research station to farmer fields**

Project personnel will take Timor Leste students supported by the East West Center and studying at the University of Hawaii on a tour of the Experiment Stations to show the students how the US Land Grant University system operates to serve its customers.

#### **Action No. 9.2**

**Train EWC students in participatory methods for nation building by involving them in watershed agricultural and community development work with project personnel in Timor Leste and elsewhere as appropriate**

The East West Center requires all of its TL students to return home for summer to perform independent studies of their choice. The project will encourage them to link their summer programs to project objectives. The project will also support student summer programs in other institutions and if appropriate.

#### **Action No. 10**

**Link NGOs and Peace Corps community development efforts with project activities to minimize duplication of effort and gain from synergy of collaboration**

The Peace Corps which does not do agricultural development work can play an important role to mobilize the community to participate in project activities. This partnership with the Peace Corps can produce mutually beneficial results.

**Action No. 11****Train MAFF personnel to interpret soil survey data for engineering uses of land.**

The soil summary data now in the hands of MAFF can be interpreted for agricultural as well as engineering uses of land. The interpretation of soil survey data for engineering use is especially critical in Timor-Leste because many of the island soils have developed from limestone and are dominated by clays that shrink and swell with wetting and drying. These types of soils serve as poor and unstable foundations for roads and buildings. The soil survey data will be used to delineate areas that contain such soils so that engineers are alerted to their presence and can take proper steps to avoid construction problems. MAFF personnel will be trained by a specialist from the National Resource Conservation Service under a separate agreement between USAID/Dili and the NRCS to interpret soils survey data for engineering uses of land.

## Specific Actions of UH Faculty:

- UH staff will use U.S. Natural Resource Conservation Service (NRCS) methodology to interpret available Timor-Leste soil survey data for engineering use of soils.
- UH staff will train MAFF personnel in interpreting soil survey data for engineering use of soils.

**Action No. 12****Coordinate Hawaii visit of the Minister of Agriculture**

The UH team will coordinate a one-week study to tour for the Minister of Agriculture to enable him to observe and be informed on a range of agricultural production methods and enterprises in a tropical island environment. The Minister will meet with key faculty and staff at the University of Hawaii Manoa campus on Oahu and visit the Island of Hawaii (the Big Island) to observe the agro-tourism operations that have been developed as an important value-added component of the coffee, macadamia nut, tropical fruit and ornamental flower industries. He will also be introduced to on-going agro-forestry research in Hawaii.

## Specific Actions of UH Faculty:

- Prepare detailed itinerary for the Minister
- Provide honorarium
- Make hotel and inter-island travel arrangements
- Escort Minister to each appointment and visitation activity

**Action No. 13****Foster close collaboration with other agricultural sector donors and service providers.**

Project personnel will meet with key donors and service providers to increase their awareness of the project objectives and to identify ways in which mutually productive synergy can be generated in donor efforts to foster agricultural development in Timor-Leste. Project personnel intend to work in a way that it will generate a positive leverage of USAID resources and complement, rather than duplicate, the efforts of other donors and service providers.

## Specific Actions of Project Personnel:

- Meet with key donors and agricultural service providers
- Identify ways in which donor efforts can be better coordinated to allow for partnerships and greater participation of MAFF.

**Action No. 14**

**Post in-country project coordinator and hire local administrative assistance**

A country coordinator will be posted in Dili by UH to work directly with the MAFF. Timor-Leste administrative assistant and technical assistant will be recruited and hired. These two individuals will provide full-time management and administrative support for the project including scheduling and logistical support for UH faculty TDY assignments. They will also play a critical in establishing and sustaining relationships and working partnerships with MAFF, the National University and various donor agencies NGOs, agriculture service providers and local farm households The in-country coordinator will prepare draft Mouse with partnering agencies including the MAFF and the National University and work with the Hawaii-based project director to prepare a final report at the end of the six-month project period.

Specific Actions of UH Faculty:

- Assign in-country coordinator to Dili
- Recruit in-country administrative assistants and staff.

**Action No. 15**

**Coordinate trip for Minister to agricultural conference in Sacramento**

As a service to USAID/Dili, the UH team will coordinate arrangements for the Minister of Agriculture to attend a special international ministerial conference on agriculture to be held in Sacramento, California in June, 2003.

Specific Actions of UH Faculty:

- Make appropriate travel arrangements
- Provide honorarium and pay hotel, conference fee and incidentals.