

Seeds of Life **Fini ba Moris**

TERRACING REPORT SUMMARY

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Terracing activities undertaken by farmers to respond to the problems of:

- **Soil erosion**
- **Needing to move their gardens**
- **Impacts of Climate Change**

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INTRODUCTION

In East Timor, farmers experience periods of intense rainfall causing erosion and periods of low rainfall making it difficult to grow crops. To address these problems, farmers can create a terrace on sloping land before planting. For this purpose, a terrace is essentially a flat garden bed that follows the contour of the land.

Objective of this Survey:

1. To see how the farmers establish terraces in the districts of Manufahi, Liquica, Ermera and Oecussi.
2. To identify the views of farmers on the benefits of terracing in order to increase production on their land.
3. To observe the difference between farmers who utilize terraces with those who do not.

LOCATION 1: MANUFAHI



FIGURE 1: TRADITIONAL TERRACE IN TURISCAI SINCE ANCIENT TIMES.

There are some farmers in Turiscai that have used the model of terraces since ancient times. Farmers in Turiscai, Manufahi, use different types of terraces such as the bench terrace, contour furrows and the traditional model (setting stone).

Compost used on the terrace →

Calliandra planted to protect terrace from landslide and erosion. →



FIGURE 2: BENCH TERRACE IN TURISCAI

Sebastiao de Jesus is a member of the farmer's group "Foti An La Bele" that is supported by the NGO PERMATIL. He says, "Terracing can benefit the farmers because the garden does not need to be moved each year and previously abandoned land can be reused."

Farmers plant corn, bean, red bean, pumpkin, sweet potato and cassava in the wet season. In the dry season they plant vegetables such as mustard, onion, garlic and carrots.



FIGURE 3: BENCH TERRACING MADE BY CUTTING AND COVERING THE LOWER PART WITH SOIL.

The bench terrace is made on low permeability soil with the aim that the available water is retained longer. (Arsyad, 1989).

Another model is contour furrow terracing. This terrace was originally built as a bench. The margins are applied with fertilizers such as burned vegetation which is then covered with cultivated soil in order to restore soil fertility. (see figure 4 & 5).



FIGURE 4 & 5: CONTOUR FURROW TERRACE ESTABLISHED BY SEBASTIAO SOIL.



Another farmer, Jose Patricio, also implemented a system for agricultural terracing. This system is a continuation of his ancestors' practices but he has only become active again in the year 2003/2004 after being involved in the group, Hadomi RAI with support from Permatil in Turascai. The terracing is able to protect soil from landslides and also able to hold



water that runs into the soil. Trees that are planted in this location are casuarinas. They plant corn, cassava, beans, taro and pumpkin in the wet season and in the dry season they irrigate vegetables such as mustard, cabbage, lettuce and carrot.

FIGURE 6: CONTOUR FURROW TERRACES IN ORLALA, KAIMAUK VILLAGE, TURISCAI SUB DISTRICT, MANUFAHI.

Some issues farmers experience:

1. **Labour:** not many farmers make terraces in the village because it takes a lot of work. Another reason is they have a lot of land and they can move their garden to a different field.
2. **Market access:** In Turiscai, farmers sell their produce from their house. Sometimes they take it to the local market on market day. The farmers did not take their produce to Dili due to bad roads and the difficulty in finding customers.
3. **Seasonal use:** Some farmers make terraces just to grow vegetables during the dry season. Most terraces are small and built near water sources. They do not use the terraces in the wet season. In the wet season corn is planted on land with no terracing.
4. **Coffee:** Most of farmers who had coffee plantations did not consider terracing as important.
5. **Animals:** Many animals destroy the crops planted on their land. However, they also get some benefit from buffalo manure for compost.

LOCATION 2: EMERA

Ermera district, located in the western part of Timor Leste, is famous for its coffee plantations. In the mountainous sub-district of Atsabe most of the farmers cultivate their land using terraces. They have done this since the time of their ancestors.

Donatos Bere, with an educational background in agricultural schools in Indonesian times, has considerable experience and knowledge regarding terraces in Malabe village. Terracing protects his land from erosion and landslides and can be used efficiently from year to year. With the existing terraces he can provide for his family and pay the school fees for his children

He has terraces on two sites. One is near a water source in order to plant horticulture crops such as vegetables, mustard, cabbage, garlic, onion and sweet potato in the dry season. On the other terrace he grows maize, cassava and beans in the wet season.



FIGURE7: BENCH TERRACE PLANTED WITH CABBAGE BY MR. DONATO



There is a need to plant trees in order to prevent soil from erosion and landslide. Types of trees that are suitable to plant in this terrace are gamal, lamtoro/leucaena and calliandra.

Sarabia Group, Lasaun

Manuel Soares has formed the group “Sarabia” to plant horticulture crops with the support of CARE. They also have a fish pond to supply food in the dry season. They use bench terraces as well as traditional terraces left by their ancestors. This group has a goal to restore soil fertility. Members of this group received training on compost but have not implemented this technique.

Terus Atan Group, Lasaun

Terus Atan group is also supported by CARE and grows similar crops as the above group. They make terraces in the traditional style using stone. In the dry season, horticulture crops on the terraces are irrigated with water from a plastic fishpond. Water for the fish pond is filled by rain and sometimes from nearby water sources. In the wet season the terraces are planted with corn.

These groups also have difficulty with access to markets. The poor road conditions also damage the produce when in transit.

Issues around soil fertility

The soil condition is good and deep (soil depth 0.5-1.0m). Due to population increases, they are cultivating in the same field with terraces every year. This has led to loss of soil fertility. Farmers are now using inorganic fertilizers such as urea, TSP and KCL to grow horticulture crops. They know how to produce organic fertilizer but they did not want to use it because it will produce low yield and takes a longer process.

Private Coffee initiative in Eraulo, Letefoho, Emera

In Eraulo, an entrepreneur from Portugal is funding the construction of terraces to plant coffee. Local labour is paid with bags of rice. The plan is to plant trees for 2-4 years and then plant coffee. The farmer thinks that terracing is very important for coffee production and expected to harvest in 3 years after planting coffee.



FIGURE 8: TERRACE PREPARED BY FARMER SUPPORTED BY PRIVATE SECTOR TO PLANT COFFEE BUT IN THE PICTURE IT WAS PLANTED WITH CASSAVA WHILE WAITING FOR COFFEE PLANTING SEASON.

Most farmers in this region of Emera did not plan to build terraces for planting corn, cassava, sweet potato and other crops. For these crops they continue to move every year. In some areas there is erosion where they are trying to open a new field through the slash and burning system. This has not stopped them from continuing with this method because they said it was easy and did not require hard work.

LOCATION 3: LIQUICA



FIGURE 9: TERRACE PLANTED WITH MAIZE AND OTHER CROPS.

Together with CARE, we interviewed a women's group in Maubaralissa, Liquica. This 15 member group has established terracing to grow vegetables such as mustard, chili and eggplant in dry season. In the wet season they plant the terraces with corn varieties such as Sele and a short season variety. CARE provides technical assistance, seed and agriculture



materials. They also assist with trees in order to protect the soil from erosion. CARE also provided plastic to set up a pool to collect water for irrigation.

FIGURE 10: POOL PREPARED FOR IRRIGATING CROPS PLANTED IN THE DRY SEASON

Another group supported by CARE is “Terras Foti Rasik” located in Lissadila village, Bautalo. Care provides assistances in term of seed, materials and capacity building in order to establish appropriate terraces that’s finally provide farmer with some benefit. Type of terrace build is bench terrace which planted with vegetables in dry season and maize in rainy season. In the dry season the field was irrigated by water collected in the pool.



FIGURE 11: BENCH TERRACE

Soil condition in general

The soil condition in this place remains fertile even though they cultivate the same plots every year. This is because they always apply organic fertilizer each time they cultivate the soil. After weeding, the weeds are left to rot in the field to become mulch so that soil remains fertile. Base on the farmer’s experience, the mulch kills other weeds that grow in the



field. As most of the other land is used for coffee the farmers need to use the same land each year for vegetables. Terracing allows them to do this more effectively. For steeper slopes they planted corn without terracing.

FIGURE 12: LAND PREPARATIONS IN A TERRACED FIELD

Market access

They produce chili, onion, garlic, eggplant and tomato sell to the local market at a lower price compared to the district market. Sometimes they barter for other commodities such as salt when there are not many buyers. Left over produce is fed to the animals. Most of the labour is performed by the group. Sometimes, when heavy labour is required they employ additional workers.

LOCATION 4: OECUSSI

Terracing is a new technology in Oecussi. In the Taiboko village of Oecussi, farmers are receiving technical assistance from a local NGO called Hadomi Ambiente (literally: “Love Environment”) which is supported by Oxfam International. In the wet season they plant corn, upland rice, melon, peanuts, string bean, and pumpkin. In the dry season they plant vegetables and other horticulture crops. This year they only grew enough to eat but in future they hope to grow enough to sell.

Most groups in Oecussi are starting with contour furrows but some are willing to try other models such as bench terracing.



FIGURE 13: FARMER ACTIVITIES IN CONTOUR FURROW TERRACING PLANTED WITH CORN, BEANS, CASSAVA AND UPLAND RICE



There has also been some work done in watershed protection to protect the soil from erosion. This technique of making benches in the gully assists in slowing the water flow and reducing erosion along the sides of the gullies.

FIGURE 14: FARMERS SHOWING WATERSHED MANAGEMENT TO CLIMATE CHANGE STAFF

Issues facing Farmers in Oecussi:

- Farmers in Oecussi continue to struggle with poor road conditions that make it difficult to access markets.
- Many farmers in Oecussi continue to use the slash and burn method of agriculture because there is a lot of unused land. A newly cleared field will produce high yields with a low weed burden.
- They struggle with other farmers' animals damaging their crops. Some groups are raising this issue with their local authorities to try to apply the traditional law (tara bandu) in each village.



FIGURE 15: TERRACES BUILT THIS YEAR

Terracing in the groups we observed in Oecussi has only been applied within the group (in the field of the chief or member of the group). They have not yet applied this technology in their respective fields.

SUMMARY AND RECOMMENDATIONS

SUMMARY

1. Terracing implemented by farmers in the districts responds to the problem of erosion by reducing the velocity of water flow in sloping areas.
2. Terracing benefits crops by holding water in the soil.
3. Terracing prevents loss of nutrients in the soil due to erosion. Trees planted as a fence (eg *Calliandra* and *Gliricidia*) can prevent top soil from being eroded.
4. Terracing enables farmers to cope with population increases as they can use the same field in the future.
5. Terracing can be used to meet the challenge of a higher rate of evaporation resulting from increased temperature due to climate change.

RECOMMENDATIONS

1. Terrace walls need to be strengthened by planting trees with a strong root system in order to prevent soil erosion. (eg *Calliandra*, *Gliricidia*, legume trees and vetiver grass)
2. Allow mulch crops such as velvet bean to grow through the dry season to add nutrients to the soil.
3. Water channel to contour furrow terrace needs to be deepened and stones used for rock wall need to be large.
4. Terraces should be planted with high yielding varieties.