Technical Information Kits for Community-Based Natural Resource Management (CB-NRM)

Prepared by

The Project for Community-Based Sustainable Natural Resource Management in the Democratic Republic of Timor-Leste

From the People of Japan

LIA MAKLOKEK

CB-NRM ka Jestaun Rekursu Naturál ne'ebé Bazeia ba Komunidade mak aproxima ida ba konservasaun natureza liuhusi rekoñese direitu komunidade lokal hodi jere no hetan benefisiu hosi jestaun no uja rekursu naturál ho sustentabel (floresta, rai, bee no biodiversidade) iha area ne'ebé designado. Ida ne'e alternativu ida hodi ha-tun sistema jestaun regulatoriu, ne'ebé mak sedauk nesesáriumente effetivu iha nasaun balun, espesialmente bainhira regulamente ne'e la apropriadu ona ho mudansa iha kontekstu social, kultura no ekonomia iha nasaun ne'e.

Timor – Leste hanesan nasaun foun ida iha mundu no ninia kuadro institusional no rekursu humano sei presija hametin iha area hotu inklui iha seitor floresta. Japan International Cooperation Agency (JICA) implementa ona " Projetu ba Jestaun Rekursu Naturál ne'ebé Sustentabel Bazeia ba Komunidade (JICA, Projetu CB-NRM)" no ajuda ona Direcção Nacional das Florestas e Gestão Bacias Hidrograficas (DNFGBH) hosi Ministério Agricultura e Pescas (MAP) hari'i kapasidade institusional ba introdusaun no aplikasaun hosi CB-NRM hanesan xave aprosimasaun ida ba jestaun floresta sustentabel iha nasaun ne'e

Susesu ida ne'ebé halo hosi Projetu JICA, CB-NRM mak livro referensia ida ne'e ho titlu "Informasaun Kit CB-NRM". Livro ida ne'e introdus Tékniku/pratika util lubun ne'ebé demonstra ona iha Timor – Leste no mós iha nasaun Ásia seluk ba protesaun floresta, dezenvolvimentu floresta, Agrikultura sustentanbel, no dezenvolvimentu vida moris. Livro ida ne'e bele ajuda pratikadores terrenu MAP nian (ezemplu, Ofisial no koordenador Ekstensaun, ofisial floresta municipiu, no guarda floresta) no mós NGO sira ne'ebé servisu iha seitor floresta no agrikultura, espesialmente bainhira sira servisu ho komunidade lokál iha area rai lolon ka foho iha Timor – Leste ba Jestaun floresta no rai sustentabel. Iha tempu ne'ebé hanesan, livro ne'e bele sai dokumentu ne'ebé iha valor bo'ot ba peskizador sira, treinadu sira, estudante bacharelatu iha area ne'ebé hanesan

MAP, espesialmente DNFGBH, iha intensaun atu ho effetivamente uja dokumentu referensia ne'e liuhusi desimina ba stakeholders lubun atu nune'e pratika konvensional bele uja iha area railolon no foho no neneik-neneik troka ho dalan ne'ebé produtivu no sustentabel liu.

Outubru 2015

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Technical Information Kits for CB-NRM

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ACRONYMS

AMCAP	Ainaro, Manatuto Community Activation Project
ARP	Agriculture and Rehabilitation Project
CBFM	Community-Based Forest Management
CBNRM	Community-Based Natural Resource Management
DAC	Dezenvolve Agricultura Comunitária
DENR	Department of Environment and Natural Resources, Government of Republic of Philippines
EM	Effective Micro-organisms
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFS	Field Farmer's School
GIZ	German International Cooperation
JFM	Joint Forest Management
JICA	Japan International Cooperation Agency
MAF	Ministry of Agriculture and Fisheries
NDF	National Directorate of Forestry
NGO	Non Governmental Organization
PAC	Public Awareness Campaign
PARCIC	PARC Interpeoples' Cooperation
PERMATIL	Permaculture Timor Lorosa'e
PLUP	Participatory Land Use Planning
PRA	Participatory Rural Appraisal
RDP	Rural Development Programme
UNDP	United Nations Development Programme
USAID	U.S. Agency for International Development
USC-CTL	USC Canada Timor-Leste/RAEBIA

Chapter 1 Introduction of Existing Useful CB-NRM Techniques/Practices

1.1 About CB-NRM

CB-NRM stands for Community-Based Natural Resource Management, which is the concept for sustainable management of natural resources by local communities in a participatory manner. In general, CB-NRM can be applied to all the natural resources, such as forest, coastal/marine, and mining. Nevertheless, CB-NRM in this document targets forest and other forest-related or agricultural resources, which are essential to livelihoods of hilly/mountainous communities in Timor-Leste.

In this context, CB-NRM aims to develop and enhance the capacities of upland communities to protect and manage forest and other forest-related natural resources in their localities. A multi-faceted approach is needed to orient local communities toward a concept of sustainable natural resource management and enable them to view forest and natural resources as their long-term assets, without which the majority have been forced to live at the subsistence level.

In other Asian countries, the concepts of community forestry or community-based forest management, such as JFM (Joint Forest Management) in India, CBFM in Philippines, and Community Forestry in Cambodia, have been introduced with a wide range of techniques and skills to help forest-dependent communities change their lifestyle and livelihood activities to environmentally-sound ones. Furthermore, all the schemes commonly take the following steps to introduce the concept.

a. Community participation and community organization
b. Community planning
c. Introduction and application of several techniques (e.g., forest protection and management, livelihood development, sustainable agricultural development, and other environmentally-friendly techniques)

CB-NRM in Timor-Leste shall also follow a similar process of introducing its concept, though the way of application as well as techniques/skills introduced should be tailored to the situations of Timor-Leste.

After careful review of the past attempts on community forestry and community-based sustainable natural resource management in Timor-Leste as well as the current conditions of hill/mountainous areas, specifically in those in the target river basins, namely Laclo and Comoro river basins, the JICA Project Team judges that the following components would be the keys to the smooth and successful introduction of the CB-NRM concepts in upland communities in Timor-Lese, especially in the target river basins.

1. Community participation
2. Participatory land use planning
3. Forest management and reforestation
4. Agriculture and livestock management
5. Sloping agriculture and agroforestry
6. Livelihood development

1.2 Guide to Use of Technical Information Kits for CB-NRM

This document, Technical Information Kits for CB-NRM, is aimed at helping planners and field workers, such as MAF officers in the central and district offices, NGO staff and anyone involved in a CB-NRM or community-based forest management project, deepen their understanding of techniques/skills effective in introducing the concept of CB-NRM in hilly and mountainous communities in Timor-Leste. All the techniques introduced in this document have been put on trial in Timor-Leste or other Asian countries, and their effectiveness has also been confirmed in the field.

The document is composed of the six (6) technical fields mentioned above. A reader can read through the document from the beginning to the end to have a whole picture of the necessary techniques for CB-NRM, or read any part of the document, which a reader is specifically interested in.

Every topic/case introduced in the document tells: i) the site/village where the technique is/was introduced; ii) objectives of the technique; iii) major activities; iv) procedures for application of the technique; and v) outcome expected to be generated by the techniques, to help a reader get a clear idea on the respective techniques/skills. Further references and possible sources for additional information are also specified in the document so that a reader can study further on any particular topic.

Chapter 2 Technical Information Kits

2.1 Community Participation

Community participation is a core activity overarching all the CB-NRM techniques and skills. Unless local communities are fully involved in CB-NRM activities, it would be difficult to change their conventional practices to the ones that would contribute to sustainable forest and natural resource management. Although many government projects and NGOs as well as donor-funded projects in Timor–Leste had/have involved local communities to a greater or lesser extent, community involvement in some cases appears to be rather temporal, or if anything, just for provision of materials. In such case the sustainability of the community-based collective activities for CB-NRM is often questionable.

Community participation should be maintained not only during the project period but also in the post-project period, to enable local communities to continue practicing CB-NRM techniques/skills to manage forest and other resources in a sustainable manner. By keeping community participation in CB-NRM activities, they can also develop a foundation for sustainable forest and natural resource management in the localities. In other words, community participation should be the essential process to achieve sustainable forest and natural resource management rather than a mere means to implement a forest management project.

After reviewing the past projects implemented in Timor-Leste, such as AMCAP, APR II, pilot projects under the JICA Watershed Management Study, and other projects implemented by the national/international organizations, the following approaches and methods are judged effective in ensuring the community's participation and enhancing their understandings of CB-NRM concepts as well as its associated skills/techniques.

1. Public awareness campaign
2. Participatory assessment
3. Group formation
4. Participatory planning, monitoring, and evaluation
5. Field farmers schools (FFSs) / Hands-on training courses

The above-listed measures should be carried out in the different stages in the project cycle, as they have different aims as outlined below and discussed in five Reference Sheets which follow summarizing techniques in actual case studies.

Measures	Project stage	Aims
1. Public awareness campaign	Pre-implementation and Initial stage of the Project	a. Enhance awareness of the importance and necessity of the project among local communities. b. Attract the interest of local communities about the project.
2. Participatory assessment	Initial stage of the Project	a. Enable local communities to assess the current situations of the village and understand the necessity of the project.
3. Group organization	Initial to end stages of the Project	a. Select local communities who are willing to engage in the project. b. Foster a sense of ownership about the project among local communities.
4. Participatory planning, monitoring, and evaluation	Initial to end stages of the Project	a. Enhance local communities' understanding of the project activities through planning of a work plan. b. Enable local communities to evaluate the effectiveness of the project through a review of their performance and outcomes of the project.
5. Field farmers schools (FFSs)	Middle stage of the Project, especially during the stage for capacity development of local communities	a. Enable local communities to put into practice skills and techniques relevant to CB-NRM in the field. b. Enable local communities to see the effectiveness of skills and techniques relevant to CB-NRM.

Reference Sheet Community Participation-1

Name of the Technique:	**Public Awareness Campaign**
Place where the technique is observed	Salamete Village, Lailaco Sub-District, Ermera District
Year of Introduction:	2008-2009
Source of Information	The Study on Community-based Integrated Watershed Management in the Laclo and Comoro River Basins

Summary of Public Awareness Campaign Techniques

Items	Description
Objectives	Public Awareness Campaign (hereinafter referred to as "PAC") aims to foster rural communities' awareness of the importance of sustainable forest and natural resource management and attract their interest in sustainable natural resource management.
Major Activities	a. Develop materials for awareness-raising campaigns. b. Identify and select target villages for an awareness raising campaign. c. Conduct a questionnaire or baseline survey to grasp the current awareness level of forest degradation among communities in the target villages. d. Hold a series of workshops with communities in the target villages using the materials developed above.
Procedures	1. Assess the current forest management practices and the major threats to forests in the target area (such as a river basin or district/sub-district) through Participatory Assessment (see Reference Sheet Community Participation-2) or assessment of any existing information. 2. Develop informative/outreaching materials for awareness-raising campaigns, such as pamphlets, posters, leaflets, and/or auto-visual media (i.e., picture-story show, movie or drama shows). 3. Select the target villages among those located in the target area. 4. Hold consultation meetings with village leaders of the target villages to explain the outlines and work schedule of the campaign. 5. Conduct a questionnaire survey to evaluate the current awareness level of forest degradation among communities in the target villages. 6. Hold a series of workshops in the target villages using the materials developed. The campaign should not treat adults and children in the same way, if anything, should hold the workshops separately for adults and children as their awareness levels are different from each other. 7. Conduct a post-evaluation questionnaire survey in the target villages to measure how far the campaign has enhanced awareness of sustainable forest management among communities in the target villages in a sustainable manner.  **Awareness Campaign**  **Sample of Informative /Outreaching Materials**
Expected outputs	a. Local communities can recognize the importance of sustainable forest management and use. b. Local communities can be motivated to reconsider their current practices to manage forest and other natural resources in their area.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	JICA Project Office

Reference Sheet Community Participation-2

Name of the Technique:	**Participatory Assessment**
Place where the technique is observed	Fadabloco, Hautoho, Madabeno, Talitu Village
Year of Introduction:	2011
Source of Information	The Project for Community-Based Sustainable Natural Resource Management

Summary of Participatory Assessment Techniques

Items	Description
Objectives	Participatory assessment aims to enable local communities to i) assess the characteristics of a target village and ii) identify the necessary interventions for introduction of CB-NRM.
Major Activities	a. Collect data and information of the target village through several types of PRA (Participatory Rural Appraisal) sessions. b. Typical PRA sessions useful for a situation analysis for a forest management/rural development project are: i) Resource mapping; ii) Transect walk; iii) Trend analysis; iv) Seasonal calendar; v) Group discussions on traditional forest and land management; and vi) Group discussions on existing potential resources and products for livelihood development. c. Analyze the results of PRA sessions to assess the present conditions of the target village.
Procedures	1. Clarify necessary data and information to assess the present conditions of a village. 2. Prepare a work plan of the participatory assessment selecting the appropriate PRA tools to be used for data collection. 3. Prepare for field workshops procuring necessary materials and mobilizing facilitators and other human resources. 4. Fix dates for PRA workshops/meetings in coordination with village leaders of the village and request them to gather communities for the workshops/meetings. 5. Hold workshops/meetings with communites in the village for i) Resource mapping; ii) Transect walk; iii) Trend analysis; iv) Seasonal calendar; v) Group discussions on traditional forest and land management; and vi) Group discussions on potential resources and products for livelihood development. 6. Compile and analyze all the data and information collected through the PRA sessions. 7. Share the results of the PRA sessions with leaders and communities of the village.
Expected outputs	a. The characteristics of the target village, including the past trend in natural resource management, can be clarified. b. Local communities can recognize the current conditions of their own village. c. Local communities can realize the necessity of external interventions to improve the current conditions of the village.
Further references	1) Annual Completion Report (2011/2012), The Project for Community-Based Sustainable Natural Resource Management, March 2012, JICA 2) Methods for Community Participation -A Complete Guide for Practitioners- Somesh Kumar, ITDG publishing (Reference book for PRA)
Contacts for information	USC Canada Timor-Leste / RAEBIA Halarae Foundation

Resource Mapping

Trend Analysis

Reference Sheet Community Pariticipation-3

Name of the Technique:	**Group Organization**
Place where the technique is observed	Batara, Samalete, Faturasa, Fadabloco, Hautoho, Tohumeta, Madabeno, and Talitu Village
Year of Introduction:	2008--2015
Source of Information	The Study on Community-Based Integrated Watershed Management in the Laclo and Comoro River Basins

Summary of Group Organization Techniques

Items	Description
Objectives	The aims of the technique are to: i) select local communities who are willing to engage in CB-NRM activities, ii) organize them into a farmers'/beneficiaries' group; and iii) foster their sense of ownership of CB-NRM activities.
Major Activities	a. Select local communities who are willing to engage in CB-NRM activities and/or eligible to take part in a CB-NRM project through consultations and discussions with them b. Organize those selected as beneficiaries of CB-NRM activities into a farmers'/beneficiaries' group. c. Select a leader and core members of the farmers'/beneficiaries' group among the selected communities. d. Help the selected communities determine visions and missions of a beneficiaries' group and roles and responsibilities of the respective members of the group.
Procedures	1. Prepare eligibility criteria for a member of a farmers'/beneficiaries' group considering the nature of CB-NRM activities. 2. Hold a meeting with communities including village leaders to help them identify and select those who are willing and eligible to be a member of a farmers'/beneficiaries' group. 3. Hold another meeting with communities selected as members of the group and help them i) select a leader, a vice leader, and core members of the group; ii) determine the roles and responsibilities of the respective members of the groups; and iii) determine visions and missions of the group. 4. Prepare by-laws/regulations of the group compiling a list of members, roles and responsibilities of the respective members, and visions and missions of the group based on the results of the meetings mentioned above.   **Meeting for Community Organization**
Expected outputs	a. A farmers/beneficiaries group of local communities will be established with its by-laws. b. Local communities who engage in CB-NRM activities/a CB-NRM project can understand their responsibilities. c. A sense of ownership can be fostered among local communities.
Further references	1) Chapter 21, Improving agricultural extension. A reference manual, 1998, FAO 2) Annual Completion Report (2011/2012), The Project for Community-Based Sustainable Natural Resource Management, March 2012, JICA
Contacts for information	USC Canada Timor-Leste / RAEBIA Halarae Foundation

Reference Sheet Community Participation-4

Name of the Technique:	**Participatory Planning, Monitoring, and Evaluation**
Place where the technique is observed	Batara, Samalete, Faturasa, Fadabloco, Hautoho, Tohumeta, Madabeno and Talitu Village
Year of Introduction:	2008-2015
Source of Information	The Study on Community-Based Integrated Watershed Management in the Laclo and Comoro River Basins

Summary of Participatory Planning, Monitoring, and Evaluation Techniques

Items	Description
Objectives	The aims of the technique are to deepen local communities' understanding of CB-NRM activities and enhance their ownership of the activities.
Major Activities	a. Hold a meeting with members of farmers'/beneficiaries' group prior to the commencement of CB-NRM activities (or a CB-NRM project) to develop a work plan of the extension service on CB-NRM techniques in a participatory manner. b. Hold a meeting with the members in the middle of the whole process of a CB-NRM project/extension service to evaluate their performance and update the work plan in the remaining term. c. Hold a meeting with the members in the end of a CB-NRM project/extension service/project to evaluate its effectiveness and develop a work plan to continue the CB-NRM activities.
Procedures	A. Participatory Planning 1. Draft a work plan of a CB-NRM project or an extension service on CB-NRM techniques with a tentative schedule. 2. Hold a two-day workshop/meeting with local communities (or members of a farmers'/ beneficiaries' group) who engage in CB-NRM activities to finalize the draft work plan.  **Meeting for Planning of a Work Plan** B. Participatory Monitoring 1. Hold a two-day workshop/meeting with the same communities/members one year after the commencement of the work to help them: i) evaluate their performance and accomplishments made; ii) find the points that need to be improved to make the work effective; and iii) review and update the work plan in the remaining term.  C. Participatory Evaluation 1. Hold a two-day workshop/meeting with the members and village leaders six (6) months before the end of the work to help them: i) evaluate the effectiveness of a CB-NRM project/extension service; ii) discuss the necessity of continuation of the same; iii) identify the necessary input and supports for continuation; iv) develop a work plan for continuation specifying the responsibilities of the communities, MAF, and other relevant organizations (such as NGOs); and v) make an agreement among the relevant organizations on the implementation of the work plan prepared.
Expected outputs	a. Local communities can deepen their understanding of CB-NRM techniques. b. Local communities can realize the effectiveness of CB-NRM techniques and extension service on them. c. Local communities can enhance their sense of ownership of the activities.
Further references	1) Participatory assessment, monitoring and evaluation, 1998, FAO 2) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	USC Canada Timor-Leste / RAEBIA, Halarae Foundation

Reference Sheet Community Participation-5

Name of the Technique:	**Farmers Field School (FFS)**
Place where the technique is observed	Batara, Samalete, Faturasa, Fadabloco, Hautoho, Tohumeta, Madabeno and Talitu Village
Year of Introduction:	2008-2015
Source of Information	The Study on Community-Based Integrated Watershed Management in the Laclo and Comoro River Basins

Summary of Farmers Field School (FFS)Techniques

<table>
<tr><th>Items</th><th>Description</th></tr>
<tr><td>Objectives</td><td>The main objective of Farmers Field School (FFS) is to ensure that local communities (or members of a farmers'/beneficiaries' group) who participate in a/n project/extension service can acquire skills and techniques related to a specific subject matter essential to introduction of CB-NRM.</td></tr>
<tr><td>Major Activities</td><td>a. Develop a training curriculum for a specific subject matter, e.g., seedling production/ afforestation, sloping agriculture, or livelihood development, which is effective in introduction of CB-NRM.
b. Locate a venue for FFS as a demonstration plot.
c. Arrange/hold a series of hands-on training and on-the-job training (OJT) courses on techniques/skills related to a specific subject matter in the demonstration plot.</td></tr>
<tr><td>Procedures</td><td>1. Break all the techniques/skills related to a specific subject matter down into parts according to the procedures.
2. Develop a training curricula composed of a series of FFS courses on the techniques/skills.
3. Identify and locate a venue for FFS courses for a farmers/beneficiaries group at sub-village level in consultation with members of the group. In case of agriculture- and/or forest-related skills/techniques, a venue for FFS courses can also be dealt with as a demonstration plot.
4. Hold a series of FFS (hands-on and on-the-job training courses) at the demonstration plots. FFS courses should cover all the techniques/skills related to a specific subject matter. The following table shows the training courses to be handled for sloping agriculture and afforestation.
 
Training in Seedling Production
 
Training in Making Bench Terrace
<table><tr><th>Subject matter</th><th>Major training courses</th></tr><tr><td>Sloping agriculture</td><td>i) compost making, ii) delineation of contour lines, iii) application of soil conservation measures, iv) land preparation with compost application, v) seeding, vi) preparation and application of liquid fertilizer, vii) weeding and pest management, viii) harvesting, ix) post-harvesting including seed storage, and ix) application of green manure.</td></tr><tr><td>Afforestation</td><td>i) land preparation for a nursery, ii) establishment of a nursery, iii) compost making, iv) mixing soils and filling pots with mixed soils, v) seeding, vi) maintenance of seedlings, vii) land preparation for plantation, viii) sticking, ix) hole digging, x) planting, and xi) tending seedlings</td></tr></table></td></tr>
<tr><td>Expected outputs</td><td>a. Communities/members of a farmers/beneficiaries group can practice and acquire skills and techniques for CB-NRM through a series of FFS courses.
b. They can be role models for other communities who may have interest in the same techniques/skills.</td></tr>
<tr><td>Further references</td><td>1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
2) Farmer field schools on land and water management in Africa, 2008, FAO</td></tr>
<tr><td>Contacts for information</td><td>USC Canada Timor-Leste / RAEBIA
Halarae Foundation</td></tr>
</table>

2.2 Participatory Land Use Planning (PLUP)

Participatory land use planning (PLUP) is an interactive process/procedure to create an enabling environment for local communities to manage land, forest, and other forest-related natural resources in a sustainable manner. PLUP has been successfully introduced and applied in other Asian countries, such as Philippines, Vietnam, Cambodia, etc., with the aim to help local communities in rural areas protect and wisely use forest resources in their localities.

In the process of PLUP, local communities develop a future land use plan and rules/principles that can guide them toward sustainable natural resource management through a series of dialogues between/among communities and other relevant stakeholders. Owing to its nature, it has been often used as an entry activity of community forestry or community-based natural resource management.

In Timor-Leste, the traditional rules/regulations, called Tara Bandu, had widely prevailed and been effective in the protection of natural resources in the Portuguese era. Tara Bandu used to be effective in controlling people's activities as it was strongly tied up with the law enforcement of the Portuguese government. Its effectiveness has weakened since the occupation of the Indonesian Government in 1975 when it was separated from the law enforcement. Tara Bandu lost its regulatory function along with the introduction of the laws and regulations of the Indonesian Government.

The Government of Timor-Leste as well as national and international organizations have taken the initiative in reviving the traditional rules/regulations to protect and improve the natural environment of rural areas after independence. Unfortunately, most of the interventions just focused on the revival of Tara Bandu (e.g., organization of a Tara Bandu ceremony) but not on the enhancement of local leaders' capacities; therefore, their effectiveness has often been limited or not sustainable.

The cases introduced in this section are the PLUP activities tailored by the JICA Project for Community-Based Natural Resource Management based on the current conditions of Timor-Leste. The following processes have been demonstrated by the JICA Project in several villages in Aileu District since 2011. The results revealed that the PLUP activities applied by the JICA Project would be effective in and essential to founding the mechanism of community-based sustainable natural resource management on a village level.

1. Future land use planning
2. Formulation of village regulations (Tara Bandu regulations) with a traditional ceremony
3. Monthly monitoring of the implementation and enforcement of village regulations

In order to ensure the effectiveness of the PLUP activities as well as Tara Bandu regulations developed through the process, the aforementioned activities should be carried out as a package, and not in a piecemeal manner. More details of the activities are shown in the following three Reference Sheets which summarize techniques in actual case studies.

Reference Sheet PLUP-1

Name of the Technique:	**Future Land Use Planning**
Place where the technique is observed	Faturasa Village, Fadabloco Village, Hautoho Village, Madabeno Village, Tohumeta Village and Talitu Village
Year of Introduction:	2008-2013
Source of Information	The Project for Community-Based Sustainable Natural Resource Management

Summary of Future Land Use Planning Techniques

Items	Description
Objectives	The main objectives of the technique are to help local communities in a target village develop an optimum future land use plan with an aim to balance sustainable forest and land management with improvement of their livelihoods.
Major Activities	a. Prepare a present land use map. b. Prepare a future land use plan with rules on land use and management. c. Consult with local communities in the target village about the future land use plan and rules.
Procedures	 Present land use mapping 1. Help village leaders as well as other representatives from sub-villages i) classify the village area into several types of land use using an aerial photo (on a scale of 1:7,500 ~ 1:15,000) covering the target village; ii) classify forests by dominant species and density; and iii) demarcate the boundaries of the respective land use and forest categories. 2. Help village leaders as well as other representatives from sub-village i) discuss the functions and values of each land use categories; ii) confirm the current management practices; iii) identify the causes of forest and soil degradation in the target village; iv) determine the future use and management of each land use type; and v) develop a future land use map using the present land use map. 3. Help village leaders have meetings with communities at sub-village level to i) introduce the future land use plan with its development process; and ii) get a consensus from communities on the future land use plan.  Future land use planning  Future land use plan
Expected outputs	a. Village leaders and other communities are able to appreciate the values and functions of forests and other natural resources in their locality. b. Village leaders and other communities understand the causes of surface soil erosion and forest degradation in their locality. c. Village leaders and other communities are able to come up with a future land use plan for sustainable management of lands and forests in their locality.
Further references	1) Annual Completion Report (2011/2012), The Project for Community-Based Sustainable Natural Resource Management, March 2012, JICA 2) Participatory Land Use Planning in Rural Cambodia, 2004, FAO
Contacts for information	USC Canada Timor-Leste / RAEBIA Halarae Foundation

Reference Sheet PLUP-2

Name of the Technique:	**Formulation of Village Regulations with a traditional ceremony**
Place where the technique is observed	Faturasa Village, Fadabloco Village, Hautoho Village, Madabeno Village, Tohumeta Village and Talitu Village
Year of Introduction:	2008-2013
Source of Information	The Project for Community-Based Sustainable Natural Resource Management

Summary of Formulation of Village Regulations with a traditional ceremony Techniques

Items	Description
Objectives	The main objective of the technique is to ensure that local communities in a target village can protect and manage forests and other natural resources in the locality in a sustainable manner on their own initiatives.
Major Activities	a. Review the existing Tara Bandu rules of the target village. b. Determine rules on management of forest and other natural resources as well as other rules of the target village. c. Develop a set of village regulations in writing. d. Organize a traditional ceremony to announce the village regulations to the public.
Procedures	1. Help village leaders i) enumerate the Tara Bandu rules in the village including those effective in the past; ii) evaluate their effectiveness; iii) select the rules applicable to the current conditions of the village, and iv) discuss necessary revision of the rules for application. 2. Facilitate their discussions on i) rules on use and management of forests and other natural resources; ii) other rules of the target village including social norms; iii) organizational set-up for enforcement of the rules; iv) implementation and monitoring systems; v) fines and penalties; and vi) management of collected fines. 3. Develop a set of draft village regulations in writing based on the discussions made in 2.  **Meeting to review the past rules**  **Explanatory Meeting at Sub-village**  **Tara Bandu Ceremony** 4. Help village leaders hold meetings with local communities at sub-village level to explain the draft village regulations. 5. Help village leaders hold a traditional ceremony to officially announce the village regulations to local communities in and around the target village.
Expected outputs	a. The incidence of forest fire and illegal cutting can be reduced. b. Communities will be oriented toward sustainable natural resource management.
Further references	1) Annual Completion Report (2011/2012), The Project for Community-Based Sustainable Natural Resource Management, March 2012, JICA 2) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	USC Canada Timor-Leste / RAEBIA Halarae Foundation

Reference Sheet PLUP-3

Name of the Technique:	**Monthly monitoring of implementation and enforcement of the village regulations**
Place where the technique is observed	Faturasa Village, Fadabloco Village, Hautoho Village, Madabeno Village, Tohumeta Village and Talitu Village
Year of Introduction:	2008-2015
Source of Information	The Project for Community-Based Sustainable Natural Resource Management

Summary of Monthly monitoring of implementation and enforcement of the village regulations Techniques

Items	Description
Objectives	The main objective of the technique is to enhance the capacity of village leaders to govern a village using the village regulations properly and effectively.
Major Activities	a. Convene a meeting with village leaders and other representatives from sub-villages on a monthly basis. b. Hold a meeting with local communities at each sub-village on a bi-monthly/quarterly basis.
Procedures	1. Help village leader hold a meeting at village level on a monthly basis to discuss i) illegal and violating acts found in a village in the previous month; ii) actions taken by aleia leaders to solve/settle such illegal/ violating acts; iii) any pending issues that have not been settled at sub-village level; and iv) necessary action to be taken to settle such pending issues. 2. Help village leaders record the discussions in the meeting so that they could enhance the effectiveness of the regulations by supplementing the same with judicial precedents. 3. Help village leaders hold a meeting with communities at each sub-village in a village on a bi-monthly/quarterly basis to enhance the awareness of the village regulations among communities by sharing the information on how village leaders have settled the illegal and violating acts using the village regulations.  Monthly meeting at village level  Suggestion by Chef de Village in the meeting at village level
Expected outputs	a. Village leaders as well as other communities can deepen their understanding of the village regulations. b. Village leaders can enhance their capacities to govern a village using the village regulations. c. The incidence of illegal acts in a village can be reduced as village leaders enhance their understanding of the village regulations.
Further references	1) Annual Completion Report (2011/2012), The Project for Community-Based Sustainable Natural Resource Management, March 2012, JICA
Contacts for information	USC Canada Timor-Leste / RAEBIA Halarae Foundation

2.3 Reforestation

Reforestation is one of the core activities to contribute to the achievement of a future land use plan of village, as it could directly convert land use and improve the land productivity by planting valuable trees in the field. Reforestation is also expected to contribute to the change of the prevailing "slash and burn" practice to the way of not burning the field to protect seedlings planted.

As the techniques associated with Reforestation need to be applied by communities on their own initiatives, they should be i) easy-to-apply, ii) attractive enough to local communities, and iii) widely-applicable to the target river basins.

This section introduces the following four key techniques required for Reforestation, namely for seedling production and tree planting, on a village level.

1. Nursery establishment
2. Nursery operations and seedling production
3. Tree planting
4. Tending of young stands

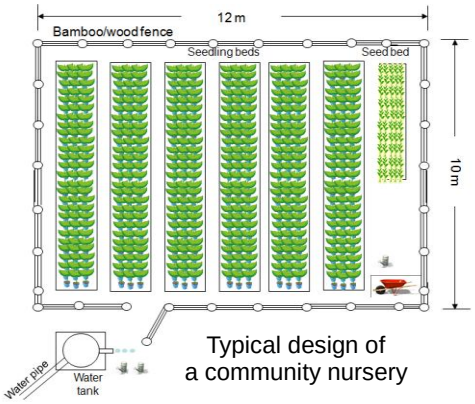
At the same time, the standard plantation designs which local communities can follow when planting seedlings are also introduced in two Reference Sheets in this section as follows:

5. Development of tree plantation: i) Home garden, ii) Coffee plantation, iii) Timber wood plantation and iv) Regenerated forest in degraded land

Reference Sheet Reforestation - 1

Name of the Technique	**Nursery Establishment**
Place where the technique were introduced	Samalete, Tohumeta, Talitu and Madabeno Villages (Aileu district)
Year of Introduction:	2008 –2015
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins

Summary of Nursery Establishment Techniques

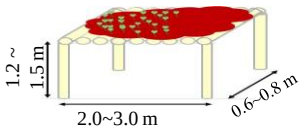
<table>
<tr><th>Items</th><th>Description</th></tr>
<tr><td>Objectives</td><td>The main objective of the technique is to enable local communities to establish a small-scale community nursery at sub-village level using locally available resources.</td></tr>
<tr><td>Major Activities</td><td>a. Select a suitable site for a community nursery.
b. Build a community nursery using locally available resources.</td></tr>
<tr><td>Highlights of the activities</td><td>1. Determine the number of seedlings to be produced in the nursey considering 20 % mortality of seedlings.
2. Design the layout of the nursery which encompasses seedlings beds, seedbed, and side paths, based the following specifications
- Seedbed: 1.2~1.5 m in width
- Side path: 0.4~0.5 m in width
- Seedbed: 0.6~1 m in width and 3~5 m in length
3. Select a site with the following conditions for a nursery.
i) accessible to a water source;
ii) open but less windy;
iii) flat or gentle sloping; and
iv) accessible to the majority of communities' houses.
4. Consult with the land owner about the use of the site for a community nursery and make an agreement on the use with the owner.
5. Install a watering system, which consists of a water tank (if necessary), water pipes (using bamboo), and a drum can.
6. Clear and prepare the site for building a nursery.
7. Collect local materials, such as bamboo or wood poles and palm leaves, for props, roof and walls of the nursery. The following table shows the necessary materials for establishment of a nursery as large as 120 m^2 which is good for 5,400 seedlings.
 

Typical design of a community nursery
<table><tr><th>Items</th><th>Quantity</th><th>Remarks</th></tr><tr><td>a. Bamboo poles</td><td>40 pcs</td><td>For Prop, beams and fence of the nursery</td></tr><tr><td>b. Wood/Bamboo poles (props)</td><td>12 pcs</td><td>3-4 m in length and 20 cm in diameter is desirable.</td></tr><tr><td>c. Wood/Bamboo poles (roof frames)</td><td>20 pcs</td><td>3-4 m in length and 5 cm in diameter is desirable.</td></tr><tr><td>d. Nalo grasses/palm leaves (roofing)</td><td>30 bundles</td><td>-</td></tr><tr><td>e. Nail</td><td>4 kg</td><td>7cm in length</td></tr><tr><td>f. Wire</td><td>3 rolls</td><td>-</td></tr></table>8. Build a fenced and thatch roofed nursery.</td></tr>
<tr><td>Expected outputs</td><td>a. Local communities can develop a nursery with the proper design using locally available resources/materials.</td></tr>
<tr><td>Further references</td><td>Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA</td></tr>
<tr><td>Contacts for information</td><td>1) Halarae Foundation</td></tr>
</table>

Reference Sheet Reforestation - 2

Name of the Technique	**Nursery Operations and Seedling Production**
Place where the technique were introduced	Samalete, Tohumeta, Talitu and Madabeno Villages (Aileu district)
Year of Introduction:	2008 -2015
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins

Summary of Nursery Operations and Seedling Production Techniques

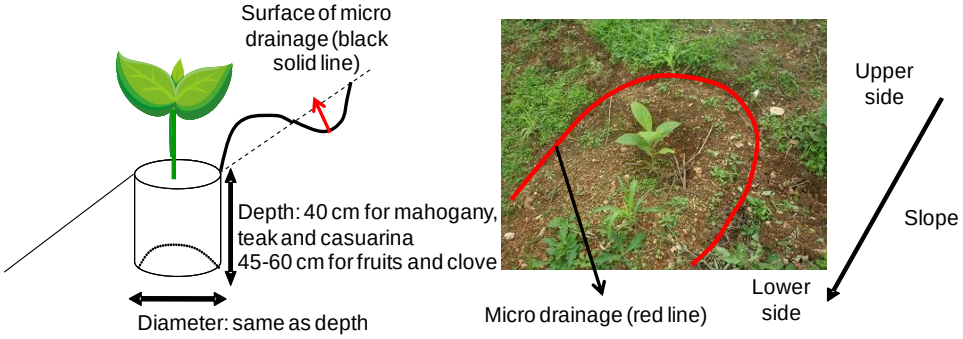
<table>
<tr><th>Items</th><th>Description</th></tr>
<tr><td>Objectives</td><td>The main objective of the technique is to produce quality seedlings in a collaborative manner at a small-scale community nursery.</td></tr>
<tr><td>Major Activities</td><td>a. Procure/collect seeds of timber, fruit, and industrial plant species.
b. Pre-treat seeds, particularly those which need pretreatment for smooth germination.
c. Sow seeds in a seed bed, transplant sprouts/germinated seeds into seedling pots/poly bags, and maintain seedlings in a nursery.</td></tr>
<tr><td>Highlights of the activities</td><td><u>A. Procurement/collection of seeds</u>
1. Identify and select healthy trees with large and well developed crowns for timber species or with large and quality fruits for fruit species, as mother trees.
2. Collect seeds from mother trees. The timing of seed collection varies by species, e.g., Mar.-Apr. and Sep.-Oct. for Sandalwood, May-Jul. for citrus, Mar.-May for Rambutan, May-Jul. for Longan, Jul.-Sep. for Teak and Jul.-Aug. for Mahogany.
<u>B. Pre-treatment of seeds</u>
1. Pre-treat seeds of Mahogany, Teak, and Sandalwood in the following manners:
<table>
<tr><th>Species</th><th>Process of pre-treatment of seeds</th></tr>
<tr><td>a. Mahogany</td><td>1) Soak the seeds in water for 12 hours.</td></tr>
<tr><td>b. Teak</td><td>1) Put the seeds in a rice sack and soak the sack in cool water for 48 hours.
2) After taking the sack from water, spread seeds in a black-colored container.
3) Put it under the sun for at least 2 days to dry them by direct sunlight.</td></tr>
<tr><td>c. Sandalwood</td><td>1) Soak the seeds in cool water from 12 to 24 hours</td></tr>
</table>
<u>C. Seedling Production</u>
1. Make a seedbed: i) prepare a seedbed 2~3 m long, 0.6~0.8 m wide and 1.2~1.5 m high; ii) sow seeds on a bed and pour water on the bed; iii) cover the bed with mulch, and ensure that seeds are protected from chicken.
 

2. Make the seedling beds flat.
3. Prepare seedling pots by mixing i) top (or black) soils, sands, and manure/compost at a rate of 3:1:2 for timber and fruit trees, and ii) top (or black) soils, sub-soils, and sands at a rate of 1:2:1 for sandalwood.
4. Transplanting sprouts/germinated seeds into the seedling pots filled with media prepared in 3. When transplanting of sprouts of sandalwood, plant host plants, e.g., alternanthera sp. in the pots together with sandalwood since sandalwood is semi-parasite tree.
5. Water seedlings every day, weed grasses in the pots at times, prepare and apply liquid fertilizer every week or every two weeks, and apply natural insecticide (e.g., water mixed with tobacco) whenever finding insect damage on leaves of seedlings.
6. Reduce the frequency of watering one month before planting to adapt the seedlings to the external environment.</td></tr>
<tr><td>Expected outputs</td><td>a. Local communities can produce quality seedlings.</td></tr>
<tr><td>Further references</td><td>1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
2) “Orientation manual technique of Forestry” for the techniques used in the central and temporary nurseries in Timor-Leste, Nov. 2010, MAF-GIZ</td></tr>
<tr><td>Contacts for information</td><td>1) Halarae Foundation
2) GIZ (RDP IV)</td></tr>
</table>

Reference Sheet Reforestation - 3

Name of the Technique:	**Tree Planting**
Place where the technique were introduced	Samalete, Tohumeta, Talitu and Madabeno Villages (Aileu district)
Year of Introduction:	2008 -2015
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins

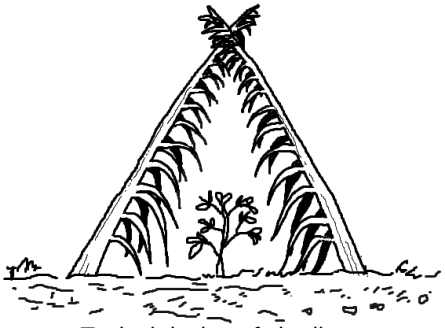
Summary of Tree Planting Techniques

Items	Description
Objectives	The chief objective of the technique is to plant seedlings in a proper manner so as to ensure high survival of seedlings planted in plantation in the initial years after planting.
Major Activities	a. Prepare a site for plantation. b. Plant seedlings in a site.
Highlights of the activities	1. Select a plot for planting trees according to the following guidelines: i) home garden/permanent farm close to a house for fruit and sandal wood (in the case of sandalwood, there should be host plants/trees, e.g., *sesbania grandiflora* and *leucaena sp*. in the plot), ii) periphery of coffee plantations for clove, iii) area used for shifting cultivation for timber species, and iv) open areas/grasslands for leguminous species and casuarina. 2. Clear the plot for plantation. 3. Delineate contour lines at intervals of 1 meter in height using an A-frame as explained in "Reference Sheet Sloping Agriculture and Afroforestry-1" in Section 2.5 of this CB-NRM Information Kit. 4. If the site has steep slopes, apply to the plot the soil conservation measures, such as contour compost, as explained in "Reference Sheet Sloping Agriculture and Afroforestry-3" in Section 2.5 of this CB-NRM Information Kit. 5. Stick stakes at the places where seedlings are planted according to the designs shown in Reference Sheet Reforestation-5 and 6 in this section. 6. Dig pits/holes 40 cm each in depth and diameter for timber species and 45~60 cm each in depth and diameter for fruits and industrial plant species. When digging holes, separate top soils from sub-surface soils. 7. Refill holes by putting back top soils first and overlay the top soils with sub-surface sols mixed with well decomposed compost/manure. 8. Dig planting holes as deep as the height of seedling pots and plant seedlings at the onset of the rainy season. 9. Make the u-shaped micro drainages in upper slope of seedlings to protect seedlings from being damaged by runoff water in the rainy season.  Typical design/practice of small drainage of the spot of planted tree
Expected outputs	a. Local communities can prepare a site for plantation and plant seedling in a proper manner.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	1) Halarae Foundation 2) JICA Project Office

Reference Sheet Reforestation - 4

Name of the Technique:	**Tending of Young Stands**
Place where the technique were introduced	Samalete, Tohumeta, Talitu and Madabeno Villages (Aileu district)
Year of Introduction:	2008 -2015
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins

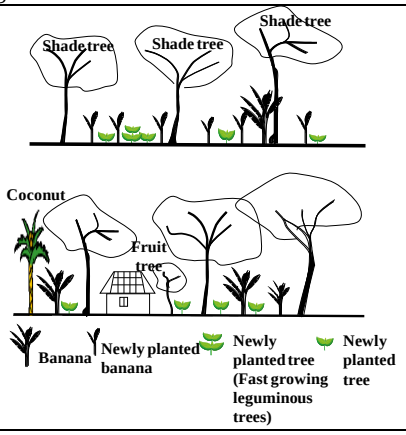
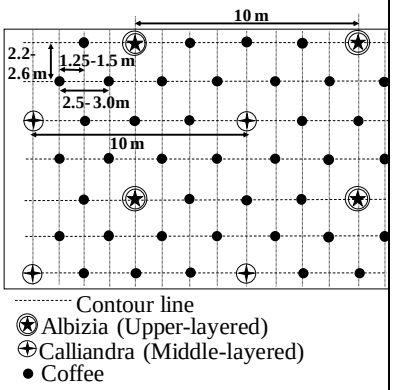
Summary of Tending of Young Stands Techniques

Items	Description
Objectives	The chief objective of the technique is to ensure a high survival rate of the young stands.
Major Activities	a. Weed grasses around seedlings. b. Apply shades to seedlings if needed. c. Apply grass mulch at the bases of seedlings.
Highlights of the activities	To maintain seedlings/young stands in healthy condition and ensure good growth of trees, the following maintenance works shall be regularly carried out for the first three (3) years after planting seedlings. 1. Weeding: Weed grasses within 0.5 m radius from seedlings every two (2) months during the rainy season to eliminate weeds that compete with seedlings for water, light, nutrition. 2. Mulching: Cover the bases of seedlings with grasses weeded as a mulch to maintain moisture contents of soils and prevent the growth of weeds. 3. Shading: Apply a temporary shade made of local materials (e.g., coconut leaves) to seedlings that should preferably grow under shade (e.g., rambutan) in the initial growth stage especially during the dry season. 4. Fixing: Repair/fix the soil conservation measures applied to the plantation, such as contour bunds and canals.  Typical design of shading with coconut leaves
Expected outputs	a. Local communities can properly maintain seedlings/young stands planted in plantation and keep seedlings grow well.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA. 2) Brochura kona ba oinsa kuda ai mahoni tuir experiensi Halarae - Hau kuda ai mahoni bah au nia oan, 11-8-2009. (A brochure prepared by Halarae Foundation under the support of GIZ and EU) 3) Trees and their management – Agroforestry Technology Information Kit-2, 1992, Department of Environment and Natural Resources, Government of Republic of Philippines
Contacts for information	1) Halarae Foundation 2) JICA Project Office

Reference Sheet Reforestation – 5a

Name of the Technique:	**Standard Designs of i) Home Garden and ii) Coffee Plantation**
Place where the technique were introduced	Tohumeta and Madabeno Villages (Laurala sub-district, Aileu district) for timber and coffee production, respectively
Year of Introduction:	2008-2009 and 2009-2010 in Tohumeta and Madabeno, respectively
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins (Tohumeta) Field survey conducted in February 2012 (Madabeno)

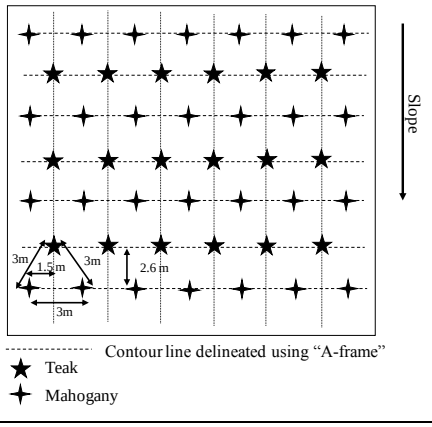
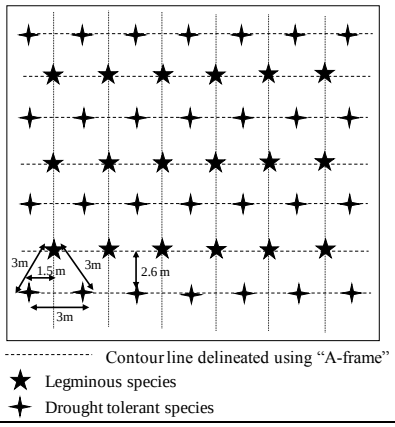
Summary of Standard Designs of i) Home Garden and ii) Coffee Plantation Techniques

<table>
<tr><th>Items</th><th>Description</th></tr>
<tr><td>Objectives</td><td>The main objective of the technique is to develop i) fruit and industrial plant plantation and ii) coffee plantation according to the respective recommendable designs.</td></tr>
<tr><td>Major Activities</td><td>a. Select areas suitable for i) fruit/industrial plant seedlings and ii) coffee seedlings.
b. Prepare and develop the selected areas according to the designs.</td></tr>
<tr><td>Highlights of the activities</td><td>1. Select sites suitable for the respective plantations and prepare the same according to the following guidelines/standard designs:
Basic conditions of the site by types of plantation
<table>
<tr><th>Purpose of plantation</th><th>i. Fruit/industrial plant seedling</th><th>ii. Coffee production</th></tr>
<tr><td>Suitable site</td><td>Home garden or backyard farms with existing standing trees and/or perennial crops such as banana</td><td>Fallow lands for shifting cultivation or farms close to existing coffee plantation</td></tr>
<tr><td>Recomm-endable species</td><td>- Fruit and industrial plants, such as, rambutan, longan, clove, cinnamon and jackfruits
- High value timber species, namely sandalwood
- Trees which prefer shady conditions in their initial growth
- Leguminous trees as living fence and fodder trees</td><td>- Coffee
- Upper-layered shade trees: Albizia, Casuarina
- Medium-layered shade tree: Caliandra</td></tr>
<tr><td>Intervals between seedlings</td><td>Random planting between existing trees and perennial crops with following intervals:
- Trees: 4 m (e.g., clove)~7 m (e.g., Rambutan)
- Perennial crops, e.g., banana: 1~2 m
- Leguminous trees: 3~4 m</td><td>- Coffee: 2.0-3.0 m x 2.0-3.0 m
-Upper/Mid-layered shade tree: 10 m x 10 m</td></tr>
<tr><td>Typical design/ Image of the plantation</td><td> 
</td><td> 
</td></tr>
</table>
2. Plant seedlings following the procedures described in “Reference Sheet Reforestation-3 and 4” in this section.</td></tr>
<tr><td>Expected outputs</td><td>a. Local communities can develop plantations of i) fruits and industrial plants and ii) coffee according to the standard designs.</td></tr>
<tr><td>Further references</td><td>1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA</td></tr>
<tr><td>Contacts for information</td><td>1) Halarae Foundation
2) JICA Project Office</td></tr>
</table>

Reference Sheet Reforestation – 5b

Name of the Technique:	**Standard Designs of iii) Timber Plantation and iv) Regenerated Forest in Degraded Land**
Place where the technique were introduced	Samalete Village (Railaco sub-district, Aileu district)
Year of Introduction:	2008 – 2009
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins

Summary of Standard Designs of iii) Timber Plantation and iv) Regenerated Forest in Degraded Land Techniques

<table>
<tr><th>Items</th><th>Description</th></tr>
<tr><td>Objectives</td><td>The main objective of the technique is to develop i) timber plantation and ii) regenerated forest in degraded land according to the standard designs.</td></tr>
<tr><td>Major Activities</td><td>a. Select areas suitable for i) timber plantation and ii) regeneration forest
b. Prepare and develop the selected areas according to the designs.</td></tr>
<tr><td>Highlights of the activities</td><td>1. Select sites suitable for the respective plantations and prepare the same according to the following guidelines/standard designs:
Basic conditions of the plantation site by purpose of the plantation
<table>
<tr><th>Purpose of plantation</th><th>iii. Timber production</th><th>iv. Regenerated forest in degraded land</th></tr>
<tr><td>Target site</td><td>Areas for shifting cultivation, especially those with low fertility and/or not suitable for crop production</td><td>Degraded forests
Open area (wasteland/barren land)
Grassland</td></tr>
<tr><td>Recomm-endable species</td><td>- Timber wood species, e.g., Teak, Mahogany and other suitable timber species</td><td>- Fast growing leguminous species, e.g., calliandra, gamal and lamtro (L-19)
- Drought tolerant species, e.g., casurina</td></tr>
<tr><td>Intervals between seedlings</td><td>- Timber: 3 m x 3m</td><td>- Leguminous species: 3 m x 6 m
-Drought tolerant species: 3 m x 6 m</td></tr>
<tr><td>Typical design/ Image of the plantation</td><td> 
</td><td> 
</td></tr>
</table>
2. Plant seedlings following the procedures described in “Reference Sheet Reforestation-3 and 4” in this section.</td></tr>
<tr><td>Expected outputs</td><td>a. Local communities can develop i) timber plantation and ii) regenerated forest according to the standard designs.</td></tr>
<tr><td>Further references</td><td>1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA</td></tr>
<tr><td>Contacts for information</td><td>1) Halarae Foundation
2) JICA Project Office</td></tr>
</table>

2.4 Agriculture and Livestock Management

2.4.1 Agriculture

Agriculture in Timor-Leste, especially in hilly and mountainous areas, is still primitive and highly vulnerable to climate changes; therefore, many communities practice shifting cultivation/rotation farming planting several upland crops in the same plot at the same time to minimize the risk of starvation. By current farming practices, communities can harvest some food crops even under unfavorable weather conditions, although the yields of crops are in general minimal. In other words, such a practice is effective in ensuring food security of communities in hilly and mountainous areas, but at the same time, the practice has kept their livelihood at the subsistent level.

This section introduces nine techniques and practices which can contribute to the stabilization and improvement of agricultural production by using materials and knowledge locally available, so that communities can improve their livelihoods while using the existing farms without any cash investment. The techniques and practices introduced in this section have been proven effective in enhancing the production of staple crops and vegetables in Timor-Leste as well as other Asian countries.

Techniques/Practices introduced in this Section

Technique	Outline	Applicability
1. Water saving cultivation method	Preservation of water is essential to the growth of crops, especially at the initial stage. The following techniques shall be introduced in vegetable farming: a) ridge making; b) solid ridge making, and c) application of green mulch.	Vegetable production
2. Application of basal fertilizer	Application of organic matters, such as compost and cow dung, helps improving soil fertility and moisture contents, which can facilitate the growth of crops in the initial stage. Production of compost and its application as basal fertilizer are the major techniques recommended.	Upland crops and Vegetable production
3. Application of additional fertilizer	Application of additional fertilizer on time is a crucial element necessary for enhancing crop yields. Production and application of liquid fertilizer are the major techniques introduced.	Upland crops and Vegetable production
4. Germination technique in cold season or in upland area	Healthy seed germination is critical to satisfactory vegetable production. Stable and moderate temperature is a key to healthy and good germination. A belly germination method is a simple but quite effective technique especially in hilly and mountainous areas.	Vegetable production
5. Nursery making	Likewise, preparation of healthy seedlings is essential to vegetable production. Techniques to prepare an optimum environment for producing healthy seedlings of vegetables are introduced.	Vegetable production
6. Vegetative propagation techniques	Asexual propagation techniques for vegetables and fruits production help saving the cost of seeds and maintaining the quality. Among other things, use of cutting is recommended as a technique suitable for production of planting materials of tomato, cabbage and some fruit trees.	Vegetable and fruit production
7. Crop rotation and mix planting	Repetitive cultivation of the same crop in the same plot causes diseases or makes crops vulnerable to insects. Crop rotation and/or mix planting are indispensable techniques to prevent crops from such damages.	Vegetable and upland crops production
8. Quality seed multiplication	Usage of quality seeds is essential to the increase of production. As the quality of improved seeds is easily deteriorated by planting with other local varieties, a technique to control its quality is introduced.	Upland crops (maize) production
9. Maize seed preservation	Post harvest loss is one of the major issues in rural areas in Timor-Leste. Reduction of seed loss during the storage of seeds contributes to the security of food and stabilization of production. Methods to store seeds using local resources are introduced.	Upland crops

Reference Sheet Agriculture Management-1

Name of the Technique	**Water saving cultivation method**
Place where the technique is observed	Lita Village, Russlau Village and Hatoblico Village
Year of Introduction:	2005-2015
Source of Information	PARCIC, Grupo Rae Hato

Summary of Water saving cultivation method Techniques

Items	Description
Objectives	The main objective of the technique is to preserve soil moisture through introduction of ridge making and green mulching. Such techniques are also effective in protection of soils from surface soil erosion by rains and winds.
Major Activities	a. Make ridges to secure enough space for roots and/or plant Poaceae family on the sides of ridges to make ridges firm and prevent evaporation from surface soils. b. Apply green mulches in a farm to cover its surface so as to maintain soil temperature and prevent evaporation from the surface.
Procedures	 **Ridge making** A. Ridge Making and Solid Ridge Making 1. Cultivate a farm mixing manure as basal fertilizer. 2. Make and form ridges from north to south so that crops can be evenly exposed to sunlight sufficiently. 3. Plant grasses on the sides of ridges to strengthen them and minimize evaporation from the surface soils. (Solid ridge making)  **Solid ridge making** B. Green mulching 1. Cultivate a farm mixing manure as basal fertilizer. 2. Make ridges/solid ridges according to the procedures described above. 3. Plant vegetables on ridges.  **Ground cover with Dareta** 4. Plant cover crops, e.g., dareta, lehe, other fodder crops or medicinal plants) around the vegetables. (Lehe is suitable as a material of green manure.) 5. Use cover crops as by-products.
Expected outputs	a. Local communities can improve the production of vegetables. b. Local communities can maintain soil fertility of vegetable farms using local resources (fodder grasses and medicinal plants).
Contacts for information	PARCIC

Reference Sheet Agriculture Management-2

Name of the Technique:	**Application of basal fertilizer**
Place where the technique is observed	Lita Village, Hatoblico Village and Russlau Village
Year of Introduction:	2005-2015
Source of Information	PARCIC, USC Canada Timor Leste/RAEBIA

Summary of Application of basal fertilizer Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to improve/amend soil fertilities, water holding capacity, and soil texture to improve the land productivity.
Major Activities	a. Make compost using locally available materials, such as cow dung, crop residues, and grasses/leaves, to improve soil conditions. b. Maintain compost for four (4) to six (6) months. c. Apply compost as basal fertilizer before planting crops and vegetables.
Procedures	A.Production of compost 1. Dig a pit for piling materials of compost. 2. Collect materials/ingredients of compost, namely, animal dung, agricultural residues, leaves of weed without matured seeds, leaves of leguminous trees, stalks of maize or trunks of banana, black soil, water, ashes, and EM, if possible. 3. Chop vegetative materials into small pieces. 4. Pile up each layer of animal dung, vegetative materials, ashes and black soil, in order in the pit. 5. Pour enough water or water mixed with EM while piling the materials. 6. Stamp firmly on the surface after piling up each ingredient's layer. 7. Repeat activities D to F until the pit is filled. 8. Make a thatch to shade the pit. 9. Stir the materials/ingredients and turn them upside down every three ~ four weeks when the temperature in the compost becomes cool to facilitate the fermentation process. B.Application of basal fertilizer 1 Apply 2-3 kg of compost per m^2 at least one week before planting. The suitable amount of compost varies with the type of crops ideally. 2. Mix compost with soils well. 3. Apply compost in each planting hole and mix it well with soils for a vegetable farm.  **Dig a pit**  **Stamp over the materials**  **Apply for transplanting hole**
Expected outputs	a. Local communities can produce quality compost using locally available resources. b. Local communities can apply compost properly. c. Local communities can increase the productivity of crops/vegetables.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	USC Canada Timor Leste / RAEBIA Halarae Foundation, PARCIC

Reference Sheet Agriculture Management-3

Name of the Technique:	**Production and Application of Liquid Fertilizer**
Place where the technique is observed	Lita, Hatoblico, Russlau, Faturasa, Fadabloco, Hautoho, Tohumeta, Madabeno and Talitu Village
Year of Introduction:	2005-2015
Source of Information	PARCIC, USC Canada Timor Leste/RAEBIA, Halarae

Summary of Production and Application of Liquid Fertilizer Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to improve the productivity of crops and vegetables by application of additional fertilizer.
Major Activities	a. Make liquid fertilizer using materials locally available. b. Apply liquid fertilizer as additional fertilizer.
Procedures	 **Put cow dung into sack** 3. Put a net sack filled with cow dung into a drum can. If a net sack is not available, put cow dung into a drum can directly. 4. Put crop residues and/or leaves of grasses/trees into a drum can.  **Cover on top** <u>A. Production of liquid fertilizer</u> 1. Procure and provide one drum can as a container for making liquid fertilizer. 2. Collect ingredients of fertilizer: 5-10kg of cow dung or other animal manure, 30-40kg of crop residues or leaves of grasses/trees, micro organism (black soil, tua mutin, tempe or EM), and 200 liter of water.  **Pour water** 5. Add micro organisms. 6. Pour water until the drum can is filled; 7. Cover the top of the can to protect it from insects. 8. Stir the contents well for 10 minutes every day for 1~3 weeks to facilitate the fermentation. <u>B. Application of liquid fertilizer</u> 1. Scoop up clear water in the surface. 2. Dilute the scooped water (liquid fertilizer) with 20 times of water; and 3. Apply the diluted liquid fertilizer to upland crop and vegetable on time.
Expected outputs	a. Local communities will produce quality liquid fertilizer using local materials. b. Local communities can increase the productivity of crops and improve the quality of vegetables.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	USC Canada Timor Leste/RAEBIA Halarae Foundation, PARCIC

Reference Sheet Agriculture Management-4

Name of the Technique:	**Germination technique**
Place where the technique is observed	Lita Village
Year of Introduction:	2008-2012
Source of Information	PARCIC

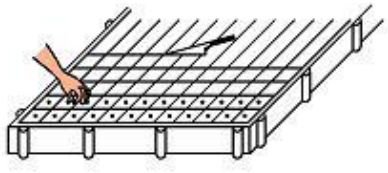
Summary of Germination technique Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to ensure the germination of vegetable seeds.
Major Activities	a. Provide or collect seeds and materials. b. Put vegetable seeds in a cloth and wrap the cloth in poly bag. c. Put the wrapped cloth onto belly. d. Sow germinated seed in pots or farms.
Procedures	  **Sow the germinated seed** <u>A. Provision or collection of materials</u> 1. Procure and provide vegetable seeds. 2. Provide or collect a cloth for a seedbed and a poly-bag for wrapping. <u>B. Facilitation of germination of seeds</u> 1. Spread a cloth and put the seeds on it. 2. Spray water on the seeds. 3. Hold the cloth wrapping the seeds.  **Put the seed onto belly** 4. Put the cloth into a poly bag. 5. Put the poly bag on human body, preferably at berry, for one to two day/s to incubate the seeds. 6. Check every morning and afternoon until the seeds germinate. This technique is very effective in high elevation areas. <u>C. Sowing</u> 1. If white tips sprout from seeds, sow them in nursery pots or farms.
Expected outputs	a. Local communities can ensure the germination of vegetable seeds even in cooler areas. b. Local communities can produce vegetables stably.
Contacts for information	PARCIC

Reference Sheet Agriculture Management-5

Name of the Technique:	**Nursery making**
Place where the technique is observed	Lita Village and Russlau Village, Lequitura Village
Year of Introduction:	2005-2012
Source of Information	PARCIC, USAID/DAI

Summary of Nursery making Techniques

Items	Description
Objectives	The main objective of the techniques is to enable local communities to produce seedlings of vegetables by making nurseries.
Major Activities	a. Make nursery pots with kontus/banana leaves and sow seeds in the pots. b. Make clay blocks as a nursery bed and sow seeds in the bed.
Procedures	 **Roll up and pin contus leaf**  **Remove the leaves** A. Nursery pot making with contus/banana leaves 1. Collect kontus or banana leaves and grass stems which can be used as sticks. 2. Tear the leaves to the size suitable for nursery pot. 3. Make pots rolling up the leaves and pinning them with sticks. 4. Fill the pots with soils. 5. Sow vegetable seeds in the pots. 6. Remove the leaves when transplanting seedlings. 7. Incorporate the removed leaves into soils so that they will decompose naturally.  **How to make clay block** B. Clay block making as a nursery 1. Make a wooden frame. 2. Mix clay soils with humus/compost at a rate of 4:6. 3. Fill the mixed soils in the frame. 4. Pour enough water and knead it. 5. Level the surface of the soils with a trowel. 6. After the water infiltrates, divide the soils into blocks with a knife. 7. Make a hole in the center of each block and sow seeds in the holes.  **Cut clay into block** 8. When the seedlings grow at the plantable size, cut out the block with a knife and transplant seedlings in a farm.
Expected outputs	a. Local communities can produce vegetable seedlings using materials locally available. b. Local communities can improve the quality of vegetables and increase the productivity of vegetables.
Further reference	USAID Timor Leste, Private Sector Development 2005-2010/DSF Fact sheet USAID http://timor-leste.usaid.gov/sites/default/files/DSPfactsheet.pdf
Contacts for information	PARCIC USAID DAC Project

Reference Sheet Agriculture Management-6

Name of the Technique:	**Vegetative/Asexual Propagation Techniques**
Place where the technique is observed	Lita Village, Hatoblico Village
Year of Introduction:	2008-2015
Source of Information	PARCIC, Rae Hato

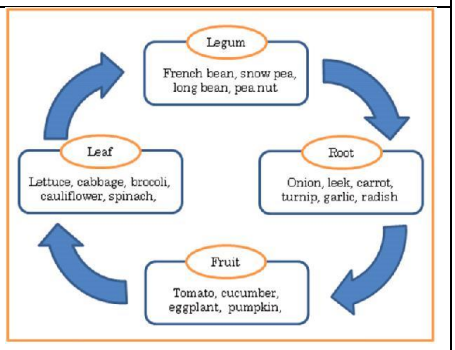
Summary of Vegetative/Asexual Propagation Techniques Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to use cuttings of tomato and cabbage for production of seedlings to save the cost for seeds and maintain the quality of vegetables.
Major Activities	a. Propagate seedlings of tomato and cabbage from cuttings
Procedures	<u>A. Propagation of tomato</u> 1. Pick 7-8cm long branches out of side buds manually. 2. Dip the picked branches into water for 30 minutes to allow them to absorb enough water. 3. Put sands/sub-soils in a seedling tray and fill soils up to about 10cm high. 4. Cut the branches on a slant and plant them at an angle of 30-60 degree to the soils. 5. Cover the branches with mulches (grasses or tree leaves) for 4-5days and gradually expose them for about 10 days so that the branches could develop their root systems in soils. 6. Transplant the seedlings in a farm when they open the first flower.  **Stick cutting into soil**  **Pick the buds up from cabbage**  **Remove excess buds** <u>B. Propagation of cabbage</u> 1. Pick the side buds from cabbage and dip them into water for 30 minutes. 2. Stick the buds into a nursery bed or farm. 3. Cover the buds with mulches (grasses or tree leaves) to protect them from being exposed to direct sunlight for 10 days. 4. Transplant them in the field. 5. If there are many new buds, select one or two quality bud/s.
Expected outputs	a. Local communities can produce quality seedlings of vegetables using cuttings. b. Local communities can keep producing quality vegetables.
Further references	-
Contacts for information	PARCIC (or Grupo Rae-Hato) JICA Project Team

Reference Sheet Agriculture Management-7

Name of the Technique:	**Crop rotation and mix planting**
Place where the technique is observed	Tohumeta Village, Manelima Village
Year of Introduction:	2004- 2012
Source of Information	USC Canada Timor-Leste/RAEBIA

Summary of Crop rotation and mix planting Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to stabilize the production of vegetables by avoiding crop diseases and keeping soils healthy.
Major Activities	a. Rotate crops in the same area to prevent the incidence of crop diseases or pest infestation caused by continuous cropping of vegetables/crops. b. Plant several crops in the same area to maintain the soil fertility and reduce the possibility of incidence of crop diseases.
Procedures	A.Crop rotation 1. Design a cropping pattern to avoid mono cropping or cropping the same family in the same place and keep enough interval periods between the cropping of the same family to avoid continuous cropping. 2. Major families that vegetables belong to are: Solanaceae family: Tomato, capsicum, eggplant, potato and chili Legume family: All beans like French beans, snow pea, long beans, soybean, etc. Cucurbitaceae: Pumpkin, cucumber, bitter gourd, bottle gourd, chayote, etc 3. Incorporate leguminous crops in the rotation to improve soil nutrient.   **Maize and peanut**  **Maize and contus** B. Mix planting 1. Plant leguminous crops with nutrition-absorbent crops (e.g.: maize with red beans or soybean) to improve soil fertility. 2. Combine water absorbing crops with water saving crop (e.g.: maize with sesame/kontas) to maintain the soil moisture contents. 3. Combine standing crops with ground cover crops (e.g.: maize with sweet potato) to minimize the potential of surface soil erosion and maintain the soil moisture content.
Expected outputs	a. Local communities can stabilize the vegetable production reducing the incidence of diseases and pest infestation. b. Local communities can maintain soil fertility of home gardens.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	USC Canada Timor Leste/ RAEBIA

Reference Sheet Agriculture Management-8

Name of the Technique:	**Quality seed multiplication**
Place where the technique is observed	Futurasa, Fadabloco and Hautoho Villages
Year of Introduction:	2005-2015
Source of Information	USC Canada Timor Leste/RAEBIA

Summary of Quality seed multiplication Techniques

Items	Description
Objectives	The main objectives of the technique are to multiply and preserve quality seeds (maize).
Major Activities	a. Organize a farmer's group. b. Develop a demonstration plot. c. Produce quality maize and preserve quality seeds from harvest.
Procedures	<u>A. Organization of a farmers' group</u> 1. Identify and select farmers who are willing to participate in the seed multiplication activities. 2. Develop by-laws of the group and a work plan of the activities in a participatory manner. 3. Arrange a study tour for the group.  **Demonstration Plot** <u>B. Development of a demonstration plot</u> 1. Select a place for seed multiplication among permanent farms, which satisfy either of the following criteria: i) a farm is separated from other farms at a distance of more than 200 m, or ii) a farm is surrounded by forests and/or coffee plantations. 2. Apply soil conservation measures if the plot has steep slopes.  **Harvest center** <u>C. Production of improved variety of crops</u> 1. Procure/provide seeds of improved varieties of maize. 2. Plant improved seeds in the demonstration plot. 3. Apply improved farming techniques, such as application of compost, and application of additional fertilizer on time. 4. Harvest and dry cobs properly. 5. Select big cobs and shell corns only in the middle part of the selected cobs. 6. Store corns in an air tight container or an unglazed jar/bamboo with herbal insect repellent. 7. Assist the group members in replicating the above-mentioned techniques in their own farms.  **Harvest center**
Expected outputs	a. Local communities can multiply seeds of improved varieties of maize. b. Local communities can increase maize production.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA 2) Seed of Life
Contacts for information	Seed of Life USC Canada Timor-Leste/ RAEBIA

Reference Sheet Agriculture Management-9

Name of the Technique:	**Maize seed preservation**
Place where the technique is observed	Faturasa, Fadabloco, Hautoho, Talitu, Madabeno, and Tohumeta Villages
Year of Introduction:	2005-2015
Source of Information	USC Canada Timor-Leste/RAEBIA

Summary of Maize seed preservation Techniques

Items	Description
Objectives	To reduce the damage/loss of maize in the post-harvest period.
Major Activities	a. Dry seeds sufficiently. b. Store seeds in an airtight container or an/a unglazed jar or bamboo container applying natural insect repellent.
Procedures	A. Seed drying 1. Dry corn until its moisture content is less than 14%. Corns should be dried as hard as there is no tooth mark on the seed, when being bit firmly. B. Storage of seeds in an airtight container. 1. Put dried corn seeds in an airtight container, such as jerry can or drum can. C. Storage of seeds in unglazed jar or bamboo container 1. Collect / prepare an/a unglazed jar or bamboo container. 2. Store maize seeds with maize cob powder (ashes) in the container. - Burn dried maize cobs after shelling. - Collect the ashes after burning. - Fill the container with ashes and dried seeds at a rate of 2:8. - Cap the container firmly and keep it in cool and dry place.  **Maize cob**  **Ai ru**  **Lantana** 3. Store maize seeds with Ai Ru (Eucalyptus europhylla) dried leaves in the container. - Spread dried Ai Ru leaves into the container. - Put dried maize seeds until the container is filled with the seeds. - Put Ai Ru leaves fully covering the surface of the seeds. - Cap the container firmly and keep it in cool and dry place. - Repeat the above-mentioned process until seeds will be planted to prevent weevil. - The appropriate amount of leaves is about 3% of the seeds. 4. Store maize seeds with Lantana leaves powder in the container. - Dry Lantana leaves fully and crash them until they become powder. - Mix dried maize seeds with the powder. - Cap the container firmly and keep it in cool and dry place. - Repeat the above-mentioned process until seeds will be planted to prevent weevil. - The appropriate amount of powder is about 5% of the seeds in weight.
Expected outputs	a. Local communities can reduce the post harvest loss using materials locally available. b. Local communities can secure their food and seeds for next cropping.
Further references	1) A Permaculture Guidebook from East Timor, Permatil, 2005
Contacts for information	Permatil Seed of Life

2.4.2 Livestock Management

Livestock management is one of the crucial issues to be addressed in forest and natural resource management in Timor-Leste, especially in hilly and mountainous areas, as free animal grazing is commonly observed in the areas. Free grazing has often caused the forest/grassland degradation and crop damage in the farms. Proper management and control of livestock animals is therefore crucial to sustainable forest and natural resource management on the village level.

Considering the carrying capacity of the land and population pressure in the future, an intensive animal management is one of the directions that local communities can aim at. It is, however, not easy for communities in hilly and mountainous areas to change their practices in a short period of time, as almost all the communities live at subsistent level and also face a shortage of family laborers as well as animal fodder in their localities.

Hence, this section proposes the following three techniques which can help communities protect crops and natural resources from animals while changing their conventional animal raising practice to a semi-intensive one.

1. Introduction of live fence
2. Development of forage/feed bank
3. Introduction of semi intensive animal husbandry

In particular, the semi-intensive livestock management is expected to enable local communities to easily access and use animal manures for farming, which can improve land productivity of the farms and eventually contribute to the increase of production of crops.

Reference Sheet Livestock Management-1

Name of the Technique:	**Introduction of Live Fence**
Place where the technique is observed	Russlau Village, Manelima Village, Maumeta Village
Year of Introduction:	2004-2015
Source of Information	USC Canada Timor Leste/RAEBIA

Summary of Introduction of Live Fence Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to protect farms and plantations from livestock animals by vegetative means.
Major Activities	a. Select materials/resources that can be used for live fence. b. Produce planting materials of live fence. c. Plant saplings along the borders of an area to be protected from animals. d. Use live fence for other purposes.
Procedures	 **Sisal Live Fence** <u>A. Selection of materials and design of fence.</u> 1. Select an area to be protected and identify the boundaries where live fences are required. 2. Identify local resources that can be used for live fence and decide the materials. (Leguminous trees are recommendable from the viewpoint of its usefulness.) 3. Determine the number of saplings required for the total length of fence. 4. Design the fence including a protective measure for saplings in the initial years. <u>B. Production of planting materials</u> 1. Develop a small nursery to produce saplings. 2. Sow seeds or plant cuttings in the nursery. 3. Maintain saplings until they become the size enough for planting. 4. Collect materials as a measure to protect saplings <u>C. Planting of sapling</u> 1. Plant saplings in the boundaries where live fences should be developed. 2. Make a protective measure along the saplings 3. Maintain saplings well. In case some saplings get withered or dead, replace them with new ones. 4. Remove the protection measure when saplings grow enough. <u>D. Utilization of live fence</u> 1. Use live fence materials for other purposes, such as: i) thread, rope and clothes by Sisal fiber, ii) animal feed and firewood by legume trees and grasses, iii) firewood by Ai Anin.  **Gamal tree fence with replacements**  **Fence of Ai Anin with replacements**
Expected outputs	a. Local communities can protect farms and plantations from animals using resources locally available.
Further ref.	1) A permacultire Guidebook from East Timor, Permatil, 2005
Contacts for information	USC Canada Timor Leste / RAEBIA PERMATIL

Reference Sheet Livestock Management-2

Name of the Technique:	**Development of Forage/Feed Bank**
Place where the technique is observed	Manelima Village
Year of Introduction:	2006-2015
Source of Information	USC Canada Timor Leste/RAEBIA

Summary of Development of Forage/Feed Bank Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to produce animal feed using resources locally available.
Major Activities	a. Select a location for production of forage/fodder trees/crops as a forage/fodder banks. b. Procure/Collect seeds and produce seedlings of fodder crops/trees. c. Transplant seedlings in the fodder bank and any areas around farms or homes.
Procedures	 **Legume (Gamal) and grasses** A. Selection of plot for a fodder bank 1. Decide the location and size of plot for a forage/fodder bank based on the number of animals that the bank should feed. 2. Decide and select fodder crops that are palatable for cattle and available in the localities (e.g., Leucaena, Gamal, Sesbania, Calliandra, Moringa, King grasses, etc.).  **Calliandra**  **Leucaena**  **Sesbania**  **Moringa** B. Production of seedlings 1. Determine the quantity of seedlings needed. 2. Collect seeds and cuttings necessary for production of seedlings. 3. Sow seeds and/or plant cuttings or divided roots to produce seedlings. 4. Maintain seedlings until they become large enough to plant. C. Transplanting of seedlings 1. Transplant seedlings in the fodder bank and other areas around farms and/or houses. Leguminous trees are also good for live fence.  **Transplant divided roots of grasses**
Expected outputs	a. Local communities can produce animal feed using resources locally available. b. Local communities can improve the nutrition conditions of livestock animals.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA

Reference Sheet Livestock Management-3

Name of the Technique	**Introduction of Semi-intensive Animal Husbandry**
Place where the technique is observed	Manelima Village
Year of Introduction	2006-2015
Source of Information	USC Canada Timor Leste/RAEBIA

Summary of Introduction of Semi-intensive Animal Husbandry Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to rear cattle putting them in a pen/fenced plot in a semi-intensive manner.
Major Activities	a. Establish a plot to produce fodder trees/crops (a feed bank) in a village. b. Construct a pen/fenced plot with watering place and a manure pit. c. Conduct training in using cattle for farming. d. Make compost from residue, feces and urine of cattle.
Procedures	<u>A. Organization of a farmers' group</u> 1. Select about 10 farmers who are willing to work together and organize them into a group. 2. Make by-laws of the group and a work plan of the group activities. 3. Share the responsibilities for rearing and taking care of animals. <u>B. Establishment of a fodder bank</u> 1. Procure and provide seeds of fodder crops and leguminous trees in one year advance. 2. Develop a fodder bank near the members' houses or animal pens as described in Ref. Sheet Livestock Management-2 in this section. <u>C. Construction of an animal pen/fenced plot</u> 1. Collect materials such as bamboo and dried wood for an animal pen. 2. Clear the site for an animal pen. 3. Build an animal pen (set up poles and tie beams/side bars with props). 4. Put up a fence and thatch the roof. 5. Make a watering place. 6. Dig a manure pit near the pen and make a connecting canal from the pen to the pit to collect animal dung and urine at the pit. <u>D. Training on use of cattle for farming</u> 1. Explain the use of cattle for farming, such as plowing. (If possible, take local communities to some villages which have already used animals for farming.) 2. Procure and provide a tool (attachment) for plowing. 3. Conduct training in plowing a farm using cattle. <u>E. Production of compost</u> 1. Help the member make compost using animal dung and urine with crop residues.  **Animal Pen**  **Train People and Cattle for Plow**
Expected outputs	a. Local communities can rear cattle in a semi-intensive manner. b. Local communities can use cattle for tilling/plowing of a farm. c. Local communities can make compost using animal manure.
Contacts for information	USC Canada Timor Leste/ RAEBIA

2.5 Sloping Agriculture and Agroforestry Techniques

Sloping agriculture and agroforestry techniques are essential to sustainable use and management of hilly and mountainous areas for production purposes in Timor-Leste, where most of the national lands have more than 40% slopes. The techniques have been widely introduced and promoted all over the world, as they enable communities to manage sloping farmlands in a sustainable manner by integrating crop production with soil conservation and/or reforestation. In the context of CB-NRM, the techniques are requisite for converting areas currently used for shifting cultivation to more sustainable forms such as plantations, farms with soil conservation measures, and orchards.

In Timor-Leste, many organizations, namely MAF, donor-funded projects, and NGOs, have already introduced and demonstrated sloping agriculture and agroforestry models in the field to promote sustainable upland farming methods. In addition to those promoted by the government and non-government organizations, there are some traditional soil conservation measures that communities used to practice in the Portuguese era.

This section introduces not only the skills and techniques that have been introduced in the country after independence, but also those that had been traditionally practiced by local communities. Among other things, the following seven skills and techniques are judged as effective in sustainable land management and easy-to-apply by communities in Timor-Leste.

1. Delineation of contour lines (making and use of an A-frame)
2. Cover cropping/mulching/laying crop residues along contour lines
3. Contour composting/canalling
4. Bench terracing
5. Contour rock walls
6. Alley cropping/Natural vegetation strips
7. Multistory planting

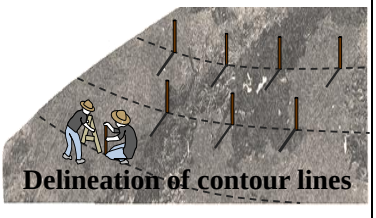
Moreover, it is advisable to refer the following technical documents to learn about other sloping agriculture and agroforestry techniques, which can be applied to Timor-Leste.

a. Sustainable Land Management Techniques, UNDP, 2010
b. Forestry Technology Guideline Book (Forestry Technology Guideline Book), NDF/MAF (Supported by APR II), 2007
c. A Permaculture Guidebook from East Timor, PERMATIL, 2005
d. Agroforestry Information Kits, DENR, 1992

Reference Sheet Sloping Agriculture and Agroforestry-1

Name of the Technique:	**Delineation of contour lines (making and use of an A-frame)**
Place where the technique is observed	Batara Village (Laclubar), Umakaduak Village (Laclo), Faturasa, Fadabloco,and Hautoho Village (Remexio), Talitu, Madabeno, and Tohumeta Villages (Laulara)
Year of Introduction:	2008-2015
Source of Information	USC-CTL/RAEBIA

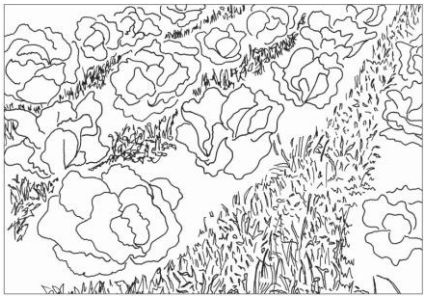
Summary of Delineation of contour lines (making and use of an A-frame)Techniques

Items	Description
Objectives	The main aim of this technique is to delineate contour lines using a simple and practical instrument, which communities can easily make of locally available materials.
Major Activities	a. Make an A-frame. b. Delineate contour lines using an A-frame.
Procedures	A. Making an A-frame 1. Collect the following materials: i) two 2.1 meter-long wooden poles and one 1.2 meter-long wooden pole; ii) sturdy string for tying or nails; and iii) a rock/stone about the size of a fist or any similar heavy object. 2. Tie or nail the two longer poles at one end. It is better to make notches on the posts of the contact so that the poles will not slip. 3. Spread the legs and brace with the shorter pole to make a figure "A". Tie or nail the crossbar to the middle of the legs (longer poles). 4. Tie one end of the string to the point where the two legs of the A-frame are joined. 5. Tie the other end of the string to the rock or any object for weight. The rock should be heavy enough not to sway with a wind. The rock should be hang about 20 cm below the crossbar. B. Delineation of contour lines 1. Start in the middle of the slope after cleaning the land. The contour lines will be first taken downwards to the bottom and then upwards to the top to minimize cumulative errors. 2. Put the first stake at the edge of the field and position the left leg of the A-frame at the stake. 3. Adjust the right leg so that the weighted string passes through the midpoint of the crossbar. 4. Put another stake at the right leg of the A-frame to mark the point. 5. Move the A-frame to the right by placing the left leg in the spot where the right leg previously was. Adjust the other leg again until the string passes through the midpoint of the cross bar. Again mark the point with a stake. 6. Follow this procedure up to the other edge. 7. Take another point downward in the slope, which is 1 m bellow in height, using a 1~1.5 meter-long stick or other measurable object. Take steps from 2 to 6 to take the contour line. 8. Repeat steps from 2 to 7 until all the contour lines are taken in the plot.   **Use of A-frame**  **Delineation of contour lines**
Expected outputs	a. Local communities can take the contour lines by themselves using local materials. b. Local communities can prepare their farms with soil conservation measures.
Further references	1) Livro Orientasaun Technico Floresta, NDCF, MAF, 2006 2) A Permaculture Guidebook from East Timor, PERMATIL, 2005
Contacts for information	USC Canada-Timore-Leste / RAEBIA NDF

Reference Sheet Sloping Agriculture and Agroforestry-2

Name of the Technique:	**Relay planting, and cover cropping/mulching**
Place where the technique is observed	Faturasa, Fadabloco,and Hautoho Village (Remexio), Talitu, Madabeno, and Tohumeta Village (Laulara)
Year of Introduction:	2012 – 2015
Source of Information	USC-CTL/ RAEBIA

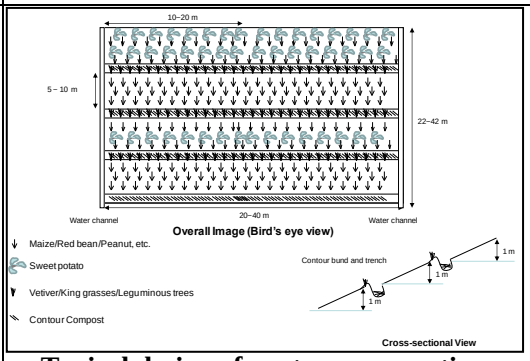
Summary of Relay planting, and cover cropping/mulching Techniques

Items	Description
Objectives	The techniques aim to reduce surface soil erosion by applying simple farming management practices to a sloping farmland.
Major Activities	a. Plant several types of crops which have different growing periods, different growth shapes, and crop heights in the same field. b. Cover a farm with a cover crop or crop residues as mulching during fallow periods.
Procedures	A. Relay cropping 1. Plant several types of crops, such as maize (erect type crop), sweet potato/squash (creeping type crop), cow pea (climbing type crop), pigeon pea (biennial crop), taro, and cassava (biennial crop), to cover the surface of soils and keep a farm being covered with crops throughout a year. 2. Relay cropping is a common practice found in upland areas in Timor-Leste. The technique has a dual purpose, protection of the farm from erosion and ensuring of food crops even under unfavorable climate conditions.  **Mix planting of maize, cow pea, cassava, and pumpkin** B. Cover cropping/Mulching 1. Plant a cover crop, such as lehe, one (1) month before harvesting maize or put/spread crop residues or grasses/leaves after harvesting maize in a farm, especially a permanent farm, protect the surface soils from exposure to direct sunlight, wind, and occasional unseasonal rainfalls during a fallow season. 2. Cover crops or mulching materials should be incorporated into the surface soils during land preparation as organic matters, so as to improve soil structure, fertility, and moisture holding capacity.  **Mulching in a farm**
Expected outputs	a. Local communities can reduce the adverse effect of surface soil erosion. b. Local communities can maintain soil fertility of a farm, especially a permanent farm.
Further references	1) Livro Orientasaun Technico Floresta, NDCF, MAF, 2006 2) A Permaculture Guidebook from East Timor, PERMATIL, 2005
Contacts for information	PERMATIL NDF/MAF

Reference Sheet Sloping Agriculture and Agroforestry-3

Name of the Technique:	**Contour Composting/Canalling**
Place where the technique is observed	Batara Village (Laclubar), Faturasa, Fadabloco,and Hautoho (Remexio), Talitu, Madabeno, and Tohumeta Village (Laulara)
Year of Introduction:	2008-2015
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in the Laclo and Comoro River Basins

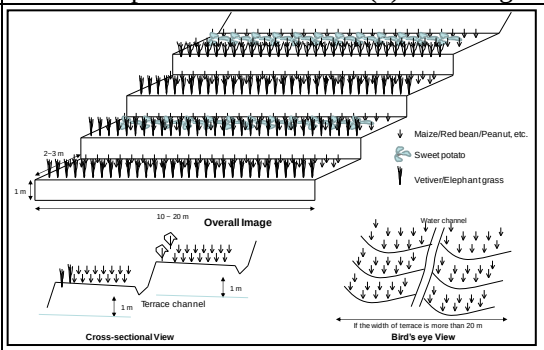
Summary of Contour Composting/Canalling Techniques

Items	Description
Objectives	The main objective of the technique is to maintain soil fertility of sloping farmland by applying a less-laborious soil conservation measure.
Major Activities	a. Take contour lines using an A-frame. b. Make small canals with bunds along contour lines. c. Put crop residues/grasses/twigs in the canals. d. Make a/ diversion canal/s downwards to the bottom.
Procedures	 **Typical design of contour composting** 1. Take contour lines following the procedures described in Reference Sheet Sloping Agriculture and Agroforestry-1 in this section. 2. Dig a canal at least 50 cm wide and 30 cm deep following each contour line. 3. Place the excavated soils from the canal on the downward edge of the canal. 4. Make bunds on the downward edge of the canals using the excavated soils. 5. Put crop residues/grasses/twigs in the canals. 6. Dig a/ diversion canal/s on the edges of the farm to collect excess water from contour canals and drain them downwards to a nearby gully to prevent the farm from being eroded. 7. Plant grasses and/or leguminous trees on the bunds. 8. At the end of every cropping season, dig the canals again and return the accumulated soils with crop residues/grasses/twigs to the farm, so that a farm can recover and maintain soil fertility. 9. Put crop residues/leaves/twigs in the canals when clearing the farm in land preparation.  **Land preparation along contour lines**  **Farm with contour composting**
Expected outputs	a. Local communities can minimize soil erosion and maintain soil fertility in sloping farmlands. b. Local communities can use their permanent farms in a sustainable manner maintaining soil fertility of the farms.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA1) 2) Livro Orientasaun Technico Floresta, NDCF, MAF, 2006 3) Agroforestry Technology Information Kit (ATIK), DENR, 1992
Contacts for information	Halarae Foundation USC Canada-Timor-Leste / RAEBIA

Reference Sheet Sloping Agriculture and Agroforestry-4

Name of the Technique:	**Bench Terracing**
Place where the technique is observed	Batara Village (Laclubar), Faturasa, Fadabloco,and Hautoho Village (Remexio), Talitu, Madabeno, and Tohumeta Village (Laulara)
Year of Introduction:	2008-2015
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in the Laclo and Comoro River Basins

Summary of Bench Terracing Techniques

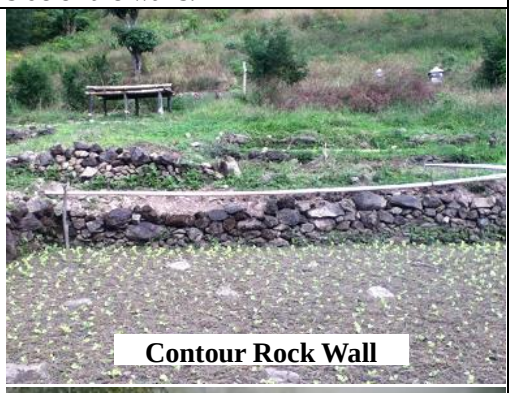
Items	Description
Objectives	The main objective of the technique is ensure that communities can continuously use sloping farmland without reducing soil fertility by preventing soil erosion.
Major Activities	a. Take contour lines using an A-frame. b. Develop bench terraces one (1) meter high.
Procedures	 **Typical design of bench terracing** 1. Take contour lines following the procedures described in Reference Sheet Sloping Agriculture and Agroforestry-1 in this section. The vertical distance between the lines should not be more than 1.0 meter. 2. Remove surface soils between the two contour lines and put aside the removed surface soils. 3. Cut the upper half of the slope between two contour lines. 4. Place the excavated soils on the lower half of the same slope (Fill the slope with soils). 5. Continue the processes of 2 to 4 until the area are leveled. 6. Put the surface soils n the leveled terraces. 7. Make the front of terraces (the riser) slant back toward the hillside with an angle between 15 and 45 degree depending on the type of soils and height of terrace.  **Measuring of height for bench terraces** 8. Dig a small canal at base of the terraces to protect the terrace from being eroded by excess water during the rainy season. 9. Slope terraces slightly from the edge to the base (or from the valley side to the hill side) so as not to allow excessive rainfall water flow over the terraces. 10. Build small bunds/mounds at the front of the terraces. 11. Plant grasses on the riser and legume hedgerows on the small bunds at the edge of the terraces to reinforce the terraces  **Farm with bench terraces**
Expected outputs	a. Local communities can use sloping farmlands continuously maintaining soil fertility.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA 2) Livro Orientasaun Technico Floresta, NDCF, MAF, 2006 3) Agroforestry Technology Information Kit (ATIK), DENR, 1992
Contacts for information	Halarae Foundation USC Canada-Timor-Leste / RAEBIA

Reference Sheet Sloping Agriculture and Agroforestry-5

Name of the Technique:	**Contour Rock Wall**
Place where the technique is observed	Madabeno Village and Talitu Village (Laurala)
Year of Introduction:	Unknown-2015
Source of Information	People in Madaebeno Village and Talitu Village

Summary of Contour Rock Wall Techniques

Items	Description
Objectives	The main objective of the technique is to prevent soil erosion in sloping stony farmlands using gravel materials in the field.
Major Activities	a. Take contour lines using an A-frame. b. Collect rocks and stones in the field. c. Put rocks and stones along contour lines to build rock walls. d. Plant leguminous tress along and below rock walls. e. Plant vetiver or king grasses on the upper side of the walls.
Procedures	1. Take contour lines following the procedures described in Reference Sheet Sloping Agriculture and Agroforestry-1 in this section. The horizontal distance between contour lines is preferably 3 to 5 meters, but the vertical distance between the same should be less than 1.5 m. 2. Excavate 50-100 cm wide and 10-25 cm deep on contour lines as base for rock walls. The base should be inversely sloped to the base (i.e., the base should be sloped from the valley side to the hill side.). 3. Construct a rock wall putting large rocks or stones as a base. Small stones should not be used as a base but used as maerials to fill in spaces between large stones. 4. Build one layer at a time and tamp the stones to make the layer firm before starting another layer of the wall. The size of the rock wall may vary with the slopes or availability of stones, but it should be 0.5~1 meter high, 0.5-1.0 meter wide at the base, and 0.5-0.7 meter wide at the top. 5. Make other rock walls along contour lines repeating the activities from 2 to 4. 6. Dig a drainage canal in the upper side of the farm to drain excessive rain water to a nearby gully. 7. Plant leguminous trees or other fast-growing trees below the rock walls (about 10 cm from the walls and 15 to 30 cm apart in a row) to stabilize the rock walls. 8. Plant vetiver/napier/king grasses or other fodder crops in the front of rock walls.
Expected outputs	a. Local communities can use sloping farmlands continuously maintaining soil fertility.
Further references	1) Livro Orientasaun Technico Floresta, NDCF, MAF, 2006 2) Agroforestry Technology Information Kit (ATIK), DENR, 1992
Contacts for information	Halarae Foundation


Contour Rock Wall

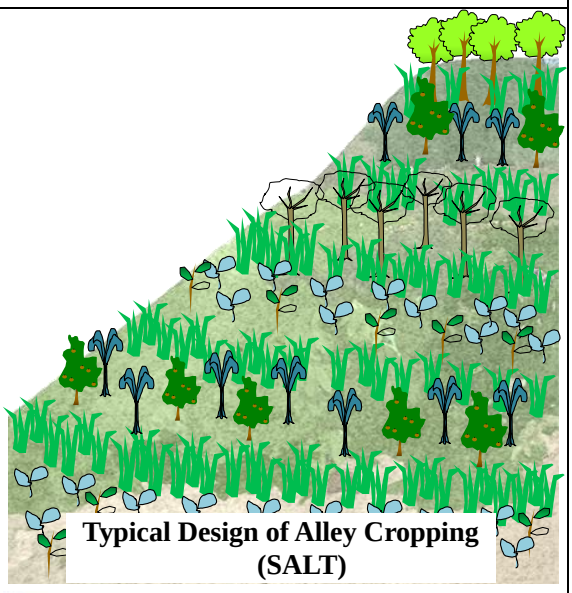

Contour Rock Wall

Reference Sheet Sloping Agriculture and Agroforestry-6

Name of the Technique:	**Alley Cropping/SALT Techniques**
Place where the technique is observed	Madabeno Village and Talitu Village (Laurala)
Year of Introduction:	2011-2015
Source of Information	Halarae Foundation

Summary of Alley Cropping/SALT Techniques Techniques

Items	Description
Objectives	The main objective of the technique is to maintain soil fertility of sloping farmland by preventing soil erosion and use the same land for production of multiple crops.
Major Activities	a. Take contour lines using an A-frame. b. Develop vegetative strips made of leguminous trees or fodder crops, such as kinggrass. c. Plant perennial/permanent crops/trees and annual/short-term crops between the vegetative strips.
Procedures	1. Take contour lines using an A-frame following the procedures described in Reference Sheet Sloping Agriculture and Agroforestry-1 in this section. The horizontal distance between two contour lines is preferably 3 to 5 m, but the vertical distance between the same should be less than 1.5 m. 2. Cultivate 1~2 m strips along the contour lines and plant seeds or seedlings of leguminous trees and/or fodder crops (e.g., vetiver/king grasses) on two lines in the cultivated strips. The distance between the lines should be 0.5~1.0 meter. 3. Plant perennial crops (e.g., banana, fruit trees, coffee with shade trees, and other industrial trees) and short-term crops (e.g., maize, beans, sweet potato, cassava, and taro) in the areas between the strips of leguminous trees/grasses separately. The proportion of perennial crops and short-terms crops should be one to three. Furthermore, short-term crops should be planed away from tall tress to protect crops from being shaded. 4. Trim leguminous trees to keep their height at 40 cm from the ground one year after planting and keep them at the same size by trimming every 30 to 45 days. 5. Spread and incorporate the cut leaves and twigs in/into the areas for perennial and short-term crops as organic fertilizer.
Expected outputs	a. Local communities can use steep sloping farmland by minimizing the effect of soil erosion and maintaining soil fertility of the farmland.
Further references	1) Livro Orientasaun Technico Floresta, NDCF, MAF, 2006 2) Agroforestry Technology Information Kit (ATIK), DENR, 19922) Agroforestry Technology Information Kit (ATIK), DENR, 1992
Contacts for information	CARE International Halarae Foundation



Typical Design of Alley Cropping (SALT)

Farm with alley cropping technique

Reference Sheet Sloping Agriculture and Agroforestry-7

Name of the Technique:	**Multistoried cropping**
Place where the technique is observed	Talitu Village (Laulara)
Year of Introduction:	1990s
Source of Information	People in Talitu

Summary of Multistoried cropping Techniques

Items	Description
Objectives	This traditional technique aims to stabilize the farm production and maximize the potential of land productivity by diversifying crops, using space, light and land effectively, and preventing soil erosion.
Major Activities	a. Determine the combination of trees and crops. b. Procure planting materials of trees and crops to be planted. c. Plant seeds/seedlings of trees and crops.
Procedures	1. Determine the combination of trees and crops suitable to the site conitions. The following combinations can be found in Timor-Leste. - Shade trees + Coffee + Clove + Pepper - Shade trees + Coffee + Pepper - Shade trees + Coffee + Ginger/Yam - Banana + Cassava + Maize + Yam In other asian countries, other combinations have revealed the successful results. Some can also be introduced in Timor-Leste, such as: - Fruit trees + upland crops (initial years) - Fruit trees + Pineapple + Ginger + Yam - Shade trees + Coffee + Pineapple + Ginger/Yam 2. Procure planting materials of trees and crops of the combination 3. Plant seeds and seedlings of trees and crops in the rainy season together with maize, cassava, and beans, to use the farm at a maximum. In case of coffee-based combination, coffee seedlings should be planted in the second or third year when shade trees develop their canopies.
Expected outputs	a. Local communities can ensure farm products and earn income from their firms. a. Local communities can produce farm products in a sustainable manner.
Further references	1) A Permaculture Guidebook from East Timor, PERMATIL, 2005 2) Agroforestry Technology Information Kit (ATIK), DENR, 1992
Contacts for information	Permatil Halarae Foundation

2.6 Income Generation / Livelihood Development

Income generating / livelihood development technique is one of the crucial techniques for community-based natural resource management as it could directly contribute to the improvement of livelihoods of local communities that have significantly depended on forest and natural resources for their livelihood. The well-designed resource-based income generating/livelihood development can not only lessen the human pressure on forest and natural resources by providing alternative livelihoods to local communities, but also develop a mechanism to encourage local communities to protect and manage natural resources in a sustainable manner on their own initiative.

Utilization of the resources and knowledge available in the localities is one of the keys to the adaptable and sustainable livelihood development. It is also important to utilize the best practices and knowledge which have been proven effective in improving the livelihoods of local communities in hilly/mountainous areas in Timor-Leste.

Given the natural and social conditions of the target river basins, which were clarified by the precedent JICA watershed study[1], and PRA conducted by the Project, and the experiences that national and international organizations have gained in Timor-Leste, the following eight livelihood development options are judged applicable to the target river basins and effective in improving local livelihoods within the framework of CB-NRM.

IG/LD Options	Type of the Option	Outline of the option
1. Honey purification	Utilization of natural resources	This is to produce quality and long-life honey by purifying and sterilizing honey collected in forests/coffee plantations.
2. Sweet potato chips	Ditto	This introduces a technique to produce a value-added processed product using sweet potato which is one of the crops commonly grown in hilly/mountainous areas.
3. Dried sweet potato	Ditto	Likewise, this aims to introduce a technique to produce long-life processed product (dried sweet potato) that local women can easily produce using sweet potato.
4. Herb tea making	Utilization of indigenous knowledge	People in coffee producing areas, especially in Maubisse District, used to drink a traditional tea made of avocado and coffee leaves. One NGO has modified such a technique and succeeded in producing herb teas for sale.
5. Salted vegetables	Ditto	Salted vegetable is the technique commonly practiced in the country to preserve vegetables. Some improvements are introduced in the section to make the storage life of the vegetable longer.
6. Tais making	Ditto	Tais, which is the traditional cloths of Timor-Leste, is one of the potential commodities that can be sold to the local and Dili markets.
7. Sewing	Others	Clothes making is one of the activities that local women in remote areas are eager to introduce as it can satisfy their instant needs and contribute to saving expenses.
8. Improved Cooking stove	Others	Improved cooking stove has been promoted by national and international organizations to reduce the consumption of firewood as well as the incidence of respiratory diseases caused by smoke.

[1] The Study for Integrated Community-Based Watershed Management in Laclo and Comoro River Basins, JICA, 2005-2009.

Reference Sheet Livelihood Improvement -1

Name of the Technique:	**Honey Purification**
Place where the technique is observed	Hatucade Village
Year of Introduction:	2009-2015
Source of Information	PARCIC

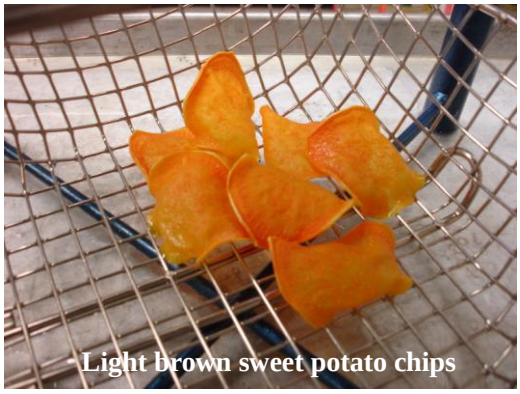
Summary of Honey Purification Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to produce quality-cum-long life honey processing raw honey collected/harvested in forests, so as to earn cash income from the processed honey.
Major Activities	a. Wash and sterilize utensils and materials for bottling. b. Purify and sterilize raw honey collected. c. Bottle purified honey into bottles.
Procedures	 **Sterilization of bottles and tools** A. Sanitation 1. Wash hands well with soap to prevent bacteria's contamination. 2. Put a clean apron and a cap on to prevent the mixture of foreign matters like hair, and strings, with honey. 3. Wash bottles/containers, such as recycled bottles of beer, well with clean water. 4. Steam the bottles and utensils for sterilization.  **Sterilization of honey in the hot water** B. Purification and sterilization of honey 1. Filter raw honey collected with a flannel filter to remove foreign/impure matters from honey. 2. Boil water in a large pot. 3. Put honey into a small pot. 4. Put the small pot with honey into the large pot, then heat the large pot to sterilize honey. 5. Skim out the scum in the surface of honey in the small pot. Using double steaming technique can prevent destroying the taste of honey but stop fermentation of honey.  **Bottling** B. Packing and labeling 1. Pour sterilized honey into the bottles sterilized in the process described in A.4 above. 2. Cap the bottles using sterilized caps and a capping tool. 3. Label the bottles with the product information, such as name of item, ingredients, quantity, manufactured date, expiration date, and producer's name.
Expected outputs	a. Local communities can produce quality and long-life honey which can be sold in markets. b. Local communities can earn cash income from natural resources collected in their localities.
Contacts for information	PARCIC JICA Project Team

Reference Sheet Livelihood Improvement -2

Name of the Technique:	**Sweet-potato Chips Making**
Place where the technique is observed	Russlau Village, Lita Village and Fadabloco Village
Year of Introduction:	2009-2015
Source of Information	PARCIC, USC Canada Timor-Leste/RAEBIA

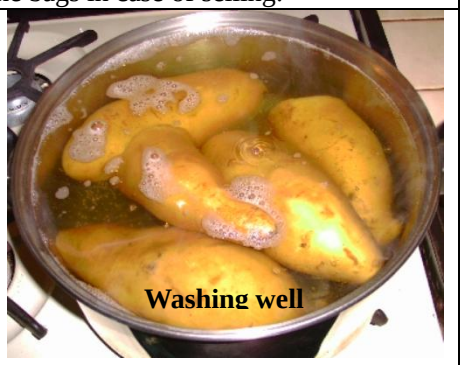
Summary of Sweet-potato Chips Making Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to generate cash income by producing sweet potato chips using simple utensils.
Major Activities	a. Slicing sweet potato. b. Frying and seasoning sliced potatoes. c. Packing potato chips and labeling the packages.
Procedures	A. Slicing sweet potato 1. Remove soils from sweet potato by brushing them in water. 2. Remove dirty parts from the potato. 3 Peel the skin with a peeler. 4. Slice sweet potato with a slicer. Keep the same thickness to maintain the quality. It would be difficult to control the quality, if sliced potato is not the same in thickness. The thicker sliced potato is, the longer the frying time should be.  Slicing sweet potato chips  Frying sweet potato chips B. Frying 1. Heat cooking oil in a big pan. 2. Put sliced sweet potato into a pan. Please do not put many sliced potatoes at once. It reduces the oil temperature and affects the crispiness of chips. 3. Fry well until the color turns light brown. 4. Spread chips on the tray and season with salt, then cool them down. C. Packing and labeling 1. Weigh fried chips. 2. Put them into poly-bags. 3. Seal tops of bags with candle. 4. Label the bags with product information, such as item name, ingredients, quantity, the date of manufacture, expiration date and producer's name. Chips should be packed before they absorb moisture. Fried chips are very fragile; therefore, they should be handled carefully.  Light brown sweet potato chips
Expected outputs	a. Local communities can produce value-added processed foods using locally available resources. b. Local communities can generate cash income from the processed food.
Contacts for information	PARCIC USC Canada Timor-Leste / RAEBIA

Reference Sheet Livelihood Improvement -3

Name of the Technique:	**Dried sweet potato making**
Place where the technique is observed	Madabeno Village, Fadabloco Village
Year of Introduction:	2009-2012
Source of Information	USC Canada Timor Leste/RAEBIA

Summary of Dried sweet potato making Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to preserve sweet potatoes by processing them into a long-life forms.
Major Activities	a. Wash sweet potatoes and remove dirty part. b. Steam and slice sweet potatoes. c. Dry sliced potatoes on a tray for two days (semi dried type) or one week (dried type). d. Pack dried potatoes into poly bags and label the bags in case of selling.
Procedures	A. Washing and cutting off dirty part 1. Select round and smooth potatoes. It is essential to use quality sweet potato, as the quality affects the quality/taste of dried sweet potatoes. 2. Wash sweet potatoes well in water to remove soils. 3. Remove dirty parts from sweet potatoes.  **Washing well**  **Steaming until became soft** B. Steaming and slicing 1. Steam sweet potatoes in a steamer until them became soft. 2. Peel sweet potatoes by hand when they are still hot. 3. Slice them into 8-9mm thickness after they are cool. C. Drying 1. Spread sliced potatoes on a mesh tray. 2. Dry them in the sun until they become leathery. 3. Don't produce dried sweet potatoes in rainy season. Dried sweet potatoes would easily get rotten/moldy.  **Sun drying** D. Packing and labeling for selling 1. Select good ones in terms of shape, color and dried condition. 2. Weigh dried sweet potatoes. 3. Put them into poly-bags. 4. Seal the tops of the bags with candle. 5. Label the bags with product information.
Expected outputs	a. Local communities can process sweet potatoes into long-life products so that they can save sweet potatoes. b. Local communities can produce a processed product that could be sold in markets.
Contacts for information	USC Canada Timor-Leste / RAEBIA

Reference Sheet Livelihood Improvement -4

Name of the Technique:	**Herb Tea Making**
Place where the technique is observed	Ruslau, Lita, Fadabloco and Hautoho Village
Year of Introduction:	2009- 2015
Source of Information	PARCIC

Summary of Herb Tea Making Techniques

Items	Description
Objectives	The main objective of the technique is to enable local communities to generate cash income by producing herb tea using leaves available in the localities.
Major Activities	a. Collect, select, clean, cut leaves of grasses and/or trees. b. Dry leaves in the sun. c. Check the quality of the dried leaves, sort and pack them into poly bags with labels.
Procedures	A. Collection, sorting, cleaning and cutting 1. Collect healthy leaves from trees and grasses which can be used for herb tea making, such as daleta, avocao, an lime. 2. Sort and select good leaves by removing dirty, worm-eaten, diseased and oddly-shaped leaves. 3. Clean leaves washing out dirty matters like soils, sands and worms. 4. Cut leaves to keep them at the uniform size if necessary.  **Sorting and cutting** B. Drying 1. Spread leaves on a mesh net put in a tray. 2. Cover the tray with a black cloth to protect leaves from being directly exposed to sunshine so as to avoid discoloring. 3. Dry leaves in the sun for 1 week. 4. Keep the tray under the roof during night and when it rains  **Dry under the sun with black cloth**  **Standard quality** C. Quality check, packing and labeling 1. Check the quality of dried leaves, in terms of color, size and dryness of the leaves, 2. Remove disqualified leaves to meet the quality standard for sale. 3. Weigh dried leaves and put them into small packages/poly-bags. 4. Seal the tops of bags with candle. 5. Label the bags with product information, such as item name, ingredients, quantity, manufactured date, etc.
Expected outputs	a. Local communities can produce marketable herb tea using leaves locally available. b. Local communities can generate cash income from the processed herb tea.
Contacts for information	PARCIC USC Canada Timor-Leste / RAEBIA

Reference Sheet Livelihood Improvement -5

Name of the Technique:	**Salted Vegetable**
Place where the technique is observed	Manelima, Fadabloco and Hautoho Village
Year of Introduction:	2009-2014
Source of Information	USC Canada Timor Leste/RAEBIA

Summary of Salted Vegetable Techniques

Items	Description
Objectives	The main objective of this technique is to enable local communities to preserve vegetables for a long period using a traditional technique and possibly to generate cash income from the products.
Major Activities	a. Wash and dry vegetables. b. Salt and pickle vegetables. c. Pack them into poly bags and label the bags.
Procedures	A. Washing and drying 1. Select fresh vegetables. 2. Cut off their roots and dirty parts. 3. Wash vegetables well with water to remove dirty matters and worms. 4. Dry vegetables for one day to reduce the moisture contents in their leaves.  **Drying for one day**  **Mixing rice fragments between vegetable leaves** B. Salting and pickling 1. Procure a container for pickling. 2. Pour water in the container. 3. Put salt into water and stir well to dissolve salt in water. 4. Mix rice fragments with dried vegetables. 5. Soak dried vegetables with rice fragments into the salted water for 2~3 months.  **Salted vegetables** C. Packing and labeling for selling 1. Pick the pickled vegetables from the salted water. 2. Squeeze the vegetables, especially the leaves. 3. Remove rice fragments, especially from the leaves. 4. Weigh the vegetables. 5. Pack the vegetables into packages and label the packages with the information of the product, such as item name, ingredients, quantity, date of manufactured, date of expiration, producer's name.
Expected outputs	a. Local community can produce a preserved food using traditional techniques and vegetables locally available. b. Local communities can preserve local products (vegetables) for a long period. c. Local communities might be able to generate income from the processed food.
Contacts for information	USC Canada Timor-Leste / RAEBIA

Reference Sheet Livelihood Improvement -6

Name of the Technique:	**Tais making**
Place where the technique is observed	Umakaduak Village, Batara Village, Manelima Village
Year of Introduction:	2008-2015
Source of Information	USC Canada Timor Leste/RAEBIA

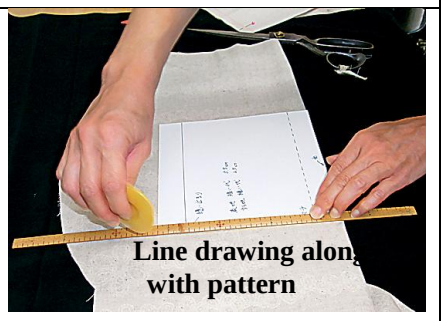
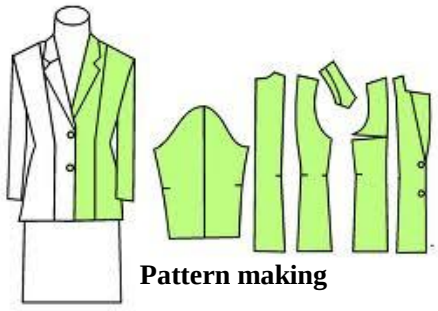
Summary of Tais making Techniques

Items	Description
Objectives	The main objective of this technique is to enable local women to produce marketable traditional cloths improving their traditional techniques.
Major Activities	a. Procure materials (threads). b. Tie and dye threads. c. Fix the colors of threads. d. Weave tais. e. Add finishing if needed.
Procedures	A. Procurement of materials 1. Design a pattern of Tais (If there are any traditional motifs, apply them.) 2. Procure and purchase threads and dyeing materials. B. Tying and dyeing 1. Dye thread according to the motif. 2. Use as many natural dyes available in the localities as possible. 3. Tie threads and dye tied threads again. 4. Repeat the activities described in B.3 according to the motif.  **Fixation of color**  **Reeling of thread** C. Fixation of color 1. Procure and provide sea water, which can help fixing the color of threads. 2. Dip the threads into sea water. 3. Dry the threads. 4. Reel the threads for weaving.  **Weaving** D. Weaving 1. Set the warp on a loom. 2. Interlace the weft with the warp. 3. Beat up the weft. E. Finishing 1. Add finishing works, such as making fringes, if necessary.
Expected outputs	a. Local communities can improve their traditional techniques to quality products (tais). b. Local communities can generate cash income from their products.
Further references	1) Progress Report (1), The Project for Community-Based Sustainable Natural Resource Management, November 2011, JICA
Contacts for information	USC Canada Timor-Leste / RAEBIA Alola Foundation

Reference Sheet Livelihood Improvement -7

Name of the Technique:	**Sewing**
Place where the technique is observed	Manelima, Fadabloco and Hautoho Village
Year of Introduction:	2009- 2012
Source of Information	USC Canada Timor Leste/RAEBIA

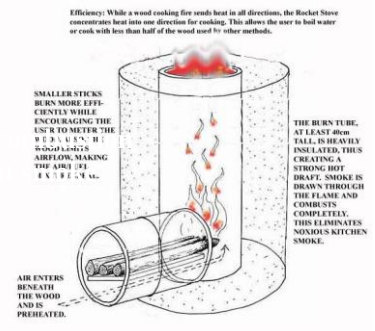
Summary of Sewing Techniques

Items	Description
Objectives	The main objective of this technique is to enable local women to make clothes using a sewing machine, and eventually earn cash income from making or fixing of clothes.
Major Activities	a. Make a pattern of clothes. b. Cut cloths. c. Have a fitting and sewing.
Procedures	A. Pattern making 1. Make a pattern for clothes (e.g, dress or apron). 2. Trace the pattern on the material with chalk.  **Line drawing along with pattern**  **Pattern making**  **Cutting** B. Cutting 1. Cut the materials according to the lines of the pattern.  **Fitting** C.Fitting 1. Have a fitting of clothes to make it fit to the size of a client.  **Sewing** D.Sewing 1. Sew the clothes to make a finished product.
Expected outputs	a. Local communities are able to make clothes using a sewing machine. b. Local communities are able to generate income from making clothes.
Contacts for information	USC Canada Timor-Leste / RAEBIA

Reference Sheet Livelihood Improvement-8

Name of the Technique:	**Simple rocket stove**
Place where the technique is observed	Maubisse Village
Year of Introduction:	2012
Source of Information	PARCIC

Summary of Simple rocket stove Techniques

Items	Description
Objectives	The main objectives of the technique are to reduce the consumption of fire wood and reduce
Major Activities	a. Procure and provide materials of a stove. b. Cut and process the materials. c. Make a rocket stove and adjust its combustion.
Procedures	<u>A. Provision of materials</u> 1. Procure and provide a kerosene oil can and a stainless steel plate which is to be used for a burn tube and air enter. 2. Collect and provide ashes or parchment of coffee and sawdust for insulation. 3. Collect stones or bricks and clay, which are to be used for basement of stove. <u>B. Metal works</u> 1. Make a round hole on the bottom of the kerosene can. 2. Make a tripod stand on the top of the kerosene can. 3. Make a fire tube made of the stainless steel plate. 4. Make an air enter made the steel plate. 5. Fill ash in the space between the kerosene can and the fire tube as an insulation. <u>C. Installation of rocket stove</u> 1. Set the rocket stove with the air enter on the base made of stones/bricks. 2. Plaster clay at the attachments between rocket stove and stones. 3. Dry the stove for 2 hours.  **Structure of rocket stove** **The rocket stove is designed by Mr. Mamoru Kuwabara.*  **Inside of rocket stove**  **Air enter**  **Efficient combustion without soake**
Expected outputs	a. Local communities can reduce the volume of fire wood used for cooking. b. Local communities can reduce the incidence of the respiratory disease caused by smoke.
Contacts for information	PARCIC

2.7 Soil and Water Conservation

Soil and water conservation (SWC) is a crucial technique for sustainable management of lands and forests, as gully erosion often causes severe damage to farms, coffee plantations, forests and other assets of communities in the hilly and mountainous areas in Timor-Leste.

In the context of CB-NRM, soil and water conservation should focus on the protection of existing farms and plantations by applying small-scale engineering/structural works, which can be copied by local communities in their own farms/areas using materials locally available.

This section introduces three relevant techniques on soil and water conservation. Their effectiveness was already proven and confirmed in the field in Timor-Leste.

1. Field assessment of gully erosion
2. Brushwood check dam
3. Loose stone check dam

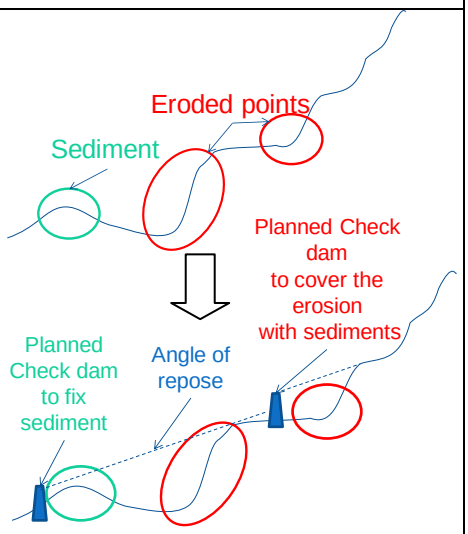
It is noted that the structural techniques introduced in this section need to be combined with vegetative measures (e.g., reforestation of fast-growing trees and strip-planting of grasses which can hold soils) to minimize the risk of surface and gully erosion in the areas.

Reference Sheet Soil and Water Conservation - 1

Name of the Technique	**Field Assessment of Gully Erosion**
Place where the technique were introduced	Faturasa Village (Remexio Sub-district, Aileu District)
Year of Introduction:	2008
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins

Summary of Field Assessment of Gully Erosion Techniques

Items	Description
Objectives	The main objective of the technique is to identify appropriate locations to install check dams to prevent progress of gully erosion.
Major Activities	a. Identify the appropriate locations for installation of check dams. b. Determine the adequate size of check dams.
Highlights of the activities	1. Measure the size of gully erosion (its height, width and length). In case the heigt of the gully is more than 1.0 m, the site is not suitable for installation of a check dam built by communities considering the security of communities who engage in the building. 2. Identify parts eroded and those where eroded soils deposit in the area. 3. Calculate the repose angle (the angle of the stabilized slope) of the area, which should be the same as the surrounding uneroded areas have. 4. Identify the locations of check dam, where the dams can i) fix the deposited sediments and/or ii) reduce erosion and fill the eroded part with sediments to stabilize the same. 5. Determine the types of check dam according to the following guidelines. 6. Dertmine the designs of the respective types of check dam as described in Reference Sheet Soil and Water Conservation-2 and 3.
Expected outputs	a. Local communities can select appropriate sites for building of check dams and determine the specifications of check dams.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA
Contacts for information	JICA Project Office USC Canada Timor-Leste / RAEBIA



Cross Section of Gully Erosion

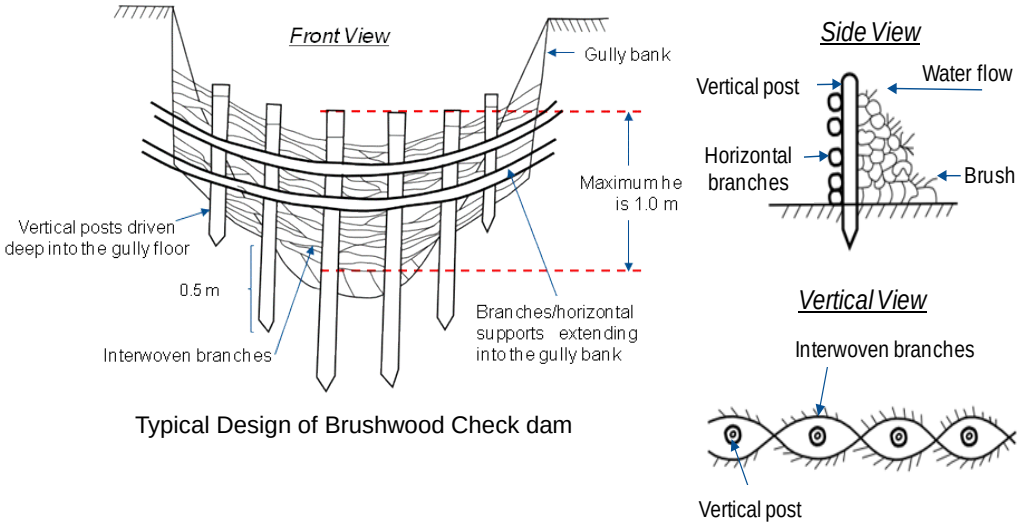
Guidelines for the selection of the type of check dam

Type	Applicable conditions	Effectiveness in soil conservation	Disadvantage
Brushwood check dam	- At the small gully heads - At gully with enough depth of soil deposit inside	Can hold relatively small particulars	Temporary structures
Loose stone check dam	- At the site with relatively rigid foundation	Can reduce the velocity of runoff and prevent the progress of gully	Not suitable for controlling the small particles

Reference Sheet Soil and Water Conservation - 2

Name of the Technique	**Brushwood Check Dam**
Place where the technique were introduced	Faturasa Village (Remexio sub-district, Aileu district)
Year of Introduction:	2008
Source of Information	The Study on Community-Based Integrated Sustainable Watershed Management in Laclo and Comoro River Basins

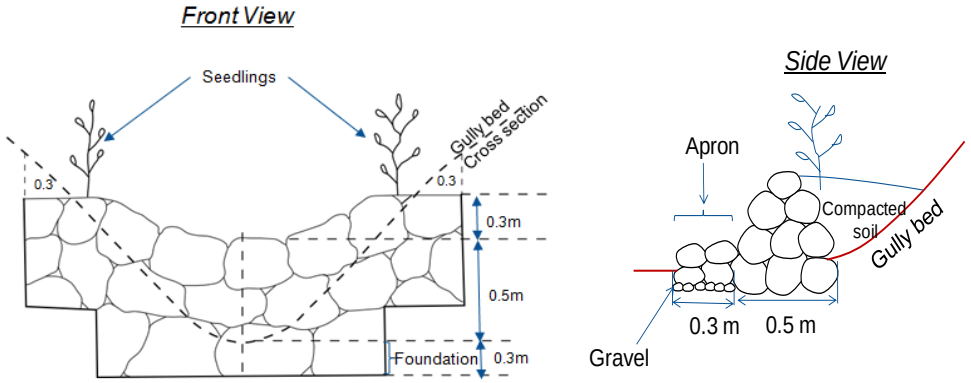
Summary of Brushwood Check Dam Techniques

Items	Description
Objectives	The main objective of the technique is to build and install brushwood check dams in a gully in an appropriate manner
Major Activities	a. Collect materials for building of check dams. b. Compact the ground of the sites of check dams. c. Build check dams. d. Mound soils behind the dams (upper side of the dams) to support the structure.
Highlights of the activities	1. Collect and prepare materials for check dams, such as woods/poles for vertical posts, branches for horizontal supports, and bamboo splits or branches for waving. 2. Compact the ground of the site where check dam is built. 3. Take the vertical posts in the site burying at least 0.5 m of post in the ground. 4. Weave the horizontal supports in the vertical posts and embed the edges of the supports into the gully banks at least 0.3 m long. 5. Mound soils behind check dam (upward part of the dam) up to the height of the dam. 6. Repeat items 2 to 5 to build brushwood check dams at the locations selected/identified by following the procedures described in Reference Sheet Soil and Water Conservation-1 in this section. 7. Plant grasses/trees, such as king grass, gamal and leucaena, at the both sides of the dams (downward and upward sides) as well as the banks of gully to support the dams. 8. Plant the same in the spaces between check dams, such as banks and bottom of gully, as long as the spaces have a sufficient effective depth of soil.  Typical Design of Brushwood Check dam
Expected outputs	a. Local communities can properly build the brushwood check dams in a gully to prevent further progress of gully erosion.
Further references	1) Final Report, The Study on Community-Based Integrated Watershed Management in Laclo and Comoro River Basins, March 2009, JICA 2) FAO watershed management field manual, 1986, FAO
Contacts for information	JICA Project Office USC Canada Timor-Leste / RAEBIA

Reference Sheet Soil and Water Conservation - 3

Name of the Technique	**Loose Stone Check Dam**
Place where the technique were introduced	Fadabloco Village (Remexio sub-district, Aileu district)
Year of Introduction:	2012
Source of Information	The Project on Community-Based Sustainable Natural Resource Management

Summary of Loose Stone Check Dam Techniques

Items	Description
Objectives	The main objective of the technique is to build and install loose stone check dams in a gully in an appropriate manner.
Major Activities	a. Collect materials for building of check dams. b. Prepare the bases of check dams. c. Build the structure of check dam including an apron. d. Put or mound soils behind the dams (upper side of the dams) to support the structure.
Highlights of the activities	1. Collect local materials for building of check dams. 2. Prepare a flat space 0.3 m deep and 0.8~1.0 m long (along the stream) for foundation of check dam in the site where check dam is built. 3. Place stones to lay the foundation for a check dam in the flat space and pile stones at the height of 0.8 m from the gully bottom. The cross section shape of the dam should be concave as shown below. 4. Make an apron made of stones or woods in the front of check-dam (the downward part of the dam) to ensure the stability of the dam and prevent the base from being washed out. 5. Cover the foundation of the check dam and apron with soils and compact the surface. 6. Fill the space behind the check dam with soils up to the height of check-dam. 7. Repeat items 2 to 6 to build loose stone check dams at the locations selected/identified by following the procedures described in Reference Sheet Soil and Water Conservation-1 in this section. 9. Plant grasses/trees, such as king grass, gamal and leucaena, at the both sides of the dams (downward and upward sides) as well as the banks of gully to support the dams. 10. Plant the same in the spaces between check dams, such as banks and bottom of gully, as long as the spaces have a sufficient effective depth of soil. 
Expected outputs	a. Local communities can properly build the loose stone check dams in a gully to prevent further progress of gully erosion.
Further references	1) Annual Completion Report (2012/2013), The Project for Community-Based Sustainable Natural Resource Management in the Democratic Republic of Timor-Leste, March 2013, JICA 2) FAO watershed management field manual, 1986, FAO
Contacts for information	JICA Project Office USC Canada Timor-Leste / RAEBIA

Chapter 3 Further References

The following references and sources of information could give more insights and clues to study and research the respective topics introduced by this document.

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- Semi intensive systems (animal husbandry), FAO http://www.fao.org/docrep/S1250E/S1250E15.htm

5. Sloping Agriculture and Agroforestry Techniques

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- Sustainable Agroforest Land Technology (SALT-3) – Sustainable Agriculture Training Pac, Sommer Haven Ranch International, 1996 http://www.sommerhaven.org/prac_app/sus_ag/t_pac_salt3.pdf

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Tékniku Informasaun Kit
ba Jestaun Rekursu Naturál Bazeia ba Komunidade (CB-NRM)

Prepara hosi

Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade
República Democrática Timor-Leste

Doado pelo Povo Japonês

LIA MAKLOKEK

CB-NRM ka Jestaun Rekursu Naturál ne'ebé Bazeia ba Komunidade mak aproxima ida ba konservasaun natureza liuhusi rekoñese direitu komunidade lokal hodi jere no hetan benefisiu hosi jestaun no uja rekursu naturál ho sustentabel (floresta, rai, bee no biodiversidade) iha area ne'ebé designado. Ida ne'e alternativu ida hodi ha-tun sistema jestaun regulatoriu, ne'ebé mak sedauk nesesáriumente effetivu iha nasaun balun, espesialmente bainhira regulamente ne'e la apropriadu ona ho mudansa iha kontekstu social, kultura no ekonomia iha nasaun ne'e.

Timor – Leste hanesan nasaun foun ida iha mundu no ninia kuadro institusional no rekursu humano sei presija hametin iha area hotu inklui iha seitor floresta. Japan International Cooperation Agency (JICA) implementa ona " Projetu ba Jestaun Rekursu Naturál ne'ebé Sustentabel Bazeia ba Komunidade (JICA, Projetu CB-NRM)" no ajuda ona Direcção Nacional das Florestas e Gestão Bacias Hidrograficas (DNFGBH) hosi Ministério Agricultura e Pescas (MAP) hari'i kapasidade institusional ba introdusaun no aplikasaun hosi CB-NRM hanesan xave aprosimasaun ida ba jestaun floresta sustentabel iha nasaun ne'e

Susesu ida ne'ebé halo hosi Projetu JICA, CB-NRM mak livro referensia ida ne'e ho titlu "Informasaun Kit CB-NRM". Livro ida ne'e introdus Tékniku/pratika util lubun ne'ebé demonstra ona iha Timor – Leste no mós iha nasaun Ásia seluk ba protesaun floresta, dezenvolvimentu floresta, Agrikultura sustentanbel, no dezenvolvimentu vida moris. Livro ida ne'e bele ajuda pratikadores terrenu MAP nian (ezemplu, Ofisial no koordenador Ekstensaun, ofisial floresta municipiu, no guarda floresta) no mós NGO sira ne'ebé servisu iha seitor floresta no agrikultura, espesialmente bainhira sira servisu ho komunidade lokál iha area rai lolon ka foho iha Timor – Leste ba Jestaun floresta no rai sustentabel. Iha tempu ne'ebé hanesan, livro ne'e bele sai dokumentu ne'ebé iha valor bo'ot ba peskizador sira, treinadu sira, estudante bacharelatu iha area ne'ebé hanesan

MAP, espesialmente DNFGBH, iha intensaun atu ho effetivamente uja dokumentu referensia ne'e liuhusi desimina ba stakeholders lubun atu nune'e pratika konvensional bele uja iha area railolon no foho no neneik-neneik troka ho dalan ne'ebé produtivu no sustentabel liu.

Outubru 2015

Manuel Mendes
Diretór Nasionál
Diresaun Nasionál Floresta no
Gestaun Bacias Hidrograficas
(DNFGBH), MAP

Raimundo Mau
Diretór Gerál Floresta, MAP

Tékniku Informasaun Kits CB-NRM

Tabela de Konteúdu

ACRONYMS

AMCAP	Ainaro, Manatuto Ativasaun Projetu Komunidade
ARP	Agrikultura no Rehabilitasaun Projetu
CBFM	Jestaun Floresta Bazeia ba Komunidade
CBNRM	Jestaun Rekursu Naturais Bazeia ba Komunidade
DAC	Dezenvolve Agricultura Comunitária
DENR	Departamentu Ambiente no Rekursu Naturais, Governo República Filipina
EM	Mikro Organismu Efetivu
EU	União Europan
FAO	Organizasaun Alimentan no Agrikultura hosi Nasaun Unidas
FFS	Escola Agrikultor Terrenu
GIZ	Kooperasaun Internacional Alemanha
JFM	Jestaun Floresta Junta
JICA	Japan International Cooperation Agency
MAF	Ministério Agricultura e Pescas
NDF	Dirasaun Nacional Floresta
NGO	Organizasaun Non - Governmental
PAC	Kampaña Hasae Konsiensia Publiku
PARCIC	PARC Interpeoples' Cooperation
PERMATIL	Permacultura Timor Lorosa'e
PLUP	Planu Uja Rai Parsipatoriu
PRA	Participatory Rural Appraisal
RDP	Programa Dezenvolvimentu Rural
UNDP	Programa Dezenvolvimentu Nasaun Unidas
USAID	U.S. Agencia ba Dezenvolvimento Internacional
USC-CTL	USC Canada Timor-Leste/RAEBIA

Kapítulu 1 Introdusaun Ezisténsia hosi Tékniku/Prátika CB-NRM nian ne'ebé Util

1.1 Kona-ba CB-NRM

CB-NRM hamriik ba Jestaun Rekursu Naturál Bazeia ba Komunidade, ne'ebé ho konseitu ba jestaun rekursu naturál sira-ne'ebé sustentável hosi komunidade lokál ho maneira partisipativu. Jerálmente, CB-NRM bele aplika ba rekursu naturál hotu-hotu, hanesan floresta, tasi/marítima no esplorasaun minerál. Maibé, iha dokumentu ida-ne'e, CB-NRM nia tarjetu mak ba floresta no buat seluk ne'ebé iha relasaun ho floresta ka rekursu agrikultura sira ne'ebé esensiál ba vida moris komunidade nian ne'ebé hela iha rai-lolon/foho iha Timor Leste.

Iha kontestu ida-ne'e, CB-NRM nia objetivu mak atu dezenvolve no hametin kapasidade komunidade sira iha área rai-lolon, hodi proteje no jere floresta no rekursu naturál sira ne'ebé iha relasaun ho floresta iha sira-nia lokalidade. Aproximasaun oioin presiza hala'o hodi orienta komunidade sira liuhosi koñesimentu konseitu jestaun rekursu naturál sira ne'ebé sustentável no fasilita sira hodi haree floresta no rekursu naturál sira, hanesan sira-nia riku soin ba tempu naruk nian, ne'ebé maioria komunidade obriga an hodi hela besik iha fatin ho nivel ne'ebé subsistensia.

Iha nasaun Ázia seluk, konseitu komunidade florestál ka jestaun floresta bazeia ba komunidade, hanesan JFM (Jestaun floresta junta) iha India, CBFM iha Filipina, no komunidade Florestál iha Cambodia, introdús tiha ona ho tékniku no abilidade ne'ebé luan, hodi ajuda komunidade ne'ebé depende ba floresta, hodi muda sira-nia atividade moris no vida moris ba moris ne'ebé hanoin ambiente ne'ebé di'ak. Tuirfalimai, eskema hotu-hotu baibain hala'o pasu sira tuirmai hodi introdús konseitu ida-ne'e.

a. Partisipasaun komunidade no organizasaun komunidade
b. Planeamentu komunidade
c. Introdusaun no aplikasaun tékniku balu (ezemplu, protesaun no jestaun floresta, dezenvolvimentu vida moris, dezenvolvimentu agrikultura ne'ebé sustentável, no tékniku ambiente – amigável seluk)

CB-NRM iha Timor-Leste mós tenke tuir prosesu ne'ebé atu hanesan, hodi introdús konseitu ida-ne'e, liuhosi dalan aplikasaun, hanesan mós tékniku/abilidade ne'ebé introdús tenke kondíz ho situasaun iha Timor-Leste.

Depois revee didi'ak esforsu iha pasadu ne'ebé hala'o tiha ona ba komunidade florestál no jestaun rekursu naturál sustentável bazeia ba komunidade iha Timor-Leste, hanesan mós kondisaun atuál hosi área rai-lolon/foho, liu-liu iha área tarjetu mota-ninin sira, hanesan Mota-ninin Laclo no Comoro, ekipa projetu JICA avalia katak, komponente sira tuirmai hanesan xave ba introdusaun konseitu CB-NRM ne'ebé di'ak no susesu ba komunidade sira iha área rai-lolon iha Timor-Leste, liu-liu iha área tarjetu mota-ninin sira.

1. Partisipasaun komunidade
2. Planeamentu uza rai ne'ebé parsipativu
3. Jestaun floresta no reflorestasaun
4. Jestaun agrikultura no animál-hakiak

5. Agrikultura iha rai-lolon no agroflorestál
6. Dezenvolvimentu vida moris

1.2 Matadalan hodi Uza Tékniku Informasaun kit sira ba CB-NRM

Dokumentu ida-ne'e, hanesan tékniku informasaun kit CB-NRM nian, ho objetivu atu ajuda planeadór no pratikadór terrenu sira, hanesan funsionáriu MAP iha nivel nasionál no munisipiu , funsionáriu ONG no ema ne'ebé involve iha CB-NRM ka projetu jestaun floresta bazeia ba komunidade, hodi haklean sira-nia kompriensaun kona-ba tékniku ka abilidade ne'ebé efetivu iha introdusaun konseitu CB-NRM ba komunidade sira, iha área rai-lolon/foho iha Timor-Leste. Tékniku hotu-hotu ne'ebé introdús iha dokumentu ida-ne'e, koko tiha ona iha Timor-Leste ka nasaun Ázia seluk, no efetividade hosi tékniku sira-ne'e mós konfirmadu ona iha terrenu.

Dokumentu ida-ne'e kompostu hosi dokumentu tékniku terrenu neen (6) ne'ebé mensiona iha sesaun 1.1. Lee na'in sira bele lee dokumentu ne'e kompletu hosi inísiu to'o finál, atu komprende didi'ak tékniku nesesáriu hosi CB-NRM, ka lee parte balu hosi dokumentu ne'ebé lee na'in partikulármente iha interese ba.

Kada tópiku ne'ebé introdús iha dokumentu ne'e hatete: i) fatin/suku ne'ebé tékniku ne'e introdús tiha ona; ii) objetivu hosi tékniku; iii) atividade prinsipál; iv) prosedúr atu aplika tékniku; no v) rezultadu ne'ebé hein, hetan hosi tékniku, hodi ajuda lee na'in sira hatene klaru kona-ba respetiva tékniku ka abilidade. Referénsia no posibilidade rekursu sira seluk ba informasaun adisionál mós espesifika iha dokumentu ida-ne'e, atu nune'e lee na'in sira bele estuda kle'an liután tópiku partikulár ruma.

Kapítulu 2 Tékniku Informasaun Kit Sira

2.1 Partisipasaun Komunidade

Partisipasaun komunidade mak atividade importante ne'ebé kobre tékniku no abilidade hotu-hotu ba CB-NRM. Se komunidade lokál la envolve iha CB-NRM nia atividade sira, sei susar atu muda sira-nia prátika konvensionál ba ida-ne'ebé bele kontribui ba floresta sustentável no jestaun rekursu naturál. Maski governu no ONG sira iha projetu barak, hanesan mós doadór-fundu ba projetu iha Timor-Leste envolve ona komunidade lokál hotu ka balu, envolvimentu komunidade nian iha kazu balu temporáriu de'it, ka balu hodi hetan materiál de'it. Ba sustentabilidade atividade koletivu bazeia ba komunidade hosi CB-NRM nian, ida-ne'e dala barak sai hanesan preokupasaun.

Partisipasaun komunidade tenke mantén, la'ós de'it durante periodu projetu, maibé mós depois projetu ne'e hotu ona, atu ajuda komunidade lokál sira bele kontinua pratika Tékniku/abilidade CB-NRM nian hodi jere floresta no rekursu sira seluk ho maneira ne'ebé sustentável. Liuhosi mantén partisipasaun komunidade iha atividade CB-NRM nian, sira mós bele dezenvolve fundasaun ida ba floresta ne'ebé sustentável no jestaun rekursu naturál iha sira-nia lokalidade. Ho liafuan seluk, partisipasaun komunidade sai hanesan prosesu importante ida hodi atinje floresta ne'ebé sustentável no jestaun rekursu naturál, duké hanesan meiu simples de'it hodi implementa projetu jestaun floresta ida.

Depois halo revizaun ba projetu pasadu ne'ebé implementa ona iha Timor-Leste, hanesan AMCAP, APR II, projetu pilotu JICA nian kona-ba Estudu Jestaun Bacias Hidrograficas, no projetu sira seluk ne'ebé implementa tiha ona hosi organizasaun nasionál/internasionál, aproximasaun no métodu hirak tuirmai mak konsidera efetivu bele asegura partisipasaun komunidade no aumenta sira-nia koñesimentu kona-ba konseitu sira-ne'ebé iha ligasaun ho abilidade/tékniku hosi CB-NRM.

1. Kampaña sensibilizasaun públiku
2. Avaliasaun Partisipativa
3. Formasaun Grupu
4. Planeamentu partisipativa, monitorizasaun no avaliasaun
5. Eskola agrikultór Terrenu (FFS) / Treinamentu prátika diretamente

Sasukat hosi lista iha leten presiza hala'o iha etapa oioin iha síklu projetu nian, tanba sasukat sira-ne'e iha objetivu diferente, ne'ebé hatudu iha Tabela kraik tuirmai ne'e, no diskute iha referénsia pájina 5 ne'ebé tuir sumáriu tékniku sira hosi kazu estudu atuál.

Sasukat	Etapa Projetu	Objetivu
Kampaña sensibilizasaun públiku	Pre-implementasaun no etapa inisiál hosi projetu	a. Aumenta sensibilidade ba importánsia no nesesidade hosi projetu iha komunidade lokál. b. Atrai interese komunidade lokál kona-ba projetu.
Avaliasaun partisipativa	Etapa inisiál hosi projetu	a. Fasilita komunidade lokál atu avalia situasaun atuál iha suku no komprende katak projetu ne'e nesesáriu.
Formasaun grupu	Etapa inisiál to'o fin hosi projetu	a. Hili komunidade lokál ne'ebé mak interese atu partisipa iha projetu. b. Haburas komunidade lokál nia interese hodi hanoin katak sira hanesan na'in ba projetu ne'e.
Planeamentu partisipativa, monitorizasaun, no avaliasaun	Etapa inisiál to'o fin hosi projetu	a. Aumenta komunidade lokál nia koñesimentu ba atividade projetu sira liuhosi planeamentu servisu. b. Fasilita komunidade lokál atu avalia efetividade hosi atividade projetu sira liuhosi halo revizaun ba sira-nia komportamentu no rezultadu hosi projetu

Sasukat	Etapa Projetu	Objetivu
Eskola agrikultór Terrenu (FFS) / Treinamentu prátika diretamente	Etapa intermédiu hosi projetu, liu-liu durante dezenvolvimentu kapasidade komunidade lokál	a. Fasilita komunidade lokál atu pratika abilidade no tékniku relevante ba CB-NRM iha kampu. b. Fasilita komunidade lokál atu haree efetividade hosi abilidade no tékniku ne'ebé relevante ba CB-NRM.

Referénsia Partisipasaun Komunidade - 1

Naran tékniku	**Kampaña Sensibilizasaun Públiku**
Fatin tékniku ne'e introdús	Suku Salamete, Postu administrativu Railaco, Munisípiu Ermera
Tinan introdusaun	2008-2009
Rekursu informasaun	Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu Tékniku Kampaña Sensibilizasaun Públiku

Item	Deskrisaun
Objetivu	Kampaña sensibilizasaun públiku (refere ba "PAC" iha lian Inglés) ho objetivu atu haforsa komunidade rurál nia sensibilidade kona-ba importánsia hosi floresta sustentável no jestaun rekursu naturál no atrai sira-nia interese ba jestaun rekursu naturál sustentável.
Atividade prinsipál	a. Dezenvolve materiál sira ba kampaña hasa'e sensibilidade. b. Identifika no hili suku tarjetu sira, hodi hala'o kampaña hasa'e sensibilidade. c. Hala'o kestionáriu ka peskiza bazededadus hodi komprende nivel sensibilidade atuál kona-ba degradasaun floresta iha komunidade laran, iha suku tarjetu sira. d. Hala'o workshop série ho komunidade iha suku tarjetu sira, uza materiál ne'ebé dezenvolve ona iha leten.
Prosedimentu	1. Avalia prátika jestaun floresta atuál no ameasa prinsipál ba floresta sira iha area tarjetu (hanesan mota-ninin ka munisipiu/postu administrativu) liuhosi avaliasaun partisipativu (haree pájina referénsia partisipasaun komunidade - 2) ka avaliasaun hosi informasaun ne'ebé eziste. 2. Dezenvolve materiál informativu sira ba kampaña hasa'e sensibilidade , hanesan pamfletu, kartás, folletu (leaflet), no/ka media auto vizuál (ezemplu fotográfika hatudu istória, filme ka drama) 3. Hili suku tarjetu sira hosi suku sira-ne'ebé lokalidade iha área tarjetu. 4. Hala'o enkontru konsultasaun ho lideransa hosi suku tarjetu sira, hodi esplika liña jerál no oráriu servisu hosi kampaña ne'ebé sei hala'o. 5. Hala'o peskiza kestionáriu hodi avalia nivel sensibilidade atuál hosi degradasaun floresta iha komunidade suku tarjetu. 6. Hala'o workshop série iha suku tarjetu sira uza materiál ne'ebé dezenvolve tiha ona. Kampaña sei labele hala'o ho maneira ne'ebé hanesan ba ema adultu no labarik sira, karik bele, workshop tenke hala'o separadu ba ema adultu no labarik sira tanba sira nia nivel sensibilidade diferente ida ho ida seluk. 7. Hala'o kestionáriu ba peskiza avaliasaun depois kampaña hala'o iha suku tarjetu hodi sukat to'o iha ne'ebé kampaña ne'e hasa'e sira-nia sensibilidade ba jestaun floresta sustentável iha komunidade sira iha suku tarjetu ho maneira ne'ebé sustentável.  **Kampaña Hasa'e sensibilidade**  **Ezemplu materiál informativu**
Rezultadu ne'ebé hein	a. Komunidade lokál rekoñese importánsia hosi jestaun no utilizasaun floresta ne'ebé sustentável. b. Bele motiva komunidade lokál hodi rekonsidera sira-nia pratika atuál atu jere floresta no rekursu naturál seluk iha sira-nia área.
Referénsia seluk	1) Relatóriu Final, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA
Kontaktu hodi hetan informasaun	Edifísiu Projetu JICA

Referénsia Partisipasaun Komunidade -2

Naran tékniku	**Avaliasaun Parsipativa**
Fatin tékniku ne'e introdús	Suku Fadabloco, Hautoho, Madabeno no Talitu
Tinan introdusaun	2011
Rekursu informasaun	Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade

Sumáriu Tékniku Avaliasaun Partisipativa

Item	Deskrisaun
Objetivu	Avaliasaun partisipativa ho objetivu atu fasilita komunidade lokál hodi: i) avalia karakterístika hosi suku tarjetu, no ii) identifika intervensaun nesesáriu ba introdusaun CB-NRM.
Atividade prinsipál	a. Rekolla dadus no informasaun hosi suku tarjetu liuhosi tipu oioin hosi sesaun PRA (Hafolin Rurál Partisipativa). b. Tipu sesaun PRA, util hodi analiza situasaun ba jestaun floresta/programa dezenvolvimentu rurál, hanesan: i) halo mapa rekursu; ii) la'o korta transektu (*transect walk*), iii) moda analiza; iv) kalendáriu tuir estasaun (*seasonal calendar*);v) diskusaun grupu kona-ba floresta tradisionál no jestaun rai no vi) diskusaun grupu kona-ba ezisténsia rekursu potensiál no produtu sira ba dezenvolvimentu vida moris. c. Analiza rezultadu hosi sesaun PRA hodi avalia kondisaun atuál hosi suku tarjetu.
Prosedimentu	1. Klarifika dadus no informasaun nesesáriu hodi avalia kondisaun atuál suku nian. 2. Prepara planu servisu ba avaliasaun partisipativa, liuhosi ekipamentu PRA ne'ebé apropriadu hodi uza ba kolesaun dadus. 3. Prepara workshop iha kampu, buka materiál nesesáriu sira no mobiliza fasilitadór no rekursu umanu seluk. 4. Hili data ne'ebé fiksu ba *workshop*/enkontru PRA koordena ho lider suku sira no husu sira atu halibur komunidade ba workshop/enkontru ne'e. 5. Hala'o *workshop*/enkontru ho komunidade sira iha suku kona-ba: i) halo mapa rekursu; ii) la'o korta transektu (*transect walk*); iii) moda analiza; iv) kalendáriu tuir estasaun; v) diskusaun grupu kona-ba floresta tradisionál no jestaun rai no vi) diskusaun grupu kona-ba ezisténsia rekursu potensiál no produtu sira ba dezenvolvimentu vida moris. 6. Kompila dadus hotu-hotu no analiza no informasaun hotu-hotu ne'ebé rekolla ona liuhosi sesaun PRA. 7. Fahe rezultadu hosi sesaun PRA ho lider no komunidade sira iha suku.  **Halo Mapa Rekursu**  **Moda Analiza**
Rezultadu ne'ebé hein	a. Karakterística hosi suku tarjetu, inklui moda pasadu hosi jestaun rekursu naturál, bele klarifika. b. Komunidade lokál bele rekoñese kondisaun atuál sira-nia suku. c. Komunidade lokál bele realiza nesesidade intervensaun hosi li'ur atu hadi'a sira-nia kondisaun atuál iha suku.
Referénsia seluk	1) Relatóriu Annual Kompletu (2011/2012), Projetu Jestaun Rekursu Naturál sustentável Bazeia ba Komunidade, Marsu 2012, JICA

Item	Deskrisaun
	2) Métodu ba Partisipasaun Komunidade – Mata-dalan Kompletu ba Pratikante sira - Somesh Kumar, Publikasaun ITDG (Livru referénsia ba PRA)
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA Fundasaun Halarae

Referénsia Partisipasaun Komunidade - 3

Naran tékniku	**Organizasaun Grupu**
Fatin tékniku ne'e introdús	Suku Faturasa, Batara, Samalete, Faturasa, Fadabloco, Hautoho, Tohumeta, Madabeno, no Talitu
Tinan introdusaun	2008-2015
Rekursu informasaun	Estudu kona-ba Jestaun Bacias Hidrograficas Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu Tékniku Organizasaun Grupu

Item	Deskrisaun
Objetivu	Objetivu hosi tékniku ne'e mak atu: i) hili komunidade lokál ne'ebé mak hakarak atu involve an iha CB-NRM nia atividade sira; ii) organiza sira hodi sai grupu agrikultór/benefisiáriu; no iii) haforsa sira-nia hanoin hanesan na'in ba CB-NRM nia atividade sira.
Atividade prinsipál	a. Hili komunidade lokál sira ne'ebé mak hakarak atu involve an iha CB-NRM nia atividade sira no/ka ilejivel atu hola parte iha projetu CB-NRM liuhosi konsultasaun no diskusaun ho sira. b. Organiza sira-ne'ebé hili ona hanesan benefisiáriu ba CB-NRM nia atividade sira hodi sai grupu agrikultór /benefisiáriu. c. Hili lider ida no membru importante hosi grupu agrikultór/benefisiáriu ne'e hosi komunidade sira-ne'ebé hili ona. d. Ajuda komunidade ne'ebé hili ona, determina grupu benefisiáriu ne'e nia vizaun no misaun no sira nia papel no responsabilidade hanesan membru hosi grupu refere.
Prosedimentu	1. Prepara kritéria ne'ebé ilejivel ba membru hosi grupu benefisiáriu/agrikultór nian, konsidera natureza hosi CB-NRM nia atividade sira. 2. Hala'o enkontru ho komunidade inklui lider suku hodi ajuda sira identifika no hili ema ne'ebé mak interese no ilejivel atu sai membru grupu agrikultór/benefisiáriu. 3. Hala'o enkontru seluk ho komunidade sira ne'ebé hili ona hanesan membru no ajuda sira: i) hili lider ida, vise lider ida, no membru importante grupu; ii) determina sira-nia papel no responsabilidade hosi grupu nia membru sira; no iii) determina grupu nia vizaun no misaun. 4. Prepara tuir lei/regulamentu grupu nian tau hamutuk lista membru, papel no responsabilidade hosi membru sira no grupu nia vizaun no misaun bazeia ba rezultadu enkontru mensiona iha leten.  
Rezultadu ne'ebé hein	a. Grupu agrikultór/benefisiáriu hosi komunidade lokál sei estabelese tuir lei. b. Komunidade lokál ne'ebé interese iha CB-NRM nia atividade sira/projetu CB-NRM nian komprende sira-nia responsabilidade. c. Hanoin hanesan na'in ba atividade sira, bele haforsa komunidade lokál sira-nia envolvimentu.
Referénsia seluk	1) Kapítulu 21, Hadi'a Estensaun Agrikultura, Referénsia Manual , 1998, FAO 2) Relatóriu Anuál Kompletu (2011/2012), Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade, Marsu 2012, JICA
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA Fundasaun Halarae

Referénsia Partisipasaun Komunidade - 4

Naran tékniku	**Planeamentu Parsipativu, Monitorizasaun, no Avaliasaun**
Fatin tékniku ne'e introdús	SukuBatara, Samalete, Faturasa, Fadabloco, Hautoho, Tohumeta, Madabeno ho Talitu
Tinan introdusaun	2008-2015
Rekursu informasaun	Estudu kona-ba Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu Tékniku Planeamentu Parsipativu, Monitorizasaun, no Avaliasaun

Item	Deskrisaun
Objetivu	Objetivu sira hosi tékniku ne'e mak atu haklean komunidade lokál nia koñesimentu ba CB-NRM nia atividade sira no hametin sira-nia hanoin hanesan na'in ba atividade sira.
Atividade prinsipál	a. Hala'o enkontru ho membru grupu agrikultór/benefisiáriu antes atividade CB-NRM nia (projetu CB-NRM) komesa, hodi dezenvolve planu servisu hosi servisu estensaun kona-ba tékniku CB-NRM nian iha maneira ne'ebé parsipativu. b. Hala'o enkontru ho membru sira iha médiu programa hosi projetu CB-NRM/estensaun, hodi avalia sira-nia komportamentu no hafoun (*update*) planu servisu iha tempu restu. c. Hala'o enkontru ida ho membru sira iha findeprograma CB-NRM/servisu estensaun, hodi avalia efetividade hosi programa refere no dezenvolve planu servisu hodi kontinua CB-NRM nia atividade sira.
Prosedimentu	A. Planeamentu Partisipativu 1. Ezbosu planu servisu hosi projetu CB-NRM ka servisu estensaun ba tékniku CB-NRM ho orário tentativu ida. 2. Hala'o *workshop*/enkontru durante loron rua ho komunidade lokál sira (ka membru hosi grupu agrikultór/benefisiáriu) ne'ebé involve iha CB-NRM nia atividade sira hodi finaliza ezbosu planu servisu.  **Enkontru Planeamentu Planu Servisu** B. Monitorizasaun Partisipativu 1. Depois tinan ida servisu, hala'o workshop/enkontru durante loron rua ho komunidade/membru sira ne'ebé hanesan hodi ajuda sira: i) avalia sira-nia komportamentu no susesu ne'ebé hetan; ii) buka hatene pontu sira-ne'ebé presiza hadi'a hodi halo servisu sai efetivu; no iii) revee no hafoun (update) planu servisu iha tempu restu.  C. Avaliasaun Partisipativu 1. Hala'o *workshop*/enkontru durante loron rua ho membru no lider suku sira, fulan neen (6) molok servisu ne'e remata, hodi ajuda sira: i) avalia efetividade hosi projetu CB-NRM/servisu estensaun; ii) diskute kona-ba nesesidade hosi kontinuasaun hosi projetu ne'ebé hanesan; iii) identifika entrada (*input*) no suporta nesesáriu ba kontinuasaun,; iv) dezenvolve planu servisu ba kontinuasaun, espesifika responsabilidade hosi komunidade, MAP no Organizasaun relevante seluk (hanesan ONG); no v) halo konkordánsia entre organizasaun relevante sira kona-ba implementasaun planu servisu ne'ebé prepara ona.
Rezultadu ne'ebé hein	a. Komunidade lokál bele haklean sira-nia koñesimentu ba tékniku CB-NRM. b. Komunidade lokál realiza efetividade hosi tékniku CB-NRM no servisu estensaun ba sira. c. Komunidade lokál bele hametin sira-nia hanoin hanesan na'in ba atividade sira.
Referénsia seluk	1) Avaliasaun Partisipativu, Monitorizasaun no Avaliasaun, 1998, FAO 2) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA, Fundasaun Halarae

Referénsia Partisipasaun Komunidade - 5

Naran tékniku	**Eskola Agrikultór Terrenu (FFS)**
Fatin tékniku ne'e introdús	Suku Batara, Samalete, Faturasa, Fadabloco, Fadabloco, Hautoho, Tohumeta, Madabeno no Talitu
Tinan introdusaun	2008-2015
Rekursu informasaun	Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu Tékniku Eskola Agrikultór Terrenu (FFS)

<table>
<tr><th>Item</th><th>Deskrisaun</th></tr>
<tr><td>Objetivu</td><td>Objetivu prinsipál hosi Eskola Agrikultór Terrenu (FFS) mak atu asegura komunidade lokál (ka membru hosi grupu agrikultór/benefisiáriu) ne'ebé partisipa iha projetu/servisu estensaun, bele hetan abilidade no tékniku relasiona ho asuntu espesífiku esensiál ba introdusaun CB-NRM.</td></tr>
<tr><td>Atividade prinsipál</td><td>a. Dezenvolve kurríkulu treinamentu ida kona-ba asuntu espesífiku, ezemplu, produsaun ai-oan/afflorestasaun, agrikultura rai-lolon ka dezenvolvimentu vida moris, ne'ebé mak efetivu iha introdusaun CB-NRM.
b. Hili fatin ida ba FFS hanesan to'os demonstrasaun.
c. Arranja/hala'o treinamentu série prátika diretamente no treinamentu iha fatin servisu (OJT) kona-ba tékniku/abilidade relasiona ho asuntu espesífiku iha to'os demonstrasaun.</td></tr>
<tr><td>Prosedimentu</td><td>1. Fahe abilidade/tékniku hotu-hotu ba asuntu espesífiku to'o ba parte ki'ik tuir prosedimentu ne'ebé iha.
2. Dezenvolve kurríkulu treinamentu ida ne'ebé kompostu hosi kursu FFS oioin kona-ba tékniku/abilidade.
3. Identifika no hili fatin ida ba kursu FFS ba grupu agrikultór/benefisiáriu sira iha nivel aldeia liuhosi konsultasaun ho membru grupu sira. Iha kazu agrikultura - no/ka floresta - relasiona ho abilidade/tékniku, fatin ba kursu FFS ne'e bele hala'o iha to'os demonstrasaun.
4. Hala'o série FFS (treinamentu pratika diretamente no treinamentu iha fatin servisu) iha to'os demonstrasaun. Kursu FFS tenke kobre tékniku/abilidade hotu-hotu relasiona ho asuntu espesífiku. Tabela tuirmai hatudu kursu treinamentu ne'ebé hala'o ba agrikultura rai-lolon no afflorestasaun.
 
Treinamentu kona-ba produsaun ai-oan
 
Treinamentu halo terrasu hanesan kadeira
<table><tr><th>Asuntu</th><th>Kursu Treinamentu prinsipál</th></tr><tr><td>Agrikultura rai-lolon</td><td>i)halo adubu orgánika; ii) delinasaun liña-male'uk (contour line); iii) aplikasaun sasukat konservasaun rai; iv) preparasaun rai ho aplikasaun adubu orgánika; v) halo-fini; vi) preparasaun no aplikasaun adubu been; vii) hamoos du'ut no jestaun peste; viii) kolleita; ix) depois-kolleita, inklui rai fini; no x) aplikasaun adubu matak.</td></tr><tr><td>Afflorestasaun</td><td>i) preparasaun rai ba viveiru; ii) estabelesimentu viveiru; iii) halo adubu orgánika; iv) kahur rai no enxe ba polybag; v) halo-fini; vi) manutensaun ai-oan; vii) preparasaun rai ba plantasaun; viii) tau ai-tonka; ix) ke'e rai kuak; x) kuda; xi) kuidadu ai-oan.</td></tr></table></td></tr>
<tr><td>Rezultadu ne'ebé hein</td><td>a. Komunidade/membru grupu agrikultór/benefisiáriu sira bele pratika no hetan abilidade no tékniku kona-ba CB-NRM liuhosi kursu treinamentu série FFS.
b. Sira bele sai modelu ba komunidade sira seluk ne'ebé mak interese ba tékniku/abilidade ne'ebé hanesan.</td></tr>
<tr><td>Referénsia seluk</td><td>1) Relatóriu Final, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA</td></tr>
</table>

Item	Deskrisaun
	2) Eskola Agrikultór Terrenu kona-ba Jestaun Rai no Bee iha Africa, 2008, FAO
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA Fundasaun Halarae

2.2 Planu Utilizasaun Rai Partisipativu (PLUP)

Planu utilizasaun rai partisipativu (PLUP) mak prosesu interaktivu ida hodi kria ambiente ne'ebé bele fasilita komunidade lokál atu jere rai, floresta, no rekursu naturál sira seluk ne'ebé iha relasaun ho floresta ho maneira ne'ebé sustentável. PLUP introdús no aplika ona ho susesu iha nasaun Ázia sira seluk hanesan: Filipina, Vietnam, Kambodia, nst., ho objetivu atu ajuda komunidade lokál iha área rurál sira-ne'ebé proteje no uza ho di'ak/matenek rekursu floresta sira iha sira-nia lokalidade.

Iha prosesu PLUP, komunidade lokál dezenvolve planu utilizasaun rai ba futuru no regulamentu/prinsipiu sira bele enkoraja sira hodi to'o ba jestaun rekursu naturál ne'ebé sustentável liuhosi diálogu série entre komunidade no *stakeholder* relevante sira seluk. Tuir natureza hosi prosesu ida ne'e, PLUP uza ona dala barak hanesan atividade inísiu ida hosi komunidade floresta ka jestaun rekursu naturál bazeia ba komunidade.

Iha Timor-Leste, regra/regulamentu tradisionál, hanaran tara bandu, dala barak susesu ona no efetivu iha protesaun rekursu naturál iha tempu Portugés. Iha tempu uluk, tara bandu efetivu hodi kontrola ema nia atividade sira, tanba iha tempu ne'ebá, tara bandu kesi metin ho lei inan hosi governu Portugés. Efetividade hosi tara bandu ne'e, sai fraku dezde okupasaun Governu Indonesia iha tinan 1975 bainhira tara bandu haketak hosi lei inan. Tara bandu lakon ninia funsaun relatóriu tanba introdusaun lei no regulasaun hosi governu Indonesia.

Governu Timor-Leste no mós organizasaun nasionál no internasionál foti ona inisiativa atu hamoris filafali regra/regulamentu tradisionál hodi proteje no hadi'ak ambiente naturál iha área rurál depois independénsia. Infelizmente, kuaze intervensaun ne'ebé hala'o, foka ba hamoris filafali Tara bandu de'it (ezemplu: organiza serimónia tara bandu) maibé, la'ós haforsa lider lokál nia kapasidade; tan ne'e, tara bandu nia efetividade dalabarak limita ka la sustentável

Kazu ne'ebé introdús iha sesaun ne'e mak atividade PLUP sira nian, ne'ebé fasilita hosi projetu JICA ba Jestaun rekursu naturál bazeia ba komunidade tuir kondisaun atuál iha Timor-Leste. Prosesu tuirmai hatudu ona hosi projetu JICA iha suku balu iha munisipiu Aileu dezde tinan 2011. Rezultadu hatudu katak PLUP nia atividade sira aplika tiha ona hosi projetu JICA sei sai efetivu no esensiál hodi buka mekanizmu ba jestaun rekursu naturál sustentável iha nivel suku.

1. Planu utilizasaun rai ba futuru
2. Formulasaun regulamentu suku (regulamentu tara bandu) ho serimónia tradisionál
3. Monitorizasaun kada fulan ba implementasaun no haforsa regulamentu suku

Atu asegura efetividade hosi PLUP nia atividade sira hanesan mós regulamentu tara bandu ne'ebé dezenvolve ona liuhosi prosesu, atividade sira-ne'ebé mensiona iha leten, tenke hala'o hanesan pakote ida, no la'ós iha maneira ne'ebé ketak-ketak. Ba detallu liután hosi atividade sira-ne'e hatudu iha referénsia tolu tuirmai ho sumáriu tékniku iha kazu atuál ne'ebé estuda.

Referénsia PLUP-1

Naran Tékniku	**Planu Utilizasaun Rai ba Futuru**
Fatin tékniku ne'e introdús	Suku Faturasa, Fadabloco, Madabeno, no Talitu
Tinan introdusaun	2008-2013
Rekursu informasaun	Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade

Sumáriu Tékniku Planu Utilizasaun Rai ba Futuru

Item	Deskrisaun
Objetivu	Objetivu jerál hosi Tékniku mak hodi ajuda komunidade lokál iha suku tarjetu dezenvolve planu utilizasaun rai ba futuru ne'ebé optimál ho objetivu atu fó balansu entre jestaun floresta sustentável no jestaun rai ho hadi'ak sira-nia vida-moris.
Atividade prinsipál	a. Prepara Mapa utilizasaun rai atuál. b. Prepara planu utilizasaun rai ba futuru ho Regulamentu kona-ba utilizasaun no jestaun rai. c. Konsulta ho komunidade lokál iha suku tarjetu kona-ba planu utilizasaun rai ba futuru no regulamentu sira.
Prosedimentu	1. Ajuda lider suku sira hanesan mós reprezentativu seluk hosi aldeia sira i) klasifika área suku ba tipu oioin hosi utilizasaun rai uza fotografia hosi leten (ho eskala 1:7.500 - 1:15.000) kobre suku tarjetu; ii) klasifika floresta liuhosi espésie ne'ebé domina no densidade; no iii) demarka baliza hosi respetiva utilizasaun rai no kategoria floresta. 2. Ajuda lider suku sira hanesan mós reprezentativu hosi aldeia sira i) diskute kona-ba funsaun no valór hosi kada kategoria utilizasaun rai; ii) konfirma pratika jestaun atuál. iii) identifika kauza hosi degradasaun floresta no rai iha suku tarjetu; iv) determina utilizasaun no jestaun rai iha futuru hosi tipu utilizasaun rai ida-idak; no v) dezenvolve mapa utilizasaun rai ba futuru ida uza mapa utilizasaun rai atuál. 3. Ajuda lider suku sira halo enkontru ho komunidade iha nivel aldeia sira hodi i) introdús planu utilizasaun rai ba futuru ho ninia prosesu dezenvolvimentu; no ii) Halo konsensu ho komunidade kona-ba planu utilizasaun rai ba future.  **Halo mapa utilizasaun rai prezente**  **Planeamentu utilizasaun rai ba futuru**  **Planeamentu utilizasaun rai ba futuru**
Rezultadu ne'ebé hein	a. Lider suku sira no komunidade sira seluk apresia valór no funsaun hosi floresta no rekursu naturál sira seluk, iha sira-nia lokalidade. b. Lider suku sira no komunidade sira seluk komprende kauza hosi erozaun rai no degradasaun floresta iha sira-nia lokalidade. c. Lider suku sira no komunidade seluk bele hamosu planu utilizasaun rai ba futuru ba jestaun rai no floresta ne'ebé sustentável iha sira-nia lokalidade
Referénsia seluk	1) Relatóriu Anuál Kompletu (2011/2012), Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade, Marsu 2012, JICA

Item	Deskrisaun
	2) Planeamentu Utilizasaun Rai Partisipativu iha Área Rurál Cambodia, 2004, FAO
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA Fundasaun Halarae

Referénsia PLUP-2

Naran Tékniku	**Formulasaun Regulamentu Suku ho Serimónia Tradisionál**
Fatin tékniku ne'e introdús	Suku Faturasa, Fadabloco, Hautoho, Madabeno, Tohumeta, no Talitu
Tinan introdusaun	2008-2013
Rekursu informasaun	Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade

Sumáriu Tékniku Formulasaun Regulamentu Suku ho Serimónia Tradisionál

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi Tékniku ne'e mak atu asegura komunidade lokál iha suku tarjetu hodi proteje no jere floresta no rekursu naturál sira seluk iha sira-nia lokalidade ho maneira ne'ebé sustentável hosi sira-nia inisiativa rasik
Atividade prinsipál	a. Revee Regulamentu tara bandu ne'ebé eziste hosi suku tarjetu. b. Determina Regulamentu kona-ba jestaun floresta no rekursu naturál sira seluk hanesan mós regulamentu seluk hosi suku tarjetu. c. Dezenvolve dokumentu regulamentu suku nian. d. Organiza serimónia tradisionál hodi anunsia regulamentu suku ne'ebé dezenvolve ona iha públiku.
Prosedimentu	1. Ajuda lider suku sira hodi i) halo lista ba regulamentu tara bandu inklui ninia efetivu iha pasadu, ii) avalia tara bandu sira-nia efetividade; iii) hili regulamentu ne'ebé kondíz ho kondisaun atuál hosi suku no iv) diskute revizaun ne'ebé nesesáriu hosi regulamentu ba aplikasaun. 2. Fasilita sira-nia diskusaun kona-ba i) regulamentu ba utilizasaun no jestaun floresta no rekursu naturál sira seluk; ii) regulamentu seluk hosi suku tarjetu inklui norma sosiál sira; iii) estabelesimentu organizationál hodi hametin regulamentu; iv) sistema implementasaun no monitorizasaun; v) multa no penaltu; no vi) jestaun ba osan ne'ebé hetan hosi multa. 3. Dezenvolve dokumentu ezbosu regulamentu suku ne'ebé hakerek bazeia ba diskusaun ne'ebé hala'o dala rua. 4. Ajuda lider lokál halo enkontru ho komunidade lokál iha nivel aldeia sira hodi esplika ezbosu regulamentu suku nian. 5. Ajuda lider suku halo serimónia tradisionál hodi inisiálmente anunsia regulamentu suku ba komunidade lokál iha suku ne'e rasik ka viziñu hosi suku tarjetu.  **Enkontru esplikasaun iha aldeia**  **Enkontru hodi revee regulamentu pasadu**  **Serimónia tara bandu**
Rezultadu ne'ebé hein	a. Insidente sunu floresta no tesi ai illegal bele redús. b. Komunidade sei orienta hodi hasoru jestaun rekursu naturál sustentável.
Referénsia	1) Relatóriu Anuál Kompletu (2011/2012), Projetu Jestaun Rekursu Naturál Sustentável

Item	Deskrisaun
seluk	Bazeia ba Komunidade, Marsu 2012, 2) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha mota-ninin Laclo no Comoro, Marsu, 2009, JICA
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA Fundasaun Halarae

Referénsia PLUP-3

Naran Tékniku	**Monitorizasaun Mensál ba Implementasaun no Haforsa Regulamentu Suku**
Fatin tékniku ne'e introdús	Suku Faturasa, Fadabloco, Hautoho, Madabeno, Tohumeta, Madabeno no Talitu
Tinan introdusaun	2008-2015
Rekursu informasaun	Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade

Sumáriu hosi Tékniku Monitorizasaun Mensál ba Implementasaun no Haforsa Regulamentu Suku

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi Tékniku mak atu hasa'e kapasidade lider suku sira hodi governa suku utiliza regulamentu suku ho própriu no efetivu.
Atividade prinsipál	a. Hala'o enkontru mensál ho lider suku no reprezentativu hosi aldeia sira seluk. b. Halo enkontru mensál ka trimestral ho komunidade lokál iha aldeia ida-idak.
Prosedimentu	1. Ajuda lider suku halo enkontru mensál iha nivel suku hodi diskute i) asaun illegal no violénsia ne'ebé akontese iha suku iha fulan uluk nian; ii) asaun ne'ebé lider aldeia sira foti hodi rezolve asaun illegal ka violénsia; iii) preokupasaun ne'ebé adianta ne'ebé seidauk rezolve iha nivel aldeia; no iv) asaun nesesáriu ne'ebé tenke foti hodi rezolve preokupasaun ne'ebé adianta. 2. Ajuda lider suku rekorde diskusaun iha enkontru atu nune'e sira bele hadi'a efetividade hosi regulamentu liuhosi suplementa ho presedente judisiál ne'ebé hanesan. 3. Ajuda lider suku sira hala'o enkontru kada fulan rua/tolu ho komunidade iha kada aldeia iha suku hodi hasa'e sensibilizasaun ba regulamentu suku entre komunidade sira liuhosi fahe informasaun kona-ba oinsá lider sira rezolve problema asaun illegal ka violénsia utiliza regulamentu suku.  Enkontru mensál iha nivel suku Sujestaun hosi xefe suku iha enkontru nivel suku
Rezultadu ne'ebé hein	a. Lider suku hanesan mós komunidade sira seluk bele haklean sira-nia kompriensaun kona-ba regulamentu suku. b. Lider suku bele hasa'e sira-nia kapasidade hodi governa suku uza regulamentu suku. c. Insidente hosi asaun illegal iha suku bele redús, tanba lider suku hasa'e ona sira-nia kompriensaun kona-ba regulamentu suku.
Referénsia seluk	1) Relatóriu Anuál Kompletu (2011/2012), Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade, Marsu 2012.
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA Fundasaun Halarae

2.3 Reflorestasaun

Reflorestasaun mak atividade sira importante ida hodi kontribui ba susesu hosi planu utilizasaun rai ba futuru hosi suku, tanba ida-ne'e bele konverte diretamente utilizasaun rai no hadi'a produtividade rai liuhosi kuda ai ne'ebé iha folin iha terrenu. Espera katak reflorestasaun mós kontribui hodi muda prátika ne'ebé sempre "tesi no sunu" ba la sunu terrenu hodi proteje ai-oan ne'ebé kuda ona.

Tanba tékniku ne'e asosiadu ho reflorestasaun, komunidade sira presiza aplika ho sira-nia inisiativa rasik, sira tenke i) fasil atu aplika, ii) atrativu ho di'ak ba komunidade lokál, no iii) bele aplika iha fatin barak ba tarjetu mota-ninin.

Seksaun ida-ne'e introdús tékniku xave haat (4) tuirmai ne'ebé presiza ba reflorestasaun, ba produsaun ai-oan no kuda ai-oan, iha nivel suku.

1. Estabelesimentu viveiru
2. Prosesu viveiru no produsaun ai-oan
3. Kuda ai-oan
4. Kuidadu ai-oan ne'ebé foin kuda

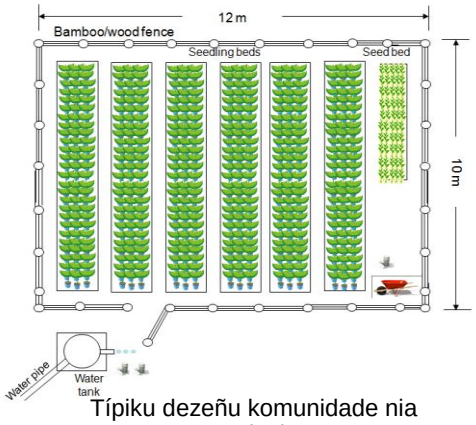
Iha tempu ne'ebé hanesan, dezeñu padraun plantasaun ne'ebé komunidade lokál bele halo tuir bainhira kuda ai-oan introdús iha pájina referénsia rua iha seksaun ida-nee hanesan tuirmai ne'e.

5. Dezenvolve plantasaun ai: i) To'os uma hun, ii) plantasaun kafé, iii) Plantasaun ba ai-kabelak no iv) Rejeneradu floresta iha rai ne'ebé hetan degradasaun ona.

Referénsia reflorestasaun - 1

Naran tékniku	**Estabelesimentu Viveiru**
Fatin tékniku ne'e introdús	Suku Tohumeta (Postu administrativu Aileu Laulara, Munisipiu Aileu) no Suku Samalete (Postu administrativu Railaco, Munisipiu Aileu)
Tinan introdusaun	2008 – 2015
Rekursu Informasaun	Estudu Jestaun bacias hidrograficas sustentável Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu hosi Tékniku Estabelesimentu Viveiru

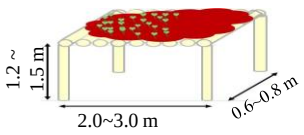
<table>
<tr><th>Item</th><th>Deskrisaun</th></tr>
<tr><td>Objetivu</td><td>Objetivu prinsipál hosi Tékniku ne'e mak atu fasilita komunidade lokál estabelese viveiru komunidade ho eskala ki'ik iha nivel aldeia uza rekursu lokál ne'ebé disponivel.</td></tr>
<tr><td>Atividade prinsipál</td><td>a. Hili fatin ida-ne'ebé apropriadu hodi harii viveiru komunidade.
b. Harii viveiru komunidade uza rekursu lokál ne'ebé disponivel.</td></tr>
<tr><td>Atividade sira foka ba</td><td>1. Determina númeru ai-oan ne'ebé sei prodús iha viveiru fatin konsidera mortalidade ai-oan 20% .
2. Dezeñu modelu viveiru fatin ne'ebé kompostu hosi kanteiru ba ai-oan, kanteiru ba fini, no dalan ki'ik entre kanteiru, bazeia ba espesifikasaun tuirmai:
- Kanteiru ba ai-oan: ho largura metru 1,2 - 1,5
- Dalan ki'ik entre kanteiru: ho largura metru 0,4 - 0.5
- Kanteiru ba fini: ho largura metru 0,6 - 1 no komprimentu metru 3 - 5
 
Típiku dezeñu komunidade nia viveiru
3. Hili fatin ba viveiru ho kondisaun hanesan tuirmai:
i) Asesu ba bee-matan;
ii) Fatin ne'ebé nakloke maibé menus anin;
iii) Rai tetuk ka ladún lolon; no
iv) Asesu ba maioria uma komunidade sira nian.
4. Konsulta ho rai na'in kona-ba fatin ne'ebé uza ba viveiru komunidade no halo akordu kona-ba utilizasaun rai ne'e ho rai na'in.
5. Instala sistema bee, ne'ebé kompostu hosi tanke bee (karik nesesáriu), kanu bee (uza au), no bidón ka jerikán.
6. Hamoos no prepara fatin hodi harii viveiru fatin.
7. Kolleita materiál lokál sira, hanesan au ka ai-naruk, tali-tahan hodi halo ai-riin, uma kakuluk no didin viveiru nian. Tabela tuirmai hatudu material nesesáriu sira ba estabelesimentu fatin viveiru ho área nia baboot 120 m^2, ne'ebé di'ak ba ai-oan 5.400.
<table>
<tr><th>Item</th><th>Kuantidade</th><th>Komentáriu</th></tr>
<tr><td>a. Au-naruk</td><td>Pedasuk 40</td><td>Hodi halo ai-riin no lutu viveiru nian</td></tr>
<tr><td>b. Ai/au-naruk (ba ai-riin)</td><td>Pedasuk 12</td><td>Di'ak liu ho komprimentu 3 - 4m no diámetru 20cm.</td></tr>
<tr><td>c. Ai/au-naruk (ba uma kakuluk)</td><td>Pedasuk 20</td><td>Di'ak liu ho komprimentu 3 - 4 m no diámetru 5cm.</td></tr>
<tr><td>d. Du'ut nalo/tali-tahan (taka uma kakuluk)</td><td>Futun 30</td><td>-</td></tr>
<tr><td>e. Pregu</td><td>4 kg</td><td>Ho komprimentu 7cm</td></tr>
<tr><td>f. Arame</td><td>Lulun 3</td><td>-</td></tr>
</table>
8. Harii lutu no taka tali-tahan ba uma kakuluk viveiru nian.</td></tr>
<tr><td>Rezultadu ne'ebé hein</td><td>a. komunidade lokál bele dezenvolve fatin viveiru nian ho dezeñu ne'ebé própriu utiliza rekursu/materiál lokál sira-ne'ebé disponivel.</td></tr>
<tr><td>Referénsia</td><td>Relatóriu Anuál Kompletu (2011/2012), Projetu Jestaun Rekursu Naturál Sustentável</td></tr>
</table>

Item	Deskrisaun
seluk	Bazeia ba Komunidade, Marsu 2012.
Kontaktu hodi hetan informasaun	1) Fundasaun Halarae

Referénsia reflorestasaun - 2

Naran tékniku	**Prosesu Viveiru no Produsaun Ai-oan**
Fatin tékniku ne'e introdús	Suku Tohumeta, Talitu no Madabeno (Postu administrativu Laulara, Munisipiu Aileu) no Suku Samalete (Postu administrativu Railaco, Munisipiu Aileu)
Tinan introdusaun	2008 – 2015
Rekursu informasaun	Estudu Jestaun Bacias Hidrograficas Sustentável Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu hosi Tékniku Operasaun Viveiru no Produsaun Ai-oan

<table>
<tr><th>Item</th><th>Deskrisaun</th></tr>
<tr><td>Objetivu</td><td>Objetivu prinsipál hosi tékniku ne'e mak atu produs ai-oan ne'ebé iha kualidade ho maneira ne'ebé kolaborativu iha viveiru komunidade eskala ki'ik.</td></tr>
<tr><td>Atividade prinsipál</td><td>a. Prokura/kolleita espésie fini hosi ai, ai-fuan, no ai-horis indústria.
b. Pre-tratamentu fini sira, liu-liu fini ne'ebé presiza pre-tratamentu hodi hetan jerminasaun ne'ebé di'ak.
c. Kuda fini iha kanteiru, transplanta fini-oan ba polybag no mantén ai-oan iha vivieru.</td></tr>
<tr><td>Sumáriu atividade sira</td><td><u>A. Akizisaun/koleksaun fini</u>
1. Identifika no hili ai-inan ne'ebé saudável, ba espésie ai ho ai-hun boot no dezenvolvimentu ai-tahan ne'ebé di'ak no ai ho fuan boot no kualidade ba espésie ai-fuan hanesan ai-inan.
2. Kolleita fini hosi ai-inan. Tempu kolleita ai-musan ba fini diferente ba kada espésie ai, ezemplu: Fulan Marsu – Abril no Setembru – Outubru ba ai-kameli, Fulan Maiu – jullu ba sabraka no derok, Fulan Marsu – Maiu ba Rambutan, Fulan Maiu – Jullu ba Kelengkeng, Jullu – Setembru, ba Ai-teka no Jullu – Augusto ba Mahoni.
<u>B. Pre-tratamentu fini</u>
1. Pre-tratamentu fini ai- mahoni, ai-teka no ai-kameli ho maneira hanesan tuirmai ne'e:
<table>
<tr><th>Espésie</th><th>Prosesu pre-tratamentu fini</th></tr>
<tr><td>a. Ai-mahoni</td><td>1) Hoban fini iha bee, durante oras 12.</td></tr>
<tr><td>b. Ai-teka</td><td>1) Tau fini iha saku foos nian no hoban iha bee malirin durante oras 48.
2) Depois hasai hosi bee, kari naklikar fini sira ne'e iha balde metan ida.
3) Habai iha loron maizumenus loron 2 hodi hamaran fini sira diretamente ho loro matan.</td></tr>
<tr><td>c. Ai-kameli</td><td>1) Hoban fini iha bee malirin durante oras 12 to'o 24.</td></tr>
</table>
<u>C. Produsaun Ai-oan</u>
1. Halo kari fini fatin: i) prepara kari fini fatin ho komprimentu metru 2 -3 no largura metru 0,6 – 0,8 no aas metru 1,2 – 1,5; ii) kari fini iha fatin kari fini, depois rega; iii) taka fatin kari ho ai-tahan rahun no asegura fini ne'ebé kari proteje hosi manu sira.
 

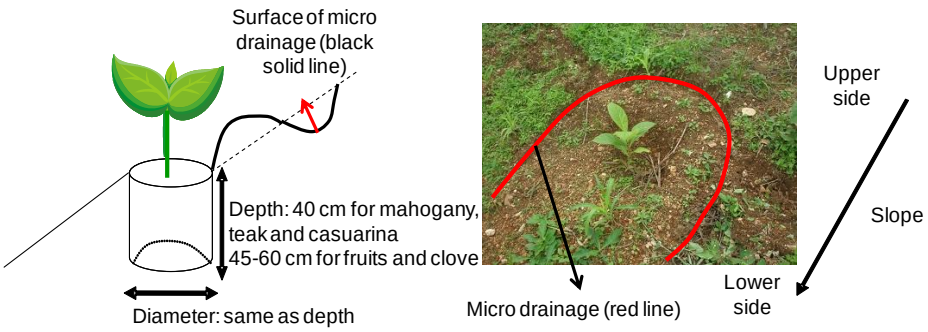
2. Prepara kantairu tetuk.
3. Prepara polybag ba ai-oan liuhosi kahur i) rai-leten (ka rai-metan), rai-henek, no animál teen/adubu orgánika ho variasaun 3:1:2 ba ai no ai-fuan; no rai-leten (ka rai-metan), rai-okos (sub soil), no rai-henek ho variasaun 1:2:1 ba ai-kameli.
4. Transplanta fini-oan/fini ne'ebé jermina ona ba polybag ne'ebé prepara iha númeru 3. Bainhira transplanta fini-oan ai-kameli , kuda mós ai-inan, ezemplu alternanthera sp. iha polybag hamutuk ho ai-kameli tanba ai-kameli hanesan ai semi-parasita
5. Rega ai-oan loron-loron, hamoos du'ut ne'ebé moris iha polybag tuir tempu, prepara no aplika adubu been kada semana ka semana rua, no aplika insetisida naturál (ezemplu: bee kahur ho tabaku been) bainhira hetan insetu ruma iha ai-oan tahan.
6. Redús frekuénsia rega ai-oan, fulan ida molok kuda ai-oan hodi hatoman ai-oan ho ambiente li'ur.</td></tr>
<tr><td>Rezultadu ne'ebé hein</td><td>a. Komunidade lokál bele produs ai-oan ne'ebé kualidade.</td></tr>
<tr><td>Referénsia</td><td>1) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba</td></tr>
</table>

Item	Deskrisaun
seluk	Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA 2) "Manual Orientasaun Tékniku florestál" ba Tékniku Utilizasaun iha Sentru no Temporáriu Viveiru iha Timor-Leste, Nov. 2010, MAF-GIZ
Kontaktu hodi hetan informasaun	1) Fundasaun Halarae 2) GIZ (RDP IV)

Referénsia reflorestasaun - 3

Naran tékniku	**Kuda Ai-oan**
Fatin ne'ebé Tékniku ne'e introdús	Suku Tohumeta, Madabeno, no Talitu (Postu administrativu Laulara, Munisipiu Aileu) no Suku Samalete (Postu administrativu Railaco, Munisipiu Aileu)
Tinan introdusaun	2008 – 2015
Rekursu informasaun	Estudu Jestaun bacias hidrograficas Sustentavel Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu hosi Tékniku Kuda Ai-oan

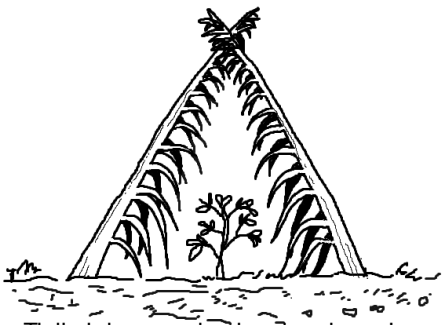
Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi Tékniku ne'e mak atu kuda ai-oan ho maneira ne'ebé própriu hodi asegura sobrevivénsia ai-oan ne'ebé aas iha fatin plantasaun iha tinan inisiál depois kuda.
Atividade prinsipál	a. Prepara fatin ba plantasaun. b. Kuda ai-oan iha fatin kuda ai.
Sumáriu atividade	1. Hili to'os ida atu kuda ai sira ho maneira hanesan tuirmai ne'e: i) to'os uma hun/to'os permanente ne'ebé besik uma hodi kuda ai-fuan no ai-kameli (ba ai-kameli tenke iha ai-inan, ezemplu: *Sesbania grandiflora no Leucaena sp.* iha to'os laran), ii) kuda *cengkeh* iha ninin hosi plantasaun kafé, iii) área ne'ebé uza ba to'os muda ba mai kuda espésie ai-kabelak, no iv) área mamuk/rai ho du'ut sira espésie ai-fore no ai-kakeu. 2. Hamoos to'os plantasaun hodi kuda. 3. Delinear liña-male'uk ho intervalu aas metru 1 uza ai-kuadru-A hanesan esplika iha "referénsia agrikultura rai-lolon no agro-florestál-1" iha sesaun 2.5 hosi informasaun kit CB-NRM ida-ne'e. 4. Karik to'os ne'ebé hili mak lolon, aplika sistema konservasaun rai, hanesan ai-tahan rahun liña-male'uk, hanesan ne'ebé esplika iha "Referénsia Agrikultura rai-lolon no Agro-florestál - 3 iha sesaun 2.5 hosi informasaun kit CB-NRM ida-ne'e. 5. Tau ai-tonka iha fatin ne'ebé ai-oan kuda ona tuir dezeñu ne'ebé hatudu iha referénsia relorestasaun - 5 no 6 iha sesaun ne'e. 6. Ke'e rai-kuak sira ho naruk no diámetru sentímetru 40 ba espésie ai-kabelak, no kada rai-kuak ho naruk no diámetru sentímetru 45-60 ba espésie ai-fuan no ai-indústria. Bainhira ke'e rai-kuak, haketak rai-leten hosi rai-okos. 7. Enxe filafali rai-kuak hodi tau rai-leten iha okos no taka iha ninia leten ho rai-okos ne'ebé kahur ho adubu orgánika/animál teen. 8. Rai-kuak ne'ebé ke'e nia naruk tenke hanesan ho *polybag* ai-oan nia naruk no kuda ai-oan sira iha tempu hahú udan. 9. Halo drainajen ki'ik hanesan letra U iha área leten hosi ai-oan ne'ebé kuda hodi proteje ai-oan hetan estraga hosi bee ne'ebé sulin tun iha tempu udan.  Dezeñu/prátika típiku hosi drainajen ki'ik iha rai-kuak ne'ebé kuda ho ai
Rezultadu ne'ebé hein	a. Komunidade lokál bele prepara fatin ba plantasaun no kuda ai-oan ho maneira ne'ebé própriu.
Referénsia seluk	1) Relatóriu Finál, Estudu Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA

Item	Deskrisaun
Kontaktu hodi hetan informasaun	1) Fundasaun Halarae 2) Edifísiu Projetu JICA

Referénsia reflorestasaun - 4

Naran Tékniku	**Kuidadu ai-oan ne'ebé foin kuda**
Fatin tékniku ne'e introdús	Suku Tohumeta, Madabeno no Talitu (Postu administrativu Laulara, Munisipiu Aileu) no Suku Samalete (Postu administrativu Railaco, Munisipiu Aileu)
Tinan introdusaun	2008 – 2015
Rekursu informasaun	Estudu Jestaun bacias hidrograficas Sustentavel Integradu iha Mota-ninin Laclo no Comoro

Sumáriu hosi Tékniku kuidadu ai-oan ne'ebé foin kuda

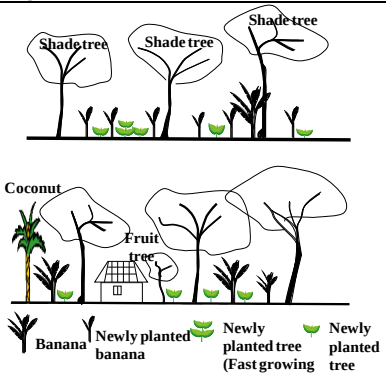
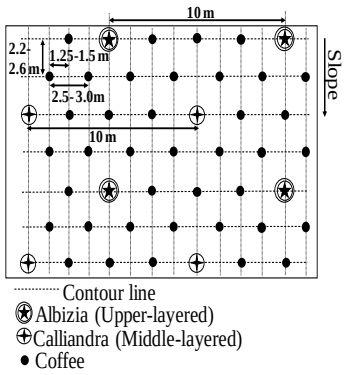
Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi Tékniku ne'e mak atu asegura sobrevivénsia aas ai-oan ne'ebé kuda ona
Atividade prinsipál	a. Hamoos du'ut besik ai-oan. b. Tau mahon ba ai-oan karik presiza. c. Aplika ai-tahan rahun du'ut iha ai-oan hun.
Sumáriu atividade	Atu mantén ai-oan ne'ebé foin kuda iha kondisaun ne'ebé saudável no asegura moris ne'ebé diak, servisu manutensaun tuirmai tenke regulármente hala'o iha tinan tolu dahuluk depois kuda ai-oan. 1. Hamoos du'ut: hamoos du'ut iha ai-oan nia sorin-sorin metru 0,5 kada fulan rua (2) durante tempu udan hodi elimina tiha du'ut ne'ebé kompete ho ai-oan ba be, loron, nutrisaun. 2. Tau ai-tahan rahun: taka ai-hun ho du'ut ne'ebé fekit hanesan ai-tahan rahun hodi mantén umidade hosi rai no prevene du'ut atu moris. 3. Tau mahon: aplika mahon temporáriu ne'ebé halo hosi materiál lokál sira (ezemplu: nuu tahan) ba ai-oan ne'ebé prefere ba mahon (ezemplu: Rambutan) iha etapa kreximentu inísiu, liu-liu durante tempu bailoron. 4. Hadi'a: hadi'a sasukat ba konservasaun rai ne'ebé aplika ba plantasaun, hanesan kabubun tuir liña-male'uk/kanál.  Tipikal deze~nu hosi mahon ho nu'u tahan
Rezultadu ne'ebé hein	a. Komunidade lokál bele ho própriu mantén ai-oan ne'ebé foin kuda iha plantasaun no mantén ai-oan moris di'ak.
Referénsia seluk	1) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA. 2) Broxura kona-ba oinsá kuda ai-mahoni tuir esperiénsia Halarae – Ha'u kuda ai-mahoni ba ha'u-nia oan, 11-8-2009. (broxura prepara hosi Fundasaun Halarae ho suporta hosi GIZ no EU) 3) Ai no sira-nia jestaun – Informasaun Teknolojia Agro-florestál Kit-2, 1992, Departamentu Ambientál no Rekursu Naturál sira, Governu República Filipina.
Kontaktu hodi hetan informasaun	1) Fundasaun Halarae 2) Edifísiu Projetu JICA

Referénsia Reflorestasaun - 5a

Naran tékniku	**Dezeñu padraun hosi i) To'os uma hun, no ii) Plantasaun kafé**
Fatin tékniku ne'e Introdús	Suku Tohumeta no Madabeno (Postu administrativu Laurala, Munisipiu Aileu) ba espésie ai-kabelak no produsaun kafé, respetivamente
Tinan introdusaun	2008-2009 and 2009-2010 iha Tohumeta no Madabeno, respetivamente
Rekursu informasaun	Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro (Tohumeta) Peskiza Terrenu Hala'o iha fulan Fevreiru 2012 (Madabeno)

Sumáriu Dezeñu Padraun hosi i) Tékniku To'os Uma hun no ii) Plantasaun Kafé

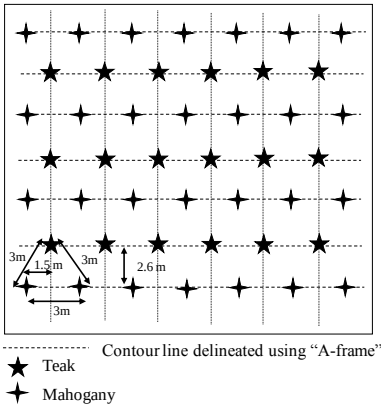
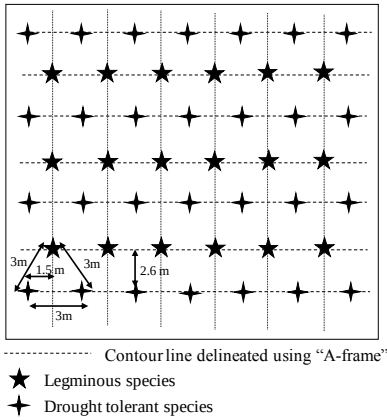
<table>
<tr><th>Item</th><th>Deskrisaun</th></tr>
<tr><td>Objetivu</td><td>Objetivu prinsipál hosi Tékniku ne'e mak atu dezenvolve i) plantasaun ai-fuan no ai-industriál no ii) plantasaun kafé tuir respetiva dezeñu ne'ebé rekomenda.</td></tr>
<tr><td>Atividade prinsipál</td><td>a. Hili área ne'ebé própriu ba i) ai-oan hosi ai-fuan/ai-industriál no ii) ai-oan kafé.
b. Prepara no dezenvolve área ne'ebé hili ona tuir dezeñu sira.</td></tr>
<tr><td>Sumáriu atividade</td><td>1. Hili fatin ida-ne'ebé própriu ba plantasaun no prepara to'os tuir matadalan/dezeñu padraun:

Kondisaun báziku hosi fatin kuda ba kada tipu plantasaun
<table>
<tr><th>Funsaun ba plantasaun</th><th>i. Ai-oan hosi ai-fuan/ai-industriál</th><th>ii. Produsaun kafé</th></tr>
<tr><td>Fatin apropriadu</td><td>To'os uma hun ka to'os uma kotuk ho ai ne'ebé eziste ona no/ou ai-inan hanesan hudi</td><td>To'os ne'ebé halo toos muda ba mai ka to'os besik iha plantasaun kafé .</td></tr>
<tr><td>Espésie ne'ebé rekomenda</td><td>- ai-fuan no ai-industriál hanesan Rambutan, lengkeng, cengkeh, kanela no kulu.
- espésie ai folin karun hanaran ai-kameli.
- ai ne'ebé prefere ba kondisaun mahon iha sira-nia kreximentu inisiál
- ai-legume hanesan lutu moris no ai-han ba animál</td><td>- Kafé
- Ai-mahon ne'ebé iha liña leten: Ai-albizia, ai-kakeu
- Ai-mahon liña médiu: Ai-Caliandra</td></tr>
<tr><td>Espasu entre ai-oan</td><td>Kuda naran/random entre ai ne'ebé eziste ona no ai-inan ho espasu hanesan tuirmai:
- ai: 4m (ezemplu: Cengkeh) - 7m (ezemplu: Rambutan)
- ai-inan, ezemplu: hudi 1- 2m
- ai-legume: 3 - 4m</td><td>- Kafé: 2 -3m x 2 -3m
- Ai-mahon liña leten/médiu: 10m x 10m</td></tr>
<tr><td>Dezeñu típiku /imajen hosi plantasaun</td><td> 
</td><td> 
</td></tr>
</table>
2. Kuda ai-oan tuir prosedimentu hanesan ne'ebé esplika iha "Referénsia Reflorestasaun - 3 no 4" iha sesaun ida-ne'e.</td></tr>
<tr><td>Rezultadu ne'ebé hein</td><td>a. Komunidade lokál bele dezenvolve plantasaun hosi i) ai-fuan no ai-industriál no ii) kafé tuir dezeñu padraun.</td></tr>
<tr><td>Referénsia seluk</td><td>1) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA.</td></tr>
<tr><td>Kontaktu hodi hetan informasaun</td><td>1) Fundasaun Halarae
2) Edifísiu Projetu JICA</td></tr>
</table>

Referénsia Reflorestasaun – 5b

Naran tékniku	**Dezeñu Padraun hosi iii) Plantasaun Ai-kabelak no iv) Rejeneradu Floresta iha Rai Degradu**
Fatin tékniku ne'e introdús	Suku Samalete (Postu administrativu Railaco, Munisipiu Aileu)
Tinan introdusaun	2008 – 2009
Rekursu informasaun	Estudu Jestaun bacias hidrograficas Sustentável Integradu iha Mota-ninin Laclo no Comoro

Sumáriu Dezeñu Padraun hosi iii) Tékniku Plantasaun Ai-kabelak no IV) Rejeneradu Floresta iha Rai Degradu

<table>
<tr><th>Item</th><th colspan="3">Deskrisaun</th></tr>
<tr><td>Objetivu</td><td colspan="3">Objetivu prinsipál hosi tékniku mak atu dezenvolve i) plantasaun ai-kabelak no ii) rejeneradu floresta iha rai degradu tuir dezeñu padraun.</td></tr>
<tr><td>Atividade prinsipál</td><td colspan="3">a. Hili área ne'ebé própriu ba i) plantasaun ai-kabelak no ii) rejeneradu floresta
b. Prepara no dezenvolve área ne'ebé hili tuir dezeñu.</td></tr>
<tr><td>Sumáriu atividade</td><td colspan="3">1. Hili área ne'ebé própriu ba plantasaun refere no prepara plantasaun tuir matadalan/ dezeñu padraun tuirmai:
<table>
<tr><td>Kondisaun báziku hosi fatin kuda ba kada tipu plantasaun Objetivu plantasaun</td><td>iii. Produsaun Ai-kabelak</td><td>iv. Rejeneradu floresta iha rai degradu</td></tr>
<tr><td>Fatin tarjetu</td><td>Área ba to'os muda ba mai, liu-liu área ne'ebé ladún bokur no/ka própriu ba agríkola</td><td>Floresta ne'ebé degradu
Área ne'ebé nakloke (wasteland/barren land)
Rai ho du'ut</td></tr>
<tr><td>Espésie ne'ebé rekomenda</td><td>- Espésie ai-kabelak, ezemplu: Teak, Mahogany no ai-kabelak espésie seluk ne'ebé apropriadu</td><td>- Espésie ai-legume ne'ebé moris lalais, ezemplu: Calliandra, gamal no lamtoro (L-19)
- Espésie ne'ebé tolera ba maran , ezemplu: Casurina</td></tr>
<tr><td>Espasu entre ai-oan</td><td>- Ai-kabelak: 3m x 3m</td><td>- Espésie ai-fore : 3m x 6m
- Espésie ne'ebé tolera ba maran: 3m x 6m</td></tr>
<tr><td>Dezeñu típiku /imajen hosi plantasaun</td><td> 
</td><td> 
</td></tr>
</table>
2. Kuda ai-oan tuir prosedimentu hanesan ne'ebé esplika iha "Referénsia Reflorestasaun - 3 no 4" iha sesaun ida-ne'e.</td></tr>
<tr><td>Rezultadu ne'ebé hein</td><td colspan="3">a. Komunidade lokál bele dezenvolve i) plantasaun ai-kabelak, no ii) Rejeneradu floresta tuir dezeñu padraun.</td></tr>
<tr><td>Referénsia seluk</td><td colspan="3">1) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA.</td></tr>
<tr><td>Kontaktu hodi hetan informasaun</td><td colspan="3">1) Fundasaun Halarae
2) Edifísiu Projetu JICA</td></tr>
</table>

2.4 Jestaun Agrikultura no Pekuária

2.4.1 Agrikultura

Iha Timor-Leste, agrikultura, espesialmente iha área rai-lolon no foho, sei primitivu no vulneravel tebes ba mudansa klimátika; tan ne'e, barak mak komunidade prátika kultivasaun ne'ebé muda ba mai/halo to'os rotasaun balu ne'ebé kuda hamutuk ai-han iha rai-lolon hodi minimiza risku ba hamlaha. Iha pratika halo to'os atuál, komunidade bele kolleita ai-han balu iha kondisaun klima ne'ebé la favoravel maske rezultadu hosi ai-han ne'ebé kolleita, jerálmente menus liu. Iha liafuan seluk, pratika sira hanesan ne'e efetivu hodi asegura seguransa ai-han hosi komunidade iha área rai-lolon no foho, maibé iha tempu hanesan, pratika sira-ne'e, mantén sira-nia vida moris iha nivel ne'ebé subsistensia .

Iha seksaun ida-ne'e introdús tékniku no pratika sia (9) ne'ebé bele kontribui ba estabilizasaun no hasa'e produsaun agrikulturál liuhosi utilizasaun materiál no matenek lokál ne'ebé disponivel, atu nune'e komunidade bele hadi'a sira nia vida moris bainhira uza to'os ne'ebé eziste ona sein uza investimentu osan. Tékniku no pratika introdús iha sesaun ida-ne'e hatudu ona efetivu hodi hasa'e produsaun ai-han no modo iha Timor-Leste hanesan mós ho nasaun Ázia sira seluk.

Tékniku/Pratika Introdús iha Sesaun ida-ne'e

Tékniku	Liña jerál	Aplikabilidade
1. Métodu kultivasaun poupa bee	Prezervasaun bee esensiál ba kreximentu ai-han, espesialmente iha etapa inísiu. Tékniku tuirmai presiza introdús ba to'os modo nian: a) halo kabubun (ridge making); b) halo kabubun metin (*solid ridge making*); no c) aplikasaun ai-tahan rahun matak.	Produsaun modo
2. Aplikasaun adubu báziku	Aplikasaun materiál orgánika, hanesan adubu orgánika no karau teen, ajuda hadi'a fertilidade rai nian no umidade, ne'ebé bele fasilita kreximentu ai-han iha etapa inísiu. Produsaun no aplikasaun adubu orgánika ninia aplikasaun hanesan adubu báziku mak tékniku prinsipál ne'ebé rekomenda.	Produsaun Ai-han rai-lolon no modo
3. Aplikasaun adubu adisionál	Aplikasaun adubu adisionál iha tempu ne'ebé loos mak elementu importante ida hodi hasa'e kuantidade produsaun ai-han. Produsaun no aplikasaun adubu been mak tékniku importante ne'ebé introdús.	Produsaun Ai-han rai-lolon no modo
4. Tékniku jerminasaun iha tempu malirin ka iha área rai-lolon	Jerminsaun fini ne'ebé saudavel importante hodi hetan produsaun modo ne'ebé satisfás. Temperature ne'ebé estavel no moderadu mak xave ida hodi hetan jerminasaun ne'ebé saudavel no di'ak. Métodu jerminasaun uza temperatura kabun simples maibé tékniku ne'e efetivu, liu-liu iha área rai-lolon ou foho.	Produsaun modo
5. Halo viveiru	Nune'e, preparasaun modo-oan ne'ebé saudavel esensiál ba produsaun modo. Tékniku sira-ne'e, atu prepara ambiente ne'ebé di'ak ba produsaun modo-oan ne'ebé saudavel.	Produsaun Modo
6. Tékniku Propagasaun vejetativu	Tékniku propagasaun aseksuadu ba produsaun modo no ai-fuan ajuda poupa kustu hodi sosa fini no mantén kualidade. Seluk tan, uza tékniku tesi rekomenda hanesan tékniku própriu ba produsaun materiál sira hodi kuda tomate, kobi no ai-fuan sira balu.	Produsaun modo no Ai-fuan
7. Rotasaun ai-han no kuda kahur	Repetisaun kuda ai-han ne'ebé hanesan iha to'os ne'ebé hanesan bele kauza moras ou halo ai-han vulneravel ba atake hosi insetu sira. Rotasaun ai-han no/ka kuda kahur ho ai-han seluk mak tékniku esensiál ida-ne'ebé bele prevene ai-han sira hosi estragu (hosi moras ka insetu).	Produsaun Modo no ai-han rai-lolon
8. Habarak fini ho kualidade	Utilizasaun hosi fini ho kualidade esensiál atu hasa'e produsaun. Tanba kualidade hosi fini di'ak fasil sai la di'ak bainhira kuda kahur ho variedade fini lokál, tékniku ida hodi kontrola fini nia kualidade mós introdús.	Produsaun Ai-han rai-lolon (batar)
9. Prezervasaun batar fini	Produsaun ne'ebé lakon durante depois-kolleita mak hanesan preokupasaun boot iha área rurál iha Timor-Leste. Redusaun lakon fini durante rai fini kontribui ba seguransa ai-han no estabilizasaun produsaun. Introdús métodu rai fini uza rekursu lokál .	Ai-han rai-lolon

Referénsia Jestaun Agrikultura - 1

Naran tékniku	**Métodu kultivasaun Poupa Bee**
Fatin tékniku ne'e introdús	Suku Lita, Russlau no Hatoblico
Tinan introdusaun	2005-2015
Rekursu informasaun	PARCIC, Grupu Rae Hato

Sumáriu hosi Tékniku Métodu Kultivasaun Poupa Bee

Item	Deskrisaun
Objetivu	Objetivu prinsipál tékniku ne'e mak atu prezerva umidade rai liuhosi introdusaun halo kabubun no tau ai-tahan rahun matak. Tékniku ne'e mós efetivu hodi proteje rai hosi erozaun rai tanba udan no anin.
Atividade prinsipál	a. Halo kabubun hodi asegura espasu ne'ebé sufisiente ba abut no/ka ai hosi família *Poaceae* ne'ebé kuda iha kabubun ninin hodi halo kabubun metin liután no prevene evaporasaun hosi rai-leten. b. Aplika ai-tahan rahun matak iha to'os hodi taka rai-leten atu nune'e mantén temperature rai nian no prevene evaporasaun hosi rai-leten.
Prosedimentu	 **Halo Kabubun** B. Ai-tahan rahun matak 1. Kultiva ai-horis uza animál teen hanesan adubu báziku. 2. Halo kabubun/sólidu kabubun tuir prosedimentu ne'ebé esplika iha leten. 3. Kuda modo iha kabubun leten. 4. Kuda ai-han ne'ebé bele taka rai,  **Taka Rai ho Dareta** A. Halo kabubun no sólidu kabubun 1. Kultiva ai-horis uza animál teen hanesan adubu báziku. 2. Halo no forma kabubun hosi norte ba súl atu nune'e ai-han sira bele hetan loro-matan ho sufisiente. 3. Kuda du'ut iha kabubun ninin hodi hametin kabubun no hamenus evaporasaun hosi rai-leten. (halo sólidu kabubun)  **Halo Sólidu Kabubun** ezemplu: dareta, lehe, ai-han seluk ne'ebé bele taka rai ka ai-medisinál) hale'u modo ne'ebé kuda. (Lehe apropriadu hanesan adubu matak.) 5. Uza ai-han ne'ebé bele taka rai hanesan produtu.
Rezultadu ne'ebé hein	a. Komunidade lokál bele hasa'e produsaun modo. b. Komunidade lokál bele mantén fertilidade to'os modo nian uza rekursu lokál (du'ut animál nian no ai-medisinál)
Kontaktu hodi hetan informasaun	PARCIC

Referénsia – Jestaun Agrikultura - 2

Naran tékniku	**Aplikasaun adubu báziku**
Fatin tékniku ne'e introdús	Suku Lita, Hatoblico no Russlau
Tinan introdusaun	2005-2015
Rekursu informasaun	PARCIC, USC Canada Timor Leste/RAEBIA

Sumáriu hosi Tékniku Aplikasaun adubu báziku

Item	Deskrisaun
Objetivu	Objetivu prinsipál tékniku ne'e mak atu fasilita komunidade lokál sira hasa'e/hadi'a fertilidade rai nian, kapasidade kaer bee, no testura rai hodi hasa'e produtividade rai nian.
Atividade prinsipál	a. Halo adubu orgánika utiliza rekursu lokál ne'ebé disponivel, hanesan karau teen, restu hosi kolleita, no du'ut/ai-tahan, hodi hadi'a rai nia kondisaun. b. Mantén adubu orgánika ba fulan haat (4) to'o neen (6). c. Aplika adubu orgánika hanesan adubu báziku molok kuda ai-han no modo.
Prosedimentu	<u>A. Produsaun adubu orgánika</u> 1. Ke'e rai-kuak hodi tau hamutuk materiál adubu orgánika sira. 2. Kolleita materiál/ingrediente hodi halo adubu orgánika, hanesan: animál teen, restu hosi kolleita, ai-tahan ka du'ut sein fini-musan tasak, ai-tahan hosi ai-fore, batar-kain ka hudi-kain, rai-metan, bee, au-kadesan, no EM, karik posivel. 3. Tetak materiál sira ne'e ki'ik. 4. Hada materiál sira iha rai-kuak, kada dalas hada tuituir malu, komesa hosi animál teen, ai-tahan no kain sira, au-kadesan, no rai-metan. 5. Rega bee sufisiente ka bee kahur ho EM bainhira hada materiál sira iha rai-kuak. 6. Sama hanehan ba kada dalas materiál sira ne'ebé hada ona. 7. Repete filafali atividade 4 to'o 6, to'o rai-kuak ne'e enxe nakonu. 8. Halo uma ki'ik hodi halo mahon rai-kuak ne'ebé enxe tiha ona. 9. Fila materiál sira ne'e hosi kraik ba leten no leten ba kraik kada semana tolu - haat bainhira temperatura iha adubu orgánika ne'e sai malirin hodi fasilita prosesu fermentasaun. <u>B. Aplikasaun Adubu Báziku</u> 1 Aplika adubu orgánika 2 - 3kg ba kada metru kuadradu maizumenus semana ida molok kuda. Kuantidade ne'ebé di'ak hosi adubu orgánika ne'ebé aplika diferente ba tipu ai-horis. 2. Kahur didi'ak adubu orgánika ho rai.

Ke'e rai-kuak

Sama hanehan Materiál sira

Aplika ba rai-kuak hodi transplanta

Item	Deskrisaun
	3. Aplika adubu orgánika iha kada rai-kuak fatin atu kuda no kahur didi'ak ho rai ba to'os modo nian.
Rezultadu ne'ebé hein	a. Komunidade lokál bele prodús adubu orgánika ho kualidade uza rekursu ne'ebé disponivel iha sira nia lokalidade. b. Komunidade lokál bele aplika adubu orgánika ho loloos. c. Komunidade lokál bele hasa'e produtividade ai-han/modo.
Referénsia seluk	1) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA
Kontaktu hodi hetan informasaun	USC Canada Timor Leste / RAEBIA Fundasaun Halarae, PARCIC

Referénsia Jestaun Agrikultura - 3

Naran tékniku	**Produsaun no Aplikasaun Adubu Been**
Fatin tékniku ne'e introdús	Suku Lita, Hatoblico no Russlau, Fadabloco, Hautoho, Tohumeta, Madabeno no Talitu
Tinan introdusaun	2005-2015
Rekursu informasaun	PARCIC, USC Canada Timor-Leste/RAEBIA, Halarae

Sumáriu hosi Tékniku Produsaun no Aplikasaun Adubu Been

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak fasilita komunidade lokál sira atu hasa'e sira-nia produtividade ai-han no modo liuhosi aplikasaun adubu adisionál.
Atividade prinsipál	a. Halo adubu been orgánika uza materiál lokál sira-ne'ebé disponivel. b. Aplika adubu been hanesan adubu adisionál.
Prosedimentu	 **Tau animál teen ba saku laran** A. Produsaun Adubu been 1. Prokura no fornese bidón mamuk ida hodi halo adubu been. 2. Kolleita ingrediente sira hodi halo adubu been: 5 - 10kg karau teen fresku ka animál teen seluk, 30 - 40kg kolleita restu sira ka ai-tahan/du'ut, mikro-organizmu (bele hetan hosi rai metan, tua mutin, *tempe* ka EM), no bee litru 200. 3. Karau teen iha saku laran tau ba bidón laran. Se karik saku la disponivel, tau karau teen diretamente ba bidón laran. 4. Tau kolleita restu sira no/ka ai-tahan/du'ut ba bidón laran. 5. Aumenta mikro-organizmu. 6. Enxe bee to'o bidón nakonu. 7. Taka bidón hodi proteje hosi insetu sira. 8. Kedok didi'ak materiál  **Fui/enxe bee**  **Taka bidón iha leten** sira-ne'ebé tau iha bidón laran, minutu 10 loron-loron durante semana 1 - 3 hodi fasilita prosesu fermentasaun. B. Aplikasaun Adubu been 1. Suru sai adubu been moos hosi bidón. 2. Kahur ka dissolve adubu been ne'ebé suru ho bee dala 20; no 3. Aplika adubu been ne'ebé dissolve ona ba ai-horis rai-lolon no modo tuir tempu.

Item	Deskrisaun
Rezultadu ne'ebé hein	a. Komunidade lokál sira sei produs adubu been ho kualidade utiliza materiál lokál sira. b. Komunidade lokál sira bele hasa'e produtividade ai-han no hadi'a kualidade modo nian.
Referénsia seluk	1) Relatóriu Final, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA
Kontaktu hodi hetan informasaun	USC Canada Timor Leste/RAEBIA Fundasaun Halarae, PARCIC

Referénsia Jestaun Agrikultura - 4

Naran tékniku	**Tékniku Jerminasaun**
Fatin tékniku ne'e introdús	Suku Lita
Tinan introdusaun	2008-2012
Rekursu informasaun	PARCIC

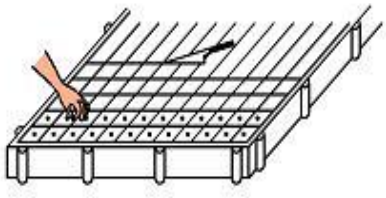
Sumáriu hosi Tékniku Jerminasaun

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál sira bele halo jerminasaun fini modo nian.
Atividade prinsipál	a. Fornese no kolleita fini no materiál sira. b. Tau fini modo iha hena no falun hena ne'e iha plástiku ka *polybag*. c. Kesi hena ne'ebé falun ona ba kabun. d. Kuda fini ne'ebé jermina ona iha *polybag* ka to'os.
Prosedimentu	 **Rai fini iha hena leten** 4. Tau hena ne'ebé rai ona fini ba plástiku. 5. Kesi plástiku ne'ebé falun ona ba ema nia isin, prefere liu kesi iha kabun, ba loron ida ka rua hodi hafera ka inkuba fini sira. 6. Haree filafali kada dadeer no loraik to'o fini sira jermina. Tékniku ida-ne'e efetivu tebes iha área ho elevasaun aas. C. Kuda fini 1. Se karik tutun mutin sai ona husi fini, kuda fini sira-ne'e ba *polybag* ka to'os. A. Provizaun ka kolesaun materiál 1. Prokura no fornese fini modo. 2. Fornese ka kolleita hena hodi sai kari fini fatin no *polybag* hodi falun. B. Fasilitasaun ba jerminasaun fini 1. Nahe hena no tau fini iha hena leten. 2. Rega bee ba fini. 3. Hodi hena, falun fini sira.  **Kesi fini ne'ebe falun ona iha kabun**  **Kuda fini ne'ebé jermina ona**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele asegura jerminasaun fini modo ho di'ak maske iha área sira ne'ebé malirin. b. Komunidade lokál sira bele prodús modo ho estavel.
Kontaktu hodi hetan informasaun	PARCIC

Referénsia Jestaun Agrikultura - 5

Naran tékniku	**Halo Viveiru**
Fatin tékniku ne'e introdús	Suku Lita no Russlau, Lequitura
Tinan introdusaun	2005-2012
Rekursu informasaun	PARCIC, USAID/DAI

Sumáriu hosi Tékniku Halo Viveiru

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál hodi produs fini-oan modo liuhosi halo viveiru.
Atividade prinsipál	a. Halo fatin viveiru hosi kontas/hudi-tahan no kuda fini ba fatin viveiru sira-ne'e. b. Halo bloku hosi rai hanesan rai-fatin viveiru no kuda viveiru sira iha bloku.
Prosedimentu	 **Homan no taka kuak kontas-tahan**  **Hasai hudi ka kontas-tahan** <u>A. Halo fatin viveiru hosi kontas/hudi-tahan</u> 1. Kolleita kontas ka hudi-tahan no du'ut kain ne'ebé bele uza hanesan ai-kesak. 2. Tesi hudi/kontas-tahan ba medida ne'ebé própriu hodi halo viveiru fatin. 3. Homan viveiru fatin hodi falun hudi ka kontas-tahan no taka kuak uza ai-kesak. 4. Enxe viveiru fatin ho rai. 5. Kuda fini modo iha laran. 6. Hasai tiha ai-tahan bainhira transplanta. 7. Tau hudi/ka kontas-tahan ne'e, atu nune'e sira bele dodok naturalmente.  **Oinsá atu halo bloku fini-fatin hosi rai** <u>B. Bloku rai halo hanesan viveiru fatin</u> 1. Halo kuadru-ai. 2. Kahur rai ho adubu orgánika ho variasaun 4:6. 3. Enxe kuadru ne'ebé prepara ona ho rai ne'ebé kahur ona. 4. Rega bee sufisiente no de'ut. 5. Halo tetuk tiha bloku leten ho kanuru rai ki'ik. 6. Depois bee infiltra ona, fahe rai sai bloku uza tudik. 7. Halo kuak iha sentru hosi kada bloku no kuda fini sira iha kuak sira-ne'e.  **Ko'a rai hodi sai bloku** 8. Bainhira fini moris ona ho boot ne'ebé bele kuda ona, ko'a bloku uza tudik no transplanta fini-oan sira iha to'os.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele produs fini-oan modo utiliza materiál lokál sira ne'ebé disponivel. b. Komunidade lokál bele hadi'a kualidade modo nian no hasa'e produtividade modo.
Referénsia seluk	USAID Timor-Leste, Dezenvolvimentu Setór Privadu 2005-2010/DSF Pájina faktu USAID http://timor-leste.usaid.gov/sites/default/files/DSPfactsheet.pdf

Item	Deskrisaun
Kontaktu hodi hetan informasaun	PARCIC Projetu DAC USAID

Referénsia Jestaun Agrikultura - 6

Naran tékniku	**Tékniku Propagasaun Vejetativu/Aseksuadu**
Fatin tékniku ne'e introdús	Suku Village, Hatoblico
Tinan introdusaun	2008 to'o agora
Rekursu informasaun	PARCIC, Rae Hato

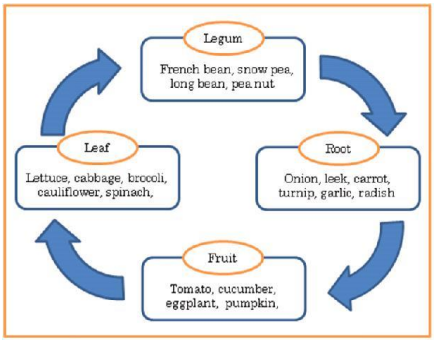
Sumáriu hosi Tékniku Propagasaun Vejetativu/Aseksuadu

Items	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál sira uza tomate no repollu nia sanak sira hodi produs fini-oan, hodi poupa kustu fini no mantén kualidade modo nian.
Atividade prinsipál	a. Halo propagasaun fini-oan tomate no repollu liuhosi tesi sanak
Prosedimentu	A. Propagasaun tomate 1. Ku'u nia sanak tutun ho naruk 7-8cm uza liman. 2. Hoban sanak ne'e iha bee laran ba minutu 30, atu nune'e sanak sira ne'e absorve bee ne'ebé sufisiente. 3. Tau rai-henek/rai iha fatin ida no enxe rai maizumenus 10cm. 4. Tesi sanak ne'e ho forma hali'is no kuda sanak sira ne'e ba rai ho forma hali'is ho medida 30 - 60 grau. 5. Taka sanak sira ne'e ho ai-tahan rahun (du'ut ka ai-tahan) ba loron 4 - 5 no graduál halo kona ba loro-matan ba maizumenus loron 10, atu nune'e sanak sira bele dezenvolve abut iha rai. 6. Kuda fini-oan sira ne'e iha toos bainhira loke funan dahuluk.  **Tesi sanak kuda ba rai**  **Tesi repollu nia kain**  **Hasai kain/*tunas* ne'ebé barak liu** B. Propagasaun repollu 1. Hili repollu nia ai-tubuk no hoban iha bee durante minutu 30 nia laran. 2.Kuda ai-tubuk ba viveiru fatin ka to'os. 3. Taka ai-tubuk ho ai-tahan rahun (du'ut ka ai-tahan) hodi proteje hosi loro-matan diretamente, durante loron 10. 4. Transplanta iha to'os. 5. Se karik iha ai-tubuk barak, hili ida ka rua ne'ebé kualidade.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele produs fini-oan modo ho kualidade uza métodu tesi sanak. b. Komunidade lokál sira bele nafatin produs modo ho kualidade.
Referénsia seluk	-
Kontaktu hodi hetan informasaun	PARCIC (ka Grupu Rae-Hato) Ekipa Projetu JICA

Referénsia Jestaun Agrikultura - 7

Naran Tékniku	**Rotasaun kuda ai-han no Kuda kahur/mistura**
Fatin ne'ebé Tékniku ne'e introdús	Suku Tohumeta, Suku Manelima
Tinan introdusaun	2004 to'o agora
Rekursu Informasaun	USC Canada Timor-Leste

Sumáriu hosi Tékniku Rotasaun Kuda Ai-han no Kuda kahur

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e atu fasilita komunidade lokál sira estabiliza produsaun modo liuhosi evita moras ai-han no mantén kondisaun rai ne'ebé saudável.
Atividade prinsipál	a. Halo rotasaun kuda ai-han iha área ne'ebé hanesan atu prevene asidente hosi moras ai-han ka peste ruma, kauza hosi kuda modo/ai-han ne'ebé kontinua. b. Kuda ai-han balu iha fatin ne'ebé hanesan, atu mantén rai bokur no redús posibilidade hosi moras ba ai-han.
Prosedimentu	A. Rotasaun Kuda Ai-han 1. Dezeñu padraun to'os ai-han ida hodi evita kuda ai-han hosi família ida-ne'ebé hanesan (*mono cropping*) iha fatin ne'ebé hanesan no fó intervalu períodu ne'ebé sufisiente entre ai-han sira ne'ebé hosi família ne'ebé hanesan, hodi evita kuda ai-han ho kontinuasaun. 2. Maioria, modo sira mai hosi família: Família *Solanaceae* mak: Tomate, ai-manas boot (*Capsicum*), berinjela, fehuk-ropa no ai-manas Família *Legume* mak: Fore hotu-hotu hanesan *French beans*, ervilla, fore-tali, fore-keli, nst. Familia *Cucurbitaceae* mak: Lakeru, pepinu, baria, lakeru-mutin, *bottle gourd*, *chayote*, nst. 3. Inkorpora ai-han fore sira iha rotasaun kuda ai-han, hodi hadi'a nutrisaun rai nian.   **Batar ho Fore-rai**  **Batar ho Kontas** B. Kuda Kahur 1. Kuda ai-han hosi família fore/*legume* ho ai-han ne'ebé absorvente ka supa – nutrisaun (hanesan: batar ho koto-mean ou fore-keli) atu hasa'e rai nia bokur. 2. Kombina ai-han ne'ebé supa bee barak ho ai-han ne'ebé bele rai bee (hanesan: batar ho kontas) atu mantén umidade rai nian. 3. Kombina ai-han ne'ebé hamriik ho ai-han ne'ebé taka rai (hanesan: batar ho fehuk-midar) atu minimiza potensiál erozaun rai-leten no mantén umidade rai nian.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele estabiliza produsaun modo liuhosi redús insidente moras no peste ne'ebé ataka. b. Komunidade lokál sira bele mantén rai nia bokur iha to'os uma hun.
Referénsia seluk	1) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA
Kontaktu	USC Canada Timor Leste/ RAEBIA

Item	Deskrisaun
hodi hetan informasaun	

Referénsia Jestaun Agrikultura - 8

Naran tékniku	**Habarak Fini ho Kualidade**
Fatin tékniku ne'e introdús	Suku Faturasa, Fadabloco, no Hautoho
Tinan introdusaun	2005-2015
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

Sumáriu hosi Tékniku Habarak Fini ho Kualidade

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu habarak no prezerva fini (batar) ho kualidade.
Atividade prinsipál	a. Organiza grupu agrikultór. b. Dezenvolve to'os demonstrasaun. c. Prodús batar ho kualidade no prezerva fini ho kualidade hosi kolleita.
Prosedimentu	A. Organizasaun grupu agrikultór 1. Identifika no hili agrikultór sira-ne'ebé hakarak partisipa iha atividade habarak fini. 2. Dezenvolve tuir regulamentu grupu nian no planu servisu ida hosi atividade ho maneira ne'ebé partisipativu. 3. Arranja estuda liuhosi vizita fatin seluk ba grupu ne'e.  **To'os demonstrasaun** B. Dezenvolve to'os demonstrasaun 1. Hili fatin ida hosi to'os permanente sira atu habarak fini, ne'ebé satisfás tuir kritéria hanesan tuirmai ne'e: i) To'os ne'ebé mak separadu hosi to'os seluk ho distánsia liuhosi metru 200, ka ii) To'os ne'ebé hale'u ho ai-laran no/ka plantasaun kafé. 2. Aplika konservasaun rai se karik to'os ne'e rai-lolon.  **Kolleita iha** C. Produsaun variedade ai-han ne'ebé di'ak 1. Prokura/fornese fini batar hosi variedade ne'ebé di'ak. 2. Kuda fini ne'e iha to'os demonstrasaun. 3. Aplika tékniku halo to'os ne'ebé di'ak, hanesan aplikasaun adubu orgánika, no aplikasaun adubu adisionál tuir tempu. 4. Kolleita no hamaran batar fulin ho própriu. 5. Hili batar fulin boot no behu de'it batar hosi parte klaran ka sentru hosi batar fulin ne'ebé hili. 6. Rai batar iha masa ka fatin ne'ebé laiha anin/au ho ai-tahan repelente insetu. 7. vii) Fó asisténsia ba membru grupu sira hosi tékniku habarak fini ne'ebé mensiona iha leten iha sira nia to'os rasik.  **Sentru Kolleita**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele habarak variedade fini batar ne'ebé di'ak b. Komunidade lokál bele hasa'e produsaun batar.
Referénsia seluk	1) Relatóriu Final, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA 2) Fini ba Moris
Kontaktu hodi hetan informasaun	Fini ba Moris USC Canada Timor-Leste/ RAEBIA

Referénsia Jestaun Agrikultura - 9

Naran tékniku	**Prezervasaun Fini Batar**
Fatin tékniku ne'e introdús	Suku Faturasa, Fadabloco, Hautoho, Tohumeta, Madabeno no Talitu
Tinan introdusaun	2005-2015
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

Sumáriu hosi Tékniku Prezervasaun Fini Batar

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu redús batar ne'ebé estragu/lakon iha períodu depois kolleita
Atividade prinsipál	a. Hamaran fini didi'ak. b. Rai fini iha fatin ne'ebé laiha anin ou au no aplika ai-tahan repelente insetu naturál.
Prosedimentu	A. Hamaran Fini 1. Hamaran batar to'o konteúdu umidade menus hosi 14%. Batar tenke hamaran didi'ak. Bele koko, bainhira ita tata fini, sei laiha marka nehan nian iha batar ne'ebé tata ne'e. B. Rai fini iha fatin ne'ebé laiha anin 1. Tau batar fini maran iha fatin ida-ne'ebé anin laiha, hanesan jerikán ka bidón. C. Rai fini iha au laran 1. Kolleita/prepara au hanesan fatin hodi rai fini. 2. Rai batar fini ho ahi-kadesan hosi batar fulin iha fatin rai fini. - Sunu batar fulin ne'ebé behu ona. - Kolleita ahi-kadesan hosi batar fulin ne'ebé sunu. - Enxe fatin rai fini ho ahi-kadesan no batar fini maran ho variasaun 2:8. - Taka fatin rai fini metin no rai iha fatin ne'ebé malirin no maran.  **Batar-fulin**  **Ai-ruu**  **Lantana** 3. Rai batar fini ho ai-ruu (*Eucalyptus urophylla*) tahan maran iha fatin rai fini. – Nahe ai-ruu tahan maran ba fatin rai fini. – Tau batar fini maran to'o fatin rai fini nakonu ho fini. – Tau ai-ruu tahan nakonu hodi taka batar fini sira. – Taka fatin rai fini metin no rai iha fatin ne'ebé malirin no maran. – Repete filafali prosesu ne'ebé mensiona iha leten to'o batar fini sei kuda fali hodi prevene estragu hosi insetu. – Kuantidade ai-ruu tahan ne'ebé apropriadu mak maizumenus 3% hosi fini. 4. Rai fini ho lantana-tahan rahun iha fatin rai fini. – Habai lantana tahan didi'ak no de'ut too rahun didi'ak . – Kahur ai-tahan rahun hamutuk ho batar fini ne'ebé maran ona. – Taka metin fatin rai fini no rai iha fatin ne'ebé malirin no maran. – Repete prosesu ne'ebé mensiona iha leten to'o batar fini sei kuda fali hodi prevene estragu hosi insetu. – Kuantidade ai-lantana tahan ne'ebé apropriadu mak maizumenus 5% hosi todan fini.

Item	Deskrisaun
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele redús batar fini ne'ebé lakon depois uza materiál lokál ne'ebé disponivel. b. Komunidade lokál bele asegura sira-nia ai-han no fini ba tempu kuda tuirmai.
Referénsia seluk	1) Livru Matadalan Permakultura hosi Timor-Leste, 2005
Kontaktu hodi hetan informasaun	Permatil Fini ba Moris

2.4.2 Jestaun Pekuária

Jestaun pekuária mak kestaun importante ida-ne'ebé presiza atu habelar iha jestaun floresta no rekursu naturál iha Timor-Leste, liu-liu iha área rai-lolon no foho, Tanba husik de'it animál han du'ut arbiru baibain hasoru iha área sira-ne'e. Husik animál han du'ut arbiru dala barak kauza degradasaun floresta/rai ho du'ut no estraga ai-han iha to'os. Tan ne'e, jestaun ne'ebé di'ak no kontrola animál ne'ebé hakiak importante tebes ba jestaun floresta no rekursu naturál sustentável iha nivel suku.

Konsidera ba kapasidade hosi rai no presaun hosi populasaun iha futuru, jestaun pekuária intensivu mak hanesan diresaun ida-ne'ebé komunidade lokál sira presiza. Maske, ida-ne'e la fasil ba komunidade sira iha área rai-lolon no foho atu muda sira-nia pratika iha períodu ne'ebé badak, tanba maioria hosi komunidade sira hela iha nivel subsistensia no mós enfrenta menus membru família ne'ebé bele serbisu no mós menus hahán ba animál sira iha sira-nia lokalidade.

Ne'eduni, seksaun ida-ne'e propoin tékniku tolu ne'ebé bele ajuda komunidade sira proteje ai-han no rekursu naturál sira hosi animál sira bainhira muda sira-nia pratika hakiak animál konvensionál ba sistema hakiak animál ho métodu semi-intensivu.

1. Introdusaun lutu moris
2. Dezenvolve banku ai-han ba animál
3. Introdusaun hakiak animál semi-intensivu

Partikulármente, jestaun pekuária semi-intensivu ne'e espera bele fasilita komunidade lokál sira hodi hetan asesu ne'ebé fasil no uza animál teen ba toos, ne'ebé bele hasa'e produtividade to'os no neineik kontribui hodi hasa'e produsaun ai-han.

Referénsia Jestaun Pekuária - 1

Naran tékniku	**Introdusaun Lutu Moris**
Fatin tékniku ne'e introdús	Suku Russlau, Manelima, Maumeta
Tinan introdusaun	2004-2015
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

Sumáriu hosi Tékniku Introdusaun Lutu Moris

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi Tékniku ne'e mak atu fasilita komunidade lokál sira hodi proteje to'os no plantasaun hosi animál hakiak liuhosi meius vejetativu.
Atividade prinsipál	a. Hili materiál/rekursu sira-ne'ebé bele uza ba lutu moris. b. Prodús ai-horis hodi kuda sai lutu moris. c. Kuda ai-oan tuir liña baliza hosi área hodi proteje hosi animál sira. d. Uza lutu moris ba intensaun seluk.
Prosedimentu	A. Selesaun materiál no dezeñu lutu. 1. Hili área ne'ebé atu proteje no identifika baliza ne'ebé presiza halo lutu moris. 2. Identifika rekursu lokál sira-ne'ebé bele uza hanesan lutu moris no deside materiál (ai-fore rekomenda haree ba ninia funsaun.) 3. Determina númeru ai-oan ne'ebé presiza ba totál perímetru hosi lutu ne'ebé sei halo. 4. Dezeñu lutu inklui sasukat protejidu ba ai-oan iha tinan primeiru.  **Lutu moris Sisal**  **Lutu ai-gamal hodi troka** B. Produsaun materiál hodi kuda 1. Dezenvolve viveiru hodi prodús ai-oan. 2. Kuda fini ka ai-sanak iha viveiru. 3. Mantén ai-oan to'o sira ho boot ne'ebé sufisiente ona atu bele kuda. 4. Kolleita materiál hodi proteje ai-oan C. Kuda ai-oan 1. Kuda ai-oan iha baliza ne'ebé lutu moris presiza dezenvolve. 2. Halo sasukat protejidu tuir liña ai-oan lutu moris 3. Mantén ai-oan ho di'ak, karik ai-oan balun namlaik ka mate, troka ho ai-oan foun. 4. Hasai tiha sasukat protesaun bainhira ai-oan moris boot ona.  **Lutu Ai-anin hodi troka** D. Utilizasaun lutu moris 1. Uza materiál lutu moris ba intensaun seluk, hanesan: i) Sisal bele halo liña, tali no hena, ii) animál nia hahán, ai-sunu hosi ai-fore no du'ut, iii) ai-sunu hosi ai-anin
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele proteje to'os no plantasaun sira hosi animál uza rekursu lokál ne'ebé disponivel.
Referénsia seluk	1) Livru matadalan permakultura hosi Timor - Lester, Permatil, 2005

Item	Deskrisaun
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA PERMATIL

Referénsia Jestaun Pekuária - 2

Naran tékniku	**Dezenvolve Banku Hahán ba Animál**
Fatin tékniku ne'e introdús	Suku Manelima
Tinan introdusaun	2006-2015
Rekursu informasaun	USC Canada Timor-Leste/ RAEBIA

Sumáriu hosi Tékniku Dezenvolve Banku Hahán ba Animál

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál sira produs animál nia hahán uza rekursu lokál ne'ebé disponivel.
Atividade prinsipál	a. Hili fatin ba produsaun hahán animál nian, ai ka ai-han hanesan banku hahán ba animál b. Prokura/kolleita fini no produs ai-oan ne'ebé bele sai hanesan hahán ba animal. c. Kuda ai-oan iha banku hahán no área sira-ne'ebé besik to'os ka uma sira.
Prosedimentu	 **Legume (Gamal) no Du'ut** A. Selesaun fatin ba banku hahán animál 1. Deside fatin no fatin nia medida ba banku hahán bazeia ba kuantidade animál ne'ebé tenke fó han. 2. Deside no hili ai-han animál nian ne'ebé di'ak ba karau baka no disponivel iha lokalidade (hanesan: *Leucaena*, *Gamal*, *Sesbania*, *Calliandra* no Marungi, Du'ut elefante, nst). B. Produsaun ai-oan 1. Determina kuantidade ai-oan ne'ebé presiza.     **Calliandra** **Leucaena** **Sesbania** **Marungi** 2. Kolleita fini no ai-sanak ne'ebé nesesáriu ba produsaun ai-oan. 3. Kuda fini no/ka ai-sanak ka fahe abut hodi produs ai-oan. 4. Mantén ai-oan to'o sira to'o ona boot ne'ebé sufisiente atu bele kuda. C. Transplanta/kuda ai-oan 1. Transplanta ai-oan iha banku hahán animál no área sira seluk besik to'os/uma. Ai-fore mós di'ak ba lutu moris.  **Transplanta dut ho fahe abut**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele produs animál nia hahán uza rekursu lokál sira ne'ebé disponivel. b. Komunidade lokál sira bele hadi'a nutrisaun ba animál ne'ebé hakiak.
Referénsia seluk	1) Relatóriu Final , Estudu Jestaun Bacias Hidrograficas bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marco 2009, JICA
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste no Ekipa Projetu JICA

Referénsia Jestaun Pekuária - 3

Naran tékniku	**Introdusaun Semi-Intensivu Hakiak Animál**
Fatin tékniku ne'e introdús	Suku Manelima
Tinan introdusaun	2006-2015
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

Sumáriu hosi Tékniku Introdusaun Semi-Intensivu Hakiak Animál

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál sira hakiak animál iha luhan ho maneira semi-intensivu.
Atividade prinsipál	a. Estabelese fatin atu prodús ai-han ba animál (banku hahán) iha suku. b. Halo lutu/luhan ho fatin bee no rai-kuak ba animál teen. c. Hala'o treinamentu oinsá uza karau halo natar. d. Halo adubu orgánika utiliza hahán restu, karau-teen no mii.
Prosedimentu	A. Organizasaun grupu agrikultór sira 1. Hili agrikultór na'in-10 ne'ebé hakarak servisu hamutuk no organiza sira ba grupu ida. 2. Halo regulamentu grupu nian no planu servisu ba atividade grupu. 3. Fahe responsabilidade hodi haree no kuidadu sira-nia animál sira. B. Estabelesimentu banku hahán animál 1. Prokura no fornese fini ai-han ba animál no ai-fore tinan ida ba oin. 2. Dezenvolve banku hahán animál besik membru sira-nia uma ka animál luhan hanesan esplika iha referénsia Jestaun pekuária-2 iha sesaun ne'e. C. Konstrusaun animál luhan 1. Foti materiál sira hanesan au no ai-maran hodi halo animál luhan 2. Hamoos fatin ba animál luhan. 3. Konstrui animál luhan (harii ai-riin hodi kesi kuadradu ho tali). 4. Konstrui luhan no halo mós kakuluk. 5. Konstrui bee fatin. 6. Ke'e rai-kuak besik animál luhan no halo kanál hodi analiza animál teen no mii ba rai-kuak. D. Treinamentu oinsá uza karau atu halai to'os 1. Esplika kona-ba uza karau hodi halai to'os, ezemplu hodi fila rai (kuandu iha posibilidade, lori komunidade lokál sira ba suku balu ne'ebé uza ona animál hodi halai to'os). 2. B. Prokura no fornese materiál sira (anexu) hodi halai to'os. 3. C. Halo treinamentu kona-ba oinsá uza karau atu halai to'os. E. Produsaun adubu orgánika 1. Ajuda membru sira halo adubu orgánika uza animál teen no mii ho ai-han restu.  **Halo hela fatin**  **Treinu ema no karau atu halai to'os**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele hakiak karau baka ho maneira semi-intensivu. b. Komunidade lokál sira bele uza karau baka hodi halai to'os. c. Komunidade lokál sira bele halo adubu orgánika utiliza animál teen
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste

2.5 Tékniku Agrikultura Rai-lolon no Agro-florestál

Tékniku agrikultura rai-lolon no agro-florestál esensiál ba utilizasaun sustentável no jestaun área rai-lolon no foho sira ba intensaun produsaun iha Timor-Leste, ne'ebé maioria rai nasionál iha lolon liuhosi 40%. Tékniku ne'e introdús no promove ona iha nasaun barak iha mundu, tanba Tékniku ne'e fasilita komunidade sira, jere sira-nia área rai-lolon iha maneira ne'ebé sustentável, liuhosi integra produsaun ai-han ho konservasaun rai no/ka reflorestasaun. Iha kontestu CB-NRM, tékniku ne'e hanesan kritéria hodi muda área sira-ne'ebé atuál uza hodi halo to'os muda ba mai, ba to'os ne'ebé sustentável liu, hanesan: plantasaun, to'os ho sasukat konservasaun rai, no abat sira.

Iha Timor-Leste, organizasaun barak, hanesan MAP, projetu fundu hosi doadór, no ONG sira introdús no demonstra tiha ona agrikultura rai-lolon no modelu agro-florestál iha terrenu hodi promove métodu to'os rai-lolon sustentável. Satán, ba buat hotu ne'ebé promove hosi governu no organizasaun não-govermentál, eziste ona konservasaun rai tradisionál balu ne'ebé komunidade sira prátika tiha ona iha tempu portugés.

Sesaun ida ne'e la'ós introdús de'it abilidade no tékniku ne'ebé introdús tiha ona iha nasaun ne'e depois independénsia, maibé mós sira-ne'ebé mak komunidade lokál sira tradisionalmente prátika tiha ona. Entre atividade sira-ne'e, abilidade no tékniku hitu (7) tuirmai ne'ebé avalia efetivu iha jestaun rai sustentável no komunidade sira fasil atu aplika iha Timor-Leste.

1. Delineasaun liña-male'uk (konstrui no uza kuadru A)
2. Ai-han ne'ebé taka rai/ai-tahan rahun/aplika ai-han restu iha liña-male'uk
3. Tau adubu orgánika /kanaliza liña-male'uk
4. Terrasu banku
5. Terrasu didin fatuk
6. Kuda to'os viela/vejetasaun naturál tuir tiras
7. Kuda ai espésie oioin

Satán, rekomenda atu refere ba dokumentu tékniku sira tuirmai hodi aprende kona-ba tékniku agrikultura rai-lolon no agro-florestál seluk, ne'ebé bele aplika iha Timor-Leste.

a. Tékniku Jestaun Rai Sustentável, UNDP, 2010
b. Livru Matadalan Teknolojia Florestál (Livru Matadalan Teknolojia Florestál), NDF/MAP (suporta hosi APRII), 2007
c. Livru Matadalan Permakultura Timor-Leste, PERMATIL, 2005
d. Informasaun Agro-florestál Kit, DENR, 1992

Referénsia Agrikultura Rai-lolon no Agro-florestál - 1

Naran tékniku	**Delineasaun liña-male'uk (Konstrui no Uza Kuadru A)**
Fatin tékniku ne'e introdús	Suku Batara (Laclubar), Suku Umakaduak (Laclo), Suku Faturasa, Fadabloco, no Hautoho (Remexio), Suku Talitu, Madabeno no Tohumet (Laulara)
Tinan introdusaun	2008-2015
Rekursu informasaun	USC-CTL/RAEBIA

Sumáriu hosi Tékniku Delineasaun liña-male'uk (Konstrui no Uza Kuadru A)

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu marka liña-male'uk uza instrumentu simples no pratikál, ne'ebé komunidade sira bele halo ho fasil hosi materiál lokál ne'ebé disponivel.
Atividade prinsipál	a. Konstrui kuadru A b. Marka liña-male'uk uza kuadru A
Prosedimentu	A. Konstrui kuadru A 1. Kolleita materiál hanesan tuirmai: i) ai-riin rua ho naruk metru 2,1 no ai-riin ida ho naruk metru 1,2; ii) tali ka fiu hodi kesi ka pregu; no iii) fatuk ida ho baboot hanesan ho liman ka objetu seluk ne'ebé ho todan hanesan. 2. Kesi ka hametin ho pregu ai-rua ne'ebé naruk iha sira-nia rohan. Di'ak liu halo marka iha ai-riin lolon atu nune'e ai labele muda an bainhira kesi ka pregu 3. Habelar rohan seluk ne'ebé la pregu (se sai ain rua) no suporta ho ai-badak iha klaran atu halo figura "A". Kesi ka hametin ho pregu ai badak ne'e nia rohan sira iha ai-riin rua ne'e nia lolon (ai-riin ne'ebé naruk). 4. Kesi tali ida iha pontu sikun ne'ebé ai-riin rua ne'e junta. 5. Kesi tali nia rohan ho fatuk ka objetu seluk ne'ebé todan. Fatuk tenke todan nato'on atu nune'e anin la fasil huu ba mai. Fatuk tenke tara tun maizumenus 20cm hosi ain kraik.   **Auja Ai matenek**  **Delineasaun lina Kontur** B. Delineasaun liña-male'uk 1. Depois hamoos rai, hahú hosi rai-lolon. Liña-male'uk sei hahú uluk hosi leten ba kraik no depois fila ba leten, atu nune'e bele minimiza erru komulativu. 2. Tidin ai-tonka primeiru iha rai-lolon ninin no tau pozisaun ain-karuk hosi kuadru A iha ai-tonka ne'e. 3. Ajusta ain-loos atu nune'e tali ne'ebé tara pasa liu iha pontu klaran hosi ai-klaran. 4. Tidin ai-tonka seluk iha ain-loos hosi kuadru A nian, hodi marka pontu seluk. 5. Muda kuadru A ba parte loos hodi tau ain-karuk iha pontu ain-loos ne'ebé tidin antes. Ajusta ain-seluk nafatin to'o tali ne'ebé tara pasa liu iha pontu klaran hosi ai-klaran. Depois marka tan pontu ne'e ho ai-tonka. 6. Kontinua prosedimentu iha leten to'o ninin seluk. 7. Foti tan pontu seluk ba kraik iha rai-lolon uza ai-tonka ho naruk metru 1 – 1,5 ka objetu seluk ne'ebé bele uza hodi sukat. Foti pasu 2 - 6 hodi foti liña-male'uk. 8. Repete pasu 2 - 7 to'o liña korta rai-lolon forma iha to'os.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele halo rasik liña korta rai-lolon uza materiál lokál sira. b. Komunidade lokál sira bele prepara sira-nia to'os hodi aplika konservasaun rai.
Kontaktu	1) Livru Orientasaun Tékniku Floresta NDCF, MAF, 2006

Item	Deskrisaun
hodi hetan informasaun	2) Livru matadalan Permakultura Timor-Leste, PERMATIL,2015
Objetivu	USC-CTL/ RAEBIA NDF

Referénsia Agrikultura Rai-lolon no Agro-florestál - 2

Naran tékniku	Kuda kahur, Ai-han taka rai/ai-tahan rahun
Fatin tékniku ne'e introdús	Suku Faturasa, Hautoho (Remexio), Suku Talitu, Madabeno no Tohumet (Laulara)
Tinan introdusaun	2012-2015
Rekursu informasaun	USC-CTL/ RAEBIA

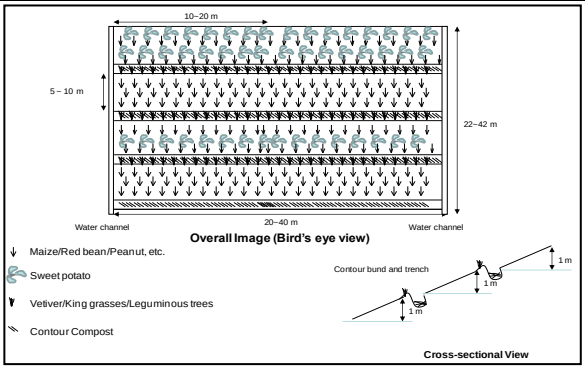
Sumáriu hosi Tékniku kuda kahur, ai-han taka rai/ai-tahan rahun

Item	Deskrisaun
Objetivu	Tékniku ne'e nia objetivu atu redús erozaun rai leten liuhosi aplikasaun pratika jestaun agrikultura simples iha to'os rai-lolon.
Atividade prinsipál	a. Kuda espésie ai-han balu ne'ebé ho ninia tempu moris, tempo kuda, aas ne'ebé lahanesan, iha to'os ne'ebé hanesan. b. Kuda ai-han ne'ebé bele taka rai iha to'os ka ai-han restu hanesan ai-tahan rahun bainhira rai sei mamuk hela.
Prosedimentu	A. Kuda ai-han kahur 1. Kuda tipu ai-han oioin, hanesan batar (tipu ai-han ne'ebé hamriik), fehuk midar/*squash* (tipu ai-han ne'ebé dolar), fore (tipu ai-han ne'ebé nani) koto-naruk (ai-han ne'ebé moris ho durasaun tinan rua), talas no ai-farina (ai-han ne'ebé moris ho durasaun tinan rua) hodi taka rai-leten no husik to'os moris ho ai-han durante tinan tomak. 2. Kuda ai-han kahur ne'e pratika ne'ebé baibain hetan iha to'os rai-lolon iha Timor-Leste. Tékniku ne'e iha objetivu rua, proteje to'os hosi erozaun no asegura ai-han maske iha kondisaun klima ne'ebé la favoravel.  **Kuda kahur batar, koto-naruk, ai-farina no lakeru**  **Nahe ai-tahan rahun iha to'os** B. Ai-han ne'ebé taka rai/ai-tahan rahun 1. Kuda ai-han ne'ebé taka rai, hanesan lehe, fulan ida molok kolleita batar ka nahe ai-han restu ka du'ut/ai-tahan depois kolleita batar iha to'os, liuliu to'os permanente atu proteje rai-leten hosi loro-matan direta , anin, no udan ne'ebé mai derrepente la'ós iha ninia tempu durante rai mamuk. 2. D. Ai-han taka rai ka ai-tahan rahun tenke inkorpora iha rai-leten durante preparasaun rai hanesan materiál orgánika, atu nune'e hadi'a estrutura rai nian, rai nia bokur, no kapasidade rai kaer bee.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele redús efeitu negativu hosi erozaun rai-leten b. Komunidade lokál sira bele mantén rai nia bokur iha to'os, liuliu iha to'os permanente.
Referénsia seluk	1) Livru Orientasaun Tékniku Floresta NDCF, MAP, 2006 2) Livru matadalan Permakultura Timor-Leste,PERMATIL,2005
Kontaktu hodi hetan informasaun	PERMATIL NDF/MAP

Referénsia Agrikultura Rai-lolon no Agro-florestál - 3

Naran tékniku	**Tau adubu orgánika iha liña-male'uk/kanaliza**
Fatin tékniku ne'e introdús	Suku Batara (Laclubar), Suku Faturasa, Fadabloco, no Hautoho (Remexio), Suku Tohumeta, Madabeno no Talitu (Laulara)
Tinan introdusaun	2008-2015
Rekursu informasaun	Estudu Jestaun bacias hidrograficas Integradu Sustentável bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

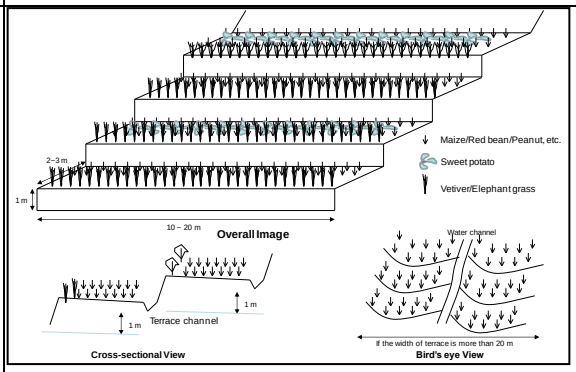
Sumáriu hosi Tékniku Tau adubu orgánika iha liña-male'uk/kanaliza

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu mantén rai nia bokur iha to'os rai-lolon liuhosi aplika servisu ne'ebé ladún todan iha konservasaun rai.
Atividade prinsipál	a. Foti liña-mala'ek uza kuadru A b. Halo kanál ki'ik ho tuir liña korta rai-lolon c. Tau ai-han restu hosi kolleita/du'ut/ai-sanak iha kanál d. Halo/diversaun kanál sira tun ba kraik
Prosedimentu	1. Foti liña-male'uk tuir prosedimentu ne'ebé esplika iha referénsia agrikultura rai-lolon no agro-florestál-1 iha sesaun ne'e. 2. Ke'e kanál pelumenus ho luan 50cm no naruk 30 cm tuir liña-male'uk ida-idak. 3. Tau rai ne'ebé ke'e halo kanál iha parte kraik ninin kanál nian. 4. Halo kabubun iha kanál ninin uza rai ne'ebé ke'e halo kanál. 5. Tau restu hosi kolleita/du'ut/ai-sanak sira iha kanál. 6. Ke'e/diversaun kanál iha to'os ninin hodi kolleita bee hosi kanál liña-male'uk no lori sira tun ba kanál boot, atu nune'e prevene to'os hosi hetan erozaun. 7. Kuda du'ut no/ka ai-fore/fore iha kabubun ninin. 8. Iha ikus hosi tempu kolleita ai-han, ke'e i kanál no tau filafali restu hosi kolleita/du'ut/ai-sanak ba to'os, atu nune'e bele hadi'a filafali no mantén rai nia bokur. 9. Nahe restu hosi kolleita/ai-tahan/ai-sanak iha kanál sira bainhira hamoos rai hodi prepara to'os.  **Dezeña nahe ai-tahan rahun iha liña-male'uk**  **Preparasaun rai tuir liña korta rai-lolon**  **Tipiku Dezeñu hosi tau ai-tahan rahun iha liña-male'uk**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele minimiza erozaun no mantén rai nia bokur iha to'os rai-lolon. b. Komunidade lokál sira bele uza sira-nia to'os permanente ho maneira ne'ebé sustentável no mantén rai nia bokur iha to'os.
Referénsia seluk	1) Relatóriu Finál, Estudu Jestaun bacias Hidrografikas Integradu Sustentável bazeia ba Komunidade iha Mota-ninin Laclo no comoro. Marsu 2009, JICA 2) Livru Orientasaun Tékniku Floresta, NDCF, MAP,2006 3) Informasaun Teknolojia Agro-florestál Kit (ATIK), DNER, 1992
Kontaktu hodi hetan informasaun	Fundasaun Halarae USC CTL / RAEBIA

Referénsia Agrikultura Rai-lolon no Agro-florestál - 4

Naran tékniku	**Terrasu Banku**
Fatin tékniku ne'e introdús	Suku Batara (Laclubar)
Tinan introdusaun	2008-2009
Rekursu informasaun	Estudu Jestaun bacias hidrograficas Integradu Sustentável bazeai ba Komunidade iha Mota-ninin Laclo no Comoro

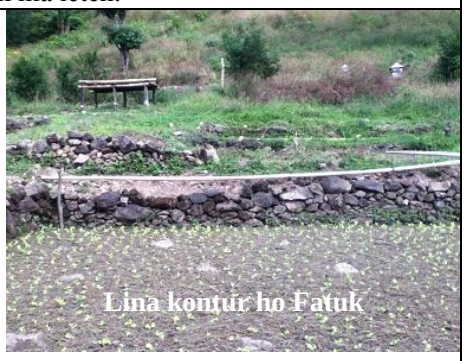
Sumáriu hosi Tékniku Terrasu Banku

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu asegura komunidade sira bele kontinua uza to'os rai-lolon sein redús rai nia bokur liuhosi prevene erozaun rai.
Atividade prinsipál	a. Foti liña-male'uk uza kuadru A. b. Dezenvolve terrasu banku ho aas metru 1.
Prosedimentu	 **Típiku dezeñu hosi terrasu banku** 1. Foti liña-male'uk tuir prosedimentu ne'ebé esplika iha referénsia agrikultura rai-lolon no Agro-florestál-1, iha sesaun ne'e. Distánsia vertikál entre liña sira labele liuhosi metru 1. 2. Hasai rai hosi parte leten rai-lolon entre liña korta rai-lolon rua no tau ketak tiha rai-leten ne'ebé hasai. 3. Ke'e rai sorin hosi parte leten ne'ebé lolon entre liña-male'uk rua. 4. Tau rai ne'ebé ke'e iha parte kraik hosi lolon ne'ebé hanesan (enxe lolon ne'ebé iha ho rai). 5. Kontinua prosesu hosi 2-4 to'o tau nivel ba área hotu-hotu. 6. Tau rai-leten iha terrasu ne'ebé tetuk ona 7. Halo parte oin tetuk (aas) inkilinu fila kotuk ba rai-lolon ho ángulu entre 15 no 45 grau depende ba tipu rai no terrasu nia aas. 8. Ke'e kanál ki'ik iha terrasu hun, hodi proteje terrasu labele hetan erozaun durante tempu udan. 9. Ke'e uitoan terrasu nia parte oin to'o baze lolon (ka hosi parte foho-leet to'o parte lolon) atu nune'e la permite udan been suli hosi terrasu leten. 10. Konstrui kabubun iha terrasu nia oin. 11. Kuda du'ut no ai-fore hanesan lutu moris iha kabubun ki'ik iha terrasu ninin hodi haforsa terrasu.  **Prepara rai ba terrasu banku**  **To'os uza terrasu banku**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele kontinua uza to'os rai-lolon no mantén rai nia bokur
Referénsia seluk	1) Relatóriu finál, Estudu Jestaun Bacias Hidrografikas bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA 2) Livru Orientasaun Tékniku Floresta, NDCF, MAP,2006 3) Informasaun Teknolojia Agro-florestál Kit (ATIK), DNER, 1992
Kontaktu hodi hetan informasaun	Fundasaun Halarae USC CTL / RAEBIA

Referénsia Agrikultura Rai-lolon no Agro-florestál - 5

Naran tékniku	**Terrasu Didin Fatuk**
Fatin ne'ebé tékniku ne'e introdús	Suku Madabeno no Talitu (Laurala)
Tinan introdusaun	Lahatene-2015
Rekursu informasaun	Komunidade sira iha suku Madaebeno no Talitu

Sumáriu hosi Tékniku Terrasu Didin Fatuk

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu prevene erozaun rai iha to'os rai-lolon fatuk no utiliza fatuk ne'ebé disponivel iha to'os laran.
Atividade prinsipál	a. Foti liña-male'uk uza kuadru -A. b. Kolleita fatuk sira iha to'os laran. c. Tau fatuk sira tuir liña-male'uk hodi harii didin hosi fatuk. d. Kuda ai-fore tuir didin fatuk no didin fatuk kraik ne'e. e. Kuda *vetiver* ka du'ut elefante iha didin fatuk nia leten.
Prosedimentu	1. Foti liña-male'uk tuir prosedimentu ne'ebé esplika iha referénsia agrikultura rai-lolon no agro-florestál-1 iha sesaun ne'e. Distánsia orizontál entre liña-male'uk prefere liu mak metru 3 - 5, maibé distánsia vertikál entre liña-male'uk tenke menus hosi metru 1,5. 2. Ke'e rai iha liña-male'uk ho luan 50-100cm no naruk 10-25cm hanesan baze ba terrasu didin fatuk. Baze terrasu didin fatuk tenke lolon inversa ho baze (ezemplu: baze tenke hosi foho-leer ba parte lolon.) 3. Konstrui terrasu didin fatuk no tau fatuk boot hanesan baze. Di'ak liu labele uza fatuk ki'ik hanesan baze, maibé bele uza hanesan materiál hodi enxe espasu entre fatuk boot sira. 4. Harii uluk dalas ida no hanehan dalas ne'e to metin molok komesa harii tan dalas seluk. Tamañu hosi fatuk ne'e, karik oioin depende ba rai-lolon ka fatuk ne'ebé disponivel, maibé di'ak liu ho aas metru 0,5-1, baze ho luan metru 0,5-1 no leten ho luan metru 0,5-0,7. 5. Tau didin fatuk seluk iha liña-male'uk sira no repete filafali atividade sira hosi 2 to 4. 6. Ke'e kanál drainajen husi parte leten to'os nian atu bele kanaliza udan been ba iha área mota-oan ne'ebé besik. 7. Kuda ai-fore ka ai seluk ne'ebé moris lalais iha terrasu didin fatuk nia okos (maizumenus 10cm hosi terrasu no 15 to'o 30cm tuir liña) atu hametin terrasu didin fatuk. 8. Kuda *vetiver*/*napier*/du'ut elefante ka ai-han seluk iha terrasu didin fatuk nia oin.  
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele kontinua uza to'os rai-lolon no mantén rai nia bokur.
Referénsia seluk	1) Livru orientasaun Tékniku Floresta, NDCF, MAP,2006 2) Informasaun Teknolojia Agro-florestál Kit (ATIK), DNER, 1992
Kontaktu hodi hetan informasaun	Fundasaun Halarae

Referénsia Agrikultura Rai-lolon no Agro-florestál - 6

Naran tékniku	**Kuda to'os veila/SALT**
Fatin ne'ebé tékniku ne'e introdús	Suku Madabeno no Talitu (Laurala)
Tinan introdusaun	2011 - 2015
Rekursu informasaun	Fundasaun Halarae

Sumáriu hosi Tékniku Kuda to'os viela

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak mantén rai-nia bokur iha to'os rai-lolon liuhosi prevene erozaun rai no uza to'os ne'ebé hanesan ba produsaun hosi kuda kahur ai-horis.
Atividade prinsipál	a. Foti liña-male'uk uza kuadru - A. b. Dezenvolve tiras vejetativu hosi ai-fore ka ai-han ba animál hanesan du'ut elefante. c. Kuda ai-han *inan*/ai-han permanente/ai no ai-han anuál/tempu badak entre tiras vejetativu.
Prosedimentu	1. Foti liña-male'uk uza kuadru A. tuir prosedimentu ne'ebé esplika iha referénsia agrikultura rai-lolon no agro-florestál-1 iha sesaun ne'e. Distánsia orizontál entre liña-male'uk rua di'ak liu metru 3 to'o 5, maibé, distánsia vertikál entre liña di'ak liu menus hosi metru 1,5. 2. Kuda tiras vejetativu 1-2 m iha liña-male'uk no kuda ai-fore no/ka ai-han ba animál (ezemplu: *vetiver*/du'ut elefante fini ka ai-sanak iha liña rua iha tiras ne'ebé kuda tiha ona. Distánsia entre liña rua di'ak liu metru 0,5 - 1. 3. Kuda ai-han inan (ezemplu: hudi, ai-fuan, kafé ho ai-mahon, no ai-industriál sira seluk) no ai-han tempu badak (ezemplu: batar, koto, fehuk-midar, ai-farina no talas) iha área entre ai-fore/du'ut separadu. Proporsaun hosi ai-han inan no ai-han tempu badak di'ak liu ida hosi tolu. Ai-han tempu badak di'ak liu kuda dook hosi ai-naruk atu prevene ai-han sira hosi mahon.  **Tipikal Desena Toos Foho lolon (SALT)**  **Tekniku Toos Foho lolon** 4. Tesi ai-fore atu mantén ninia naruk 40cm hosi rai leten iha tinan ida depois kuda no nafatin husik sira-ne'e ho tamañu ne'ebé hanesan liuhosi tesi ai-sanak sira kada loron 30 to'o 45. 5. Nahe no inkorpora ai-tahan no ai-sanak ne'ebé tesi bá área ai-han inan no ai-han tempu badak hanesan adubu orgánika.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele uza área rai-lolon no minimiza efeitu erozaun rai no mantén rai nia bokur to'os ne'e.
Referénsia seluk	1) Livru orientasaun Tékniku Floresta, NDCF, MAP,2006 2) Informasaun Teknolojia Agro-florestál Kit (ATIK), DNER, 1992
Kontaktu hodi hetan informasaun	CARE Internasionál Fundasaun Halarae

Referénsia Agrikultura Rai-lolon no Agro-florestál - 7

Naran tékniku	**Kuda Ai Espésie Oioin**
Fatin ne'ebé tékniku ne'e introdús	Suku Talitu (Laulara)
Tinan introdusaun	1990
Rekursu informasaun	Komunidade sira iha Talitu

Sumáriu hosi Tékniku Kuda Ai Espésie Oioin

Item	Deskrisaun
Objetivu	Tékniku tradisionál ida-ne'e ho objetivu atu estabiliza produsaun no maximiza potensiál hosi produsaun ai-han iha to'os liuhosi diversifikasaun ai-han, utiliza espasu, loron no rai ho efetivu, no prevene erozaun rai.
Atividade prinsipál	a. Determina kombinasaun ai no ai-han. b. Prokura materiál hosi ai no ai-han sira ne'ebé sei kuda. c. Kuda fini/ai-oan hosi ai no ai-han sira.
Prosedimentu	1. Determina kombinasaun ai no ai-han ne'ebé apropriadu ba área nia kondisaun. Kombinasaun tuirmai bele hetan iha Timor-Leste. - Ai-mahon + kafé + *cengkeh* + pimenta - Ai-mahon + kafé + pimenta - Ai-mahon + kafé + Ai-lia/fehuk - Hudi + ai-farina + batar + fehuk Iha nasaun Ázia sira seluk, Iha kombinasaun seluk ne'ebé hatudu rezultadu ne'ebé di'ak. Balu bele mós introdús iha Timor-Leste, hanesan: - Ai-fuan + ai-han rai-lolon (tinan primeiru) - Ai-fuan + ai-nanas + ai-lia + fehuk - Ai-mahon + kafé + ai-nanas + ai-lia/fehuk 2. Prokura materiál ai no ai-han hosi kombinasaun ne'ebé atu kuda. 3. Kuda ai fini no ai-oan no ai-han iha tempu udan hamutuk ho batar, ai-farina, no koto, atu uza to'os ho másimu. Iha kasu kombinasaun kafé, kafé oan di'ak liu kuda iha tinan segundu ka terseiru, bainhira ai-mahon dezenvolve ona.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele asegura produsaun to'os nian no rendimentu hosi sira-nia to'os. b. Komunidade lokál sira bele prodús ai-han ho maneira ne'ebé sustentável
Referénsia seluk	1) Livru matadalan Permakultura Timor-Leste,PERMATIL,2005 2) Informasaun Teknolojia Agro-florestál Kit (ATIK), DNER, 1992
Kontaktu hodi hetan informasaun	Permatil Fundasaun Halarae

2.6 Jerasaun Rendimentu no Dezenvolvimentu Vida Moris

Tékniku jerasaun rendimentu no dezenvolvimentu vida moris mak hanesan tékniku importante ida ba jestaun rekursu naturál bazeia ba komunidade, tanba ida-ne'e bele diretamente kontribui hodi hadi'a vida moris komunidade lokál sira nian, ne'ebé mak signifikativu depende ba floresta no rekursu naturál sira iha sira-nia moris. Dezeñu ne'ebé di'ak bazeia ba rekursu hodi kria jerasaun rendimentu/dezenvolvimentu vida moris, la'ós de'it hakmaan presaun ba floresta hosi ema, maibé mós dezenvolve mekanizmu ida hodi fó korajen komunidade lokál sira, atu proteje no maneja rekursu naturál sira, ho maneira ne'ebé sustentável hosi sira-nia inisiativa rasik.

Utilizasaun rekursu sira no matenek ne'ebé disponivel iha sira nia lokalidade mak xave ida ba dezenvolvimentu vida moris ne'ebé adaptavel no sustentável. Importante mós atu utiliza pratika no matenek ne'ebé diak ne'ebé aprova ona efetivu, hodi hadi'a komunidade lokál sira-nia vida moris iha área rai-lolon/foho iha Timor-Leste.

Ho kondisaun naturál no sosiál hosi mota-ninin tarjetu, ne'ebé mak klarifika hosi estudu bacias hidrograficas JICA ne'ebé mak hala'o[1], no PRA ne'ebé hala'o hosi projetu, no esperiénsia ne'ebé organizasaun internasionál no nasionál hetan iha Timor-Leste, opsaun dezenvolvimentu vida moris ualu (8) tuirmai mak bele aplika ba mota-ninin tarjetu no efetivu hodi hadi'a vida moris komunidade lokál tuir kuadru servisu CB-NRM.

Opsaun IG/LD	Tipu opsaun	Liña jerál opsaun
1. Purifikasaun bani been	Utilizasaun rekursu naturál	Ida-ne'e atu prodús bani been ho kualidade liuhosi purifika no esteriliza bani-been ne'ebé kolleita iha floresta no plantasaun kafé sira.
2. Batatiñas fehuk midar	Utilizasaun rekursu naturál	Ida-ne'e atu introdús tékniku atu prodús ai-han ne'ebé prosesu atu aumenta ninia valór uza fehuk midar, ne'ebé hanesan ai-han ne'ebé baibain ema kuda iha área rai-lolon/foho.
3. Fehuk midar maran	Utilizasaun rekursu naturál	Ida-ne'e mós ho objetivu atu introdús tékniku ba produsaun produtu prosesa ne'ebé dura kleur (fehuk midar maran) ne'ebé feto lokál sira bele prodús uza fehuk midar.
4. Halo xá *herbal*	Utilizasaun matenek rai-na'in/lokál	Komunidade sira iha área produsaun kafé, liuliu iha munisipiu Maubisse ne'ebé toman ona hemu xá tradisionál ne'ebé halo hosi abakate no kafé tahan. ONG ida modifika ona tékniku ne'e no susesu prodús xá *herbal* hodi fa'an.
5. Halo modo masin	Utilizasaun matenek rai-na'in/lokál	Modo masin mak tékniku ida-ne'ebé barak liu prátika iha nasaun hodi prezerva modo. Modifikasaun uitoan introdús iha sesaun ne'e hodi bele rai/prezerva modo masin ne'e ho tempu ne'ebé kleur liután.
6. Halo Tais	Utilizasaun matenek rai-na'in/lokál	Tais, hanesan hena tradisionál Timor-Leste nian mak produtu ida-ne'ebé potensiál, ne'ebé bele fa'an iha merkadu lokál sira no Dili.
7. Suku	Seluk-seluk	Halo roupa mak hanesan atividade ida-ne'ebé feto lokál sira iha área remota hakarak atu aprende, tanba ida-ne'e bele hatán ba sira-nia nesesidade no halo sira poupa osan.
8. Hadi'a fogaun te'in nian	Seluk-seluk	Hadi'a fogaun te'in nian promove tiha ona hosi organizasaun nasionál no internasionál atu redús konsumu ai-maran no mós moras respiratóriu ne'ebé kauza hosi ahi-suar.

Referénsia Promove Vida Moris - 1

Naran tékniku	**Purifikasaun Bani been**
Fatin tékniku ne'e introdús	Suku Hatucade
Tinan introdusaun	2009-2015
Rekursu informasaun	PARCIC

Sumáriu hosi Tékniku Purifikasaun Bani been

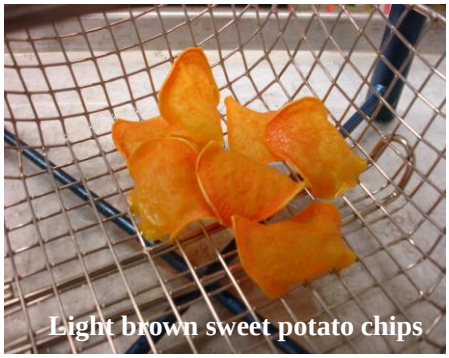
Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál sira atu prodús bani been ho kualidade ne'ebé dura ba tempu naruk hosi bani been matak ne'ebé kolleita iha floresta, hodi bele hetan rendimentu hosi bani been ne'ebé prosesa.
Atividade prinsipál	a. Fase no esteriliza sasán no materiál sira iha prosesu tau bani-been iha botir laran. b. Purifika no esteriliza bani been matak ne'ebé kolleita. c. Tau bani-been ne'ebé purifika ona ba botir.
Prosedimentu	A. Sanitasaun  **Hamoos no esteriliza ekipamentu** 1. Fase liman ho sabaun atu prevene kontaminasaun bakteria. 2. Tau aventál no taka-matan ne'ebé moos atu prevene mistura fo'er hosi li'ur hanesan fuuk no hena rohan ho bani been. 3. Fase botir sira, hanesan botir serveja mamuk, fase moos ho bee moos. 4. Hamanas ho bee-suar no esteriliza botir no sasán seluk ne'ebé uza B. Purifikasaun no esterilizasaun bani been 1. Tais bani been matak ne'ebé kolleita ho filtru *flannel* atu hasai fo'er sira hosi bani been matak. 2. Nono bee iha sanan boot. 3. Tau bani been ba sanan ki'ik. 4. Tau sanan ki'ik ho bani been iha laran ba sanan boot, depois hamanas sanan boot atu esteriliza bani been iha sanan ki'ik.  **Halo esterilizasaun bani ben ho bee manas**  **Tau iha botir** 5. Hasai fo'er iha leten hosi sanan ki'ik. Uza tékniku hamanas dala rua bele prevene bani hosi estraga, maibé hapara fermentasaun bani been. C. Tau ba Pakote no marka 1. Fui bani been ne'ebé esteriliza ona ba botir ne'ebé esteriliza ne'ebé esplika ona iha A.4 iha leten. 2. Taka botir uza taka-matan no ekipamentu ne'ebé uza atu taka ne'ebé esteriliza tiha ona. 3. Tau marka iha botir ho informasaun produtu, hanesan naran sasán, ingrediente, kuantidade, data manufatura, data prazu no naran ne'ebé produtór.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele prodús bani been ho kualidade dura tempu naruk ne'ebé bele fa'an iha merkadu. b. Komunidade lokál sira bele hetan rendimentu hosi rekursu naturál sira ne'ebé kolleita iha sira-nia lokalidade.

Item	Deskrisaun
Kontaktu hodi hetan informasaun	PARCIC Ekipa Projetu JICA

Referénsia Promove Vida Moris - 2

Naran tékniku	**Halo Batatiñas Fehuk-midar**
Fatin tékniku ne'e introdús	Suku Russlau Lita no Fadabloco
Tinan introdusaun	2009 to'o agora
Rekursu informasaun	PARCIC, USC Canada Timor-Leste/RAEBIA

Sumáriu hosi Tékniku Halo Batatiñas Fehuk-midar

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál hodi kria rendimentu liuhosi produs batatiñas fehuk-midar uza ekipamentu ne'ebé simples.
Atividade prinsipál	a. Koa fehuk-midar. b. Sona fehuk-midar no kahur temperu ba fehuk-midar. c. Falun batatiñas fehuk-midar no tau marka ba pakote
Prosedimentu	A. Koa fehuk midar 1. Fase fehuk-midar ho eskova iha bee atu hasai fo'er hosi fehuk-midar. 2. Koa sai parte ne'ebé mak fo'er. 3. Hasai fehuk nia kulit. 4. Laba fehuk-midar ho *slicer.* Mantén ninia mahar ne'ebé hanesan atu mantén kualidade. Sei difisil atu kontrola kualidade karik fehuk midar ne'ebé ko'a sira-nia mahar la hanesan. Kuandu batatiñas mahar liu, tempu ne'ebé uza ba sona mós sei kleur.  **Koa fehuk midar halo kripik**  **Sona kripik fehuk midar** B. Sona 1. Hamanas mina iha taxu. 2.Tau fehuk ne'ebé ko'a ona ba taxu manas. Labele tau barak dala ida, tanba temperatura hosi mina sei menus no afeta ba kualidade batatiñas (la *garing*/*krispi*) 3.Sona to'o ninia kór sai kór-kafé di'ak. 4.Tau no separa fehuk-midar iha bandeja, kahur ho temperu depois rai halo malirin. C. Pakote no Tau marka 1. Tetu fehuk sona. 2. Tau iha pakote. 3. Hametin pakote ho lilin 4. Tau marka ba pakote ho informasaun produtu, hanesan: naran produtu, ingrediente sira, kuantidade, data manufatura no data prazu produtu no naran produtór. Batatiñas di'ak liu tau iha pakote antes nia absorve umidade. Batatiñas frajil tebes, tenke halo ho kuidadu.  **Light brown sweet potato chips**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele produs ai-han prosesa ho aumenta ninia valór uza rekursu lokál ne'ebé disponivel. b. Komunidade lokál sira bele kria rendimentu hosi ai-han prosesa.
Kontaktu hodi hetan informasaun	PARCIC USC Canada Timor-Leste/RAEBIA

Referénsia Promove Vida Moris - 3

Naran tékniku	**Halo Fehuk-midar Maran**
Fatin tékniku ne'e introdús	Suku Madabeno no Fadabloco
Tinan introdusaun	2009-2012 to'o agora
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

Sumáriu hosi Tékniku Halo Fehuk-midar Maran

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál sira prezerva fehuk-midar liuhosi prosesa sai ai-han ne'ebé bele rai ba tempu naruk.
Atividade prinsipál	a. Fase fehuk-midar no hasai fo'er. b. Da'an ho bee-suar/kukus no laba fehuk-midar. c. Habai fehuk-midar ne'ebé laba ona iha bandeja/rede ba loron 2 (tipu semi-maran) ka semana ida (tipu maran). d. Tau fehuk-midar maran ba pakote no tau marka karik sei fa'an.
Prosedimentu	A. Fase no ko'a sai parte ne'ebé fo'er 1. Hili fehuk ne'ebé kabuar no di'ak. Importante tebes atu uza fehuk midar ne'ebé kualidade di'ak, tanba fehuk ne'ebé kualidade fó sabór/kualidade fehuk-midar maran. 2. Fase fehuk-midar didi'ak hodi hasai fo'er. 3. Hasai parte fo'er/aat iha fehuk-midar  **Fase ho di'ak** B. Da'an ho bee-suar no laba 1. Da'an fehuk-midar iha sanan to'o fehuk sira ne'e sai mamar. 2. Hasai fehuk-midar kulit ho liman bainhira sei manas hela. 3. Bainhira malirin ona, laba fehuk ho mahar 8-9cm.  **Da'an to'o kulit sai mamar** C. Habai maran 1. Nahe fehuk-midar ne'ebé laba ona iha fatin habai nian/*traveja*. 2. Habai fehuk iha loro-matan to'o sai maran. 3. Labele prodús fehuk-midar maran iha tempu udan. Fehuk-midar maran sei fasil loos atu dodok ka lahuk.  **Hamaran** D. Tau ba pakote no tau marka hodi fa'an 1. Hili fehuk-midar maran ne'ebé di'ak, haree ba fehuk nia modelu, kór no kondisaun maran. 2. Tetu ninia todan. 3. Tau fehuk-midar maran ba pakote. 4. Taka pakote nia tutun uza lilin. 5. Tau marka ba pakote ho informasaun hosi produtu.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele halo prosesa fehuk-midar maran ba produtu ne'ebé dura tempu naruk atu nune'e fehuk midar bele rai kleur. b. Komunidade lokál sira bele prodús produtu ai-han prosesa ne'ebé bele fa'an iha

Item	Deskrisaun
	merkadu.
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste / RAEBIA

Referénsia Promove Vida Moris - 4

Naran tékniku	**Halo Xá *Herbal***
Fatin tékniku ne'e introdús	Suku Ruslau, Lita, Fadabloco, no Hautoho
Tinan introdusaun	2009-2015
Rekursu informasaun	PARCIC

Sumáriu hosi Tékniku Halo Xá *Herbal*

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku mak atu fasilita komunidade lokál sira hodi kria rendimentu liuhosi produs xá *herbal* uza ai-tahan ne'ebé disponivel iha sira-nia lokalidade.
Atividade prinsipál	a. Kolleita, hili, hamoos, tesi du'ut tahan no/ka ai-tahan. b. Hamaran ai-tahan sira ne'e iha loron. c. Kontrola kualidade hosi ai-tahan, hili ne'ebé di'ak no tau ba pakote ho marka.
Prosedimentu	A. Kolleita, hamoos no tesi 1. Kolleita ai-tahan ne'ebé di'ak hosi ai no du'ut ne'ebé bele uza hodi halo xá *herbal* hanesan dareta, abakate no derok. 2. Hili tahan ne'ebé di'ak no hasai fo'er, ida-ne'ebé ular han, ai-tahan moras no tuan ho forma ladún di'ak. 3. Hamoos ai-tahan no fase hodi hasai fo'er, rai-henek no ular-oan. 4. Tesi ai-tahan sira no halo sira ba tamañu hanesan se karik nesesáriu .  **Hili no tesi**  **Hamaran iha loron, taka ho hena-metan** B. Halo maran 1. Tau ai-tahan iha rede iha bandeja leten. 2. Taka ai-tahan ho hena-metan hodi proteje hosi loron-manas direta atu prevene hosi lakon kór 3. Hamaran ai-tahan sira iha loron durante semana ida. 4. Rai rede iha fatin mahon durante kalan no bainhira udan. C. Kontrola kualidade, pakote no marka 1. Kontrola kualidade hosi ai-tahan ne'ebé hamaran, hosi kór, tamañu no ai-tahan nia maran. 2. Hasai ai-tahan ne'ebé ladi'ak hodi hetan padraun kualidade ba fa'an. 3. Tetu ai-tahan ne'ebé maran ona no tau sira ba pakote ki'ik 4. Taka/hametin pakote nia tutun uza lilin. 5. Tau marka ba pakote ho informasaun produtu, hanesan: produtu nia naran, ingrediente sira, kuantidade, data manufatura, nst.  **Padraun kualidade**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele produs xá *herbal* ne'ebé folin iha merkadu uza ai-tahan ne'ebé disponivel iha lokalidade. b. Komunidade lokál sira bele kria rendimentu hosi xá *herbal* ne'ebé prosesa.
Kontaktu hodi hetan informasaun	PARCIC USC Canada Timor-Leste/RAEBIA

Referénsia Promove Vida Moris -5

Naran tékniku	**Modo Masin**
Fatin tékniku ne'e introdús	Suku Manelima, Fadabloco, no Hautoho
Tinan introdusaun	2009-2014
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

Sumáriu hosi Tékniku Halo Modo Masin

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita komunidade lokál sira hodi prezerva modo ba tempu naruk uza tékniku tradisionál no iha posibilidade bele kria rendimentu hosi produtu refere.
Atividade importante	a. Fase no hamaran modo. b. Tau masin no budu. c. Falun modo iha pakote no tau marka ba pakote.
Prosedimentu	A. Fase no hamaran 1. Hili modo fresku. 2. Tesi sai ninia abut no hasai parte ne'ebé fo'er. 3. Fase modo didi'ak no hasai fo'er no ular-oan. 4. Hamaran modo ba loron ida atu redús konteúdu umidade iha modo-tahan.  **Hamaran ba loron ida** B. Tau masin 1. Prokura balde ida hodi rai. 2. Fui bee ba balde laran. 3. Tau masin ba bee no kahur didi'ak hodi disolve masin iha bee laran.  **kahur modo-tahan ho foos been** 4. Kahur foos been ho modo ne'ebé hamaran. 5. Hoban modo maran ne'ebé kahur ho foos been ba bee masin ba fulan 2-3. C. Tau ba Pakote no tau marka hodi fa'an 1. Foti no hasai modo hosi bee-masin. 2. Kumu maran modo, liu-liu hosi modo-tahan, 3.Hasai foos been hosi modo, liu-liu hosi modo-tahan. 4. Tetu modo masin. 5. Tau ba pakote no tau marka pakote ho informasaun hosi produtu, hanesan: naran produtu, ingrediente sira, kuantidade, data manufatura, data prazu, naran produtór.  **Modo masin**
Rezultadu ne'ebé hein	a. komunidade lokál sira bele produs hahán prezerva uza tékniku tradisionál no modo lokál ne'ebé disponivel iha fatin. b. Komunidade lokál sira bele prezerva produtu lokál (modo) ba períodu ne'ebé naruk. c. Komunidade lokál sira iha posibilidade atu kria rendimentu hosi modo-tahan ne'ebé prosesa.
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste/RAEBIA

Referénsia Promove Vida Moris -6

Naran tékniku	**Halo Tais**
Fatin tékniku ne'e introdús	Suku Uma kaduak, Batara, no Manelima
Tinan introdusaun	2008-2015
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

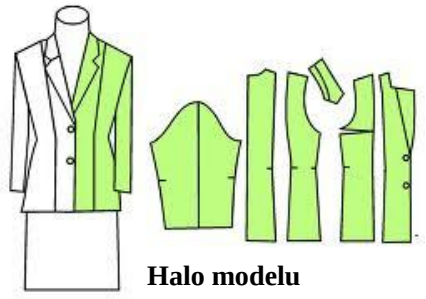
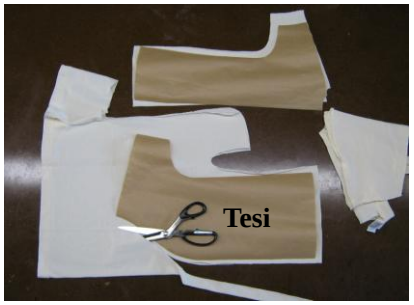
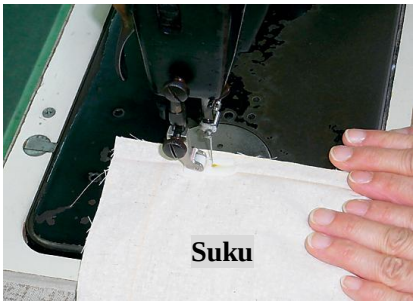
Sumáriu hosi Tékniku Halo Tais

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu fasilita feto lokál sira atu produs hena tradisionál ne'ebé bele fa'an iha merkadu hasa'e sira-nia tékniku tradisionál.
Atividade prinsipál	a. Prokura materiál sira (kabas). b. Kesi no tau kór ba kabas. c. Hadi'a kabas nia kór. d. Soru tais. e. Aumenta hodi remata bainhira presiza.
Prosedimentu	<u>A. Prokura material sira</u> 1. Dezeña modelu tais (se karik modelu tradisionál balu iha, bele aplika.) 2. Prokura no sosa kabas no kór. <u>B. Kesi kabas no tau kór</u> 1. Tau kór tuir modelu. 2. Uza materiál naturál ne'ebé disponivel iha lokalidade. 3. Kesi Kabas no tau fali kór. 4. Repete filafali atividade ne'ebé esplika iha B.3 tuir modelu. <u>C.Hadi'a kór</u> 1.Prokura no fornese tasi-been, ne'ebé bele ajuda hodi hadi'a kabas nia kór. 2. Hoban kabas iha tasi-been. 3. Hamaran kabas. 4. Bobar kabas hodi soru. <u>D. Homan ka Soru</u> 1. Monta kabas ne'ebé atu soru iha soru fatin. 2. Tutan kabas sira ho di'ak. 3. Baku hamutuk kabas ne'ebé bobar ho ai-soru nian. <u>E. Remata</u> 1. Bele aumenta tan hanesan halo fuuk-rohan bainhira remata karik nesesáriu.  **Mudo kór**  **Bobar kabas**  **Soru Tais**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele hasa'e tékniku tradisionál ba kualidade produtu (tais). b. Komunidade lokál sira bele hetan rendimentu hosi sira nia produtu.
Referénsia seluk	1) Relatóriu progresu (1), Jestaun Rekursu Naturál bazeia ba Komunidade, November 2011, JICA
Kontaktu hodi hetan informasaun	USC Canada Timor-Leste/RAEBIA Fundasaun Alola

Referénsia Promove Vida Moris -7

Naran tékniku	**Suku**
Fatin tékniku ne'e introdús	Suku Manelima, Fadabloco, Hautoho
Tinan introdusaun	2009-2012
Rekursu informasaun	USC Canada Timor-Leste/RAEBIA

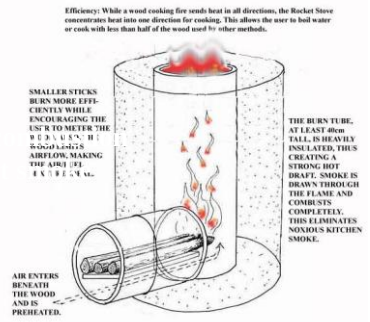
Sumáriu hosi Tékniku Suku

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku nee mak atu fasilita feto lokál sira atu suku roupa uza mákina suku no eventualmente kria rendimentu hosi halo ka hadi'a roupa.
Atividade prinsipál	a. Halo modelu ba roupa. b. Tesi hena. c. Sukat ho apropriadu tuir modelu no suku.
Prosedimentu	A. Halo modelu 1. Halo modelu roupa (ezemplu, vestidu ka aventál) 2. Riska tuir modelu iha hena leten uza jís.  **Halo modelu**  **Risku liña tuir modelu ne'ebe iha**  **Tesi** B. Tesi 1. Tesi hena konforme liña hosi modelu. C. Koko 1. Koko hena ne'ebé tesi ona, atu nune'e tuir medida kliente nian.  **Koko** D. Suku 1. Suku hena ne'e hodi prodús roupa.  **Suku**
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele suku roupa uza mákina suku. b. Komunidade lokál sira bele kria rendimentu hosi suku roupa.
Kontaktu hosi hetan informasaun	USC Canada Timor-Leste / RAEBIA

Referénsia Promove Vida Moris -8

Naran tékniku	**fogaun Ai-eruka Simples**
Fatin tékniku ne'e introdús	Suku Maubisse
Tinan introdusaun	2012
Rekursu informasaun	PARCIC

Sumáriu hosi Tékniku fogaun Ai-eruka simples

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu redús konsumu ai-maran.
Atividade prinsipál	a. Hola no fornese materiál sira hodi halo fogaun. b. Tesi no prosesu materiál sira. c. Halo fogaun ai-eruka no halo ajustamentu ba fatin sunu.
Prosedimentu	A. Provizaun ba materiál 1. Prokura no fornese, lata mina, no besi alumíniu belak ne'ebé sei uza hanesan fatin hodi sunu no fatin anin tama. 2. Kolleita no fornese ahi-kadesan ka kafé kulit ka ai-rahun ba insolasaun 3. Kolleita fatuk ka bloku no tahu-nurak ne'ebé sei uza hanesan fogaun nia baze. B. Serbisu ba kalén 1. Halo kuak sírkulu ida iha lata mina nia okos. 2. Halo fatin tuur iha lata mina nia leten. 3. Halo tubu ahi hosi besi alumíniu. 4. Halo kuak ba anin tama sai uza besi alumíniu. 5. Enxe ho ahi-kadesan entre lata mina nian no ahi fatin hanesan insolasaun ida. C. Instalasaun fogaun ai-eruka 1. Harii fogaun ai-eruka ho fatin anin tama iha okos ne'ebé halo hosi fatuk/bloku. 2. Reboka tahu-nurak hodi kaer metin fogaun ai-eruka no fatuk. 3. Habai fogaun ne'e ba oras 2.  **Estrutura hosi fogaun ai-eruka** **fogaun ai-eruka ne'e dezeñu hosi Sr. Mamoru Kuwabara.*
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele redús kuantidade ai-sunu ne'ebé uza ba te'in. b. Komunidade lokál sira bele redús insidente moras respiratóriu kauza hosi ahi-suar.
Kontaktu hodi hetan informasaun	PARCIC


Parte laran hosi fogaun ai-eruka


Anin tama


Lakan ho efisiente no la iha suar

2.7 Konservasaun Rai no Bee

Konservasaun rai no bee (KRB) mak tékniku importante ida ba jestaun rai no floresta ne'ebé sustentável, tanba dalabarak, erozaun mota-oan kauza estragu ne'ebé maka'as ba to'os, plantasaun kafé, floresta no komunidade sira-nia soin seluk, iha área rai-lolon no foho iha Timor-Leste.

Iha kontestu CB-NRM nian, konservasaun rai no bee di'ak liu foka ba protesaun to'os no plantasaun ne'ebé eziste tiha ona, liuhosi aplikasaun enjeñeiru eskala-ki'ik/obra estruturál, ne'ebé komunidade lokál sira bele halo tuir iha sira-nia to'os/área rasik, uza materiál lokál sira ne'ebé disponivel iha sira-nia lokalidade.

Sesaun ida-ne'e, introdús tékniku relevante kona-ba konservasaun rai no bee. Efetividade hosi tékniku ne'e prova no konfirmadu ona iha terrenu iha Timor-Leste.

1. Avaliasaun terrenu hosi erozaun mota-oan
2. Barrajen kontrola ai-metin (Brushwood check dam)
3. Barrajen kontrola fatuk (Loose stone check dam)

Hanesan nota, tékniku estruturál ne'ebé introdús iha sesaun ne'e, presiza kombina ho

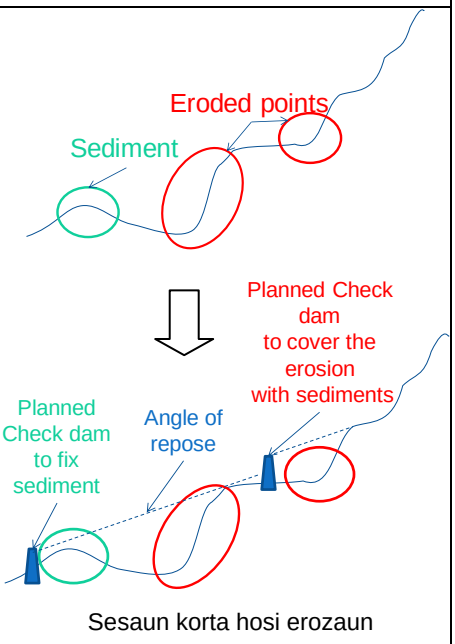
vejetasaun (ezemplu: reflorestasaun ho ai ne'ebé moris lalais no kuda du'ut iha tiras ne'ebé bele kaer rai) hodi minimiza risku hosi erozaun rai-leten no mota-oan iha área sira.

Referénsia Konservasaun Rai no Bee - 1

Naran tékniku	**Avaliasaun Terrenu hosi Erozaun Mota-oan**
Fatin tékniku ne'e introdús	Suku Faturasa (Postu administrativu Remexio, Munisipiu Aileu)
Tinan introdusaun	2008
Rekursu informasaun	Estudu Jestaun Bacias Hidrograficas Integradu Sustentável bazeia ba Komunidade iha Mota-ninin Laclo no Comoro

Sumáriu hosi Tékniku Avaliasaun Terrenu hosi Erozaun Mota-ki'ik

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu identifika fatin apropriadu hodi instala barrajen kontrola hodi prevene progresu erozaun mota-oan.
Atividade prinsipál	a. Identifika fatin apropriadu ba instalasaun barrajen kontrola. b. Determina tamañu adekuadu hosi barrajen kontrola.
Prosedimentu	1. Sukat medida hosi erozaun mota-oan (nia aas, luan no naruk). Se karik mota-oan nia aas liu husi metru 1, fatin ne'e la apropriadu ba instalasaun barrajen kontrola atu komunidade sira bele harii, konsidera kona-ba seguransa servisu komunidade sira-ne'ebé serbisu hodi harii barrajen kontrola ne'e. 2. Identifika parte rai ne'ebé hetan erozaun no fatin sedimentu nian. 3. Kalkula área nia ángulu/*sudut* nia baboot (ángulu hosi lolon ne'ebé estavel), ne'ebé tenke hanesan ho área sorin-sorin ne'ebé seidauk hetan erozaun. 4. Identifika fatin ba barrajen kontrola, ne'ebé barrajen ne'e bele i) hadi'a sedimentu ne'ebé butuk no/ka ii) redús erozaun no enxe parte ne'ebé hetan erozaun ho sedimentu hodi estabiliza sai hanesan. 5. Determina tipu barrajen kontrola hanesan matadalan tuirmai.
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele hili fatin ne'ebé apropriadu hodi harii barrajen kontrola no determina espesifikasaun barrajen kontrola.
Referénsia seluk	1) Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA
Kontaktu hodi hetan informasaun	Edifísiu Projetu JICA USC Canada Timor-Leste / RAEBIA



Sesaun korta hosi erozaun

Matadalan ba selesaun tipu barrajen kontrola

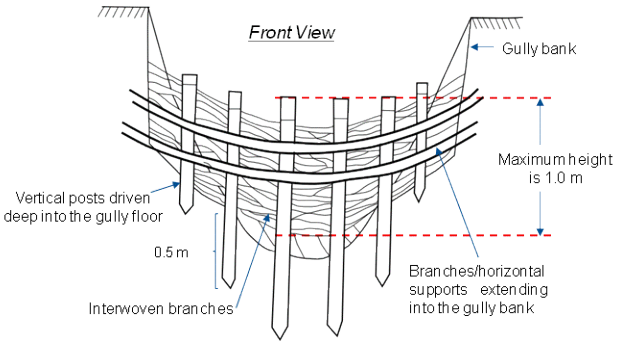
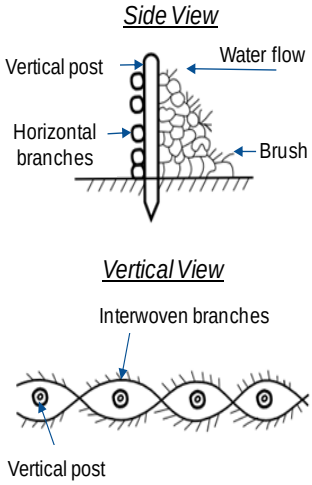
Tipu	Kondisaun ne'ebé bele aplika	Efetividade iha konservasaun rai	Dezvantajen
Barrajen kontrola ai-metin	– iha mota-oan ki'ik ulun – iha mota-oan ho sedimentu ne'ebé sufisiente iha laran	Bele kaer baluk-oan ne'ebé relativamente ki'ik	Estrutura ne'ebé temporáriu
Barrajen kontrola fatuk	– Iha fatin ne'ebé relativamente ho fundasaun ne'ebé metin	Bele redús velosidade bee ne'ebé suli maka'as no prevene progresu erozaun mota-oan	La apropriadu atu kontrola baluk-oan ki'ik

6. Determina dezeñu respetiva hosi tipu barrajen kontrola hanesan esplika iha referénsia konservasaun rai no bee-2 no 3.

Referénsia Konservasaun Rai no Bee - 2

Naran tékniku	**Barrajen Kontrola Ai-metin (*Brushwood Check Dam*)**
Fatin tékniku ne'e introdús	Suku Faturasa (Postu administrativu Remexio, Munisipiu Aileu)
Tinan introdusaun	2008
Rekursu informasaun	Estudu Jestaun Bacias Hidrograficas Integradu Sustentável bazeia ba Komunidade iha mota-ninin Laclo no Comoro

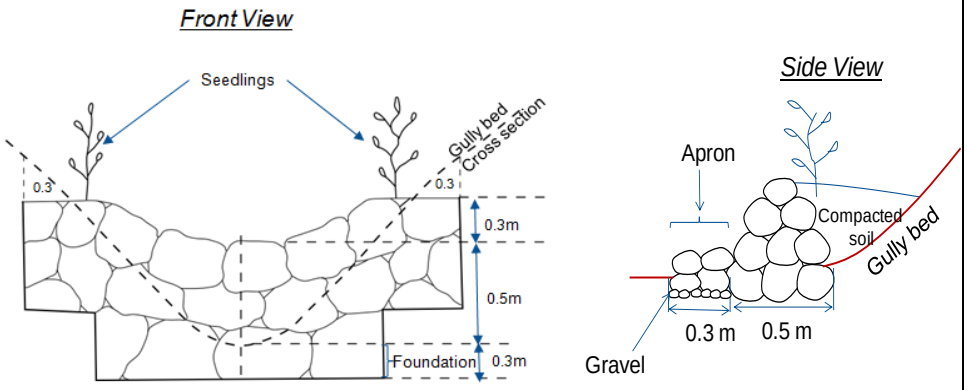
Sumáriu hosi Tékniku Barrajen Kontrola Ai-metin

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu harii no instala barrajen kontrola ai-metin iha mota-oan ho maneira ne'ebé apropriadu.
Atividade prinsipál	a. Kolleita materiál sira hodi harii barrajen kontrola. b. Hametin rai iha fatin ne'ebé barrajen kontrola ne'e sei harii. c. Harii barrajen kontrola. d. Halo kabubun rai iha barrajen kontrola nia kotuk (barrajen nia parte leten) hodi suporta estrutura.
Prosedimentu	1. Kolleita no prepara materiál sira ba barrajen kontrola, hanesan ai/ai-riin ba riin vertikál, ai-sanak sira hodi suporta orizontál, no au-fera ka ai-sanak hodi homan. 2. Hametin rai iha fatin ne'ebé barrajen kontrola ne'e sei harii. 3. Tidin ai-riin vertikál no hakoi maizumenus metru 0,5 ba rai okos. 4. Homan suporta orizontál iha ai-riin vertikál no kesi ninia rohan sira ba banku mota-oan pelumenus ho naruk metru 0,3. 5. Halo kabubun rai iha barrajen kontrola nia kotuk (barrajen nia parte leten) to'o barrajen kontrola nia ass/altura. 6. Repete filafali prosesu 2-5 hodi harii barrajen kontrola ai-metin iha fatin ne'ebé hili/identifika tuir prosedimentu ne'ebé esplika iha referénsia konservasaun rai no bee -1 iha sesaun ne'e. 7. Kuda du'ut/ai sira, hanesan du'ut elefante, *gamal* no *leucaena*, iha barrajen nia ninin sorin-sorin (hosi parte kraik no leten) no mós iha banku mota-oan ne'e hodi suporta barrajen kontrola sira-ne'e. 8. Kuda ai ne'ebé hanesan iha espasu entre barrajen kontrola, hanesan banku no mota-oan nia hun, se karik iha espasu rai efetivu ne'ebé sufisiente.   Tipikal Dezeñu hosi barrajen kontrola ai-metin
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele harii barrajen kontrola ai-metin iha mota-oan ho própriu hodi prevene progresu erozaun liután iha mota-oan.
Referénsia seluk	1. Relatóriu Finál, Estudu Jestaun Bacias Hidrograficas Integradu Bazeia ba Komunidade iha Mota-ninin Laclo no Comoro, Marsu 2009, JICA 2. Manual Terrenu ba Jestaun Bacias Hidrograficas FAO, 1986, FAO
Kontaktu hodi hetan informasaun	Edifísiu Projetu JICA USC Canada Timor-Leste / RAEBIA

Referénsia Konservasaun Rai no Bee - 3

Naran tékniku	**Barrajen Kontrola fatuk**
Fatin tékniku ne'e introdús	Suku Fadabloco (Postu administrativu Remexio, Munisipiu Aileu)
Tinan introdusaun	2012
Rekursu informasaun	Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade

Sumáriu hosi Tékniku Barrajen Kontrola Fatuk

Item	Deskrisaun
Objetivu	Objetivu prinsipál hosi tékniku ne'e mak atu harii no instala barrajen kontrola fatuk iha mota-oan ho maneira ne'ebé apropriadu.
Atividade prinsipál	a. Kolleita materiál sira hodi harii barrajen kontrola. b. Prepara barrajen kontrola nia baze. c. Harii barrajen kontrola nia estrutura inklui aventál. d. Halo kabubun rai iha barrajen kontrola nia kotuk (barrajen nia parte leten) hodi suporta estrutura.
Prosedimentu	1. Kolleita materiál lokál sira hodi harii barrajen kontrola. 2. Prepara espasu tetuk ho kle'an metru 0,3 no naruk metru 0,8 – 1 (tuir dadalak) ba fundasaun barrajen kontrola iha fatin ne'ebé barrajen kontrola ne'e sei harii. 3. Nahe fatuk hanesan fundasaun ba barrajen kontrola iha espasu tetuk no hada fatuk to'o altura metru 0,8 hosi mota-oan nia okos. Forma sesaun kruza hosi barrajen ne'e tenke kurva/*concavo* hanesan hatudu iha kraik. 4. Halo aventál ida hosi fatuk ka ai iha barrajen kontrola nia oin (parte barrajen kontrola nia kraik) hodi asegura barrajen kontrola nia estabilidade no prevene fundasaun/baze hosi bee ne'ebé bele lori. 5. Taka barrajen kontrola no aventál nia fundasaun ho rai no hametin rai-leten. 6. Enxe espasu iha barrajen kontrola nia kotuk ho rai to'o barrajen kontrola nia altura. 7. Repete filafali prosesu 2-6 hodi harii barrajen kontrola fatuk iha fatin ne'ebé hili/identifika tuir prosedimentu ne'ebé esplika iha referénsia konservasaun rai no bee -1 iha sesaun ne'e. 8. Kuda du'ut/ai, hanesan: du'ut elefante, *gamal* no l*eucaena*, iha barrajen nia ninin sorin-sorin (hosi parte kraik no leten) no mós be iha banku mota-oan ne'e hodi suporta barrajen kontrola sira-ne'e. 9. Kuda ai ne'ebé hanesan iha espasu entre barrajen kontrola, hanesan banku no mota ki'ik nia hun, se karik iha espasu rai efetivu ne'ebé sufisiente. 10. kuda iha fatin hanesan entre cek dam, hanesan banku no parte karaik, kuandu fatin nee nakonu ona ho rai. 
Rezultadu ne'ebé hein	a. Komunidade lokál sira bele harii barrajen kontrola fatuk iha mota-oan ho própriu hodi prevene progresu erozaun liután iha mota-oan.
Referénsia seluk	1) Relatóriu Anuál Finál (2012/2013), Projetu Jestaun Rekursu Naturál Sustentável Bazeia ba Komunidade iha República Demokrátika Timor-Leste, Marsu 2013,

Item	Deskrisaun
	2) Manual Terrenu ba Jestaun Bacias Hidrograficas FAO, 1986, FAO
Kontaktu hodi hetan informasaun	Edifísiu Projetu JICA USC Canada Timor-Leste / RAEBIA

Kapítulu 3 Referénsia Seluk

Referénsia no rekursu informasaun tuirmai bele fó persepsaun no indikasaun kle'an liután hodi estuda no buka hatene tópiku respetiva ne'ebé introdús hosi dokumentu ida-ne'e.

1. Partisipasaun komunidade

- Community Forest Management-Tools and Techniques, Asia Forest Network, 2002 http://www.mekonginfo.org/assets/midocs/0001655-environment-participatory-rural-appraisal-for-community-forest-management-tools-and-techniques.pdf
- Establishment and Maintenance of Farmers' Groups, Southeast Asian Network on Agricultural Extension (SEANAE), 2003 http://www.mekonginfo.org/assets/midocs/0001413-farming-establishment-and-maintenance-of-farmers-groups-fgs.pdf
- Facilitating participatory natural resource management-A toolkit for Caribbean managers, Caribbean Natural Resource Institute, 2011 http://www.canari.org/documents/CANARIPNRMTooklitFinalJan2012_003.pdf
- The Farmers' Participatory Evaluation (FPE) – A methodological guide to evaluate the effect and impact of technological development, PASOLAC and UNICAM, 2006 http://www.poverty-wellbeing.net/en/Home/Resources/document.php?itemID=10597&langID=1

2. Planu Utilizasaun Rai Partisipativu

- Participatory Land Use Planning (PLUP) in Rural Cambodia-Manual for Government Staff and Development Partner, Ministry of Land Management, Urban Planning and Construction, 2001 http://www.iapad.org/publications/ppgis/PLUP_in_Rural_Cambodia.pdf

3. Jestaun Floresta no Reflorestasaun

- Guide to Quality Seedlings in Smallholder Nurseries, V Australian Center for International Agricultural Research (ACIAR), 2010 http://www.rainforestation.ph/resources/pdf/howto/Gregorio_et_al_2010_Guide_to_Quality_Seedling_Production.PDF
- Good Nursery Practices, World Agroforestry Center, 2008 http://teca.fao.org/sites/default/files/technology_files/Good%20Nursery%20Practices.pdf
- Farmers' Tree Planting Manual – A Practical Guide from Seed to Tree, Department of Forestry and Wildlife, Ministry of Agriculture, Forestry and Fisheries, the Royal Government of Cambodia, DANIDA (Denmark's development cooperation), 2003 http://www.treeseedfa.org/tree_planting.htm
- Grower's guide for sandalwood plantation in Vanuatu, ACIAR, 2012 http://aciar.gov.au/files/node/14881/mn151_vanuatu_sandalwood_growers_guide_for_san_46020.pdf

4. Jestaun Agrikultura no Pekuária

- Composting in the tropics II, HDRA-the organic organization, 2001 http://www.infonet-biovision.org/res/res/files/497.Compost202.pdf
- Fertilizer and their use – A pocket guide for extension officers, FAO, 2000

http://www.fertilizer.org/ifacontent/download/5483/86528/version/2/

- Saving Your Own Vegetables – A Guide for Farmers, The World Vegetable Center, 2005
  http://203.64.245.61/web_docs/manuals/save-your-own-veg-seed.pdf
- Semi intensive systems (animal husbandry), FAO
  http://www.fao.org/docrep/S1250E/S1250E15.htm

5. Agrikultura Rai-lolon no Tékniku Agro-florestál

- How to farm your hilly land without losing your soil – The Sloping Agricultural Land Technology (SALT) Farming System, Asian Rural Life Development Foundation International, 2004
  http://c.ymcdn.com/sites/www.echocommunity.org/resource/collection/E66CDFDB-0A0D-4DDE-8AB1-74D9D8C3EDD4/SALT_1.pdf
- Sloping Agro-Livestock Technology (SALT-2) – Sustainable Agriculture Training Pac, Sommer Haven Ranch International, 1996
  http://www.sommerhaven.org/prac_app/sus_ag/t_pac_salt2.pdf
- Sustainable Agroforest Land Technology (SALT-3) – Sustainable Agriculture Training Pac, Sommer Haven Ranch International, 1996
  http://www.sommerhaven.org/prac_app/sus_ag/t_pac_salt3.pdf

6. Kria Rendimentu no Dezenvolvimentu Vida moris

- How to build a simple rocket stove, Ar Livre
  http://www.cato-projects.org/ArLivre/EN/RocketStove1.htm
- The National Bee Keeping Training and Extension Manual, The African Development Bank and Government of Uganda, 2012
  http://www.agriculture.go.ug/userfiles/National%20Bee%20keeping%20training%20and%20extension%20manual%202.pdf
- Income Generating Activities Training Modules for Pre-service and In-service Training – Facilitator's Manual, Peace Corps Center for Field Assistance and Applied Research, 2008
  http://www.google.tl/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&cad=rja&ved=0CCcQFjAA&url=http%3A%2F%2Fpctanzania.org%2Frepository%2FEnvironment%2FTech%2520Manual%2FIncome_Generation_Trg_manual_081.doc&ei=2BhMUuXMJIreyQGizoGIDQ&usg=AFQjCNHSqZNvXmesmuRiVus-e-b--IYFIw