CATHOLIC RELIEF SERVICES

Deforestation and Land Degradation Barrier Analysis Report

Catholic Relief Services, Timor-Leste

Australian Government

Climate Resilient by Nature

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Table of Contents

Abbreviations

ADD	Analyzing Drivers of Deforestation
AEW	Agriculture Extension Workers
BA	Barrier Analysis
BVD	Baucau and Viqueque Districts
CDB	Caritas Diocesana Baucau
CRS	Catholic Relief Services
DBC	Designing for Behavior Change
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
MAF	Ministry of Agriculture and Fisheries
M&E	Monitoring and Evaluation
QIVC	Quality Improvement and Verification Checklist (QIVC)
TL	Timor-Leste
TRACC	Transforming Rural lives through Adaption and Carbon Capture

A. Introduction

1. Catholic Relief Services (CRS) Timor-Leste (TL) is implementing a 12-month project called *Analyzing Drivers of Deforestation* (ADD) project, whose primary purpose is to conduct several Barrier Analysis (BA) studies to better understand the drivers of deforestation in Baucau and Viqueque districts (BVD). A secondary objective of the project is to produce six Barrier Analysis questionnaires that can be used to conduct BA studies in other countries. The ADD project, which was initiated in May 2022, includes the identification of behaviors, the development of BA questionnaires for up to six behaviors, data collection and analysis, and dissemination of the learning both in Timor-Leste and more broadly. CRS will use the results to inform the behavior change strategy of the ongoing *Transforming Rural Lives through Adaption and Carbon Capture* (TRACC) project as well as future projects. Caritas Diocesana Baucau (CDB) is the implementing partner for the TRACC project. The project also works closely with the Ministry of Agriculture and Fisheries (MAF) Agriculture Extension Workers (AEW).

   CRS identified a need to identify critical behaviors associated with deforestation in Timor-Leste and to identify barriers that prevent Timorese maize farmers from adopting the behaviors associated with reduced deforestation. The CRS team decided to use a BA approach because it produces actionable results in a short period of time and focuses on eliciting the opinions of Priority Group members.[1] A detailed description of the BA study and the Designing for Behavior Change (DBC) framework can be found in Annex 1.

Note that this report was prepared in February 2023 to inform CRS' ongoing agroforestry activities in Baucau and Viqueque Districts. However, there are findings from the BA Study that are applicable to other agroforestry and climate change projects across Timor Leste; therefore, CRS is also publishing and disseminating the report for external stakeholders, as a secondary audience. Readers who are not part of CRS may wish to focus most on sections B, C, D, and on Annex 1 and Annex 7.

B. Social and Behavior Change Strategy

1. As a first step in the process, the study team identified behaviors currently practiced by maize farmers and their families in the project area (BVD) that contribute to deforestation and soil degradation. Knowing these allowed the team to identify the beneficial behaviors (ones that would combat deforestation and soil degradation). Related to deforestation, the team identified cutting trees to build cook-fires among the main reasons for tree-cutting since most families cook over wood fires several times daily. Many families also cut trees to build/repair fences. Related to soil degradation, the project teams identified mono-culture, residue burning, lack of fertilizer use, and field abandonment as issues.

   The study team comprised a behavior change specialist consultant hired for the study and ADD and TRACC project staff from CRS TL. To finalize the behaviors for the study, the team in TL engaged in extensive dialogue and consulted CRS technical staff at the CRS regional and

[1] The Priority Group is comprised of the people who would practice the beneficial behavior(s).

headquarters levels. The consultant guided the team in the formulation of behavior statements (Priority Group + action verb + details). The team initially considered eight potential behaviors to study, but agreed this was too many to effectively analyze and act upon. Through ongoing consultation and finally a vote, the team narrowed the list down to the following six behaviors to study for the BA:

Behavior 1: Women cook over fires built with fast-growing wood (ipil-ipil, gamal and/or albizia sama[2]) daily. *This behavior can reduce the cutting of trees that are slow-growing.*

Behavior 2: People who want/need a fence, construct a live-fence of gamal &/or ipil-ipil trees (live fencing). *This behavior can reduce the cutting of trees that are slow-growing.*

Behavior 3: Maize farmers plant peanuts, cowpeas, soybeans, green gram/mung beans, lime beans, winged beans, or pigeon peas between rows of maize in the same growing season (intercropping). *This behavior can improve soil quality, thereby improving crop yield.*

Behavior 4: Maize farmers plant peanuts in the following season in the same field (crop rotation). *This behavior can reduce soil degradation by replacing nutrient removed by maize*.

Behavior 5: Maize farmers leave the residue on the field from one season to the next (don't burn). *This behavior can improve water retention & quality of soil, thereby improving crop yield.*

Behavior 6: Maize farmers spread organic material (mulch) such as maize and rice straw, grass, and leaves on their fields within three months of planting/between August and November. *This behavior can improve the quality of the soil.*

2. Following behavior selection, the consultant engaged in additional discussion with ADD staff for nuances to the behaviors and consideration of cultural context. The consultant then designed BA questionnaires in English per a standard format that is established in the Designing for Behavior Change methodology (see annex 1 for further information on the DBC Methodology). The ADD Project Manager then translated the questionnaires into Tetum,[3] referencing also a generic BA questionnaire in Tetum language used during a prior BA study in TL.
3. To prepare the team to implement the study, the consultant designed and facilitated three different orientation and training events. The first event was a brief online presentation (27 slides) with an introduction to the DBC framework and the BA study for CRS staff, including 15 CRS staff from headquarters and the CRS Asia regional office.

   The second training was conducted in-person, in Baucau, for 13 CRS/TL staff. This 6-hour course allowed the participants to engage more concretely with the different elements of the DBC framework but focused primarily on the 12 determinants of behavior change and the BA study process. The training was designed to enable the ADD team to feel confident in supervising the 20 interviewers who would be collecting data via structured individual interviews and overseeing the field work. Please refer to Annex 2 for the one-day course outline.

   Thirdly, twenty young Timorese men and women from the ADD project area participated in the 3-day course where they were trained in interviewing respondents (mostly maize farmers) and completing the BA questionnaires accurately. ADD staff also attended this course and provided ongoing English to Tetum language interpretation to all twenty trainees. The training focused on becoming familiar with the six BA questionnaires, learning and practicing interviewing

[2] glyricidia

[3] For CRS employees, the BA questionnaires can be found at: Final formatted BA questionnaire Tetum-English

techniques, and accurately recording the responses on the paper questionnaire. All attendees had had some previous experience interviewing community members and all were fluent Tetum speakers. Initially, a two-day training had been planned, but a third day was added to ensure that skills acquisition included a thorough understanding of the important nuances of the BA approach, such as the difference between "difficult" and "disadvantages" and the importance of probing for multiple responses for some questions. Furthermore, the training clarified everyone's understanding of the agriculture practices being studied (intercropping, crop rotation, mulching, etc.) and ensured that each interviewer could identify the three types of fast-growing trees inquired about in two of the questionnaires. Each trainee practiced administering all six questionnaires by way of mock interview, and each received guided feedback using a Quality Improvement and Verification Checklist (QIVC) from both a fellow trainee and a supervisor. Please see Annex 3 for the BA Interview QIVC and Annex 4 for the Course Outline.

4. For data collection, the team implemented two BA studies with the in-country support of the consultant, including help plan the field work and demonstrated the coding and tabulation process for the first study. ADD staff then took the lead in coding and tabulation for the second study with support from the consultant. Since the consultant was only in-country long enough to complete two studies, ADD staff used the initial two studies as learning opportunities to ensure they were sufficiently prepared to independently carry out the coding and tabulation for the final four BA studies.

   To decide in which communities each study would be conducted, the consultant and ADD Project Manager considered the communities in each of the two districts included in the ADD project. This list (see Annex 5) indicates the driving time from Baucau City, accessibility, and number of households. Each study day, two teams of interviewers visited two communities in Baucau District and two other teams visited two communities in Viqueque District. Each team consisted of five interviewers (men and women) and one supervisor (see Annex 6 for team make-up). The team ensured that no community was visited on consecutive days and no household was visited more than once, by tracking the neighborhoods visited by each team. This approach prevented study-fatigue among respondents and ensured that opinions were sought from the widest-possible section of the ADD project area.

   The team planned to dedicate one day to data collection followed by one day of coding and tabulation. Since October is field preparation season, the four teams departed Baucau at 6:00am to ensure a timely arrival before villagers departed for their fields. Most teams returned by mid-afternoon, after having interviewed a total of 90 respondents (45 Doers and 45 Non-doers or 4-5 interviews per interviewer per day). The coding and tabulation went smoothly and took approximately four hours each day. The ADD team quickly learned the process of coding, though sometimes the codes were not clear enough to be understood by people who were not privy to the discussion among the interviewers. Furthermore, a few of the responses that were coded were too general to be actionable (such as 'lacking knowledge' which does not specify which knowledge the respondent lacked). Overall, the ADD team demonstrated the ability to organize BA studies and to code and tabulate the data.

   The ADD team entered data into the BA excel spread sheet[4], which provided a preliminary automatic data analysis. This needed a next-step manual check follow-up analysis to correct for some data overlap (self-efficacy/access) and because some apparently significant results were found to be not actionable. Learning to analyze the results of BA studies is challenging and will require additional support if CRS TL wants to continue to conduct BA studies.

[4] The BA excel spread sheet is available here: https://docs.google.com/spreadsheets/d/1tHxWdYWrnQQ_PuN4bANWg_kuvu52EBqd/edit?usp=sharing&ouid=101822260208793560054&rtpof=true&sd=true

As stated above, the team conducted two studies -- regarding cook fires and live fences -- while the consultant was in country. ADD staff implemented the remaining four studies and shared the completed BA spreadsheets with the consultant who continued to provide remote support via clarifying questions and feedback, after which she completed the analysis.

5. The consultant used the BA study results to complete the six DBC frameworks, using the significant findings (those that are actionable) to write Bridges to Activities, as shown below and in Annex 7.

C. Significant Findings from the Barrier Analysis Study

When using the BA Analysis Doer/Non-doer methodology, it is the gap between the percentage points associated with individual responses given by type of respondent (Doers and Non-doers) that indicates whether a response is significant. A gap greater than 15 percentage points is considered significant: the greater the gap, the more significant the response. For example, if one response has a gap of 19 percentage points, and another response has a gap of 28 percentage points, while both are significant, the latter response is more significant and more likely to cause a change in behavior, if addressed, than the former response. When designing a behavior change strategy, if it is not feasible to address all significant findings (the ideal) then the most significant findings should be addressed.

That said, not all significant responses are *actionable*. For example, Non-doers may give a response that is significant, mentioning the benefit of a behavior, but they are not practicing the behavior. This indicates (an)other barrier(s) is/are preventing them from adopting the behavior, despite their knowledge of a benefit. Repeating the benefit is not going to make them change.

Bridges to Activities, the fourth column in the DBC framework, are based on the significant responses given by the Priority Group during the formative research. They are more specific descriptions of what should done to address the issue revealed by the research. A Bridge to Activity usually begins with a directional verb (e.g., increase, decrease, improve, reinforce) and often proposes to change the perception of the Priority Group. The purpose of the Bridges to Activities in the development of a behavior change strategy is to ensure the designer addresses the very specific reason that the Priority Group is not practicing the behavior, rather than jumping directly to designing behavior change activities.

The following tables show the significant responses for each behavior that are actionable along with their corresponding Bridges to Activities. The behavior change activities are discussed in section D and E of this report.

1. Behavior: Women cook over fires built with fast-growing wood (ipil-ipil, gamal and/or albizia sama[5]) daily.

[5] glyricidia

Determinants/ Significant Response	Ranking by gap	Bridges to Activities
Self-Efficacy/ Difficult/Access: Non-Doers say the supply of fast-growing wood is insufficient	19	Increase the availability of fast-growing wood.
Positive Consequences: Doers say, cooks fast/hot coals	23	Reinforce the perception that fires of fast-growing wood, cook foods faster because it makes hot coals
Social Norm: Non-doers say, in-laws disapprove	19	Increase the perception that in-laws approve of making cook fires from fast-growing wood/trees.
Action-Efficacy: Doers say building a fire from fast-growing trees will prevent deforestation	15	Reinforce the perception that cooking over fires made of fast-growing trees will help prevent deforestation.

2. Behavior: People who want/need a fence, construct a live-fence of gamal and/or ipil-ipil trees (live fencing).

Determinants	Ranking by gap	Bridges to Activities
Access: Non-Doers say it's very difficult to get ipil-ipil and ai-gamal trees to make a fence	18	Increase the availability of fast-growing trees (ipil-ipil and ai-gamal)

3. Maize farmers plant peanuts; cowpeas; soybeans; green gram/mung bean; lima beans; winged beans; or pigeon peas between the rows of maize in the same growing season (intercropping).

Determinants	Ranking by gap	Bridges to Activities
Self-efficacy/ difficult/ Access: Non-doers say it's too far to the place where seeds are sold	18	Increase the availability (closer) of (leguminous) seeds
Self-efficacy/ difficult/Cue for Action: Non-doers say they need knowledge[6]	21 17	- Increase the ability to plant crops between the rows of maize - Increase the ability to remember how to plant crops between the rows of maize

4. Behavior: Maize farmers plant peanuts in the following season in the same field. (crop rotation)

Determinants	Ranking by gap	Bridges to Activities

[6] This response is too vague to be immediately actionable. Further inquiry should be done to determine exactly what knowledge the farmers are lacking.

Self-Efficacy/Difficult: Doers say peanuts require double digging/heavy work	29	- Decrease the perception that peanut planting requires double- digging. OR - Increase the perception that planting peanuts is worth the effort
Self-Efficacy/Access: Non-doers say: Difficult to get peanut seeds.	27	Increase availability of peanut seeds.
Action Efficacy: Non-doers say they don't believe crop rotation improves soil quality.	18	Increase the perception that rotating crops improves soil quality.
Cue for Action: Non-doers say it's very difficult to remember to rotate crops	29	Increase the ability to remember to rotate crops.

5. Maize farmers leave the residue on the field from one season to the next. (don't burn)

Determinants	Ranking by gap	Bridges to Activities
Self-efficacy/easy: Doers say it requires less effort to leave the residue	36	Reinforce the perception that leaving the residue is less effort (than burning)
Self-efficacy/difficult: Non-doers say they don't know how to leave the residue (see Cue for Action)	52	Increase the ability to leave the residue of maize crops on the field
Pos. Consequences: Doers say maize yield will be better	20	Reinforce the perception that the yield will be better if the farmer leaves the residue on the field
Social Norms: Non-doers say that children would disapprove of leaving the residue on the field.	25	Increase the perception that children approve of leaving the residue.
Cue for Action: Non-doers say they can't remember how to dig the residue from the maize field into the soil before planting the next crop	26	Increase the ability to remember how to dig the residue into the soil before planting the next crop

6. Maize farmers spread organic material (mulch) such as maize and rice straw, grass, and leaves on all of their fields within three months of planting/between August and November.

Determinants	Ranking by gap	Bridges to Activities
Self-efficacy: Easy Doers say: no need to buy organic mulch	19	Increase the perception that organic mulch is available for free

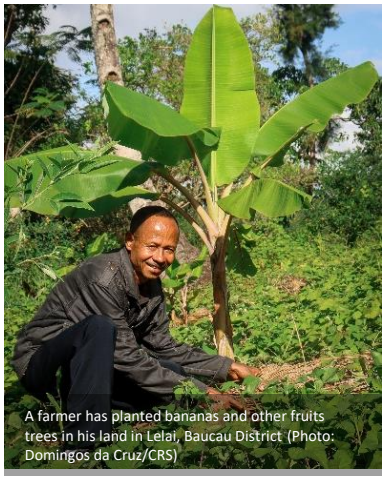
Determinants	Ranking by gap	Bridges to Activities
Self-efficacy: Difficult Non-doers say: not knowing how to use mulch[7]	64	Increase the ability to apply organic mulch
Self-efficacy: Difficult/Access Hard to get organic material	30	Increase the ability to get organic material to use as mulch
Positive Consequences – Doers say: organic material becomes fertilizer	23	Reinforce the perception that organic material is a good fertilizer
Positive Consequences – Doers say: mulch improves production of maize to sell at the market, to store for seed and to consume	28	Reinforce the perception that mulch improves maize production for sale, seeds, and consumption
Negative Consequences – Non-doers say: Mulch prevents maize from growing well esp. if gray grass and ipil-ipil is used	21	
Positive Consequences – Doers say: Applying mulch prevents grass from growing around the maize	17	Reinforce the perception that applying mulch prevents grass from growing in the field.
Cue for Action – Non-doers say it's hard to remember to apply mulch	18	Increase the ability to remember to apply mulch at the correct time
Cue for Action – Non-doers say Hard to remember *how* to apply mulch	17	Increase the ability to apply mulch correctly
Action Efficacy – Non-doers are not convinced that mulch will improve soil quality	24	Increase the perception that applying mulch each year will improve the quality of the soil

[7] Since this response is quite vague, it would be a good idea to conduct a few group discussions with maize farmers to more precisely understand exactly what they don't understand about mulch use. This will make the behavior change strategy more focused and effective.

D. Behavior Change Activity Description

Behavior change activities are tasks that program implementers plan, organize, and implement with the Priority and/or Influencing group to address a Bridge to Activity (increase/decrease the perception, remove a barrier, or enhance a motivator). The purpose of a behavior change activity is to remove a barrier or maximize a motivator, such that it is more likely that the Priority Group will adopt the desired behavior. When designing a behavior change strategy for a project with many behaviors (which is the norm), it is important that the activities:

- Reach enough people in the Priority Group (critical mass) with enough frequency (no less than once a month)
- Address as many of the Bridges to Activities as possible
- Minimize barriers while maximizing benefits
- Work together (use one Activity to address several Bridges)
- Fit the project budget
- Match the organization's skill set
- Fit The local context
- Be sustainable



A farmer has planted bananas and other fruits trees in his land in Lelai, Baucau District (Photo: Domingos da Cruz/CRS)

The behavior change activities suggested here rely almost entirely on the work of the MAF Agriculture Extension Workers (AEW). This is because they are the people already responsible for promoting beneficial agroforestry practices among farmers. They are already known and respected by the farmers and there is already a system in place to support them. However, that system may not provide the level or kind of support that is needed to reach the target farmers as frequently as is necessary. In this case, the project will need to determine what additional support MAF AEWs will need and plan to provide that support. Also, as part of the project's M&E plan this support and the outcomes related to it (improved skills of AEWs) should be monitored and evaluated. Improving the outreach skills of the AEWs working in the districts is a critical part of the project's sustainability plan and essential to the behavior change strategy.

Among the six behaviors, there are three different Priority Groups: 1) people who make cook fires (predominantly women); 2) people who want/need to make a fence, and 3) maize farmers. The third group is the target audience for four of the six behaviors and the TRACC project has already planned to work with 500 small landholding maize farmers (250 in Baucau District and 250 in Viqueque) through two distinct behavior change activities: sapling distribution and various training events. Training content is where many of the Bridges to Activities can be addressed.

CRS will distribute three types of saplings – fruit trees, 'energy'[8] trees (those adding nutrients to the soil) and 'protection' trees, which have large root systems and protect the soil against erosion. This activity will address the Bridge to Activity related to live fence construction – *increase access to fast-growing trees.* Over a period of two weeks in early December 2022, TRACC project staff trained 500 households how to plant tree saplings by demonstrating the planting process on their farms.

[8] ai-kafe and ai gamal (gliricidea sepium)

In addition to the tree distribution and one training per farmer, to ensure the survival of the saplings, the project should implement a follow-up system (aligned with the Monitoring and Evaluation plan) whereby each household/farmer receives at minimum monthly monitoring visits from the AEWs and/or training from CDB staff for at least six months. During follow-up visits, the AEW should record the trees' conditions, note sapling survival rate, provide advice to the farmer's family about how best to ensure the trees' survival and growth. There is on average 1 MAF AEW per suco/village and the project works in 10 suco/villages – translating into about 50 household visits per month or 2-3 visits per day, balanced with their other responsibilities. This would require adequate support. This means that each AEW will need to visit about 50 households per month.[9]

During follow-up visits, the AEWs should also promote the use of fast-growing trees to make the daily cook fires and to build live fences, incorporating the Bridges to Activities. TRACC project staff should train AEWs in conducting effective 'home visits' and 'negotiated behavior change' techniques as described in the *Make Me a Change Agent* manual[10] (Chapters 3 and 4). Since 'non-doers' identified their in-laws and children as influencers, to the extent possible, family members should be included during home visits. Project staff could work with families making fires and live-fences using fast-growing trees to develop testimonials highlighting the benefits of burning ai-kafe/ipil-ipil wood.

The timing for promoting the four agroforestry behaviors, all of which relate to field preparation (don't burn and mulching) or planting (crop rotation and intercropping), is not ideal for the TRACC project since Timorese farmers will have planted their fields by December/January, and the farmer trainings will have already been designed/implemented. In anticipation of the following planting season (November/December), however, to address the barriers associated with each of the four agroforestry behaviors, TRACC project team should develop[11] mini lessons which address the Bridges to Activities related to each behavior (don't burn, mulch, intercropping and/or crop rotation) and train MAF AEWs to 'deliver' these lessons during their follow-up visits with target farmers.

For example, if the AEW has seeds for leguminous crops on hand, some could be given to farmers interested in trying intercropping during the follow-up visits. (Bridge to Activity: *increase availability of seeds for leguminous crops*.) Or the AEW could advise farmers where to purchase seeds. For farmers interested in trying intercropping (or crop rotation) the AEW could help organize them into a purchasing group (cooperative) to negotiate with seed sellers for bulk purchases at better prices.

The AEWs can also be instrumental in addressing the barriers related to Cue for Action by reminding farmers when to do something (the correct timing) and how to do something (like dig the maize residue into the soil or spread mulch). This would require the MAF AEW to track which farmers want to try which behavior(s). TRACC MEAL team could support AEWs by developing such a tracking tool.

During household visits, the AEWs or project staff should identify which farmers are eager to adopt the recommended behaviors (early adopters) and/or those already practicing the beneficial behaviors. In the current project, these farmers can be used as 'influencers' to help other farmers understand the benefits (positive consequences) of each behavior (*reinforce the perception that mulch improves the quality of the soil, becomes fertilizer, results in improved maize yield*). For this approach to be effective each early-adopting farmer should be linked to farmers in their suco/village who are interested in trying the new practices. Project staff should encourage them to meet periodically to share their opinions and experiences related to leaving the residue and/or spreading mulch and/or intercropping and/or crop rotation. The project can consider additional strategies to make this approach more effective, such as teaching model farmers how to develop and

[9] Of course this expectation needs to be balanced with the other responsibilities of the AEWs.

[10] https://www.fsnnetwork.org/resource/make-me-change-agent-multisectoral-sbc-resource-community-workers-and-field-staff

[11] better to adapt lessons from existing manuals making sure that they address the Bridges to Activities

communicate a testimonial and facilitating cross visits to farms where the new behaviors have been put into practice (See *Make Me a Change Agent Manual* - Chapters 5 and 7).

In a follow-on project, these model farmers should be used more formally as AEW Assistants in the promotion of the beneficial behaviors among their neighbors.

To convey the benefits of specific behaviors, to the extent possible, project staff and AEWs should design *demonstrations* rather than just 'telling'; the 'seeing is believing' approach more often results in behavior change. For example, to demonstrate the effect on moisture retention from mulching or leaving the residue on the field, two small demonstration spaces could be created: one with unimproved soil and one with mulch/residue mixed in. To each plot an equal amount of water could be added and then the two spaces compared to see which one had retained more moisture. Something similar could be done (on a slope) to demonstrate the ability of mulch and residue to reduce water run-off/erosion on a field that is sloped.

CRS/TL can strengthen AEW skills in using creative learning techniques like these and others by referencing the *Make Me a Change Agent* manual and the GIZ[12] manual called *Agents of Agricultural Change.*[13] In preparation for a future project, CRS could translate the tools into Tetum for use in enhancing the behavior change skills of MAF AEWs and CDB staff. One demonstration area in each district could be developed and extension agents and model farmers could bring their farmer neighbors to see for themselves how the behaviors are practiced and the benefits they produce.

Finally, the consultant recommended that CRS/TL develop Quality Improvement and Verification Checklists (QIVC) for each of the critical behavior change activities of AEWs and model farmers to monitor the quality of activity implementation and make improvements where necessary based on observable data. Information about QIVCs can be found in the last chapter of the *Make Me a Change Agent* manual, previously referenced in this report. An example QIVC can be found in Annex 3.

A woman has planted a variety of fruit trees in her garden in Lelaia Village, Baucau District (Photo: Domingos da Cruz/CRS)

[12] Deutsche Gesellschaft fur Internationale Zusammenarbeit – a German NGO

[13] www.behaviourchange.net/document/274-agents-of-agricultural-change-strengthening-the-behaviour-change-skills-of-agricultural-extension-staff-and-volunteers

E. Behavior Change Strategy Summary/ Sequence

In order of implementation:

1. Translate Make Me a Change Agent Manual and Agents of Agricultural Change into Tetum; Share/Discuss with MAF/Caritas Baucau Leadership; secure buy-in to teach AEW these skills. (Consider training CRS/TL in these skills first.)
2. TRACC staff develop lessons for use with/by AEW that incorporate the Bridges to Activities (these are lessons that will be taught to AEWs for use with maize farmers and their families).
3. MEAL staff in consultation with TRACC staff, develop monitoring/behavior change support tools for use by AEWs.
4. With MAF and Caritas Baucau leadership, TRACC staff devise plan for AEWs to 1) monitor the newly planted trees; 2) promote beneficial behaviors among 500 targeted maize farmers and their families (for cook-fire and live-fence behaviors). The plan should anticipate each AEW visiting each target farmer/HH at least once a month and specify the content/topic of the visit.
5. TRACC staff train AEWs in promotional skills using the newly developed lessons as examples. Teach the skills by using the 'new' lessons. Train AEW to use the monitoring/support tools. Train AEWs in use of demonstrations for the beneficial behaviors.
6. Identify which target farmers want to adopt/continue the beneficial behaviors and form these into model farmer groups. Devise a plan whereby the model farmers assist/influence their target farmers on a regular basis. (This includes practice of cook-fire building and live fence construction.)
7. Train model farmers in promotional techniques, including effective home visits, negotiated behavior change, testimonials, cross visits, and demonstrations.
8. Develop Quality Improvement and Verification Checklists (QIVC) and use to monitor performance of AEWs and model farmers.

A farmer is planting sapling trees in the potential landslide area in Builale in Viqueque District (Photo: Domingos da Cruz/CRS)

Annexes

Annex 1: Descriptions of DBC framework and Barrier Analysis study

The Designing for Behavior Change (DBC) Framework

Two new tools are now available that will significantly strengthen the skills of aspiring behavior change strategy designers to move people from knowledge to practice. These are: The **Designing for Behavior Change** (DBC) **Framework** and the **Barrier Analysis** (BA) **Survey**. The DBC framework is a 6-part matrix that assists Behavior Change Agents to organize existing information and to gather new information needed to design more effective behavior change strategies.

The DBC framework requires the designer to reflect on different elements essential to behavior change. The first requirement is to state the behavior in clear and concise terms; identifying the group who should practice the behavior, the action that the behavior requires, and the specific aspects of the behavior that guarantee it will effectively address the problem. It sounds rather straight forward, but workshop participants often struggle to state the behaviors they seek to change. We are more comfortable with technical terms - like open defecation, good hygiene, conservation, Agriculture, and gender equity - than we are with stating the specific behaviors.

The second element involves describing the subject of the behavior change effort. At this juncture, we seek to define in detail who the people are and the context in which the behavior will be practiced and promoted. This reflection causes the designer to examine the life of the people needing to change and to identify when and where to reach them and in which stage of behavior change they are. Initiating the behavior change process at the stage of change of the *changee* – rather than the point where the behavior change Agent feels most comfortable – is efficient.

The key to the potency this behavior change approach is the research that is conducted as part of the third component of the DBC Framework. This element requires the designer to dialogue with the target audience via a short questionnaire to identify which of the twelve determinants of behavior change are key to changing the behavior. During the workshop, participants learn to do the research by conducting a Doer/Non-doer survey and analyzing the results. The results of the research narrow down the areas of intervention to those that are clearly the barriers to behavior change. This makes the behavior change strategy far stronger than those that are based on assumptions and conjecture.

To complete the DBC Framework, programmers are called to design or select behavior change activities that address the barriers to behavior change that were identified through the research. Not only is this approach more effective because it focuses on the few key factors that are most likely to bring about change, but also because it demonstrates a high level of respect for the subject of our behavior change efforts.

The DBC framework can be used to design behavior change strategies in any sector (health, nutrition, food security, water and sanitation, agriculture, natural resource management, civil society, and gender equity) and it can be used to promote change in service providers (health care providers, extension agents, water committee members) as well as among direct project participants (mothers, youth, farmers, herders, etc.).

The DBC Workshop takes five days and the combined DBC/BA workshop requires seven days with a maximum of 25 participants. Participants from different sectors can attend the course at the same time. As an added benefit, participants experience first-hand the *Dialogue Education* approach espoused by Global Learning Partners, which uses only hands-on, practical learning exercises.

Using the DBC framework to design behavior change strategies provides a greater assurance that the project objectives will be met and that project funds will be used most efficiently.

Designing for Behavior Change Framework

Behavior	Priority Group	Determinants	Bridges to Activities	Activities
To promote this behavior…	…among this audience…	…we will research these determinants… * These can only be determined by conducting research studies.	…and promote these bridges to activities (priority benefits and priority barriers)…	…by implementing these activities.
Outcome Indicator:				Process Indicators:

Barrier Analysis Study Description

A Food Security and Nutrition Network SBC Task Force Endorsed Method/Tool

Purpose:

- **Barrier Analysis**[14] is a rapid assessment tool that can help organizations identify why a promoted behavior has low coverage or has not been adopted at all. It is usually used at the beginning of a program to determine key messages, strategies, and activities for boosting behavior change in food security, child survival and other community development programs. It can also be used in an ongoing program to evaluate how to improve the promotion of specific behaviors that continue to show low adoption rates.

Evidence for efficacy of the Method / Tool:

- Barrier Analysis was designed by Food for the Hungry staff in 1990 using the scientific literature on behavior change. The main theories that support the method are the *Health Belief Model* and the *Theory of Reasoned Action*. Knowledge is not enough to change behavior. There are many different determinants of behaviors that should be explored when putting together a behavior change plan.

- "Powerful to Change Analysis"[15] was conducted by the CORE Group SBC Working Group in order to compare those projects that successfully boosted behavior change for different practices (e.g., exclusive breastfeeding, handwashing with soap) in comparison with those that did not. Those projects that showed the highest levels of behavior change used formative research tools like Barrier Analysis and Doer/Non-Doer Analysis.

- Barrier Analysis has generally been used to improve health, nutrition and hygiene practices at the household and community levels, working with health personnel, community health workers, mothers, and caretakers. However, the methodology has recently been updated based on determinants of agricultural and NRM practices, and the latest *Designing for Behavior Change* manual (available on the Food Security and Nutrition Network website) includes these modifications. Barrier Analysis should be useful for better understanding all types of behavior at the community level, including behaviors related to value chains. It has been applied in both developing and industrialized countries.

- Barrier Analysis is practical because it can be applied in a short time frame, does not require a lot of time or money, and produces enough information to design behavior change communication messages, strategies, and activities for food security, child survival and other types of programs. It is useful for use at the beginning of a project focusing on key practices most linked with impact, and later in a project focusing on other practices where widespread adoption has not occurred.

Details of Use:

- **Overview**: Barrier Analysis explores 12 behavioral determinants: perceived self-efficacy/skills, perceived social norms, perceived positive/negative consequences, access, perceived barriers/enablers, cues for action/reminders, perceived susceptibility, perceived severity, perceived divine will, culture, and policy. Ninety respondents are selected (45 "Doers" and 45 "Non-Doers" of the behavior) and asked a series of questions to identify which determinants are impeding them – or enabling them – to do the behavior. This comparison of people who do and do not do a behavior is very helpful to identify which of the determinants are the most important ones on which to focus during the behavior change plan. The tabulation table allows

[14] Davis, Thomas. Barrier Analysis Facilitator's Guide. http://barrieranalysis.fhi.net/annex/Barrier_Analysis_Facilitator_Guide.pdf

[15] For an example, see http://www.coregroup.org/storAGe/Social_Behavior_Change/EBF_Final_Report_and_Annex.pdf

the user to make statements such as "Doers of the behavior are 5.2 times more likely to say that their husband approves of the practice than Non-Doers." Project staff members then use these results to develop key activities and messages to make changes related to each determinant found to be important (e.g., to convince husbands to approve of the practice).

There are seven steps in conducting a Barrier Analysis Study:

1. Define the Goal, Behavior & Target Group
2. Develop the Behavior Question
3. Developing Questions About Determinants and Pretest Questionnaire
4. Organize the Data Collection
5. Collect Field Data for Barrier Analysis
6. Organize and Analyze the Results
7. Use the Results of Barrier Analysis

- **Usual Audiences**: Farmers and mothers of young children.
- **Level of skill needed:** The tool is meant for use by project management staff and community-level implementers. Past experience with social and behavior change programs is helpful, as well as skills in conducting interviews, developing questionnaires, and using MS Excel. Analysis is done manually with markers, paper, and a computer loaded with an Excel BA Tabulation Table (which can be downloaded[16]).
- **Time/staff required**: Barrier Analysis can be done quite rapidly by trained personnel. Training in Barrier Analysis is usually done as part of the 6.5 day *Designing for Behavior Change* training. If you have a team of 10 people available to carry out Barrier Analysis, the data collection for each behavior you study can usually be done in about 9-10 communities in 1-2 days (total). Tabulation of the data can usually be done in a single day. A larger group can generally analyze more behaviors in the same amount of time.
- **Common constraints/difficulties**: Sometimes it is difficult to find enough Doers (people currently doing the behavior) for certain behaviors. The facilitator in the process should be skilled in helping people to think of activities that focus on each determinant identified to be important. (Participants will often default to only focusing on new messages.)

Resources:

- **The Practical Guide to Conducting a Barrier Analysis** HKI, 2012 B. Kittle
- **Designing for Behavior Change for Agriculture, Natural Resource Management, Health, and Nutrition** (manual). Produced by TOPS, FSN Network, & CORE Group. October 2011.
- **Barrier Analysis Facilitator´s Guide**. Food for the Hungry. Reprint 2010. Download from here: http://barrieranalysis.fhi.net/annex/Barrier_Analysis_Facilitator_Guide.pdf.
  Please see this important preface to the second printing:
  www.caregroupinfo.org/docs/BA_Preface_to_Second_Printing.doc
- **Barrier Analysis Narrated Presentation**: http://caregroupinfo.org/vids/bavid/player.html

[16] The Excel file can be downloaded here: www.caregroupinfo.org/docs/BA_Tab_Table_Eng_9_30_10.xls. An instruction sheet for use of the BA Tabulation Table is available here: www.caregroupinfo.org/docs/BA_Analysis_Excel_Sheet_Tab_Sheet_Explanation_Sept_2010.doc

Annex 2: Outline of one-day BA training

Lesson #	Duration	Timeframe	Lesson Name
1	60 min	8:00 – 9:00	Opening Lesson
2	30 min	9:00 – 9:30	Intro to DBC Framework
3	45 min	9:30 – 10:45	Intro to Determinants of Behavior Change
4	60 min	11:00 – 12:00	Introduction to the Questionnaire
5	90 min	1:00 – 2:30	Learning to Interview the Doer/Non-Doer Way
6	90 min	2:45 – 4:15	Practice interviewing finalizing the questionnaires
7	45 min	4:15 – 5:00	Organizing the Field Work (Including Sampling)

Annex 3: QIVC for interviewing

Doer/Non-doer Interviews[17]

Observer: _____Interviewer _____

Instructions: With a copy of the questionnaire in hand, observe the interview and respond to questions 1 – 16. After the interview, review the completed questionnaire and respond to questions 17 – 21. Ask the interviewer how they thought they did. What they would do differently next time; what went well. Share your evaluation with the interviewer and discuss ways to improve.

#	Evaluation Questions	Yes	No
1	Did the interviewer have a friendly manner?		
2	Did the interviewer seek out a private place to sit?		
3	Did the interviewer seat the respondent with her/his back to any people?		
4	Did the interviewer complete all the demographic information correctly?		
5	Did the interviewer read the scripted introduction correctly?		
6	Did the interviewer get the respondent's consent before proceeding?		
7	Did the interviewer pose all of the Behavior Screening questions correctly?		
8	Did the interviewer pose the correct type of question to the respondent according to his/her classification (Doer/Non-doer)?		
9	Did the interviewer pose the questions exactly as they were written on the questionnaire?		
10	Did the interviewer follow the questionnaire instructions carefully; reading response options where necessary?		
11	For open-ended questions, did the interviewer strongly encourage the respondent to provide multiple responses?		
12	Did the interviewer ask the respondent to clarify any unclear responses?		
13	Did the interviewer keep track of the questions and record responses in the right places?		
14	Did the interviewer avoid reacting to the respondent's answers?		
15	Did the interviewer avoid leading the respondent to give any particular answer?		
16	Did the interviewer thank the respondent for her/his time?		
17	Did the interviewer write her/his name at the top of the questionnaire?		
18	Did the interviewer correctly classify the respondent as a Doer or Non-doer?		
19	Did the interviewer ask all of the questions and write responses for each question?		
20	Did the interviewer write responses in clear handwriting?		
21	Did the interviewer write down the responses in a complete and clear way so that anyone reading the questionnaire would understand the meaning?		

Number of Yes = _____

Number of No = _____

[17] Based on the QIVC approach developed by FH

Annex 4: Outline of interviewer training

Thursday, Oct 20, Lesson Outline

1. Introductions
2. Introduction to the DBC Framework
3. Introduction to BA Study
4. Introduction to the Twelve Determinants of Behavior Change
5. Examining the Questionnaires (Cook Fire and Live Fence)

Friday, Oct 21 Lesson Outline

1. Review Difficult vs Disadvantage definitions
2. Practice the introduction
3. Observe Handwashing Interview with exercises
4. Practice Classification for Live Fence
5. Examine photo of Live Fence and how to use it during an interview
6. Practice interviewing /completing the questionnaire
    a. Cook fire
    b. Live Fencing

Saturday, Oct 22, Lesson Outline

1. Review Definitions of Doers/Non-doers for all 4 remaining behaviors
2. Do classification Exercise for all 4 remaining behaviors
3. Spend the rest of the day practicing interviewing/completing the questionnaire on all 4 remaining behaviors
    a. Don’t burn
    b. Intercropping
    c. Crop rotation
    d. Mulching

Annex 5: List of Communities in ADD project

Baucau municipality					
Suco/Village	**Distance**	**Road Access**	**Language**	**Religion**	**Population**
Bualale (Quelicai Post Administrative)	1.5 hours' drive from Baucau	Accessible	Macassae & Tetum	Majority Catholic	438 HHs
Lacoliu (Quelicai Post Administrative)	1 hour' drive from Baucau	Accessible	Macassae & Tetum	Majority Catholic	284 HHs
Macalaco (Quelicai Post Administrative)	1.5 hours' drive from Baucau	Accessible	Macassae & Tetum	Majority Catholic	273 HHs
Lelalai (Quelicai Post Administrative)	1.5 hours' drive from Baucau	Accessible	Macassae & Tetum	Majority Catholic	185 HHs
Libagua (Laga Post Administrative)	45 minutes' drive from Baucau	Accessible	Macassae-*Laga* & Tetum	Majority Catholic	133 HHs
					1313 HH
Viqueque municipality					
Suco/Village	**Distance**	**Road Access**	**Language**	**Religion**	**Population**
Uaguia	1.5 hours' drive from Baucau	Accessible	Macassae-*Ossu* & Tetum	Majority Catholic	241 HHs
Fatudere	2 hours' drive from Baucau	Accessible	Macassae-*Uatulari* & Tetum- *Terik*,	Majority Catholic	130 HHs
Builo	2 hours' drive from Baucau	Accessible	Macassae-*Ossu* & Tetum	Majority Catholic	494 HHs
Builale	1 hours' drive from Baucau	Accessible	Macassae-*Ossu* & Tetum	Majority Catholic	222 HHs
Bibileo	2.5 hours' drive from Baucau	Accessible	Tetum-*Terik* & Tetum.	Majority Catholic	668 HHs
					1755 HH

Annex 6: Data Collection Teams and supervisors; Communities visited

Cook Fire and Live Fence Behaviors

Grupu 1	Grupu 2	Grupu 3	Grupu 4
21 interviews **10 – doers** **11 – non-doers**	24 interviews 12 – doers 12 – non-doers	21 interviews 11– doers 10 – non-doers	24 interviews 12 – doers 12 – non-doers
Monday – Cook Fire			
Baucau/Libagua (133)	Baucau/Lelalai (185)	VQQ/Fatudere (130)	VQQ/Builale (222)
Wed – Live Fence			
Baucau/Macalaco (273)	Baucau/Lacoliu (284)	VQQ/Builo (494)	VQQ/Uagia (74)
Jose	Joao	Edna/Adriana	Julio
Domingos	Rui	Juanita	Gaspar
Julieta	Justinho	Fernanda	Samuel
Lucia	Joao	Isildo	Joanita(Fonseca)
Leonora	Delicia	Ambrosia	Henriqueta
Honorio	Juliana	Martiniho	Maria

Intercropping 7/11	Crop Rotation 9/11	Don't Burn 12/11	Mulching 14/11
Baucau			
Bualelale (438 HH)	Lelalai (185 HH)	Macalaco (271 HH)	Bulalale (438 HH)
Macalaco (271 HH)	Lacoliu (284 HH)	Libaqua (133 HH)	Lacoliu (284 HH)
Viqueque			
Fatudere (130 HH)	Bilbieo (668 HH)	Uaguia (241 HH)	Fatudere (130 HH)
Builale (222 HH)	Builo (494 HH)	Builale (222 HH)	Biblieo (668 HH)

Go to different sub-village for each behavior

Annex 7: Behaviors Change Frameworks

Behaviors	Priority/Influencing Group	Determinants	Bridges to Activities	Activities
1. Women cook over fires built with fast-growing (Ipil-ipil, Gamal and Albizia sama) everyday.	1.Women/Mother and care givers. 2.Grandmother/Grandfather/ Husband. 3. Influencer people in community level such as head of village, head of sub village, AEWs, Forest guard, community police and Disaster Management Committee.	Self-Efficacy/Difficult/Access: Non-Doers say the supply of fast-growing wood is insufficient.	Increase the availability of fast-growing wood.	Promote planting of fast-growing woods/trees.
		Positive consequences: Doers say, cooks fast/hot coals.	Reinforce the perception that fires of fast-growing wood, cook foods faster because it makes hot coals.	Awareness raising on using fast-growing trees for firewood and use leaves for animal feeding.
		Social Norm: Non-doers say, in-laws disapprove.	Increase the perception that in-laws approve of making cook fires from fast-growing wood/trees.	Increase perception through information campaigns that communities approve the use of fast-growing trees for cooking fires.
		Action-Efficacy: Doers say building a fire from fast-growing trees will prevent deforestation.	Reinforce the perception that cooking over fires made of fast-growing trees will help prevent deforestation.	Community education sessions on the ways to prevent deforestation (i.e., plant fast growing trees, use tree branches for cooking fire). Connect project participants to vendors of efficient stoves and promote through cooking demonstrations.

Behaviors	Priority/Influencing Group	Determinants	Bridges to Activities	Activities
2. Behavior: People who want/need a fence, construct a live-fence of Gamal and/or ipil-ipil trees (live fencing).	1.Women/Mother and care givers. 2.Grandmother/Grandfather/ Husband. 3. Influencer people in community level such as head of village, head of sub village, AEWs, Forest guard, community police and Disaster Management Committee.	Access: Non-Doers say it's very difficult to get ipil-ipil and ai-gamal trees to make a fence.	Increase the availability of fast-growing trees (ipil-ipil and ai-gamal) .	Implement *"Tara-Bandu"* that prohibits cutting of slow growing trees and increased planting fast growing trees. Community awareness campaigns on the benefits of planting trees (fast growing or slow growing) for their livelihoods Establish community seedlings for farmers to plant in their fields.
3. Maize farmers plant peanuts; cowpeas; soybeans; green gram/mung bean; lime beans; winged beans; or pigeon peas between the rows of maize in the same growing season (intercropping).	1. Maize farmers (women & men). 2. Influencer people in the community level such Agriculture Extension Workers.	Self-efficacy/ difficult/ Access: Non-doers say it's too far to the place where seeds are sold.	Increase the availability (closer) of (leguminous) seeds.	Coordinate with seed vendors to outreach at aldeia (village) level to sell seeds during cultivation season. Awareness campaign on the benefits of intercropping. Promote legume seeds storages practices through demonstrations. Use multimedia to demonstration seed storage process. Promote seed saving during harvest season.
		Self-efficacy/ difficult/ Access: Non-doers say they need knowledge.	increase the ability to plant crops between the rows of maize. Increase the ability to remember how to plant crops between the rows of maize.	Provide training on intercropping of maize with legumes and emphasis on key messages of the benefit of maize intercropping with legumes. Establish a demo plot following the training with assistance and mentorship from extension workers from planting through harvesting.

Behaviors	Priority/Influencing Group	Determinants	Bridges to Activities	Activities
4. Behavior: Maize farmers plant peanuts in the following season in the same field. (crop rotation).	1. Maize farmers (women & men), 2. TRACC beneficiaries 3. Influencer people in the community level such Agriculture Extension Workers.	Self-efficacy/ difficult: Doers say peanuts require double digging/heavy work.	- Decrease the perception that peanut planting requires double- digging. OR	Provide training and develop simple guidelines on crop rotation (correct timing), organic mulching, and growing peanuts, targeted for extension workers and farmers. Provide training with a demonstration on harvesting practices, monitoring and leaving reside and drying, and rotating crops.
			Increase the perception that planting peanuts is worth the effort	
		Self-Efficacy/Access: Non-doers say: Difficult to get peanut seeds.	Increase availability of peanut seeds.	
		Action Efficacy: Non-doers say they don't believe crop rotation improves soil quality.	Increase the perception that rotating crops improves soil quality.	
		Cue for Action: Non-doers say it's very difficult to remember to rotate crops	Increase the ability to remember to rotate crops.	

Behaviors	Priority/Influencing Group	Determinants	Bridges to Activities	Activities
5. Maize farmers leave the residue on the field from one season to the next. (don't burn).	1. Maize farmers (women & men) 2. Influencer people in the community level such Agriculture Extension Workers and chefe suco & chefe aldeia.	Self-efficacy/easy: Doers say it requires less effort to leave the residue	Reinforce the perception that leaving the residue is less effort (than burning).	Promote use of residues for mulching (leave the residues around the plants). Use multimedia (video) to demonstrate on how to leave the residue on the field and the benefits.
		Self-efficacy/difficult: non-doers say they don't know how to leave the residue (see Cue for Action.	Increase the ability to leave the residue of maize crops on the field.	
		Pos. Consequences: Doers say maize yield will be better.	Reinforce the perception that the yield will be better if the farmer leaves the residue on the field.	
		Social Norms: Non-doers say that children would disapprove of leaving the residue on the field.	Increase the perception that children approve of leaving the residue.	
		Cue for Action: Non-doers say they can't remember how to dig the residue from the maize field into the soil before planting the next crop.	Increase the ability to remember how to dig the residue into the soil before planting the next crop.	

Behaviors	Priority/Influencing Group	Determinants	Bridges to Activities	Activities
6. Maize farmers spread organic material (mulch) such as maize and rice straw, grass, and leaves on all their fields within three months of planting/between August and November.	1. Maize farmers (women & men) 2. Influencer people in the community level such Agriculture Extension Workers and Head of village and sub village.	Self-efficacy /Easy: Doers say: no need to buy organic mulch.	Increase the perception that organic mulch is available for free.	Mobilize farmers to apply the techniques. Conduct training on household decision making on selection of type of seedlings and mulch. Conduct training on making fertilizer from organic materials. Information campaign on importance of land conservation and awareness of the benefits of using mulch each year.
		Self-efficacy /Difficult: Non-doers say: no knowing how to use mulch.	Increase the ability to apply organic mulch.	Provide training on using organic material for mulching.
		Self-efficacy /Difficult/Access: Non-doers say: hard to get organic material.	Increase the ability to get organic material to use as a mulch.	
		Positive Consequences – Doers say: organic material becomes fertilizer.	Reinforce the perception that organic material is a good fertilizer.	Awareness campaign of use of organic materials for fertilizer.