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Knowledge Pathways: The Introduction of New Food Security Technologies in Lautem, Timor-Leste

RESEARCH REPORT

Mayra Walsh, Carmenesa Moniz Noronha and Damian Grenfell

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Acknowledgments

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Cover Image: A family home in Porlamano, Lautem with water bottles in the backyard placed on black cloth and corrugated iron. This is the SODIS technology introduced to the community by Concern Worldwide. Lautem, February 2010.

Executive Summary

There are a multitude of development projects currently being undertaken throughout Timor-Leste that involve introducing new technologies to local communities. By 'new technologies' we are not only referring to technology such as machinery used for agriculture or computer equipment, but also sets of knowledge that are aimed at changing everyday practices, such as health, food preparation or business skills. This work is being carried out across all sectors and the success of these projects is often judged on levels of community participation or quantified data on the rate of up-take of technologies. In this context, this project seeks to understand three key points that impact on the successful implementation of projects that seek to introduce new technologies. How is information dispersed in local communities? Who is dispersing information in local communities? And why do people implement new technologies?

This research has been conducted in two *aldeia* communities in Lautem, the eastern most district of Timor-Leste. It was not commissioned by Concern as a project evaluation as such but rather a study on the patterns of information dispersal within local communities. In order to undertake this research, four different technologies from Concern Worldwide's OFFSET food security project were studied; solar water disinfection (SODIS), the vegetable solar dryer, silo storage containers, and organic compost fertilizer. There are several key findings that respond to the questions outlined above.

We found that there are a variety of patterns in terms of how knowledge is shared among community members, and that while most people learn through attending training sessions, there is also a definite process of information dispersal that is occurring post-training. As such, the training programs run by Concern in conjunction with their local associate partner organizations is the first point of reference in terms of how information is initially introduced into the community. After the training, however, the way in which information is dispersed by training participants and other community members is characterized by face-to-face exchanges between people during which the technologies are explained verbally and through the demonstration of the technologies in practice. Genealogy, or familial-connection, is important in this exchange of information, as are a range of other factors such as mobility. This transfer of knowledge occurs most commonly in informal settings, though there are also instances where more formal pre-arranged meetings are organized for members of local community groups. The places in which information sharing occurs are most frequently the domestic sphere and the garden or rice fields, a point which further emphasizes the informal nature of the knowledge pathways.

The implications of this for organizational project work are significant as organizations commonly frame activities in a highly structured and formalized way. If an organization wants to further strengthen patterns of information dispersal, especially post-training, then building on the characteristics outlined above would appear to assist in the success of such projects. This is especially the case where resources are limited in a post-conflict society. In this case, the work of local partner staff is vital as they are present in the communities both on a daily basis and over an extended period of time, and thus in effect become a regular part of the community (if they are not already). In addition to having locally based staff, it is important that staff be allowed a degree of flexibility in their style of work that may stretch beyond conventional or structured office procedures. While the initial training is important, in order to monitor, develop or support the knowledge sharing processes that occur post-training, staff should be able to spend time with community members in ways that are informal and irregular, such as in homes, fields and at social occasions.

In terms of understanding who receives and passes on information, and who the key actors in this process are, the findings show that information is most commonly dispersed between people who have a familial relationship. Firstly, this pattern shows that the community is relying on pre-

existing and very well established social structures and networks to share information about new technologies. This is important for organizations working in this area as it means that they do not have to put resources into drawing people into connection with one another, as may be required for instance in urban areas. However this also suggests a need for caution as there is a possibility that people may be isolated from the information dispersal process due to unseen (that is, unseen by NGO staff or people kept as relative outsiders to the community) family conflicts or because a family is more marginal in terms of local customary structures.

Finally, this research suggests that there has been significant community interest in, and implementation of, the four technologies focused on during this project. While in the case of the technologies considered here, the degree of uptake was most commonly determined by when the technology was first introduced (i.e.: the technologies introduced earlier had higher levels of uptake), there were also additional factors that impacted on why community members did or did not implement a new technology. For instance, findings show that old age was often a factor in why some people did not use a new technology. Gender did not appear to be a significant factor and we found that both men and women were engaged in the implementation of all four technologies. However, we found that certain tasks appeared to be determined by gender within the implementation and use of the technologies.

The relevance of the technology to people's daily lives was an important consideration for many, with people often citing a variety of reasons for uptake, such as the technology making things easier for them or helping them plan for the future. The degree of relative ease or difficulty involved in implementing the new technology was also a common theme that shaped people's decisions over whether or not to use it. The range of reasons as to why people implement technologies highlights the importance of pilot programs and in-depth community consultation in the initial stages of a project. Identifying technologies that are relevant, cost-effective, not too difficult to use and available to a range of community members across gender and age groups is vital for the success and long-term sustainability of a project.

Part One: Project Overview

Concern Worldwide began working in Timor-Leste in 1999, and since 2007 they have collaborated with local NGO and government partners to implement a food security project in the districts of Lautem and Manufahi. The project that is the focus of this study—Options For Food Security Transformation (OFFSET)—aims to introduce and promote new technologies designed to achieve food security through increased agricultural production and diversification, as well as improved food utilization, health and nutrition. A wide range of technologies have been introduced in both districts and the success of the project is strongly influenced by patterns of information dispersal. With the aim of improving the understanding of factors that impact new technology adoption at the local community level in Timor-Leste, this research was conducted in two *aldeia* communities, Ra'ano and Porlamano, both in Lautem district.

This research is underpinned by questions around the information dispersal that occurs in communities after a training program has been run and the reasons that underpin the levels of adoption of new technologies. Essentially, we want to understand *how* and *why* rural communities have adopted new technologies that have been promoted through Concern's food security program. There are three key project objectives:

1. To assess the uptake pathways for new technologies and determine the ways in which related information has been distributed within the communities, between actors involved, and the strengths and weaknesses of this process;

2. To ascertain the degree to which new technologies have been used/implemented by the community; and

3. To determine the sustainability of new technology adoption in the two study sites, and the key challenges in relation to the transfer of information that have limited the adoption of new technologies.

In order to respond to these three objectives, this report begins with the background of this research project, including a brief overview of the data-collection methods that were used, the different technologies under consideration and some information on the two research sites of Ra'ano and Porlamano. The first objective of this research, as outlined above, is addressed across the second and third parts of the report; the second part maps the information dispersal processes and practices occurring within communities while the third explores who is involved in dispersing the information. The second objective outlined above will be discussed in the fourth section of the report by focusing on the reasons why people implement new technologies and the degree to which the technologies are being used. The third objective will be handled differently, as the sustainability of the program in relation to information dispersal will be discussed throughout the entire report, and will also be included in the section on recommendations in the report's fifth and final section.

Field Research Methods

The field research for this report was conducted in Lautem from 16–25 February 2010. Over this period RMIT based researchers spent time in each community as well as with Concern staff at their Lospalos office. While the overall methodological approach framing the project is qualitative, the use of quantitative data generated from surveys is drawn into the analysis undertaken in this report. In total, five different methods were used to collect data during the

field research, including: semi-structured interviews, surveys, two different social mapping techniques, and participant observation.

A local staff member from ONE meets with members of the Porlamono community to tell them about the research project. Porlamono, Tutuala, February 2010.

Both short and long semi-structured interviews were conducted with a total of 19 research participants (nine in Ra'ano and ten in Porlamano). These interviews provided opportunities for community members to speak at length on a range of themes linked to their experiences and opinions regarding the introduction of new technologies. Research participants who were involved in semi-structured interviews included members of Concern's local associate partner organizations, community leaders, volunteer animators, as well as people living in both beneficiary households and households not involved in the project.

Community members sit together filling out the survey, aldeia Porlamano, Tutuala, February 2010.

In addition, a great deal of data was gained through a short survey which generated statistical data from the community regarding the use, impact and challenges associated with the uptake of new technologies. A total of 126 surveys were completed across the two communities, 56 in Ra'ano and 70 in Porlamano. Of that total 50.8 percent of survey participants were women and 49.2 percent men. The survey was completed by people in the community at the time of the research on a voluntary basis.

The survey was the most challenging method used during this research project due to the significant complexity involved with collecting responses regarding four very different technologies. In addition, and as is not uncommon in Timor-Leste and elsewhere, people often want to represent themselves and their community as positively as possible which can influence their responses to the survey questions. With this in mind, statistical results are treated in this report in relation to the broader social context in which they are derived and will be considered together with the responses provided through the more qualitative data collection methods.

Working together with local community members to draw a map of aldeia Ra'ano, Lautem, February 2010.

Two social mapping techniques were developed specifically to respond to the objectives of this project. The first uses a map of the aldeia, and through a semi-structured interview with an individual, the patterns of information dispersal and the actors involved are analysed. The second social mapping technique is designed to map the flow of information from the international NGO to the community. This map was produced in each aldeia during a group discussion facilitated by the research staff.

Conducting a semi-structured interview with a community member in aldeia Ra'ano, Lautem, February 2010.

The final method, participant observation, was a key method requiring extensive field notes and photographic documentation of the implementation of new technologies. This was supplemented

by many informal points of data-collection, especially as it is important to allow time to engage with people in a casual social context, allowing for people to speak more openly about their community, their experiences and their opinions on the use and uptake of new technologies.

Key Technologies

A variety of new technologies are being introduced as part of Concern's food security project in Lautem district. To promote increased agricultural production and diversification, the project has provided training on technologies including terrace rice fields, diversification of crops, production of pesticide from local materials, and seed selection and storage. As part of the nutrition and health focus of the more general OFFSET project, the introduction of technologies such as food processing, diet diversification and home gardens has occurred. For the purposes of this research there are four technologies that we focused on as guided by Concern's Lospalos-based staff: solar water disinfection (SODIS), vegetable solar dryer, silo storage containers and organic compost fertilizer. The technologies were chosen firstly because they have each been implemented in the two communities that are the focus of this research, and secondly because they are seen to have impacted in a range of ways on a broad range of community members.

The OFFSET project began in March 2007 with a pilot project which involved key leaders (animators) from a range of communities located throughout Lautem district. These leaders were brought together in *suco* Daudere where they went back and forth, staying five days a week for three months. Land in Daudere was used to train the leaders in some of the new agricultural technologies that Concern planned to introduce, thus Daudere was the initial training centre for this project. As Santos Viegas from Ra'ano describes, 'I first learnt about this in Daudere, I attended training in Daudere, that was in 2007. That was when I thought this is good for our people to see. … Then I tried it on my own rice fields so that the community could see.'[1] As Santos' comments suggest, once key leaders had completed the pilot program, it was expanded in 2008 with local associate partner organizations beginning to run community level training. Before this, Concern staff directly facilitated community level training activities.

Of the four technologies being focused on here, SODIS was the first to be formally introduced through training programs in April 2008.[2] These training sessions usually ran for half a day and were solely focused on SODIS. They continued to be conducted several times a year until the end of 2009 when the training program finished. However staff continued to monitor the use of SODIS by community members. Following this, in May 2008 training began on the production and use of organic compost fertilizer and the storage of rice and corn in silo containers. The introduction of these technologies was integrated into a larger agricultural training program, as such training sessions often covered several topics, sometimes over several days. The final technology, the vegetable solar dryer, was first introduced in Porlamano in September 2009 and in Ra'ano in November 2009.

Broadly speaking, there are three groups of people with differing levels of awareness in the community in terms of the use and understanding of these technologies. The first group includes people who had a high level of comprehension and sense of the importance of these technologies. These people had participated in the training sessions and a large majority of them are using the technologies in their daily lives, as well as sharing their skills with others. The second group includes people who have close connections or relationships with those who attended the training, such as a spouse, siblings, children, or immediate neighbours. Within this group there was a good general understanding of the application of the technologies, with SODIS

[1] Santos Viegas in interview with Santos Viegas and Maximus Maxi, Ra'ano, Lautem, 17 February 2010.
[2] The timeline of training programs included here is approximate as exact dates for all training conducted across the two communities to-date is not available.

and organic compost being the most commonly used. Finally, there was a group of people in both communities who had little or no awareness of Concern or their local partner's work, and minimal or no understanding of the technologies. In some cases this was because they lived far away from the centre of the *aldeia*, or because their main form of livelihood did not correspond with the topic being taught in the training.

Solar Water Disinfection (SODIS)

SODIS is a low-cost water disinfection and purification system that involves filling plastic bottles with water and placing them on black cloth that is spread out on top of galvanized iron. The bottles are then positioned in direct sunlight and the water is exposed to the sun for a minimum of six hours. This process purifies the water to a level that makes it safe for drinking. Initial supplies of plastic bottles (four one-litre bottles per beneficiary), black cloth and water containers (four-litre jerry cans) were provided for households who completed the training. Prior to the introduction of this technology, families would boil water on wood fires, and sometimes drank un-purified water straight from the water source.

A woman demonstrates the way she places bottles filled with water on black cloth in order to purify the water so it is safe to drink, Porlamano, February 2010.

Organic Compost Fertilizer

Organic compost fertilizer is being used by farmers in Ra'ano and Porlamano as an alternative to either purchasing chemical-based fertilizer or the more traditional method of using buffalo manure. Organic compost fertilizer is made entirely of natural materials, all of which are available in the local area. The production process involves collecting materials such as animal manure, dried leaves and left over food and drink. A hole is dug in the ground (a large bucket may also be used as an alternative) and the materials are all placed into it, covered over, and left for approximately two weeks. The mixture decomposes over this time, developing into a high quality fertilizer at no financial cost to the household.

A woman displays some materials she has collected to use in the production of organic compost for her garden, Porlamano, February 2010.

This home garden benefits from the use of compost to grow organic vegetables, Porlamano, February 2010.

Solar Dryer

The solar dryer is a simple wood-framed structure with sheets of plastic attached to the frame, creating a glass-house effect. This technology is used for preserving vegetables. After being briefly boiled in salted water, the vegetables are chopped up and submerged in cold water, until finally being placed inside the solar dryer out in the sun for approximately four hours. Through the use of this technology, users are able to dry out their vegetables and store them for long periods in plastic containers. When people require the vegetables, they cook it and it returns to its original size, providing a source of food during periods when food is scarce. Vegetables that can be dried out using the solar dryer include tomatoes, carrots, cabbage, spinach and onion among others. Prior to the introduction of this method, families would dry out vegetables by placing them on the roofs of their houses, but this was only done with a limited variety of vegetables and tended to be unhygienic.

A man shows the two parts of a solar dryer that when put together are used to dry out vegetables, Ra'ano, February 2010.

Ra'ano women drying vegetables (cabbages and tomatoes) on their solar dryer, 2010.

Silo Storage

Silo storage containers were distributed to communities for the long-term storage of rice or corn. The large tin containers have a capacity of three tonnes and are used by community groups rather than individual households. The grain that is stored is managed by the groups in a variety of ways. In some circumstances it is used as a food bank so that families in the community can borrow grain and repay it over time, while in other situations the grain is gradually sold at the market with the income generated used by the group. Many families continue to store surplus rice and corn in their homes using traditional hand-woven storage containers. However, rats, mice and insects can get into these and eat the produce. Some households also continue to store food in old petrol drums, many of which were purchased during the Indonesian occupation.

Two members of a women's group stand in front of the 3 tonne silo Concern provided, Porlamano, February 2010.

A silo used to store rice, Ra'ano, 2010.

Aldeia Ra'ano and Aldeia Porlamano

The two communities chosen for this research are Aldeia Ra'ano and Aldeia Porlamano. Both communities are situated in Lautem District which is at the eastern end of Timor-Leste. The Fataluku language is spoken in each aldeia and subsistence farming is the main form of livelihood for most people, with some fishing and small business activities complementing this.

Aldeia Ra'ano is a small community situated in Suco Serelau, sub-district Lautem, with a population of approximately 427 people in 83 households. The boundaries of the Ra'ano community are determined genealogically rather than by a fixed territorial border. Their houses are interspersed with households from the other two aldeia that make up Suco Serelau, with houses spread across a wide geographical area. In several cases, two families from separate aldeia were living in the one house. The terrain is varied, with one main road stretching the long seven kilometres from the flat area of Suco Serelau on the coastline, up into the steep mountainous section that is the geographical and social centre of the community. In terms of community demographics, taking just two common data points that could be considered as impacting on how information is dispersed, the s results show that 44.6 percent of survey

participants described themselves as illiterate, 21.4 percent as semi-literate, and 33.9 percent as literate. These high levels of self-designated illiteracy correspond approximately with the participants' levels of education, as 33.9 percent have never been to school while a further 32.1 percent had only completed primary school.

Aldeia Porlamano is much larger than Ra'ano, with a population of approximately 835 people in 192 households. The geographical layout of the community is also distinctly different. Situated in suco Mehara, sub-district Tutuala, Porlamano is located on flat land with clearly demarcated boundaries between the community and its two neighbouring aldeia. Houses in Porlamano have electricity in the evenings as the area has recently been linked into the Lospalos township's electricity grid. This accentuates the difference with Ra'ano where there is not yet any electrical energy infrastructure in place. According to survey results, residents of Porlamano have had better access to education and tend to be more literate than Ra'ano. Again to turn to literacy and education levels of survey participants, 78.6 percent described themselves as fully literate, with just 12.9 percent as semi-literate, and 8.6 percent illiterate. In terms of education, 24.3 per cent of survey participants attended some high school, and 25.7 percent completed a secondary education. There remains a high percentage of people who have only a primary school education (34.3 percent), and 12.9 percent have never attended school, meaning that there is a significant gap between levels of formal education and the self-designation of literacy that would require more investigation at a later date.

Two different local associate partner organizations work with Concern in these communities. In Ra'ano a local NGO called Fraterna is responsible for the daily implementation and monitoring of the project. Fraterna has a central office in Lospalos and works in several suco in sub-district Lautem. Fraterna's method of community engagement involves a staff member living in the community during the week and returning home on the weekend. As staff members do not originate from the beneficiary community, this extended time spent living in the community enables the development of close working relationships that would otherwise be difficult to establish and maintain. In Porlamano, the local associate partner organization is ONE (Okani Nita Eceremu in Fatuluku), and they work in a very different way. Their central office is based within aldeia Porlamano itself and largely works to run community development programs in suco Mehara, although they have recently expanded to sub-district Iliomar. All of the fifteen ONE staff are members of the suco Mehara community either by birth or through marriage and five of them work directly on the Concern funded project.

Part Two: Patterns of Information Dispersed in the Community

Over the last two and a half years, Concern has been introducing new technologies to the communities of Ra'ano and Porlamano in Lautem as part of the OFFSET food security project. In this section we will map out some of the main ways in which information is transferred from one person to another within those communities in relation to new technologies. There are two key information transferral points in these communities: the training sessions run by Concern staff together with their local associate partner organizations, and the sharing of information that goes on between training participants and other community members.

Community members in both Ra'ano and Porlamano spoke very positively of the training programs that have been conducted regularly in their community. During these programs participants are actively encouraged by trainers to share their new knowledge with other community members, and results show this encouragement is having an impact. This sentiment was reflected in survey results, as in question 12 people were asked 'did you share this information with others?' Representing a very high level of response, 84.1 percent of the total

respondents marked ‘yes’, and just 15.9 percent marked ‘no’ (in Ra’ano 76.8 percent marked ‘yes’ and 23.3 percent marked ‘no’, while in Porlamano 90 percent marked ‘yes’ and 10 percent marked ‘no’). Such a high response can be seen as important to the longer-term sustainability of a project for several reasons. Firstly it means that a wider number of people may employ a new technology than those specifically trained. Secondly, the retention of the new knowledge is better encouraged by ensuring that more people have access to it. For instance, if the knowledge was only carried by a few, then it increases the risk that the knowledge does not become a ‘natural practice’ in the community nor carried on over an extended period of time. The following four sections provide greater detail on the manner of the dispersal of information within the community, starting with the training programs run at both the suco and aldeia level which act as the initial entry point for new information in the community.

Training Programs

As is often the case in Timor-Leste, development projects that seek to initiate changes in community practice tend to begin with some kind of training program within a local community. In this instance, Concern Worldwide facilitated training within both communities, an important task as with limited mobility in the communities (as both access to transport and road conditions tend to be very poor) it means that, in general, training is taken to people rather than people travelling to participate in training. It is also an attempt to ensure participation by people who have responsibilities close to their home—for instance caring for children—and for those who have little time due to the demands of working in agricultural production.

The initial introduction of new information into Aldeia Ra’ano and Aldeia Porlamano has occurred in a similar way for each of the new technologies discussed in this report. Typically, a training session is held at a central location such as the ONE office in Porlamano or the former xefe-aldeia’s house in Ra’ano. The training is conducted in a mixture of Tetun and Fataluku and is most commonly organized by the local associate partner organizations which schedule the timing of the training, organise materials, provide food and drink, and invite community members to attend. Concern staff, together with their local associate partner’s staff, then conduct the training.

The teaching style used during training sessions is very hands-on and there is a strong focus on active participation by those receiving the training. This has often meant that the first stage of the training has been held at a central location within the aldeia, and then following that the participants go together to a plot of land to implement what they are learning. In addition to this initial two stage training, there are also follow-up training sessions on a smaller scale that involve local NGO staff visiting people’s homes or farming plots to do further demonstrations. The capacity of the local associate partner organizations to undertake this follow-up work varies greatly between Ra’ano and Porlamano. In Ra’ano where Fraterna work, there is one staff member who is responsible for three geographically spread out aldeia (that together make up suco Serelau). In comparison, households within Porlamano are easily accessible and while ONE are responsible for the three aldeia that make up suco Mehara, they have five staff (two full-time staff and three volunteers) who work together to implement the programs discussed here.

The ability of the local associate partner organizations to undertake follow-up visits has significant implications for the level of up-take and the long-term use of these technologies. While initial training is clearly important, as shall be described below, there are also many opportunities for teaching and sharing knowledge in informal settings. Therefore, if the local NGO is able to do regular follow-up visits, the likelihood of greater rates of technology up-take, and ongoing technology use, we assume would be higher.

Community members are invited to attend training programs by staff from local associate partners. This is important as in effect the staff make the decisions about who is invited to participate at this stage of the project. At the beginning of this project local NGO staff in both communities worked together with the xefe-aldeia to nominate 'volunteer animators'.[3] These are people who are asked to take up positions of responsibility around post-training information dispersal, and the management or maintenance of equipment. The training of participants always include the volunteer animators, and often also involve some other community members who have a specific reason to learn about this technology—such as farmers or a member of the local women's group and the current and former xefe-aldeia.

Commonly there are between 15 and 30 participants at any one training session, however there are records of as little as five people attending some. In terms of the four technologies focused on here, there has consistently been a mixture of men and women attending the training sessions. The training programs are based around specific technologies, for example: 'SODIS Training' or 'Compost and Pesticides Training'. In some cases trainings are initially run at the suco level, with only key leaders from each aldeia being invited to participate. Following this, the same training is run again at the aldeia level with a broader range of people attending.

The Oral and the Face-to-Face

After the initial training, information is dispersed in turn by those who have received the training to other members in the community. This research has found that information is overwhelmingly shared orally through face-to-face interaction between people. Other forms of communication that tend to be used in training in other circumstances—such as those involving written materials such as training manuals, written notes, electronic mediums such as PowerPoint programs, or information dispersal via electronic means such as web-based or telephone based communication—were all but absent. There was even very little evidence of communication carried by intermediaries, such as where one person carries a message or set of information from one person to another. Overwhelmingly, information was dispersed orally, spoken by those who had received training, in an embodied manner and at the face-to-face level, to others that had physical proximity to them on a day-day basis.

This characteristic of information dispersal was described by a volunteer, Rita, who worked as an animator in Porlamano and explained how after attending training her neighbours have often visited her house and asked her about what she has learnt.[4] While the act of visiting someone's house is a very normal day-to-day occurrence for people in Ra'ano and Porlamano, this simple description was repeated frequently in other interviews and casual conversations and showed how the informal patterns of oral communication were integral to the uptake of new technologies.

As in the example above, storytelling and conversation between people is a key method used to transfer knowledge. This was consistently the case across both research sites, despite the variation in levels of literacy. It is particularly interesting to note that in Porlamano, while the survey results show relatively high rates of self-designated literacy in the community, people still preferred to exchange information through oral means. While Concern have produced and distributed some educational posters that are often visibly displayed in people's homes, these were not mentioned during interviews when people were asked to describe the methods used when sharing knowledge.

[3] The word 'animator' has been used by Concern staff during the implementation of this project and is now a common term used by community members who have been in contact with the program. For more information on the role of the animators see the section titled 'Key Actors'.
[4] Interview with Rita da Costa, Porlamano, Lautem, 22 February 2010.

The importance given to forms of oral communication was reinforced through the survey results. According to Question 14, which asked 'how did you share information with others?' 55.1 percent of people responded by saying that they prefer to 'meet with people and talk' as a way of learning. In terms of responses, this was followed by the option of 'showing someone by way of example' with 37.4 percent (namely knowledge transferred through watching people actually implement the new technology). Both these patterns of information dispersal require face-to-face meetings between people. In fact all options chosen somehow indicated a need for embodied contact between people, while for instance no one chose the option that involved information dispersal via the use of a telephone. Together this demonstrates the importance of oral forms of communication which have the benefit of durability, contextualisation and authority in regards to new patterns of knowledge, especially where literacy remains relatively low.

While the oral transmission of knowledge is important in terms of providing context and opinion, and carries an authority when derived from experience, the description or explanation of a new technology on its own is more than likely not enough. As will be discussed later in this report, in communities where experience with new technologies have been more limited, trust is generated by viewing the actual application (both in terms of the output, for instance compost, and its secondary impact, for instance improved soils and harvesting). Hence, there may not be the same level of trust that new technologies will necessarily create a positive impact, or can even be undertaken, as may be the case in other communities with longer and deeper histories of technological innovation and change.

Formal and Informal Pathways

It is important to note that while the modes of communication tend to be characterised by embodiment and the oral, it was also clear that this occurred within both formal and less formal environments and that together both these methods provided important opportunities for information dispersal within the community. By formalised patterns of information dispersal we are referring to organised and planned attempts to redistribute information from those already trained in the community to those interested in learning. Interviews conducted during this research with people who are part of locally organized groups or co-operatives, such as the Kasihan women's group in Ra'ano, showed that these groups do organise using formal methods.[5] For instance, Joaquina da Almeida from the women's group in Porlamano explains here that after having attended a training session 'I go to each of their houses (group members) and I tell them that I have some information and if it's possible everyone should go to my house and then I will explain'.[6] This is described as a more formal process because the objective of the meeting is specifically to share information about the new technologies, and the gathering occurs at a pre-arranged location and time. Such patterns of information dispersal thus occur through existing pathways for knowledge transfer, in effect relying on established patterns of social integration that lift members out of the immediacy of the household.

The formal creation of information pathways through community organising, while important as a method, was marked by a lack of other examples. Other than this example for the Kasihan women's group, there was no mention during the field research across both communities of involvement by other pre-existing community groups such as the Catholic church. There was

[5] These community groups have been established by Concern and their local partner organizations in each aldeia. The groups work together on particular projects, such as setting up a co-operative to run a kiosk or other small livelihoods programs.
[6] Interview with Joaquina da Almeida, Porlamano, Lautem, 22 February 2010.

also no discussion of local leaders, such as the xefe-aldeia, organising ongoing meetings or support groups at their office or in other public spaces that were outside of the training sessions.

Given the close and regular social contact between people in these communities, it is very important to take into consideration the way in which knowledge of new technologies is passed on informally as part of broader social connections between people. For instance, many research participants described scenarios whereby they would visit their neighbours house and at some stage during the conversation would discuss SODIS or the vegetable solar dryer, or someone would be walking past their agricultural land-plot and would stop and ask some questions about the organic compost fertilizer they are using. In both interviews and discussions for this study, many people described scenarios where information was exchanged which were not pre-arranged or planned for. Rather, the information transferral was shaped by the broader social context of people's relations, meaning that learning about new technologies has occurred as a subsidiary part of other social activities rather than training and learning being the primary reason that frames the connections between people. Armindo da Costa, the former xefe-aldeia of Porlamano, described the way he goes about disseminating information after participating in a training session as follows:

> Our time to gather people together is limited and it's very difficult. So we just take opportunities like when we're gathered together because someone has died, while we're sitting together we tell stories. If there is a party and all the work is done we chat, we sit together and drink and talk, then we talk about how we went to the training and what we learnt there.[7]

It is worth adding that an important characteristic in terms of knowledge transfer relies significantly on the informal demonstration of new technologies. This kind of 'indirect information dispersal', which occurs in an ad hoc manner, over an extended period of time, and in accordance with people's resources and levels of interest, is important enough to be factored into initial planning. Regina in Ra'ano, for example, explained this kind of knowledge transfer by explaining that 'I have never taught anyone. People just come and watch, and then they try it themselves.'[8] Similarly, in their final report following the second year of project implementation, Concern commented that 'learning from 2007 in piloting and trialling technologies showed the importance of strategic locations for demonstration plots/farm (considering the traffic flow and visibility)'.[9] According to Concern staff 'Hothouses'—where technologies are trialled in demonstration plots and gardens and subsequently scaled out to other communities—were part of the original design of OFFSET. The experiences of community members such as Regina would appear to confirm the importance of planning a new technology so that it will be implemented in a space that is highly visible, such as on key community pathways or close to places where households are concentrated.

Learning Spaces

As described previously in the section titled 'Training Programs', the sites used for conducting the formal training were either in the xefe-aldeia's house, the local associate partner organizations office or the site at which the technology is used, such as in the rice fields. While these places are the initial point of reference in terms of spaces for learning, in Ra'ano and Porlamano we found that after the training, information sharing and learning tended to occur primarily in or around the home or garden. This is partly due to pragmatic reasons as these are both the spaces where people spend a great deal of time due to familial commitments, and

[7] Interview with Armindo da Costa, Porlamano, Lautem, 21 February 2010.
[8] Informal discussion with Regina, documented in field research notes, Ra'ano, Lautem, February 2010.
[9] Concern Worldwide, Interim Narrative Report for OFFSET Project Year 2, 24 March 2009, and p.6.

because the four technologies surveyed here tend to be implemented near the home. There is a pattern of information exchange occurring in domestic or very familiar settings, which may extend as far as the site of an *adat* ceremony, rather than in more formal public spaces such as the local NGO's office or the suco centre (*sede suco*).

This pattern shows us that community members are often sharing information at the site where the technology is used. The use of space in this way may help people make a direct link between the new information or method of working and its direct application in their daily lives. Therefore the role of the post-training follow-up visits to people's homes is significant as it enables NGO staff to engage community members in a space that they are already using for the purpose of exchanging information.

It is interesting to note that the places where knowledge is shared are largely located within the local community. In other words, the geographical spread of information dispersal is not very wide. Most of the information is being dispersed within the aldeia and suco. When asked directly, many research participants said they do not have a problem with sharing information with people from neighbouring aldeia. However, we were unable to find someone who could give us an example of when this occurred, and during the mapping exercises it was very difficult to draw people into discussions around sharing information with people from other places such as neighbouring sub-districts or even Lospalos villa. When asked about sharing information beyond the immediate aldeia, the responses often gave a sense of indifference or confusion at the question.

In terms of understanding the limited reach of information dispersal, there could be any number of possible suggestions. Firstly, according to Concern, there has been no instance where animators reached out to villages other than theirs (which is usually facilitated by associate partners and Concern as part of the scaling out process). However, this only takes account of information sharing between those formally trained animators, and not the informal patterns of exchange that have otherwise been covered in this report. These could include all kinds of inter-community visitation, perhaps for celebrations, through marriage, trade or travel. Yet still in these instances there was little evidence of inter-community exchange of information on the new technologies. In addition to the fact that the programs tend to be geographically concentrated, there are other reasons that we could suggest here to its limited spread even by informal channels.

Firstly, information may be shared based on perceived need (i.e. only people who work in a garden will be told about organic compost). Secondly, often in subsistence agricultural communities, such as the two at the centre of this study, there is often a relatively low level of mobility. If and when people do move, it is often in concentrated lines between their homes and, for instance, schools, markets, homes of relatives or their own gardens. Hence, if people visit or move through other communities, it tends to be for very specific reasons and as such, there is limited reason for the informal transfer of knowledge. Thirdly, we see that the primary reason for concentrated and localised patterns of information exchange as a confirmation that communities are essentially seen in terms of closely connected familial relations rather than as people who live near one another irrespective of genealogical connection. Taken together, these three reasons show that knowledge, including the transfer of new knowledge, is overwhelmingly conveyed and given authority by close family members rather than people who may be more removed from the immediate community.

Part Three: Actors in information dispersal

Having identified some of the key characteristics of how information is dispersed, this section will now turn to look at who in the community in particular is sharing the information, and thus influencing the rate and character of technology uptake. There are three points that are considered in examining which actors are seen as important. Firstly, some of the factors that influence who comes to hold different forms of information in Ra'ano and Porlamano will be discussed. Secondly, the role of key people, or 'connectors', who assist in the dispersal of information are identified. Thirdly, some of the key gendered dimensions of information dispersal in both communities are considered.

Factors Impacting Information Dispersal

In terms of the quantitative data gathered, Question 11 in the survey asked respondents 'where (or from whom) did you first learn about this new technology?' The vast majority, 73 percent, said they attended training. This indicates a very high level of penetration in terms of the training *in comparison* to those who learnt about the new technologies *via* someone else who had attended training. Before we begin an analysis of these figures it is worth noting two limitations to such data.

Firstly, we need to caution that any study such as this will be limited as the data collection process is geared towards those who already have knowledge about a particular topic. Hence, a different type of study would be required to get a fuller sense of some of the reasons as to why some people do not a) have access to the information pathways, and b) take up the new technologies even though they have some basis of knowledge. For instance, to build a more comprehensive picture, we would need to work in communities where there were lower levels of uptake rather than concentrating more exclusively on the character of the uptake itself.

A second limitation to the study relates to the ways in which new knowledge is put to use and people develop their own experience with it, in this sense seeing what may be seen for a period as 'new technologies' gradually become treated as existing technologies. For instance, while 73 per cent of respondents showed that training was the primary way in which they learnt about the technologies, there is no way through this research to gauge the level to which follow up conversations and information dispersal reinforced, convinced, extended and deepened those things learnt in the training. For instance, people may have learnt something new at a training, but until that knowledge could be confirmed within the social context of the local community and within households, there may not have been the confidence to put it to use. So although the new technology is often initially learnt in training, if there were not others to share and clarify understandings with amid a community, it is possible that the uptake of the technology would be more limited.

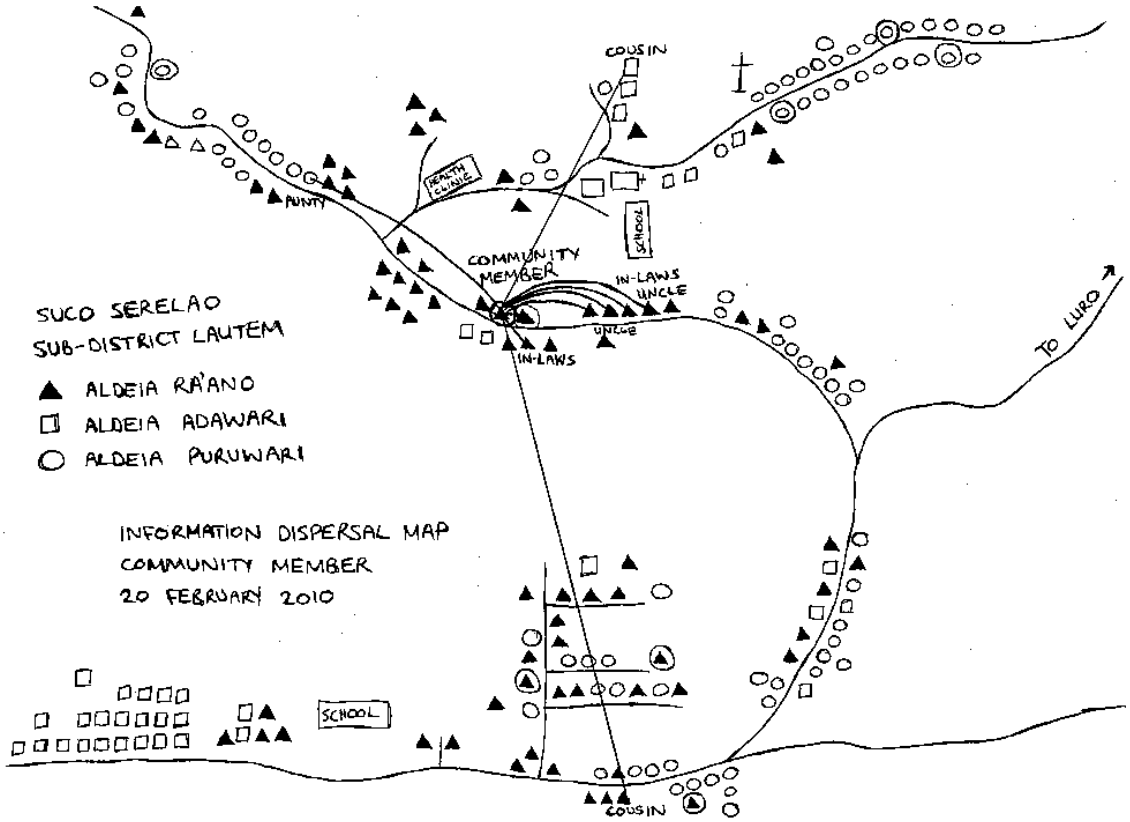
To return then to the question of the actors involved in dispersing information, and in particular the 73 per cent of respondents who identified training as being the primary source of their information, we do not have detailed demographic information about who actually attended the training. From what information we do have, it is possible to identify two important points.

Firstly, there appears to have been a good representation of women and men across the trainings. This is partly due to the different types of technologies focused on in this study, as the gendered breakdown of participants varies according to what was covered in the training. For example, at the most recent solar dryer training in Porlamano in January 2010 there were fourteen women and six men in attendance, while in May 2008 at a more agricultural focused training in the same community, there were fourteen men and two women.

Secondly, a number of people have attended more than one training session. This information was confirmed anecdotally by the local associate partner organisation's staff, and can be seen in a map that was produced in each community where the houses of training participants are marked according to which training they have attended (see appendices). While most houses are marked as having attended training on just one technology, through these maps we can see that in Ra'ano there are three people's homes identified who have attended training about all four technologies, and several more who have attended training for three different technologies. In Porlamano, while there are no households who have attended training on all four technologies, there are still many who have participated in training on more than one technology. This finding is reinforced by the results from Question 7 of the survey that asks 'which other technologies do you know about?' In response to this question 74.6 percent of survey participants marked one or several of the technologies listed. While this statistic does not confirm how many people have attended more than one training, it does point to a pattern whereby once a person knows about one technology, it is highly likely they will also learn about others.

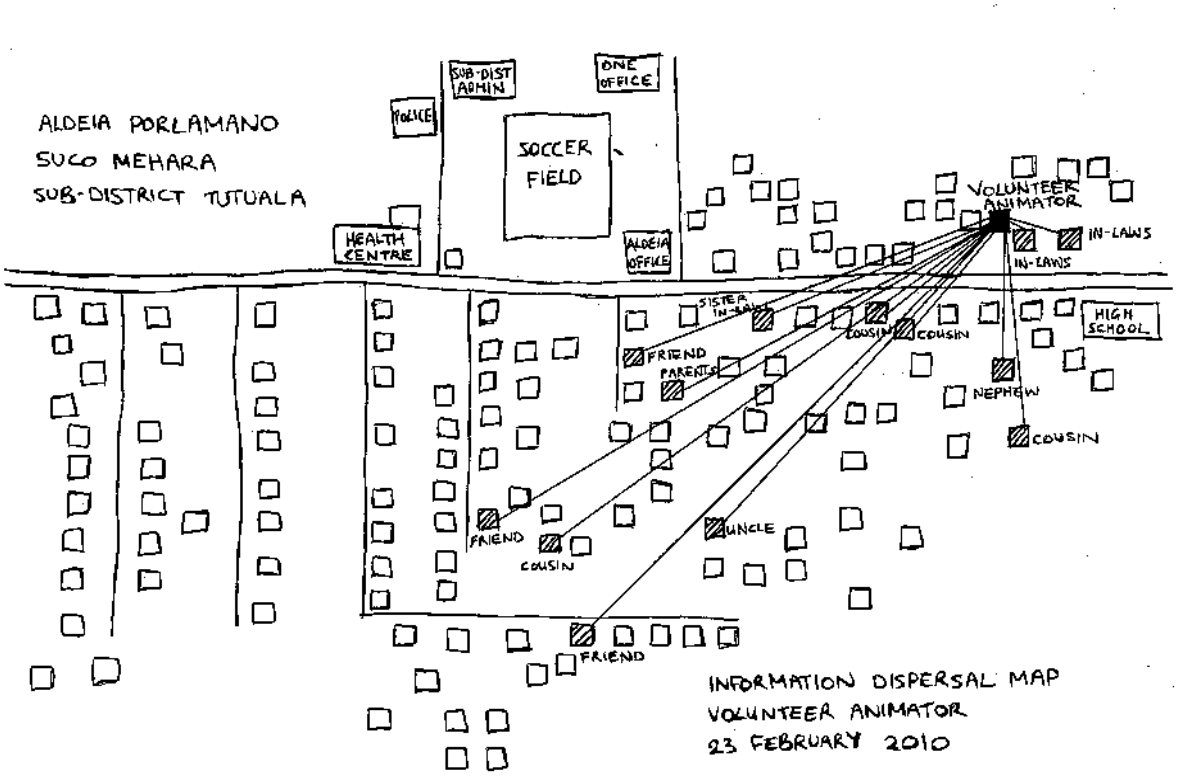
With training clearly highlighted as the key initial point for information dispersal, we will turn now to consider the remaining quarter who learnt primarily by 'word of mouth'. Of this group, 12.6 percent said they first learnt about the technology from a family member including those living within and outside their home (6.3 percent 'someone from my household' and 6.3 percent 'family from outside the home'). A further 5.6 percent marked 'friends' and the same number of people marked 'local animator or group leader'. Finally 2.4 percent said 'other' and 0.8 percent said 'neighbours who are not family'.

As suggested previously, these statistics, together with information collected through semi-structured interviews and social mapping techniques, indicate a strong pattern of information dispersal that occurs according to familial relationships. Each social mapping activity consistently identified that information was shared by a variety of people according to genealogical connection, especially for those closely related such as parents and children, as well as cousins and uncle and aunts. In some cases, people described how they share information with



relatives who live in close proximity to them, as well as those on the other side of the aldeia. When Ajito Reigas in Ra'ano was asked to explain who he has told about SODIS, he pointed to houses on the map saying, 'the ones up there, and over there, and here. … they are all my family. This one is my uncle, and that one is also my uncle.'[10] Over the duration of the interview Ajito identified a total of ten households with whom he had shared information, all of which he had a familial relationship.

The pattern of sharing knowledge with people from your own family, however, should not be seen as an absolute. There are exceptions to this, as Andre de Assuncao in Porlamano explains. 'Here if we are telling someone about those activities (the training or new technologies) then we don't only tell family. It depends on whoever wants to know, and then they can find out. However in this aldeia everyone has at least some family, brothers or in-laws or uncles.'[11] In this interview Andre suggests that it is most common for people to share information with people they consider to be close family, however that does not exclude others altogether. The ambiguity here is in how we treat the term 'family', as most of the target communities identify themselves as being to some extent or another as largely populated by people from an extended family line (rather than referring to an immediate 'nuclear family' as might be the case in other societies). Two preliminary conclusions can be made from this that may help to inform future practices in terms of planning for training.



Firstly, the social mapping techniques demonstrate that where such training occurs, it does so in the context of a deeply developed social infrastructure that is already in place. By this it is meant that the training, and the implementation of the new technologies, makes use of the social connections that already exist—it does not have to make these or compensate for a lack of social connection as might for instance occur in a more urbanised community.

Secondly, if equity is of issue then project planners would need to ensure the inclusion of those who may be geographically part of a community but remain genealogically isolated (even to a

[10] Interview with Ajito Viegas, Ra'ano, Lautem, 20 February 2010.
[11] Interview with Andre da Assuncao, former xefe-aldeia, Porlamano, Lautem, 21 February 2010.

relatively limited extent) as they may well not have the same access to knowledge and information dispersal.

While genealogy and family-connection is a constant factor that needs to be taken into consideration in terms of the ways people in these communities relate to one another, work together and share knowledge, there are also other factors that impact on secondary level dispersal of information. These factors include a) age, b) the level to which that person needs to know about the technology, and c) the geographical location of one's house or agricultural land. For instance, in some households we found some people had incorporated new technologies into their daily activities, while others from the same household were quite unfamiliar with them. This was commonly a result of either the age of the person, as it was not seen as relevant to their age grouping (in particular the elderly), or the relevance of the technology to the designated responsibilities of people in the household. For example, in some instances if it was a person's primary responsibility to look after a kiosk, care for children or tend to animals, then the new technologies were not seen as particularly relevant to such people, and as such the information was not passed on.

Members of both communities also repeatedly stated that geographical location is a determining factor of whether or not they will share information with someone. In Porlamano, Berta dos Santos described how after attending training about organic compost, her and her family began using the compost on their garden. Berta explained that she has not told any of her immediate neighbours in the aldeia because their gardens are very far away. 'Our neighbours just use buffalo manure on their gardens. … If I tell them about organic compost they don't believe me. So people whose gardens are close to ours they come and ask what we have used on the vegetables, and we tell them.'

This point, however, is specific to technologies that are implemented on people's agricultural land and gardens, such as organic compost. For those technologies used in the domestic sphere, such as the vegetable solar dryer, the effect can be seen far more immediately. As a young woman in Ra'ano explained, when she first learnt about SODIS she tried it at home in the area in front of her house. Her neighbours could see what she was doing and so a conversation was initiated about the use of the SODIS method to purify water.[12]

Key Actors

The most important actors within the communities in terms of information dispersal were the local leaders—such as the xefe-aldeia and xefe-suco—and the volunteer animators who are invited to take on this role by Concern and the local associate partner organizations. In some instances, these are undertaken by the same person (such as in Ra'ano where Santos Viegas is the former xefe-aldeia and also an animator), though normally the positions are held by different people and as such, the impacts on information dispersal can also be different.

When discussing the role of the xefe-aldeia and xefe-suco in relation to information dispersal, several community members said that the support of one or both of those leaders for the project is very important. This is particularly the case as their opinions within the community are highly respected. If the xefe-aldeia does not have a positive experience of the work of the NGO, then they can influence other people's attitudes towards participating in the program. On the other hand, if they are positive, they can have significant impacts on the level of success. As Andre da Assuncao put it, 'when the people see the creativity of their leaders, like our leaders and Concern are working well together, then the people will support it. If it's not like this then when there is

[12] Information taken from field notes, Ra'ano, Lautem, 19 February 2010.

an activity, people may respond passively.'[13]

In terms of formal community level information dispersal, a community member in Ra'ano explained that in practice, 'the xefe-suco and the suco council are responsible for co-ordination, while the xefe-aldeia is responsible for implementation'.[14] Effectively the xefe-suco provides permission to work in the community, conducts formal meetings with NGO representatives and perhaps marks a time for the initial training. However it is the xefe-aldeia who is the key actor in terms of everyday promotion of the technologies introduced by Concern. Community members were adamant that without either the support of the xefe-aldeia or the xefe-suco, the project will most likely fail.[15]

At the time this research was conducted, there had recently been elections for the local leadership positions, including the xefe-suco, the suco council members and the xefe-aldeia. With the potential for the local leadership to change at the time of election, it is then conceivable that different personalities and experiences of new leadership will mean a change in the level of support for particular projects. In Ra'ano, for example, the nephew of the former xefe-aldeia has been elected as the new xefe-aldeia. He is already very familiar with Concern and Fraterna's work in Ra'ano because he was involved in the programs through his uncle. In Porlamano, while the former xefe-aldeia was very familiar and supportive of Concern and ONE's work there, the newly elected xefe-aldeia's main form of livelihood is fishing, not agricultural work, and has never before attended a training session.[16] While it cannot be said how this will impact on the implementation of technologies within the communities, it does suggest that projects such as these develop small strategies in order to manage political change within communities.

The other key actor in terms of information dispersal is the volunteer animator.[17] The animators often attend training and are responsible for different technologies. This responsibility requires that they are effectively the 'local expert' about the technology; they sometimes have to manage maintenance of equipment (such as with the silo storage containers) and often help to conduct further informal training or oversee the implementation of the technology (such as conduct follow-up visits to peoples homes with the local NGO staff).

The volunteer animators were particularly responsive to questions and discussion around information dispersal, and they were consistently articulate in explaining their role. For example, Armindo da Costa, a volunteer animator in Porlamano, describes his role saying 'we look for our friends who don't know yet and we tell them what happened when we attended the training, what was good, what we learnt, and what the result is. We transfer this to our friends so they know.'[18] In Ra'ano we found a similar level of self-consciousness around the strategic method of information dispersal. This appears to be a direct result of Concern and their local partner's conscious strategy to weave discussions about information dispersal into the training sessions and of explicitly delegating the task of information dispersal to the animators.

[13] Interview with Andre da Assuncao, Porlamano, Lautem, 21 February 2010.
[14] Quote taken from field notes of informal discussion with community members in Ra'ano, Lautem, 19 February 2010.
[15] It is interesting to note that in both Ra'ano and Porlamano, the locally elected state representatives are also members of the liurai, or king's family, who traditionally are the leaders of the community. This is not uncommon in Timor-Leste, and while it can only be speculated, this characteristic of local governance tends to both demonstrate and reconfirm the importance of such figures in relation to the dispersal of information.
[16] Interview with Patricio da Costa Hornay, xefe-aldeia Porlamano, Lautem, 21 February 2010.
[17] The English term 'animator' is used in the community to describe people who have a specific role to play in supporting the link from the formal project training to the everyday implementation of the new technologies.
[18] Interview with Armindo da Costa, Porlamano, Lautem, 21 February 2010.

Of note, while this group of people is very clear about their task to share the information with others in the community, there was no sense of urgency or strategy in the way this was to be done. None of the animators described scenarios in which they door-knocked houses, or specifically went to visit people to explain the technology to them. It was all done, as described in the previous section, in a very informal manner and in very casual day-to-day type contexts. This method of working is positive as people remain in an environment and a context that is familiar and comfortable for them, which eases the transfer of knowledge. However it also takes time, so it is vital that program implementation strategies and outcome goals set-up by the NGO are reasonable in terms of time constraints. To rush the process could add an unnecessary tension, whilst altering the social context may lead to people feeling pressured.

Gendered dimensions

When asked about the gender dynamics involved in sharing knowledge, several people across both aldeia commented that in general, 'women talk to women' and 'men talk to men'. There were also some comments that men will sometimes share information with women, however it was commonly accepted that women do not usually disperse information to men. For example, one training participant described how he attended training about SODIS, and then returned home and taught his wife how to do it.[19] Others also described returning home and explaining the technology to their siblings or, for some young women, their mother. When asked how many people had come and asked her about using the vegetable solar dryer technique, Berta said 'eight'. She went on to explain that 'only women come to me, men have never come to ask me. … both old women and people my age ask me about it'.[20]

Both in Ra'ano and Porlamano, issues around local cultural customary practices and law came up during discussions about information dispersal processes across gender lines. For Fataluku speaking people, there are strict rules that determine social interactions between men and women who have particular familial relationships. For example, when a man marries into a family, there are social protocols that determine his behaviour towards particular people in that family, such as his wife's sisters. This social system could potentially have a significant impact on the way information is dispersed according to gender because there are often situations, such as above, in which a man and a woman are not permitted to speak to each directly and are therefore potentially unable to share information. However, we found that community members had a range of ways to negotiate this, such as using an intermediary person to facilitate a discussion, so while it is important to be aware of customary patterns of social regulation—especially for those coming from outside of the area—strategies had been found to both negotiate cultural norms as well as adopt new forms of information. For example, during a group discussion and information mapping exercise in Porlamano, due to their particular familial relationship, two participants were not able to speak directly to each other. Despite this they both actively participated, making their comments generally to the group, or specifically to the facilitator.

According to the gendered breakdown of results from question eleven, 'where (or from who) did you first learn about this?', more women first learnt about the technology from training or from someone in the household, while more men first learnt about it from 'neighbours who are not family', 'friends' and 'animators or local group leaders'. Such statistics suggest different patterns of mobility within communities, for instance men being able to mix and interact more outside of the household as part of broader social engagement, a point that in turn highlights the importance of developing learning spaces and training programs that women are specifically invited to participate in. Survey results also show that men are slightly more likely to share information

[19] Interview with Andre da Assuncao, former xefe-aldeia, Porlamano, Lautem, 21 February 2010.
[20] Interview with Berta dos Santos Assuncao, Porlamano, Lautem, 22 February 2010.

with others, however the difference is marginal; 82.5 percent of women said they have shared information with others, while 85.5 percent of men gave that response.

Part Four: Motivations for the Take up of New Technologies

In order to consider the reasons that drive people to take up new technologies introduced through Concern's food security program, this section will respond to two questions. First, to what degree have the four new technologies been implemented in the communities? And second, what social factors are behind peoples' decision to take up a new technology?

Technology Uptake

The four technologies focused on as part of this research project have all been implemented to some degree by the communities in Ra'ano and Porlamano. None of the technologies have been rejected outright and there was no obvious evidence of any negative sentiment around the introduction of these technologies as a general process. While the data collected through the survey shows a strong positive response to questions around implementation, as will be discussed, there is also evidence from other qualitative methods used that points to unevenness in terms of the degree of technology uptake. Despite this, the overarching finding is that there is a generally high degree of technology uptake among community members, and that the OFFSET project has been successful in the introduction of these technologies in these two aldeia.

Question eight in the survey asks, 'do you implement this new technology in your daily life?' The responses across the two research sites show an extremely high number of survey participants are putting into practice the new knowledge, as 89.7 percent said yes (meaning only 10.3 percent of those surveyed said no). The breakdown of these results according to research sites shows that in Porlamano the uptake rate is slightly higher than in Ra'ano, with 94.3 percent of respondents saying they implement the technology, compared to 83.9 percent. These results are general across the four technologies, so we will turn now to looking at them in more detail.

When survey participants in Porlamano were asked which technology they know most about, the responses from research participants were as follows: SODIS 55.7 percent, organic compost 22.9 percent, food storage in silo 12.9 percent and solar dryer 8.6 percent. It is important to note that these results show a trend towards which technologies people are most confident with rather than representing statistical data on how many people are implementing the technology (as people may use multiple technologies, but feel more confident with one in particular). While in Porlamano SODIS is the most well known technology of the four, in Ra'ano 44.6 percent of participants identified organic compost as the most well known technology, followed by SODIS 30.4 percent, solar dryer 17.9 percent and food storage in silo 7.1 percent.

These results show that SODIS and organic compost are the two technologies that both communities feel most confident with. This corresponds somewhat with the length of time since the technology was first introduced and the amount of training undertaken. There have been more formal trainings run on SODIS than any other technology, and this technology was also one of the first to be introduced. The solar dryer is the most recently introduced technology with initial training being held in September 2009, and this would help explain the lower level of knowledge with regards to its use. Even though the food storage silo and organic compost were introduced around the same time, the silo storage is not very popular, a point dealt with in the next section.

Measuring the degree to which a technology has been implemented has been a challenging part of this research. While efforts were made to conduct surveys and interviews with people who were not using the technologies or were not involved in the training program, as discussed earlier a limitation of this project is that by its overall intent the data tends to be skewed towards those who use the technology rather than those who do not. With this in mind, it is interesting to note the comments of Judita Maria Fernandes in Porlamano as she talks about the use of organic compost in her community. 'From what I've seen, not many people in the aldeia are using it. Lots of people are not yet using compost.' When asked why this is the case she went on saying

> 'because sometimes they hear the information but because they have lots of work, then they don't use it. … Those people who didn't attend the training, they don't want to do it. … Those who are the target beneficiaries for the program, they implement it but the people who are outside the target, it takes a long time until they implement it.'

Such a view indicates hesitancy by some within the community regarding the use of new technologies, even if this initial research suggests that these people are a minority and may be hesitant because of a range of reasons. When viewed generally, information is being dispersed over time, there is a high rate of technology uptake, and the community as a collective group does not appear to have rejected (outright or passively) any of the new technologies.

Social factors

A range of social factors impact on whether someone will take up a new technology. Some of these are identifiable through patterns of behaviour observable across the community, while other determining factors, such as personality, are harder to assess. Age was a common factor that came up in several discussions and was used to explain why a person had not been privy to receiving certain information about a new technology. Typically this was because a person was seen as being too old and hence they would not understand. In this situation a person is not given a chance to decide for themselves whether or not they are interested in a new technology because the information never reaches them. There were other cases, however, in which people referred to their age when explaining why they did not implement a technology, despite already being familiar with it.

The geographical location of a person's house or garden can also have an impact on whether or not a new technology is implemented. For example, the Ra'ano community are spread out over a very large geographical area. For those residents who live on the fringes of that area, it is much more difficult to participate in anything that is occurring at a more centralized location as the distance one must travel is significant, particularly for people with no motorized transport.

There are also gender dimensions that impact on technology uptake. This research has found that for each of the technologies included in this study, both men and women participate in their implementation. We have not observed a technology that is gender-specific, in that only men or only women use it. For SODIS and the silo storage containers, the research indicated that the gendered division of labour is relatively equal as both men and women implement these technologies. For solar dryer and compost, however, the labour tends to be divided by gender according to task. For example, in one community group in Porlamano, Berta describes how the men and women work together to use the solar dryer equipment. 'The men work with us. The men build the frame and then we do the vegetables. Us women are the ones who do it, they just build the frame.'[21] In a similar scenario an elderly woman in Ra'ano explained that she is

[21] Interview with Berta dos Santos Assuncao, Porlamano, Lautem, 22 February 2010

responsible for collecting materials to be included in the organic compost, while her husband digs the hole and maintains the compost.

The degree of relevance the technology has to people's everyday life is also a factor in terms of whether or not someone chooses to implement it. In terms of relevance, the economic status of the community in general, as well as the households within the community, is important to consider. If the new technology requires people to purchase materials outright, it may not be feasible. Likewise, if there are materials provided by the NGO that are not available in the local area, the implementation of the technology may not be sustainable over the long term. Of the four technologies included in this study, organic compost is the only one that does not require special materials or equipment as it is made entirely from organic produce available locally. Many people who are using the organic compost commented on this fact, saying that it 'is easy and we don't have to use any money'.[22] In the case of SODIS, while families are provided with initial materials such as aqua bottles and black cloth, these are inexpensive and easily obtainable. Similarly to organic compost, many community members commented on the ease with which they are able to use SODIS.

In the case of the silo food storage containers, the technology itself would appear as relevant as any other, however the level of implementation has varied greatly between Ra'ano and Porlamano. In Ra'ano, the three tonne silo is being used by a group of farmers led by the former xefe-aldeia and the group members are very positive about their experience of this. In contrast, a Porlamano based group have struggled to use their three tonne silo. The challenge in this case has not been with the technology itself, but with the method of using it. The system requires a record of how many kilos of food people are putting into the silo which in turn has required a need for administrative and mathematical skills. The members of the group in Porlamano are not used to writing and felt the system was complicated and created a lot of extra work for them. So while they understood the value of the silo as a long-term storage container, they did not use it as it was difficult to manage through a group of people. The alternative to this, already identified by Concern staff, is that small silos (half a tonne) are provided to households, rather than large ones for community-based groups. This adaptation in the program may have a significant impact on the level of uptake of this technology, and therefore its sustainability as a viable option for people into the future.[23]

Part Five: Recommendations

As this report was commissioned by Concern as a study into the patterns of knowledge transfer in relation to new technologies and their uptake in two aldeia, the recommendations here are somewhat different to those that would typically be found in more evaluation-oriented studies. As such, the following recommendations are not specific to the OFFSET program itself, as the data collected was not designed for such a purpose. Some recommendations reflect upon and draw out some of the underlying principles of the OFFSET program, while other recommendations are more general in their character. While some may be obvious to those who have experience working on development style projects in Timor-Leste, we hope that the articulation of them is still of value, and more so to those coming anew to work in this field.

[22] Interview with Andre da Assuncao, former xefe-aldeia, Porlamano, Lautem, 21 February 2010.
[23] At the time of this research Concern had already identified this problem and was going through the process of ordering smaller silo storage containers for household use.

1. Integration of Marginalised Members of a Community

Resources tend to be concentrated as differently within the communities as they are between them, and people can be marginalised from resources—including information—for a whole host of reasons, such as gender, age, physical disability, geography, political affiliation, competition over resources and local conflicts. The benefits of local staff are many, though potential constraints can occur if local staff make decisions that either intentionally or incidentally perpetuate marginality.

As such, it is recommended that:

a) *Additional financial support is budgeted from the planning stage onwards so as to ensure that marginalised people are not excluded from training and project related opportunities. This is particularly the case in situations where organisational resources are scarce and projects subsequently concentrate on achieving maximum efficiency which may perpetuate inequality in the process.*

b) *Implementing staff should be trained in a way that will help them identify and engage people marginalised within a community, from the process of socialisation onwards.*

c) *If the implementing organisation scales down their operations over an extended period of time, people identified as 'at risk' or marginalised should be contacted and visited at a proportionately higher rate than those less marginalised, even as the contact in general diminishes.*

d) *Monitoring of the project occurs with mixed teams of people from within and beyond the community.*

2. Project Duration

Different conceptions of time held by Western trained development workers and local agricultural subsistence communities can often be a point of friction and misunderstanding in projects in Timor-Leste. This tension can be understood in a range of ways, though underpinning these are different conceptions of temporality; hence why the tensions are often difficult to resolve. The project under examination in this study allows for some very apt ways in which to adapt the process to help ensure the longer-term success of a project.

As such it is recommended that:

a) *Development projects are designed across the longer-term, and remain committed to maintaining a connection to those communities, even if it evolves over time. A potential source of tension can be apparent when a community's typical way of dispersing information and testing new technologies is not compatible with a focused target driven organisational approach.*

b) *Program staff should spend as much time as possible within the community. While the training of local community members in formal training scenarios is important, as this report has found, it is vital that these are followed up with informal interactions that confirm the new technologies.*

c) *If there are multiple technologies, these are introduced in a staggered fashion that allows for a gradual process of learning to occur not just in relation to the particular technology, but the actual process of learning and the accrual of new knowledge.*

d) *Where there is an initial project implementer (such as Concern Worldwide) and then local associate partner organizations (for instance ONE or Fraterna), the ability of the local associate partner organizations to undertake follow-up visits will assist in the consolidation of new technologies.*

3. Methods and Implementation

It is recommended that:

a) *Both the method of implementation and the technology itself should be relevant to, and appropriate for, the community. As discussed in this report in the instances of the silo storage containers, if the technology is right but the method of managing that technology is too complicated, it will not be used.*

b) *In the case of an expansion of the program to other communities, both animators, as well as a selection of those members of a community who have utilised the training, are involved in the implementation of its use in other communities.*

c) *Significant respect is accorded to oral forms of communication for its durability over time, the authority that the spoken word gives to new information, and the ability to provide contextualisation. It is also an efficient form of communication when resources are limited. As such, training and implementation should be geared towards contextualising related discourses according to local patterns of communication.*

4. Community

It is recommended that:

a) *The phenomena of mixed aldeia is given greater priority in terms of understanding its impacts on development projects, as thus far this point has been overwhelmingly ignored in Timor-Leste. By 'mixed aldeia' we mean, as in the case of Aldeia Ra'ano in this study and as is prevalent throughout the country, that aldeia are non-contiguous and are defined by genealogical connection rather than shared territory. Hence the way in which information or other resources are shared can occur on the basis of familial connection not proximity (i.e. seed distribution not occurring within a set of proximate households but across relative distance via familial connection.)*

5. Gender

It is recommended that:

a) *There is monitoring of the longer term gender dimensions of programs, as initial training may mean that the ways in which new technologies are initially implemented reflect the gender objectives of the project, however these may shift over a period of time.*

b) *If, as this report suggests, the patterns of information dispersal are gendered, especially if women do not generally pass information onto men, then it is important to ensure that both males and females are accorded opportunities for training. This recommendation is justified in terms of the patterns of information dispersal in relation to securing the longevity of the new technologies, and as such sits in conjunction with other arguments for gendered approaches such as a rights based argument for equal training.*

c) *The training occurs in a way that does not place added pressure on women in relation to their often perceived responsibilities within the realm of domestic duties and childcare. For instance, smaller group training done in a home by one or more trainers (generally including a female trainer), over more extended periods and at times suited to the recipients of the training, may assist uptake.*

6. Leadership

Projects that introduce new technologies seek to create change but seek to draw from existing resources and social structures to do so. This is particularly evident in terms of support from community leadership, including having the support of the xefe-suco and the xefe-aldeia (which as found in this study is generally pivotal to a project's success). However, as part of broader social changes in Timor-Leste, the election of these positions now means that periodically there may be change in leadership that could affect either positively or negatively the project's acceptance and longevity.

It is recommended that:

a) *Organisations identify potential leaders and trainers who are outside of the usual leadership group while ensuring that the more formal political structures of the aldeia and suco continue to be included and drawn upon.*

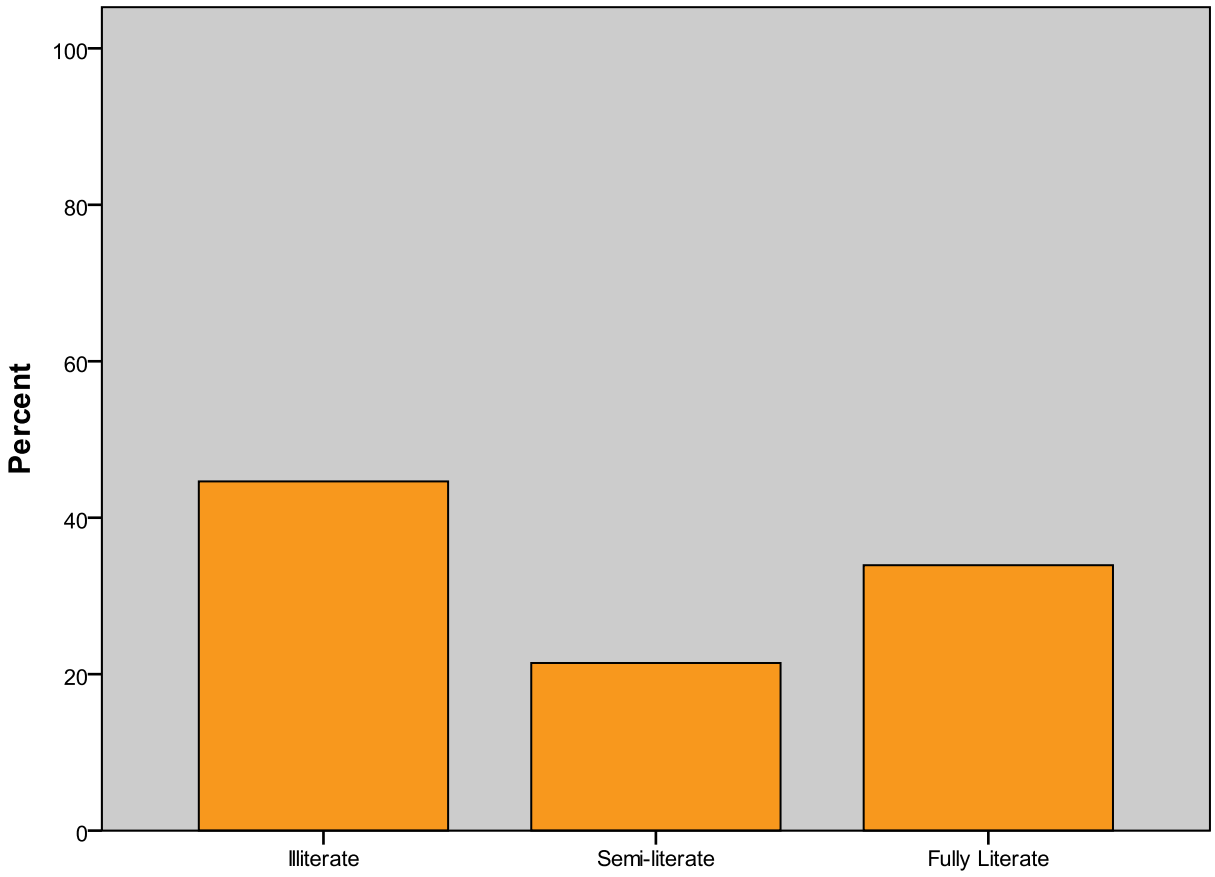
b) *Different leadership groups are identified within communities, for instance political (such as xefe-aldeia) and community groups (such as women's collectives), as well as locals who can be trained in order to train others (such as animators in this study). Ensuring a broad field of expertise at the leadership level should not only help increase the level of secondary transferral of knowledge but also help ensure that the program continues with support from within the community even when a change in leadership positions occurs.*

Appendix 1

Graphed Information from Survey

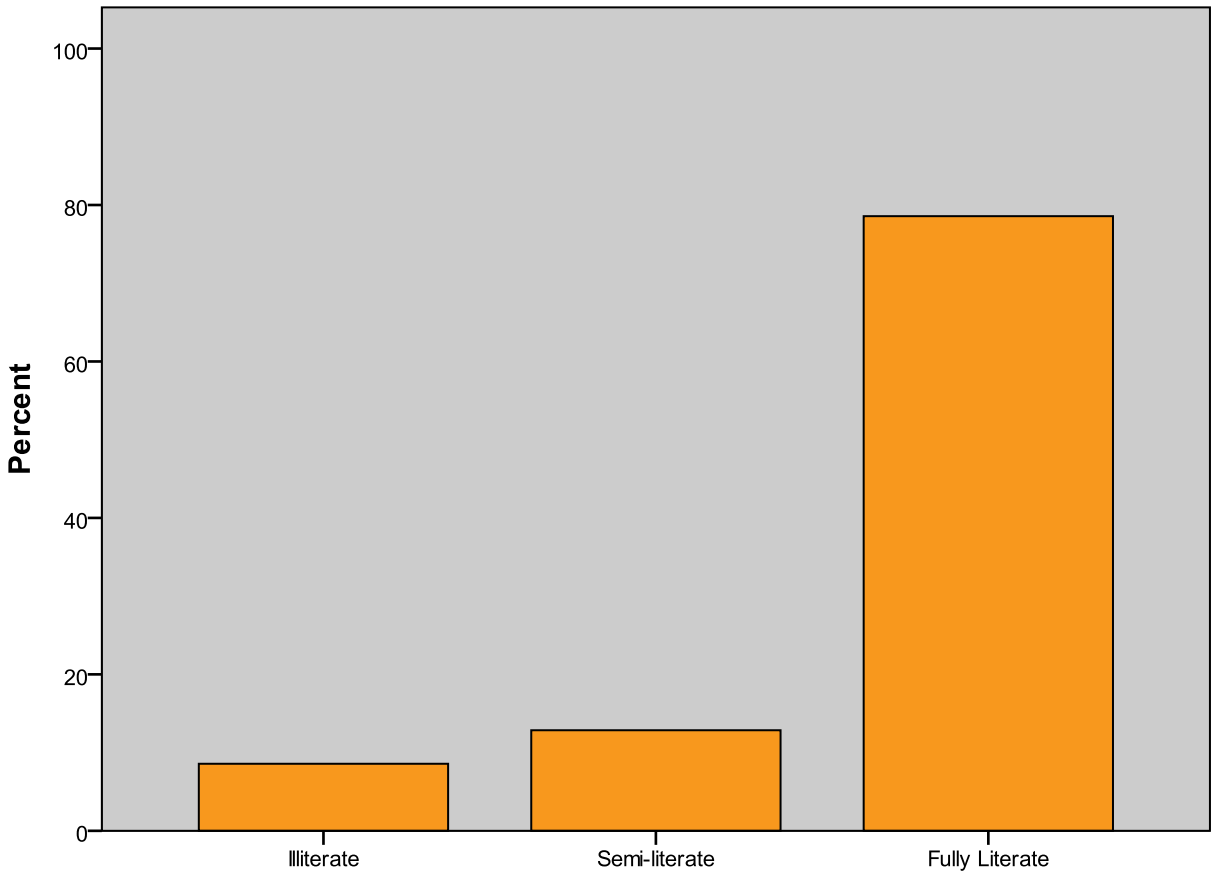
Question 5
Results from Aldeia Ra'ano

How would you describe your level of literacy?



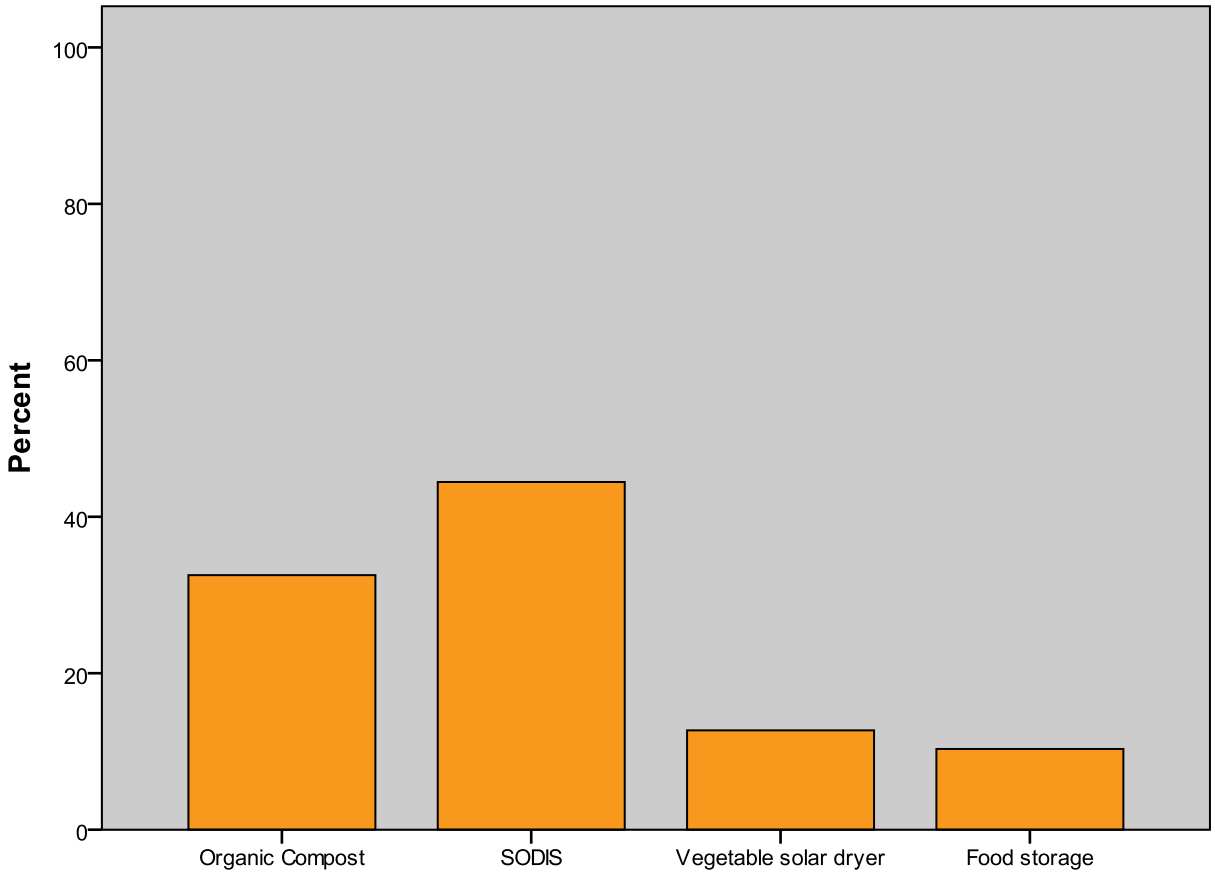
Question 5
Results from Aldeia Porlamano

How would you describe your level of literacy?



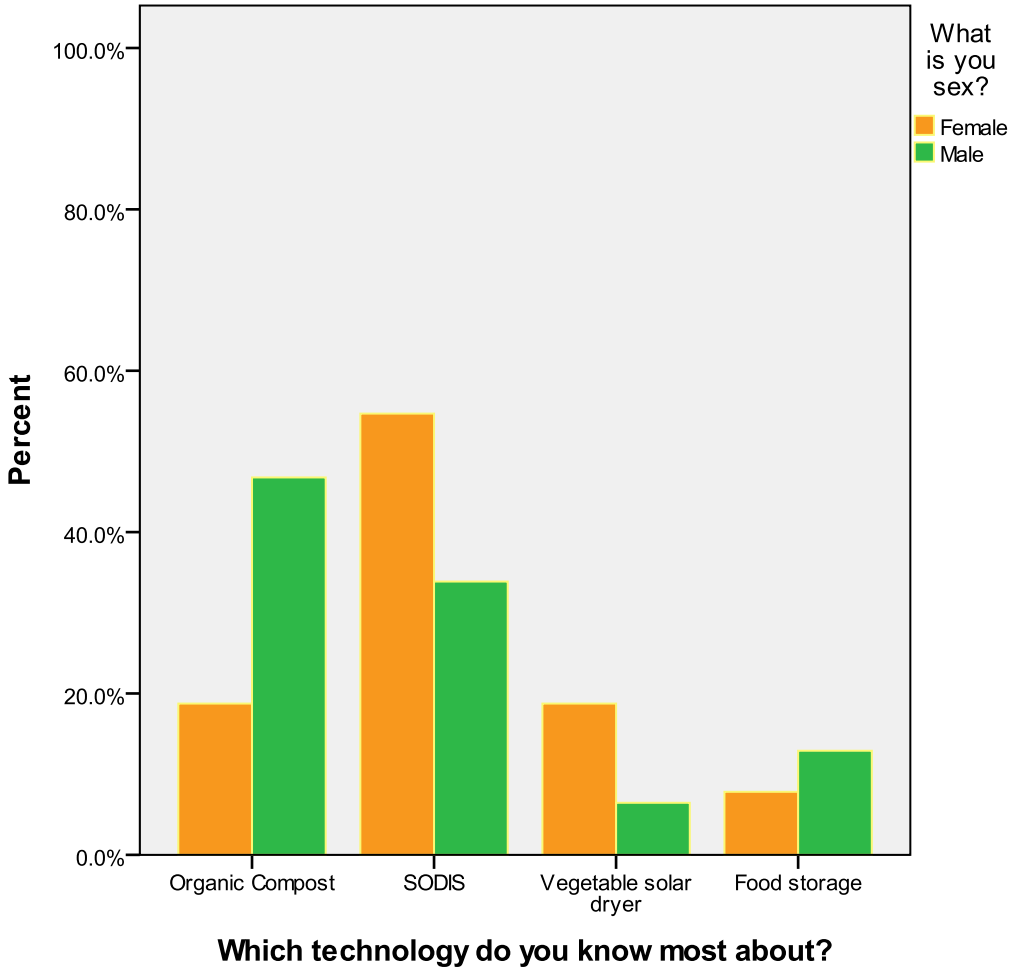
Question 6
General results from both communities

Which technology do you know most about?



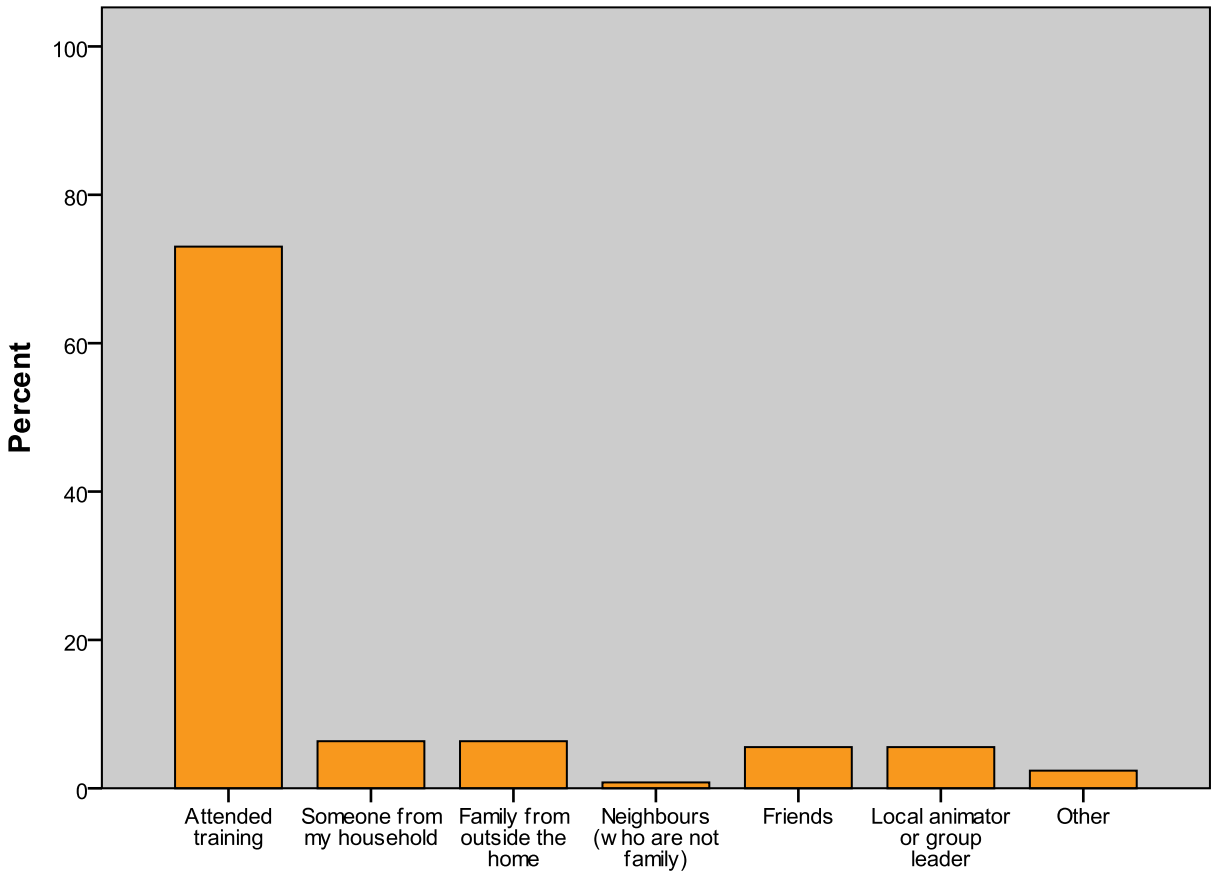
Question 6
General results from both communities

Which technology do you know most about?
Crosstabulated With What is you sex?



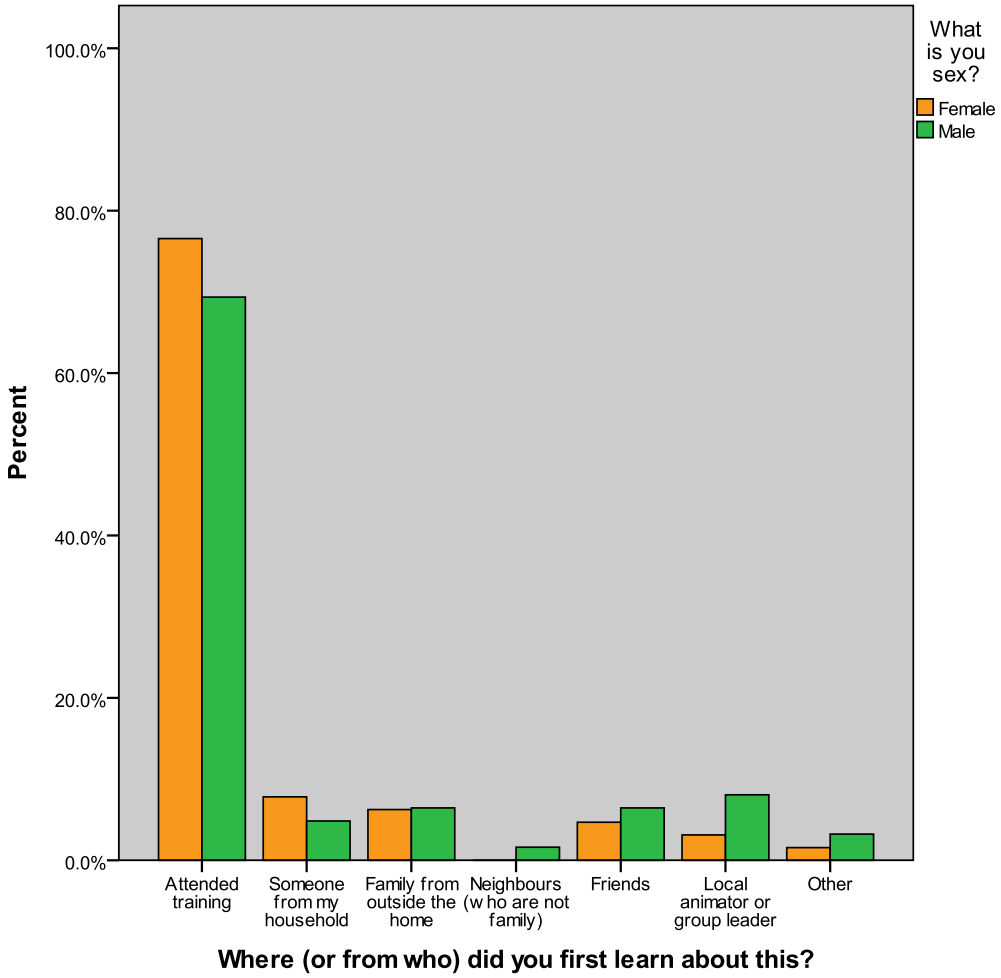
Question 11
General results from both communities

Where (or from who) did you first learn about this?



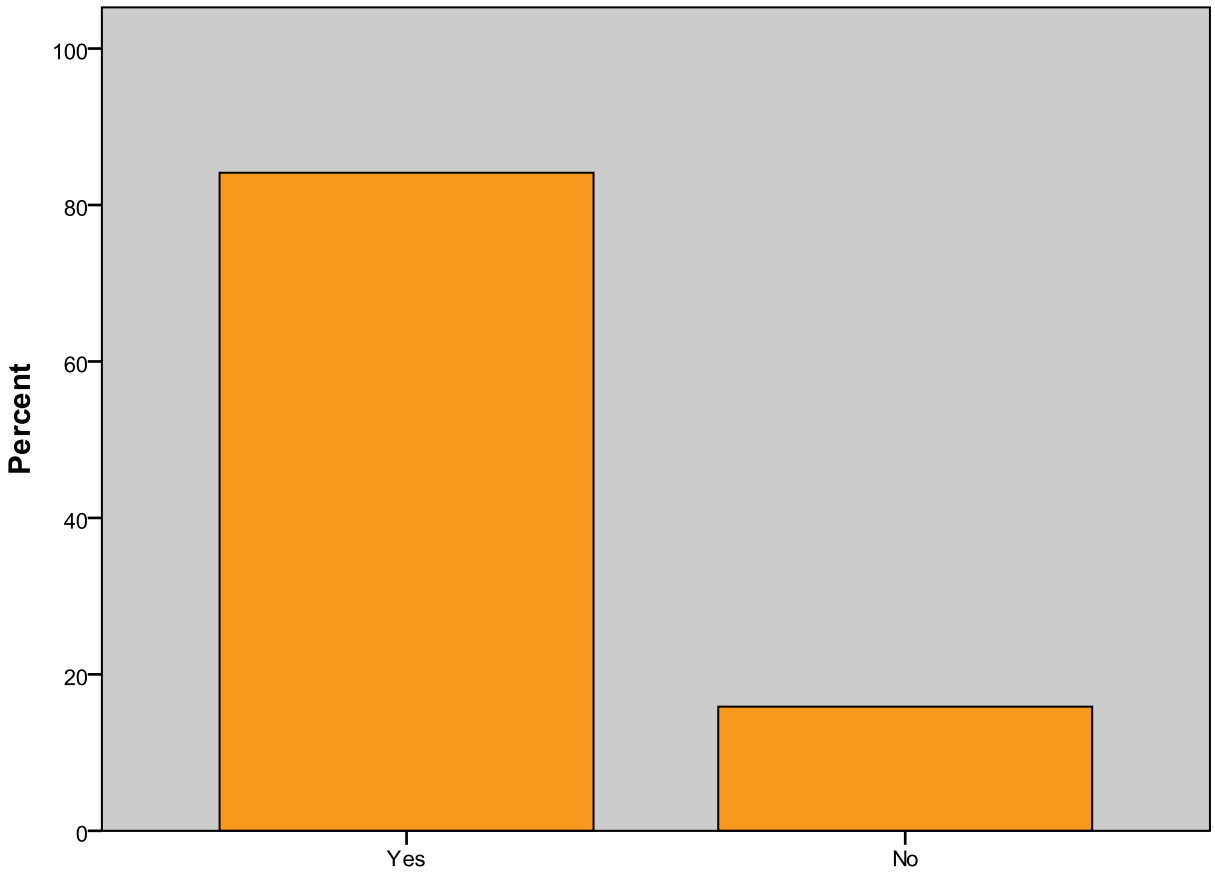
Question 11
General results from both communities

Where (or from who) did you first learn about this?
Crosstabulated With What is you sex?



Question 12
General results from both communities

Did you share this information with others?



Question 13
General results from both communities

Who did you share information with?

Share information with	Percent
My extended family	43.9 %
People within the aldeia	43 %
People in my household	24.3 %
Neighbourse (who are not family)	24.3 %
Friends	12.1 %

Question 14
General results from both communities

How did you share information with others?

Share information with others	Percent
Met with them and chatted	55.1 %
Showed someone using an example (did it together)	37.4 %
People just watched me do it	9.3 %
Explained it in a meeting	4.7 %
Gathered people together and explained it to them	3.7 %
Someone came and asked me	3.7 %
Met with them and explained using a book	2.8 %
Wrote information down and gave it to someone	2.8 %
Told people using a public announcement	2.8 %
Other	2.8 %
Called someone (telephone)	0 %

Appendix 2

Community Survey

RMIT University

Survey Number ……..
Research Location ……..
Researcher …….
Date ……

For the following questions, please respond by marking the number (X) next to your chosen answer.

1. Where were you born? (*Please write your aldeia, suco and then sub-district)*

……..

2. What is your sex?

1 ☐ Female 2 ☐ Male

3. How old are you?

1 ☐ 16–19 2 ☐ 20–29 3 ☐ 30–39 4 ☐ 40–49 5 ☐ 50–59
6 ☐ 60–69 7 ☐ 70–79 8 ☐ 80–89 9 ☐ 90–100 10 ☐ I don't know

4. What is your level of education?

1 ☐ No school 2 ☐ Primary School 3 ☐ Some secondary school
4 ☐ Finished secondary school 5 ☐ Trade training 6 ☐ University (undergraduate)
7 ☐ University (postgraduate)

5. How would you describe your level of literacy?

1 ☐ Illiterate 2 ☐ Semi-literate 3 ☐ Fully Literate

<u>Questions About Concern's Program</u>

6. Which technology do you know most about?

1 ☐ Organic Compost 2 ☐ SODIS 3 ☐ Vegetable solar dryer 4 ☐ Food storage

7. Which other technologies do you know about? (*you can mark more than one box*)

1 ☐ Organic Compost 2 ☐ SODIS 3 ☐ Vegetable solar dryer 4 ☐ Food storage

8. Do you implement (or use) this in your life? *(Refers to the technology chosen in question 6)*

1 ☐ Yes *(if yes, skip question 10)* 2 ☐ No *(if no, skip question 9)*

9. If yes, why do you use (or do) it?

1 ☐ Can make money
2 ☐ Can store things for a long time
3 ☐ It's easy and simple to implement
4 ☐ Because someone told me to
5 ☐ It doesn't waste money
6 ☐ It increases the produce of the household
7 ☐ Other …….

10. If no, why don't you use (or do) it?

1 ☐ Don't really understand how
2 ☐ Scared to use something new
3 ☐ Don't like using new things
4 ☐ It is difficult to do alone
5 ☐ It's not relevant for my situation
6 ☐ There is not much local material to use
7 ☐ Not enough time
8 ☐ Not enough money to buy materials
9 ☐ Other …….

11. Where (or from who) did you first learn about this?

1 ☐ Attended training
2 ☐ Someone from my household
3 ☐ Family from outside the home
4 ☐ Neighbours (who are not family)
5 ☐ Friends
6 ☐ Local leaders
7 ☐ Local animator or group leader
8 ☐ Other …….

12. Did you share this information with others?

1 ☐ Yes 2 ☐ No *(If no, please go straight to question 15)*

13. If yes, who did you share the information with? (*you may mark more than one box*)

1 ☐ People within the aldeia (or community)
2 ☐ Just people in my household
3 ☐ My family
4 ☐ Neighbours (who are not family)
5 ☐ Friends
6 ☐ Other …….

14. How did you share information with others? (*you may mark more than one box*)

1 ☐ Met with them and chatted
2 ☐ Met with them and explained using a book
3 ☐ Wrote information down and gave it to someone

4 ☐ Gathered people together and explained it to them
5 ☐ Showed someone using an example (did it together) 6 ☐ Called someone
7 ☐ Told people using a public announcement (such as through the xefe-suco office)
8 ☐ Explained it in a meeting 9 ☐ Someone came and asked me
10 ☐ People just watched me do it 11 ☐ Other …….

15. How do you feel about the knew knowledge you have?

5	4	3	2	1
Very satisfied	Satisfied	Neutral	Not very satisfied	Unsatisfied

6 ☐ No opinion

16. Have you experienced a positive change from the new technology?

1 ☐ Yes 2 ☐ No

17. If yes, what was the positive change you experienced?

1 ☐ Met knew people 2 ☐ Increased income 3 ☐ Increased food production
4 ☐ Better health 5 ☐ I don't feel tired 6 ☐ Can store food
7 ☐ Other ……..

18. Have you experienced a negative change from the new technology?

1 ☐ Yes 2 ☐ No

19. If yes, what was the negative change you experienced?

1 ☐ Made me tired 2 ☐ Reduced household money
3 ☐ Reduced household food supplies 4 ☐ Gave me health problems
5 ☐ Made people jealous 6 ☐ Caused conflict in my household
7 ☐ Increased the workload 8 ☐ Wasted time
9 ☐ Other…….

THANK YOU FOR YOUR PARTICIPATION.

Appendix 3

Reflections on the Field Research

By Carmenesa Moniz Noronha, Pekiza Timor-Leste, RMIT University (Translated by Mayra Walsh)

March 2010

My name is Carmenesa Moniz Noronha, I am an RMIT staff member and I have worked with RMIT as a researcher for three years (2007-2010). In this project Concern and RMIT have worked together to conduct research on the projects that Concern have been running in Lautem district, Timor-Leste. This research, however, is just focused on two *aldeia*: *aldeia* Ra'ano in *suco* Serelao, sub-district Lautem and *aldeia* Porlamano in *suco* Mehara, sub-district Tutuala. We conducted the field research for nine days in Lautem district.

Some of the methods we used during the field research included: information dispersal maps, surveys, and semi-structured interviews. Our objective was to understand and to hear from the community themselves about the many new technologies that Concern has taught them. However, for this project we focused on just four technologies: SODIS, organic compost, solar dryer and silo storage containers. We looked for information such as: did the people who have attended training sessions implement these technologies or not? And if not, why? Do people generally like the new technologies or not? Have people shared information with others who did not attend the training?

During the time the research was run in *suco* Serelao it was difficult to do our work quickly because in *suco* Serelao there are three *aldeia* that are all mixed together. We only needed people from *aldeia* Ra'ano so we were lucky that the former *xefe-aldeia,* who is also an animator, was able to help us. In *aldeia* Porlamano it was great because the people in the *aldeia* all live in one place, they are not mixed with other *aldeia*, so it was easy for us to find information.

In these two *aldeia* people speak Fatuluku. There were people who did not really understand Tetun so we sometimes used interpreters to conduct semi-structured interviews. According to what I saw, in these two *aldeia* the majority of people work in agriculture. From the two communities I found that the *liurai* (king) system is still strong. For example, I heard from Santos Viegas that in his *aldeia* in Ra'ano the normal people who are not part of the king's family do not put themselves forward as candidates for positions such as *xefe-suco* and *xefe-aldeia* because they are scared of the possible negative impact this will have. Ever since the ancestors time people who are not from the *liurai* family are not allowed to lead the people of the *suco*. This is an *adat* (customary) system that is similar in *aldeia* Porlamano where the local leaders are also from the *liurai* family.

According to my observations, the four technologies (compost, solar dryer, SODIS and silo containers) are being implemented by people who have attended training, and these people say that they like the new technologies.

Organic Compost

From what I've seen, many people use compost, particularly those people who have rice fields because they say that this compost is very good for their rice. When they use it the results are much better than when they use traditional methods. However they don't only use compost for rice, it is also used for their garden where they plan vegetables and corn. One woman, whose name is Berta dos Santos from *aldeia* Porlamano, said that she is happy with the results after using compost and

that compost is not difficult to make because it only requires leaves and materials from the local area, there is nothing that needs to be bought. Berta makes her own compost and uses it according to how much she needs for the vegetables she has planted. There are some people who prefer to just use buffalo manure and refuse to make the new organic compost because they say the process takes too long. However, according to Berta, when compost is compared with the buffalo manure, this traditional method is not very good and the organic compost makes the plants grow better.

Berta is using organic compost in her garden and she has shared information about compost with people whose gardens are next to hers. She says that at first people did not want to try it straight away because they didn't trust that it would work, so she did it on her own. Then the people working in the gardens close to her saw that her corn and vegetables were growing very well so they began to look for information from her about how to make organic compost. She taught the people who came and asked her or who wanted to use it. Berta said that compost 'is helpful because when we use it even if we don't water the garden it still grows. Like if we are tired and so we don't go, then we go and check we will be happy because the garden is growing well.'

SODIS

I heard from the two communities that many people are using SODIS, particularly during the dry season when many people put water bottles onto sheets of corrugated iron so that after a while they can drink the water. People said that at first some people were not used to the water or it made them cough, however slowly after they tried to drink it a few times they became familiar with it. Others said that it was fine from when they first drank the SODIS water and there was no negative impact for them. Mr. Santos, the former xefe-aldeia in Ra'ano, said that he is still in the process of analysing the negative impacts that some people felt from SODIS. 'Some people reported that it is good to drink, others said that drinking it makes them cough. This is what we are still analysing, perhaps because of the rain they are coughing, or maybe their physical condition is not right for this water. We are still analysing this.' Mr. Santos also said that SODIS has helped them, particularly those who work in the rice fields because they don't need to boil water anymore. When they are thirsty they can just go and get the bottles of water and drink it. This makes people feel that they have less work to do.

Andre Fernandes from *aldeia* Ra'ano said that he likes SODIS and that this technology is simple and reduces his workload such as collecting wood and boiling water. 'Because this water we just put it in a bottle and then put it out in the sun, we don't need wood, we don't need a fire and we don't need to boil the water. That is why we like it, it is better.' This data shows us that Andre feels that this technology does not make him busy because it reduces the work in his home. His whole family drink the SODIS water and it has been fine, no-one has been sick because of it. 'For us this is good because we can put it out in the sun from morning until afternoon and then drink it all without any fuss. The children also drink it straight from the bottle and they are not sick, they feel good.'

Solar Dryer

The vegetable solar dryer technology is being used by the community at the times when the vegetables, such as cabbage, tomato, onion and others, are harvested. At this time there are lots of vegetables so some of them are eaten, some are sold, and those that are not bought or are going to go bad soon are used in the solar dryer system that Concern has introduced. People feel good about this because when the vegetables are starting to go bad they can take those vegetables and dry them out so they can be kept for longer.

According to the data provided by Berta, she uses the solar dryer but she does not really know if the other people who participated in the training are also implementing this technology or not. However Berta feels that this technology helps her because her families' garden is very far away so if someone suddenly visits their house she can just take the dried vegetables and cook them. In the community some people have said that this work makes you tired or it takes too long to wait for the process to finish. They also say that if you don't wait next to the solar dryer animals can come and eat the vegetables because in the *aldeia* many people just leave their animals such as pigs, buffalo and goats, to wander freely. However Berta says that even though it makes her tired, it also helps her in the future when there are no vegetables or she doesn't have time to go to her garden. Berta has also shared information about the solar dryer if people come and ask her. 'When we are doing it they come and watch and ask us, what are you doing with that? So we teach them and also if we meet them somewhere else and they want to talk about it we can explain it to them.'

Silo Storage Containers

From what I've seen the silo storage containers are important for people because sometimes there is too much food, like corn or rice, and there are not enough places to store it. People can use the silo to store their seeds until the time when they are ready to plant corn or rice again, or they can use them to help when someone in the community experiences a natural disaster. Also people who do not have seeds can borrow from the silo, for example if they borrow one kilogram, once they have planted them and their rice is harvested they will pay back two kilograms. This is when people decide together to use the silo like a food bank.

In *aldeia* Porlamano there is a women's group who received a silo. They have a garden and then the produce from the garden is used to fill the silo. Before Concern helped them they had small storage containers that are usually used for petrol. This is not a very good system because the petrol drums are small. The food that they store in the silo is the produce that has recently been harvested, such as corn or rice, and then this is sold and the money is kept for the group.

From these four technologies I found that many people are implementing SODIS and organic compost. It is important that people do it the way Concern has taught them. Many people use organic compost because it is good for all food that is planted in the garden and the results are always good. Regarding SODIS, many people use it because they say it is simple to implement and reduces the household work.