DEZENVOLVE AGRICULTURA COMUNITÁRIA

FINAL REPORT

FEBRUARY 2015

CONTRACT NO: EDH-I-00-05-00004-00

February 23, 2015

Contents

Overview of Dezenvolve Agricultura Comunitaria

Dezenvolve Agricultura Comunitária (DAC) is a USAID funded program implemented by DAI from 2010-2014. DAC's scope of work included technical assistance to farmer groups on vegetable production and farmer group organization, and the facilitation of market linkages to improve the economic and social livelihood of farmer households.

Under the technical leadership of DAI Chief of Party Catherine Johnston, the DAC project has delivered a comprehensive value chain upgrading project with a rigorous focus on sustainability. DAC's approach combines the introduction of new production and management technologies; technical, organizational and business management training for farmer groups; the development of a contract farming model with an integrated supply chain management system and database; in-depth market research; a complete value chain analysis for the sector; the formation of the national Horticulture Working Group; the formation of a District-wide farmer association: facilitation of access to agriculture loans; and training and market linkages for input suppliers. A special focus on nutrition and environmental management, and the implementation of a USAID-China AID-Government of Timor-Leste Trilateral Food Security Activity further contributed to the long-term sustainability and broader development impact of project activities. All aspects of the program were supported by the creation of a range of high quality, creative, Tetum-language training materials and tools targeting each level of the value chain.

This report begins with an overview of the project's achievements – our long term sustainable outcomes. A summary of lessons learned captures the principles underlying DAC's achievements. Finally, we include a chronological overview of DAC activities. The Annexes provide more data, and a series of photos and short stories on project successes.

Sustainable Outcomes

Sustained Participation

The DAC project registered 547 farmers and 37 farmer groups as project participants from 2010-2014. Each participant represents a separate household. With average household size of 6, DAC has positively impacted the incomes of 3,282 rural Timorese.

What is most impressive is the sustained participation of these households. After joining the program, farmer groups receive one year of intensive technical assistance and training. In the second year, assistance is scaled down, until groups are operating totally independently. As of May 2014, DAC had minimized assistance to 26 groups, while initiating activities with 11 new groups (99 farmers). At the end of this final project year, 91% of households remained engaged in commercial vegetable production. 88% continued to benefit from the successful market linkages to Kmanek, Dilimart, and W4 Supermarket, and 3% were selling to local markets. 34 farmer groups remained active.

Incomes Improve for the Long Term

DAC's proven market linkages and technical assistance model has permanently increased incomes, by as much as five times, for DAC farmer households. As noted above, DAC farmers and DAC commercial partners have demonstrated a long term commitment to the

vegetable industry. In addition to the sales reported by DAC, which result only from the contract farming linkage, farmers are selling additional production (excess production from contract farming linkages, or additional production from their own inputs) to local markets.

In 2014, DAC had 448 farmer households that were part of the program for the entire year. Of those, 42% were seriously committed to continuous commercial production, making sales in every month of the year. For those farmers, average income was $1,394 – almost five times the average rural income of $292.

Annual Farmer Income 2014
Farmers with sales in all 12 months

	Dilimart	Kmanek	W4	All Farmers
$ Mean	830	1,438	0	1,394
$ Median	859	1,204	0	1,180
$ Min	354	224	0	224
$ Max	1,388	6,233	0	6,233
# Farmer	16	171	0	186

In 2014, 99 new farmers joined the program in July. Despite these farmers making sales for just a few months, average annual income of all farmers with even one sale was still an impressive $844.

Annual Farmer Income 2014
Farmers with at least one sale

	Dilimart	Kmanek	W4	All Farmers
$ Average	531	971	98	844
$ Median	423	664	34	586
$ Min	1.88	4.20	0.63	0.63
$ Max	2,206	6,233	789	6,233
# Farmers	76	369	33	476

Below is a summary of the total production and incomes over the life of the project.

DAC 2010-2014 Results

	People	Production (kg)	Value
Outdoor	547	1,068,126	$837,324
Greenhouse	34	101,424	$105,845
Total	547	1,169,549	$943,169

*376 male & 171 female (greenhouse farmers are also outdoor farmers)

Technical and Business Skills

DAC's agriculture training objective was for farmers to permanently change their production techniques, by learning and using a core set of 15 new technologies and management practices. DAC's Performance Management Plan tracked the introduction and adoption of these new technologies (see Annex for details), and has exceeded targets for each one. Most farmers were recorded as adopting most of the new technologies and management practices. However, a farmer was considered to have "adopted" a new practice if he/she was using it during one annual M&E survey period. It is even more important to know whether farmers will sustain these new practices.

In early 2015, DAC surveyed 183 (33% of all farmers, selected from newer and older groups) to verify whether farmers that were reported to have adopted the new technologies (at one point in the project period) were in fact still using them. We selected 3 of the new technologies that best capture a farmer's overall level of production quality and skill. If the farmer is maintaining these new practices, it is likely that his entire operation is being conducted with improved techniques. The results were very encouraging.

2015 Review of Farmer Skills

	Reported as "Adopted"	Confirmed 2015	Percentage
Using Improved Seedling Media	183	163	89%
Using Organic Fertilizer	183	171	93%
Compost Pile is Active	183	141	77%

Another reflection of increasing technical and business skills is increasing productivity and profitability. Throughout the project period, farmers' incomes grew faster than their production in kilos. This is a complicated metric since the weights of different vegetables

vary so widely. But, overall, it reflects the farmers increasing technical and business skills, maximizing the value of their production.

Yearly Percentage Increases			
	2011-2012	**2012-2013**	**2013-2014**
Increased Production	12%	197%	16%
Increased Incomes	14%	210%	26%

Strong farmer organizations developing good business negotiation skills resulted in higher prices per kilo for many vegetables at each year's negotiations with their commercial buyers. Better technical skills allowed farmers to grow more Grade A product which brings a price premium. As the commercial buyers raised specific prices to incentivize farmers to produce vegetables that were most difficult to grow, such as broccoli and cauliflower, the most successful farmers placed a laser focus on mastering the production of those products.

As farmers business and analytical skills grew, they started to focus on more profitable vegetables, such as broccoli, rather than on the vegetables that were easiest and quickest to grow but brought lower returns, such as bok choy. This reflects not only their increasing commercial focus, but their rise out of poverty – they became less desperate for immediate cash and were able to plan and invest to increase longer term profitability.

The controlled environment of the greenhouses also provided a good opportunity to observe improved technical skills, production and income. The same groups of farmers, using the same inputs, with the same infrastructure, began operating the hydroponic greenhouses in the Sarin and Liurai communities in 2010. Each year they have increased productivity and improved their incomes significantly.

Productivity and Income Per Greenhouse Harvest		
	KG	$
Sarin 2011	11,385	11,375
Liurai 2011	14,028	12,393
Sarin 2012	15,123	16,324
Liurai 2013	18,311	19,119
Sarin 2013 (major pest outbreak)	*12,884*	*14,003*
Liurai 2014	18,534	19,590

Farming as a Business

The shift from subsistence to commercial farming requires major changes in farmers' production techniques, planning, use of resources, and engagement with the market. DAC farmers have developed the skill and confidence to shift to a market orientation in the following ways:

Shifting from seasonal to year-round consistent production

This is the most difficult shift for farmers to make. Serious technical challenges accompany vegetable production in both rainy and dry season, so traditionally a limited variety of crops is produced depending on the season. Farmers also traditionally plant, harvest, and sell only one or two times per year. Heavy labor and resource demands of staple crop production also present severe constraints to achieving consistent vegetable production. Meeting the market demand of supermarket buyers means farmers need to master advanced agriculture techniques, and plan their land use and labor in a completely new way.

In 2014, all farmers who participated in the program for the entire year made sales in at least 6 months of the year. 42% of farmers made sales in every month of the year. This is a major shift from the traditional one or two vegetable crops per year. It also is the pathway out of poverty. Farmers selling in 6 months or more had average annual income of $1,038, while farmers selling in all 12 months averaged $1,394.[1]

[1] Percentages based on the 448 DAC farmers that were registered in the program for 12 months in 2014.

Investing to expand and improve production

Scaling up subsistence to commercial production requires investment. To take full advantage of the opportunity provided by the contract farming model, farmers need to invest to attain the consistency, quality and quantity demanded by the buyers. DAC farmers invest in plastic tunnels to protect crops in rainy season; water pumps, hoses, pipes and storage to ensure adequate water year round; and inputs such as fertilizers and pesticides. Over 2013-2014, 50% percent of DAC farmers made significant investments, totaling $23,928. The greenhouse groups invested over $8,000 for maintenance and repairs to the greenhouse facilities. Overall, this represents a re-investment of almost 5% of *total income received by all farmers*. For farmers who were in extreme poverty when they joined the program, as a group to reinvest 5% of their income to grow their businesses is an exceptional achievement.

Organizing and negotiating with buyers

Subsistence farmers are price-takers for whatever excess product they bring to market. Commercial farmers can organize and negotiate with buyers, demanding not only fair prices but prices that give adequate incentive for them to put in the extra work and resources to grow the wide diversity of vegetables demanded by the supermarkets. DAC farmer groups have learned to conduct regular negotiations with their commercial partners. In February of 2012, representatives all farmer groups successfully negotiated with Kmanek for price increases on 65% of the target vegetables. In March 2013, farmer group negotiations with Dilimart resulted in price increases for 15 items and an overall price per kilo increase of 21%. In March 2014, farmer group representative again successfully negotiated with Kmanek. They requested price increases for ten vegetables, presenting arguments about their costs, risks and labor requirements for production. All ten increases were approved. Price increases ranged from 14% increase to 60% increase with an average of 34.4%.

Strong, Sustainable Farmer Organizations

DAC Community Mobilization team helped the farmers to build strong, sustainable organizations from the ground up. At the farmer group level, elections are held for President, Secretary and Treasurer. Farmer group leaders are responsible for maintaining the transparent bookkeeping system, facilitating communication with commercial buyers, and organizing their members' participation in technical assistance and training activities. They gather inputs from members prior to any leadership meetings, and take notes to report back to their members after the meeting.

Building on these strong farmer groups, DAC assisted the farmers to move to the next level of organization. The groups began meeting together to discuss the sustainability of their operations following the close of the DAC project. The 26 farmer groups in Aileu District, with 448 members, then organized themselves into 5 regional associations, with elected leadership for each region. 4 regions are partnered with Kmanek and one with Dilimart. They decided to formalize a District-wide association, and did the hard work of writing by-laws, opening bank account, discussing and implementing a membership fee structure, and establishing their mission, vision, and objectives. The Associacao Hortikultura Distrito Aileu (AHDISTAL) was formally registered with the Ministry of Justice on August 18, 2014. The leadership has visited every farmer group, as well as all Suco and District level government authorities, to introduce their Association and its mission, vision and objectives.

AHDISTAL is already taking on the sustainable continuation of DAC's technical assistance activities by creating a 2-week, full-time, on-site training program in vegetable production. The training program has been delivered twice by AHDISTAL members in the Seloi Valley. The National Employment and Vocational Training Center (CNEFP in Tibar) contracted with AHDISTAL for this program as the final practicum for their horticulture training program. The training was also provided to a group of staff and residents from two shelters for victims of domestic violence (from Suai and Maliana). Horticulture skills will allow the shelters to improve the food and nutrition of shelter residents, and also provide a new livelihood option for women residents when they leave the shelter.

AHDISTAL is also establishing a permanent office to serve their members in Aileu District. They are in negotiations with the District government to rent land, where they will share the location with Kmanek. They have future plans to develop a compost production business and collaborate with Kmanek to sell agriculture inputs in Aileu District.

In addition to the formation of AHDISTAL, DAC also facilitated the formal registration of two smaller Associations representing the greenhouse farmer groups. DAC assisted both Associations to complete business plans with operations, finance, maintenance, and investment components, which were fully implemented. Each Association invested over $4,000 from their savings accounts for planned repairs, upgrades and maintenance to greenhouse facilities.

Strong farmer groups must have participation from both women and men, to respond to the complete needs of families and communities. 30% of the farmer group members are women, but 50% of the elected leaders are women. DAC's Community Mobilization emphasis on transparency and communication in farmer meetings, secret ballots in elections, and the overall project emphasis on merit based activities has contributed to this excellent result in women's leadership.

Contract Farming Operations Scaling Up

DAC's two major contract farming lead firms, Kmanek Agriculture/Supermarket and Dilimart have clearly demonstrated their long-term commitment throughout the life of the program. Both firms have invested significant capital and management resources in building in-house capacity to manage and scale up their fresh vegetable supply chains. With DAC's guidance, they invested early and fully operate and control their own operations. Both firms are fully committed to sustaining their domestic vegetable supply chain.

Kmanek Agriculture/Supermarket began working with DAC farmer groups in 2010. Kmanek now works with 21 DAC farmer groups with 390 members. They have independently added 6 more farmer groups with 117 members. For their vegetable supply chain business, Kmanek employs 9 Aileu based staff, and 8 Dili based staff that are fully or partly employed within the vegetable business. Kmanek has made a very large investment in refrigerated trucks, cold storage, and chilled display cases for fresh vegetables, as well as operational costs for staff transport and computers.

Dilimart began working with DAC farmer groups in mid-2012. They now work with 6 DAC farmer groups with 84 members. They have independently added 6 more farmer groups

with 60 members. For their vegetable supply chain business, Dilimart employs 9 full time staff. Dilimart has invested in a refrigerated truck, motorcycles and computers for the staff.

W4 Supermarket began working with DAC farmers in mid-2014. They are already demonstrating strong commitment to building their local purchasing capacity. They have 4 farmer groups with 24 members. They employ several part time staff to manage their fresh produce business, and have installed chilled display cases and purchased a refrigerated truck.

High Quality, Tetum Language Materials

DAC leaves a legacy of creative, Tetum-language trainings, manuals and tools. DAC has also made important contributions to the understanding and analysis of the fresh vegetable sector in Timor-Leste through the Fresh Vegetable Value Chain Analysis, and the Fresh Vegetable Market Research (the most extensive data collection to date on any retail food sector in Timor-Leste). Both reports were published in Tetum and English

DAC was particularly successful in building capacity of local organizations to develop and deliver high quality training. DAC worked with Halarae on environmental management training, with HIAM Health on nutrition training, with Empreza Diak on bookkeeping systems, and with Timor Aid on the Farming as a Business training. DAC recognized that these were challenges facing the entire agriculture sector, and made the commitment not only to provide trainings to the DAC farmers, but to build the capacity of local organizations to expand and sustain this work.

Timor Aid's Farming as a Business training has been a fantastic local capacity success story. "Timor Aid's Farming as a Business curriculum began when the DAC project supported us to customize an existing agribusiness training (developed by GIZ) for delivery to semi-literate, subsistence farmers. With technical support from the DAC team, we adapted the training to the community level and made it more interactive," explained Timor Aid CEO Florentino Sarmento. "We continue to adapt it so now it varies from a one-day course for participants who already have some knowledge, to two or three days of training for newcomers. The course is now in its 10th edition as we adapt to new communities and their needs. For example, recently we added a module on production planning and budgeting." Other international organizations, including donor agencies from Germany, Australia and Spain, and the government of Timor-Leste have hired Timor Aid to provide its Farming as a Business training in locations across the country.

Other products that make a permanent contribution to the future development of the horticulture sector include:

- Horticulture Production Manual: A comprehensive guide to improved vegetable production available in Tetum, with an emphasis on practical experience of the DAC project in providing simple, replicable techniques that farmers can easily adopt.

- Pest and Disease Identification Manual: The only guide in Tetum to the most common pests and diseases. This manual (along with training) allows farmers, input suppliers, and other technical assistance providers to identify the problem and pursue appropriate solutions

- Pesticide Label Guide: Developed in Tetum to enhance understanding of the differences between insecticides, herbicides and fungicides; commercial names vs. active ingredients; and the necessary personal protective equipment to be used for all of the commonly available crop protection products in Timor-Leste.

- Pesticide Safer Use Training: Several trainings developed in Bahasa Indonesia and in Tetum. Targeted to outdoor vegetable production with focus on proper application methods and personal protective equipment.

- Water Use and Irrigation Training: Developed in Tetum to improve farmers' knowledge of the necessary amounts of water for vegetable production, and to develop solutions to common water availability, storage and distribution problems.

- Field Evaluation Tool: A unique tool that helps technical assistance staff to observe, assess, and analyze the conditions of an individual farmer, and make prioritized recommendations for improvements

As part of project closedown, these materials have been distributed in hard and soft copy to farmer groups, technical assistance NGOs, input suppliers, contract buyers, University agriculture departments, and the Ministry of Agriculture and Fisheries.

Lessons Learned and Recommendations

Transition from Subsistence to Commercial Agriculture

The transition from subsistence to commercial farming is not only a technical agriculture challenge. It requires a shift to a market orientation, and a change in how farm households organize their agriculture activities. Subsistence farmers focus on production of adequate food for their families, and are price-takers for any surplus. They plant and harvest according to traditional seasons, which are often tied to deeper cultural and spiritual belief systems. They do not plan, analyze or invest to improve profitability. Farming is not considered a business, although it provides the livelihood for over 85% of Timor-Leste's population.

Commercial farmers must grow according to market demand. They must produce the quantity, quality and consistency demanded by the buyers. This requires them to allocate land, labor and resources on a constant basis to their commercial production. Given the labor shortage in rural areas of Timor-Leste, and the strong adherence to traditional planting and harvesting seasons, it is difficult for farmers to make this transition. In the context of very high levels of food insecurity, it is a particular challenge for farmers to invest in cash crops during staple crop seasons. Farm families remain unsure whether basic foods will be available or affordable year round. The heavy demands of planting and harvesting staple crops are difficult to reconcile with the constant demands of a year-round cash crop. This presents a challenge for commercial buyers and supply chain management.

DAC has successfully supported Timorese farmers to manage this transition in a way that works best for their household. DAC's long-term, intensive engagement provided households with agriculture, business, and management skills. Farmers have seen that consistent commercial production has the potential to transform their standards of living. In 2014, all farmers who were part of the program for the entire year had vegetable sales in at least 6 months of the year, and attained an average income of $844 (189% higher than average rural income). 42% of farmers had vegetable sales in every month of the year, and their average income was $1,394. These are the farmers that have most successfully developed a diversified livelihood strategy that combines food security and commercial orientation consistently throughout the year.

Still, the transition to the modern methods is not necessarily applied to all household crops, nor is the transition to commercial farming equally adopted. Despite the evident success of these techniques, often highlighted by the farmers themselves, many still use traditional planting and growing techniques for their staple crops. Despite the guaranteed access to market, 58% of farmers did not sell in every month of the year. The farmers' commitment to their food security, and shortages of labor in rural areas, mean that during the intensive periods of staple crop cultivation, less time and labor can be devoted to cash crops. Social and cultural demands also influence a farmer's decisions on how and when to focus on cash crops. This will continue to present a challenge for supply chain management by commercial buyers.

Long term Intensive Engagement

Long-term assistance should be provided on a daily basis, for individual farmers, allowing farmers to go through the complete crop cycle at least two times (rainy and dry seasons) with daily accompaniment and advice from technical staff. This is in addition to more formal "trainings" such as a one-day workshop on irrigation or a three-month Farmer Field School. Translating "training" to actual farmer implementation can be extremely successful with adequate personalized follow-up. Encouraging and incentivizing farmers to continue to grow consistently throughout the year is a technical and lifestyle shift that demands a trusting and committed relationship with the technical staff, as well as intensive assistance to meet the technical challenges that vary across the seasons.

Importance of Integrated Agriculture and Business Training

Assisting farmers to participate in commercial agriculture production requires capacity building on agriculture technical skills and business skills/market orientation. Both are critical for farmers to make the transition from subsistence to commercial farming. All training should be customized to the level appropriate for Timorese farmers.

The extremely low level of development in agriculture in Timor-Leste is a challenge for any project hoping to demonstrate improved commercial agriculture techniques, both in terms of actual production and in terms of commercial marketing (market linkages, packaging, processing, etc.). Exposure to a functional commercial agriculture operation that was relevant for Timorese farmers (i.e. smallholder farmers using appropriate technology machinery, equipment and inputs) was transformative for the DAC farmers that attended training at the Value Chain Community in Indonesia. Many of these farmers had not previously been outside of Timor-Leste. The training was in-depth and intensive, lasting for one month, with a focus on practical hands-on learning. Working and living in VCC farm communities, DAC farmers learned not only the agriculture techniques and marketing systems, but gained a vision of the benefits of commercial farming for households similar to their own.

Importance of Market Linkage

In Timor-Leste, low productivity in every agriculture sector presents a major challenge for food security and economic growth. In order to justify making the investments in additional land use, labor, and inputs to scale up their production, farmers must have a clear, committed market linkage. The risk that they will produce but not be able to sell is too high, and unfortunately through government interventions (such as Povo Kuda Governu Sosa) or the failure of private sector players (such as FarmPro and Zero Star) farmers have been put in this position.

Market linkage agreements must be clear and developed through adequate individual and group discussions, preferably with the support of community leaders. It is difficult to gain the trust of farmers that are not familiar with participating in repeat marketing arrangement, and are not used to producing on a commercial scale. The buyer must demonstrate commitment to fulfilling their part of the agreement, often requiring some time and up-front sunk costs before the farmers really start to perform according to the buyers' requirements.

The most important aspects of a market linkage for the farmers are:

- Buyer purchasing product on site at farmer location
- Buyer providing clear market information on product, quantity and quality required
- Buyer provides access to inputs on site at farmer location (does not have to be provided free, more important to physically bring the required inputs)
- Price has proven to be less of a concern than the other logistical solutions that a committed buyer can provide.

Need for Staff Capacity Building

In Timor-Leste, low human capacity is widely documented and cited as a key challenge. Despite this, development projects rarely include a staff capacity building component. The assumption is often made that skilled field staff will be available. Projects that expect to improve the skills and knowledge of "beneficiaries" must also include a component for building staff capacity. Particularly as multiple large agriculture development programs launch, it is critical to have a systematic approach to building staff capacity.

Given the limited human resource pool in Timor-Leste, it was very difficult to recruit field staff that are willing to live in remote Districts and carry out hands-on field technical assistance. Of 270 applicants for a recent field staff position, only 4 had any relevant experience. As soon as staff gain experience, they prefer to move to positions based in Dili, preferably in an office.

Education levels are also a challenge. Of 31 DAC field staff, 58% have only high school diplomas. It is clear that their ability to learn the scientific and mathematical aspects of agriculture technical assistance lags behind their better educated colleagues. However, DAC has learned that staff from agriculture technical high schools, particularly those with exposure to the BACET curriculum, often perform better due to their practical training in agriculture field activities. DAC field staff with bachelor degrees in agronomy generally lack the most basic understanding of the practical application of improved agriculture techniques. Unfortunately, their theoretical understanding of the scientific principles underpinning improved agriculture is equally lacking, given the historically poor quality of education at the main universities in Timor-Leste.

DAC Activities

The following section provides a brief chronological overview of the DAC project activities.

DAC Progress Year One

As of August 31, 2011, DAC will have completed its first year and many of the year one activities have been implemented with a great degree of success. The project was ready to embark on the next phase of activities which was designed with the sustainability of the Special Horticultural Areas (SHA) in mind.

In Year One, eight activities were undertaken to improve the horticulture value chain in Timor-Leste. DAC completed the installation and initial operation of greenhouses and outdoor production technologies in Liurai and Sarin. We also provided intensive training and technical assistance to improve the productivity of farmers in the SHAs, and to help them organize and manage their groups and their participation in this commercial activity. We facilitated the development of a strong value chain relationship between the farmers and Kmanek Supermarket, in which Kmanek advances inputs and guarantees purchase of the resulting products. A third SHA in Seloi was identified and preliminary steps have been taken to introduce them to the value chain model and to outdoor production technologies.

To summarize DAC's impact, we present overall results in terms of number of people, amount of production, and value of sales.

DAC Year 1 Results

	People	Production (kg)	Value
Outdoor	152	82,848	$59,622
Greenhouse	42	21,581	$21,313
Total	152*	104,429	$80,935

*105 male and 47 female (greenhouse farmers are also outdoor farmers)

DAC Progress Year Two

As of August 31, 2012, DAC will have completed its second year, and is transitioning technical and managerial responsibility to the farmer group/commercial buyer partnership in the original contract communities. We are also preparing to launch new activities funded under the approved contract modification funded by the USAID ConocoPhillips GDA.

SHA farmer groups have produced 44 types of vegetables (32 varieties not previously grown in Timor-Leste) using both greenhouses and outdoor vegetable production technology (tunnels, drip irrigation). Even more important is the groundwork established for the development of a thriving horticultural industry by building the necessary value chain relationships between suppliers and buyers and promoting managerial capacity within the SHAs for continued development of this relationship.

People

Farmer groups in the eight original communities (Sarin, Liurai, Lequitura, and five communities in Seloi) are working directly with the commercial buyer, Kmanek Supermarket, to manage production and sales. They are able to provide important production data (germination and transplanting rates) to Kmanek, and to record and distribute sales revenue. Farmers in Seloi have organized group purchases of inputs facilitated by Kmanek transportation. Many farmers are understanding the value of investment in their commercial vegetable production and purchasing irrigation equipment, fertilizer, and even seeds when not available from Kmanek. In the two greenhouse communities, Sarin and Liurai, the groups have made an informed decision about the form of legal entity they will use and have begun the process of registering as Associations. All farmer group leaders meet monthly with Kmanek and DAC staff to share information and to identify and solve problems.

Production

Farmers in the eight original communities (Sarin, Liurai, Lequitura, and five communities in Seloi) are using many of the new technologies/management practices introduced by the DAC project in Year One and Two (see Annex 1). In the five communities in Seloi, farmers shared costs with DAC to install 56 plastic tunnels to improve production during the rainy season. DAC has also (ahead of schedule) identified more than five new communities for assistance under the expansion funded by the USAID-ConocoPhillips GDA, and begun to introduce new technologies/management practices. One community, Fatubossa, has already begun sales to Kmanek.

Value

Kmanek Supermarket has implemented many DAC recommended improvements to their management of the contract farming model, and is now able to independently manage nine farmer groups in subdistrict Aileu Villa. We have identified a second commercial partner, DiliMart, and are already introducing them to the management requirements of a contract farming model and identifying additional expansion sites to fill their demand for fresh local produce. To support the development of the horticulture sector overall, DAC staff have completed a horticulture value chain analysis, a Value Chain Basics training, and in-depth market research on the horticulture market in Dili.

To summarize DAC's impact, we present overall results in terms of number of people, amount of production, and value of sales.

DAC Year 2 Results

	People	**Production (kg)**	**Value**
Outdoor	169	96,710	$67,144
Greenhouse	34	21,107	$21,825
Total	169	117,817	$88,969

*111 male & 58 female (greenhouse farmers are also outdoor farmers)

DAC Progress Year Three

Dezenvolve Agricultura Comunitaria completed the third project year on August 31, 2013. The two primary goals for the year were achieved. First, technical and managerial responsibility for the contract farming operations in the original contract communities has effectively been transferred to those eight farmer groups and their commercial buyer Kmanek. Second, DAC exceeded the contract goals under the ConocoPhillips GDA agreement, expanding the program to include 17 new communities and 208 new farmers.

People

The eight original contract communities, Sarin, Liurai, Lequitura and five groups in Seloi, are independently carrying out their contract farming businesses with Kmanek Supermarket. DAC field technical assistants have been re-assigned to the expansion communities. The two greenhouse groups, Sarin and Liurai, successfully registered as Associations with the Ministry of Justice and became the legal owners of the greenhouse facilities.

208 new farmers and 17 communities were added to the program under the ConocoPhillips GDA expansion. Each of these farmers has received intensive on-site agriculture technical assistance, facilitation of farmer group organization and linkage to the contract farming operations, and business skills trainings.

DAC developed a customized, transparent bookkeeping system for use by the farmer groups and the commercial buyers. The system has reduced payment errors to almost zero, and is enthusiastically embraced by all farmer groups. DAC also developed a “Farming as a Business” training that helped farmers to understand the importance of planning and investment in their farm businesses. As a result, 88 farmers made significant investments to improve production. In 21 cases, these investments were financed through a DAC facilitated linkage to a microfinance institution.

All farmer group leaders meet monthly with the commercial buyers and DAC staff to share information and to identify and solve problems.

Production

DAC introduced two effective new training programs to give farmers the skills to boost production. Farmer Field School, a “farmer led” participatory training method, was completed in four communities and begun in eight more. Farmer Field School focuses on pest/disease control and soil fertility improvement through organic methods. DAC also sent the first 20 farmers to the international training center, the Value Chain Community in Bandung, Java to receive one month, hands on training in vegetable production. Both of these trainings have had “ripple” effects as other farmers observe and learn the new techniques.

Value

Two commercial buyers, Kmanek Agriculture and Dilimart, have taken full responsibility for planning and managing their vegetable supply chains with tools and training provided by DAC. DAC has provided technical training to input suppliers, continued with value chain analysis, and disseminated the results of in-depth market research on the horticulture market

in Dili. DAC worked through the Ministry of Agriculture to establish the Horticulture Working Group.

To summarize DAC's impact, we present overall results in terms of number of people, amount of production, and value of sales.

DAC Year 3 Results

	People	**Production (kg)**	**Value**
Outdoor	448	304,662	$230,267
Greenhouse	34	31,195	$33,122
Total	448	335,857	$263,388

*315 male & 133 female (greenhouse farmers are also outdoor farmers)

DAC Progress Year Four

Dezenvolve Agricultura Comunitaria completed the fourth project year on August 31, 2014. DAC has effectively handed over technical and managerial responsibility for the contract farming operations in Aileu District 26 communities with 448 farmers linked to Kmanek and Dilimart. Farmers' productivity and incomes continued to grow, fueled by investments in their farm businesses and advanced technical assistance. Two important new initiatives, the Trilateral Food Security Activity and the ConocoPhillips GDA funded expansion to 3 new Districts, were carried out successfully.

People

DAC's greatest achievement in this year was the formation and formal registration of the Aileu District Horticulture Association (AHDISTAL). The 26 DAC supported farmer groups in Aileu District, with 448 members, are organized into 5 regional associations, with leadership elected for each group and for each region. 4 regions are partnered with Kmanek and one with Dilimart. The Associacao Hortikultura Distrito Aileu (AHDISTAL) was formally registered with the Ministry of Justice on August 18. AHDISTAL leadership traveled to all farmer groups to discuss the mission, vision and objectives of the Association. The leadership also established relationships with local and District government authorities.

DAC and AHDISTAL guaranteed the sustainability of DAC's technical assistance activities by creating an on-site training and internship program, delivered by AHDISTAL members in the Seloi Valley. The National Employment and Vocational Training Center (CNEFP in Tibar) contracted with AHDISTAL for this 2 week, full-time, on-site program as the final practicum for CNEFP's horticulture training program. The training was also provided to a group of staff and residents from two shelters for victims of domestic violence (from Suai and Maliana). Horticulture skills will allow the shelters to improve the food and nutrition they provide to shelter residents, and also provide a new livelihood option for women residents when they leave the shelter.

The two Greenhouse Associations continued to thrive. DAC assisted both Associations to complete business plans with operations, finance, maintenance, and investment components. These plans were implemented well. Each Association invested over $4,000 from their savings accounts for planned repairs, upgrades and maintenance to greenhouse facilities.

DAC's Farming as a Business skills training and individualized technical assistance supported farmers to invest and grow their businesses. 137 farmers made significant investments to improve and increase their production. 82 loans totaling $24,820 were provided by either a microfinance institution or Kmanek Agriculture, with a 100% repayment rate.

DAC delivered several activities promoting vegetable nutrition. DAC partner HIAM Health, a leading nutrition education NGO that also implements community vegetable gardens, presented nutrition workshops to 61 representatives of 14 of the Aileu District farmer groups. DAC also sponsored a large and successful public event at Timor Plaza to promote vegetable consumption and vegetable nutrition, including exciting visual displays, cooking demonstrations, and booths from all major supermarket retailers of fresh local produce.

Production

DAC continued to deliver the successful, customized training programs that transform farmers' technical skills. Farmer Field School was completed with 16 communities in Aileu District, and 10 communities in the GDA Expansion area (Ermera, Liquica, Bobonaro Districts). 20 farmers from Aileu District and 30 farmers from the GDA Expansion area were sent to the Value Chain Community in Indonesia for one-month practical and theory training in outdoor vegetable production and marketing.

A special focus on irrigation improved farmers' water use, planning and management. Irrigation assessments and cost estimates for upgrades were completed for 231 farmers. Training in adequate water use for vegetable production, and capacity to assess, design and install improved water management / irrigation systems was delivered to 17 groups. As a result, 41 farmers have made investments in improving their water supply, investing $3,931. 6 small groups of farmers or individuals built water storage tanks (2,000 – 5,000 liters).

DAC created three pilot sites to demonstrate integrated agriculture approaches. The focus was on penning animals to collect manure and urine for high quality compost production or use directly as fertilizer. Penning and feeding animals also increases the weight and value of the animal. The activity has been replicated in communities across the Seloi Valley.

Safer use of pesticides was a significant focus during the year. A pesticide use survey was conducted among DAC farmers. A comprehensive assessment of the enabling environment (regulation, testing, health infrastructure) and the market of available pesticide/fungicide/herbicides was completed. Training materials on safer use guidelines for pesticide use were created, and training on those practices was given to 20 DAC outdoor production farmer groups, 2 greenhouse associations, and 4 input supply shops. DAC also created a Pest and Disease Identification Manual and a Pesticide Label Guide (clarifying information on active ingredients, toxicity class, and PPE requirements for all pesticides, fungicides and herbicides regularly available in Timor-Leste).

To ensure environmental sustainability in areas where DAC has introduced and scaled up vegetable production, DAC partnered with the RDP4 program of the Ministry of Agriculture to support farmers in multiplying and planting over 12,000 trees in 8 communities with 173 farmers in the Seloi Valley. In mountainous areas at greatest risk of erosion, DAC supported farmers to plant 1,750 trees and bushes, and partnered with environmental NGO Halarae to deliver contour line/terracing training. In addition to stabilizing slopes and preventing erosion, these plants can also serve as green manure to be used by the farmers in compost production or as fodder crops for animals.

DAC distributed materials and training for outdoor production facilities appropriate for each farmer's growing conditions. DAC maintained a rigorous standard for materials distribution, providing these inputs only to farmers that demonstrate commitment to the activity and have the appropriate growing conditions. In total DAC distributed plastic for growing tunnels or mulch to 393 farmers; plastic for nurseries to 315 farmers, and irrigation equipment to 142 farmers.

DAC completed the comprehensive Horticulture Production Manual in Tetum.

Value

DAC initiated the formation of the Horticulture Working Group in Year Three, and in Year Four the HWG met twice. In the first meeting, DAC facilitated a discussion about the mission and objectives of the HWG. The second meeting focused on better understanding the value chain and identifying problems and solutions at each level.

To improve performance at various levels of the value chain outside of the contract farming model, DAC provided three technical trainings to the input supply shops, including those in Dili, those supported by Mercy Corps in Ainaro, and one from Baucau. DAC also published a Business Directory for 5 Districts (Aileu, Ainaro, Liquica, Bobonaro, Ermera) that included contact information for buyers, technical assistance providers (government and NGO), BNCTL, and farmer groups.

Empreza Diak assisted Dilimart to customize and improve current management systems, strengthen staff capacity to implement those systems, and provide additional effective management reporting tools and processes.

Experts from the Indonesian fresh produce wholesaler and exporter Al Amana conducted a thorough assessment of the Kmanek supply chain, examining farmer production, grading, collection points, transportation, storage in Dili, and retail sales. Their final report and recommendations provide a clear roadmap for Kmanek's ongoing improvement of quality and sales. Following the recommendations, DAC also completed new materials and training for Kmanek's produce grading system. In partnership with Kmanek, DAC produced training materials for 8 products and delivered trainings to each of the 20 Kmanek partner groups.

New Initiatives

Trilateral Food Security Activity

DAC implemented the Trilateral Food Security Activity in collaboration with an implementing contractor from China AID and the Ministry of Agriculture. DAC's contribution was to test five varieties of beans and five varieties of onions to determine the best producers under various growing conditions; to manage 4 demonstration plots in 3 Districts for both bean and onion season; and to provide training to over 100 university students, MAF extension workers, NGO and donor program staff, and smallholder farmers. Results were presented in a final report.

ConocoPhillips GDA Expansion to New Districts

DAC also implemented the second ConocoPhillips GDA Expansion. 99 new farmers in 10 communities in Ermera, Bobonaro, and Liquica Districts were added to the program. Each of these farmer groups received intensive on-site agriculture technical assistance, Farmer Field School, international training in Indonesia, facilitation of farmer group organization, business skills trainings, and market linkages.

As part of the expansion, DAC also piloted two new market linkage models. One, with W4 Supermarket, includes an MOU, agreed price list, and sale of inputs to farmers (rather than "free" distribution). This linkage has worked well and is on-going. The second, with FarmPro, has failed due to FarmPro's weak model, as well as lack of commitment and follow

up. FarmPro did not make any fixed agreement with farmers, provide any regular access to inputs, or demonstrate any clear market demand. The FarmPro employee that was supposed to provide regular linkage and communication to the farmers was eliminated. This model was a failure.

To summarize DAC's impact, we present overall results in terms of number of people, amount of production, and value of sales.

DAC Year 4 Results

	People	**Production (kg)**	**Value**
Outdoor	547	446,582	$363,602
Greenhouse	34	18,534	$19,590
Total	547	465,116	$383,192

*376 male & 171 female (greenhouse farmers are also outdoor farmers)

DAC Year 5 Results – One Quarter Only

	People	**Production (kg)**	**Value**
Outdoor	547	137,324	$116,690
Greenhouse	34	9,007	$9,995
Total	547	146,331	$126,685

*376 male & 171 female (greenhouse farmers are also outdoor farmers)

Annex 1 Final Participant List

Summary of Farmer Group Participation	
Kmanek	
21	groups
390	farmers
Dilimart	
6	groups
84	farmers
Other buyers	
7	groups
58	farmers
Inactive groups	
3	groups
15	farmers
Sustained Participation	
547	number of registered farmers
476	farmers with recorded sales in 2014 to Dilimart, Kmanek, W4
20	active sale to local markets (no recorded sales of FarmPro linkage)
15	farmers in inactive groups
36	inactive farmers in other groups
91%	sustained participation

No	Farmer Group	Total Registered Farmers		
		M	F	Total
	Original Site			
1	Sarin (Kmanek)	13	12	25
2	Liurai (Kmanek)	15	7	22
3	Lequitura Kraik (Kmanek)	38	9	47
4	Foin Kaman (Kmanek)	11	11	22
5	Hakiak Moris (Kmanek)	10	7	17
6	Moris Foun (Kmanek)	10	3	13
7	Mudansa (Kmanek)	19	10	29
8	Tasonih (Kmanek)	19	9	28
	Total (OS)	135	68	203
	GDA 1 Expansion Sites	M	F	Total
9	Boklelo (Dilimart)	11	3	14
10	Cassamau I (Kmanek)	14	4	18
11	Cassamau II (Kmanek)	10	0	10
12	Dou Dato (Kmanek)	10	1	11
13	Fatubosa Aldeia I (Kmanek)	14	6	20
14	Fatubosa Aldeia II (Kmanek)	12	4	16
15	Fatulumau (Kmanek)	14	2	16
16	Fo Liman ba Malu (Kmanek)	6	13	19
17	Foin Mehi (Kmanek)	19	2	21
18	Halibur (Kmanek)	4	1	5
19	Remexio (inactive group)	4	1	5
20	Saboria (Kmanek)	15	7	22
21	Sarau I (Kmanek)	6	2	8
22	Sarau II (Kmanek)	3	8	11
23	Sarlala (Dilimart)	24	7	31
24	Talitu (Balibar) (inactive)			0
25	Teblor (Kmanek)	6	4	10
26	Casnafar (Dilimart)	8	0	8
	Total (GDA 1)	180	65	245
	GDA 2 Expansion Sites	M	F	Total
27	Gleno 1 (Maudio 1) (Dilimart)	9	1	10
28	Gleno 2 (Maudio 2) (Dilimart)	9	0	9
29	Railako (Haburas Bera) (Dilimart)	9	3	12
30-31	Ulmera I and II (W4 Market)	5	9	14
32	Maubara 1 (Barkau 1) (W4 Market)	2	6	8
33	Maubara 2 (Barkau 2) (W4 Market)	2	6	8
34	Loes (Haburas Fini) (W4 Market)	8	0	8
35	Atabae 1 (Madameta Haburas) (FarmPro)	4	6	10
36	Atabae 2 (Ai-tasi) (FarmPro)	3	7	10
37	Miggir (Bia-lape) (inactive group)	10	0	10
	Total (GDA 2)	61	38	99
	Total (OS+GDA 1+GDA 2)	376	171	547

Annex 2 Production and Income Summary

DAC Production and Income Results		
Indoor and Outdoor Production		
	KG	FARMER INCOME
Oct-Dec 2010	16,000	$ 16,000
Jan-March 2011	28,680	21,611
April-June 2011	22,955	17,637
July-Sept 2011	36,794	25,687
Oct-Dec 2011	35,431	26,324
Total 2011	**123,860**	**$ 91,259**
Jan-March 2012	16,950	13,857
April-June 2012	21,576	16,648
July-Sept 2012	43,860	32,140
Oct-Dec 2012	56,788	41,682
Total 2012	**139,174**	**$ 104,327**
Jan-March 2013	59,037	50,958
April-June 2013	97,647	77,648
July-Sept 2013	122,385	93,100
Oct-Dec 2013	133,583	101,931
Total 2013	**412,652**	**$ 323,638**
Jan-Mar 2014	71,523	57,441
April-June 2014	114,837	92,981
July-Sept 2014	145,173	130,838
Oct-Dec 2014	146,331	126,685
Total 2014	**477,864**	**$ 407,945**
PROJECT TOTAL	1,169,549	943,169

INDOOR PRODUCTION ONLY		
	KG	FARMER INCOME
Oct-Dec 2010	2,152	$ 3,046
Jan-March 2011	6,497	$ 5,794
April-June 2011	4,888	$ 5,581
July-Sept 2011	8,044	$ 6,892
Oct-Dec 2011	5,984	$ 5,501
Total 2011	**25,413**	**$ 23,768**
Jan-March 2012	5,235	$ 5,553
April-June 2012	1,550	$ 2,277
July-Sept 2012	8,338	$ 8,494
Oct-Dec 2012	-	$ -
Total 2012	**15,123**	**$ 16,324**
Jan-March 2013	18,311	$ 19,119
April-June 2013	-	$ -
July-Sept 2013	12,884	$ 14,003
Oct-Dec 2013		
Total 2013	**31,195**	**$ 33,122**
Jan-March 2014	-	$ -
April-June 2014	-	$ -
July-Sept 2014	18,534	$ 19,590
Oct-Dec 2014	9,007	$ 9,995
Total 2014	**27,541**	**$ 29,585**
PROJECT TOTAL INDOOR	101,424	105,845

OUTDOOR PRODUCTION ONLY			
Oct-Dec 2010	**13,848**	**$**	**12,954**
Jan-March 2011	22,183		15,817
April-June 2011	18,067		12,056
July-Sept 2011	28,750		18,795
Oct-Dec 2011	29,447		20,823
Total 2011	**98,447**	**$**	**67,491**
Jan-March 2012	11,715		8,304
April-June 2012	20,026		14,371
July-Sept 2012	35,522		23,646
Oct-Dec 2012	56,788		41,682
Total 2012	**124,051**	**$**	**88,003**
Jan-March 2013	40,726	$	31,839
April-June 2013	97,647	$	77,648
July-Sept 2013	109,501	$	79,098
Oct-Dec 2013	133,583	$	101,931
Total 2013	**381,457**	**$**	**290,516**
Jan-March 2014	71,523	$	57,441
April-June 2014	114,837	$	92,981
July-Sept 2014	126,639		111,248
Oct-Dec 2014	137,324	$	116,690
Total 2014	**450,323**	**$**	**378,360**
PROJECT TOTAL OUTDOOR	1,068,126		837,324
PROJECT TOTAL	1,169,549		943,169

Annex 3 DAC Project Monitoring and Evaluation Indicators

Dezenvolve Agricultura Comunitária (DAC) | **Indicator Reporting** | **February 23, 2015**

Year 5

A **Name:** Number of Farmers, Processors, and Others who have adopted new Technologies or Management Practices as a result of USG assistance

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015
	34	124	166	173	306	349	306	293	50	101

B **Name:** Number of Firms Receiving USG Supported Assistance to improve their Management Practices

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015
	34	90	167	177	311	467	316	576	102	94

C **Name:** Number of individuals who have received short-term agricultural sector productivity training with USG assistance, disaggregated by gender

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015
(total)	34	126	10	10	306	174	506	477	100	409
a. Men	17	84	7	8	214	110	354	294	66	266
b. Women	17	42	3	2	92	64	152	183	33	143

D **Name:** Number of Institutions/Organizations Mature/Viable in the Competency Areas as a result of USG assistance

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015
	0	0	3	9	10	16	15	23	7	8

E **Name:** Number of new technologies or management practices made available for transfer as a result of USG assistance

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015
	4	39	164	239	149	288	68	209	100	139

F **Name:** Number of new technologies or management practices under Field Testing as a result of USG assistance

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015

4	28	123	224	112	274	51	363	50	173

G **Name:** **Number of rural household benefiting directly from USG interventions**

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015
	34	124	166	169	306	349	306	293	50	101

H **Name:** **Number of Vulnerable Households Benefiting Directly from USG assistance**

Target/Result:	Target 2011	Result 2011	Target 2012	Result 2012	Target 2013	Result 2013	Target 2014	Result 2014	Target 2015	Result 2015
	0	7	7	7	10	11	10	28	1	2

Annex 4 DAC Success Stories in Pictures

USAID | TIMOR-LESTE
HUSI POVU AMERIKANU

Projetu
Dezenvolve Agricultura Communitária
(DAC)

DAC
MODO DIAK
MERCADO DIAK
MORIS DIAK

Investment

Farmers make investments in plastic tunnels or plastic mulch in order to protect their vegetable crops from heavy winds, rain, and intense sun. This improves production quantity and quality.

68 DAC farmers have made investments in plastic tunnels or mulch, totaling $15,590.

One tunnel costs approximately $200. A farmer using a plastic tunnel can increase their production by at least 25% per year.

Investment

Farmers also make investments in irrigation. Farmers need sufficient water for growing vegetables – providing proper quantity and consistency of water can increase production by at least 20%.

69 DAC farmers have made investments in irrigation, totaling more than $4,000.

23 DAC farmers have constructed water tanks to ensure that they have a sufficient and consistent supply of water. 41 farmers have purchased pumps, and others have invested in hoses or drip irrigation.

Investment

Farmers also invest to improve the quality of life for their families. Farmers use their improved incomes from vegetable farming to improve their families' nutrition, health and education. They also invest in improving their homes, and purchasing motorcycles.

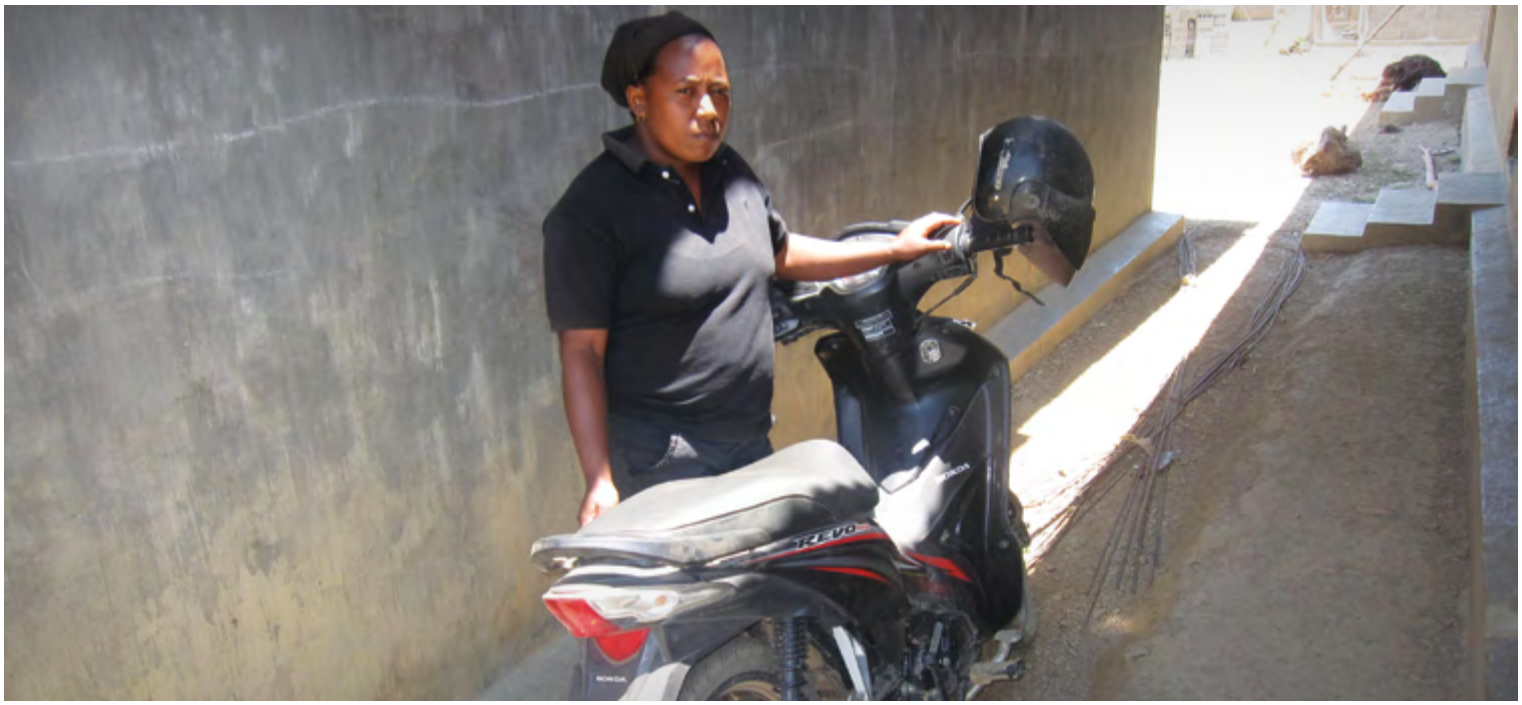
Many farmers have improved their housing. Here, Carlos Guterres Araujo of the Moris Foun group in Seloi Valley, Aileu District at his current home.

This picture shows Mr. Araujo with the new home he is constructing with the profits from his vegetable business. One challenge is the lack of labor in rural areas – when Mr. Araujo needs to take time to work on his house, his vegetable production declines. Economies of scale have not yet allowed for hiring labor.

Investment

Farmers also invest to improve the quality of life for their families. Farmers use their improved incomes from vegetable farming to improve their families' nutrition, health and education. They also invest in improving their homes, and purchasing motorcycles.

Some farmers have purchased motorcycles using the profits from the vegetable businesses. This motorcycle, purchased by Ms. Juliana da Conceicao of the Tasonih, is worth about $1300.



Some farmers use their business profits to send their children to receive advanced education, or to attend agriculture technical high schools in other Districts. Here, Mr. Florindo da Costa of the Hakiak Moris group with his son, who is attending the Dili Institute of Technology.

Credit

DAC farmers have a guaranteed buyer, who purchases their vegetables every week through the entire year. Their accounting system keeps a clear record of their weekly incomes. Because they have consistent income and clear records, the National Commercial Bank of Timor-Leste (BNCTL) and one of the lead firms, Kmanek Agriculture, are easily able to determine their creditworthiness and offer them loans.

- BNCTL and Kmanek have given 109 loans to DAC farmers.

- The total amount of credit from BNCTL and Kmanek to DAC farmers is $34,920.

VCC

DAC has sent 100 farmers to the Value Chain Community in Bandung, Indonesia for a one-month intensive training in advanced techniques for production and marketing.

The farmers learned that good vegetable production requires approximately 30-50 kg of compost for every seedbed. Traditionally, Timorese vegetable farmers use only 3-5 kgs. This experience has led to a large increase in the production and use of compost by DAC farmers.

The farmers learned two systems of vegetable cultivation. Monoculture produces only one type of vegetable per seedbed. Intercropping can produce several different types of vegetables in the same seedbed.

VCC

Farmers work directly with VCC member farmers in their fields, in order to learn new technologies to improve production and marketing.

Farmers learn about the entire cycle of vegetable production, from land preparation to harvest and post-harvest handling.

Farmers learn about quality control and grading standards according to market demand, as well as packaging and storage of vegetables to maintain quality.

VCC

When DAC farmers return to their communities after training at the VCC, they create demonstration plots to show the new techniques they have learned. When their demonstration plot is showing results, they develop and deliver a presentation to share more in-depth information with the other farmers in their group.

The VCC training was funded in part by the Bayu Undan / ConocoPhillips GDA. Farmers delivered a formal presentation to USAID, MAF, ConocoPhillips and the ANP explaining all of the new techniques they have learned at the VCC. The presentation was covered by TVTL news.

Participants' demonstration plots show the results of monoculture production of high quality zucchini, using plastic mulch and improved vegetable production techniques.

Integrated Ag

DAC's Integrated Agriculture pilot program taught two farmers how to properly pen animals and collect manure and urine for use in compost. After seeing the results, more and more farmers are replicating the system in the Seloi Valley.

DAC taught vegetable farmers proper techniques for penning their animals. Zinc roof protects the cows from rain and sun. Cement floors are easy to wash, protecting the cows from disease and making it easier to collect manure and urine.

Farmers need to collect fodder for their animals every day, which can be difficult. Sometimes, it works better for farmers to let the cows roam to feed during the day, and only provide enough food to pen them overnight.

Integrated Ag

Penning and feeding animals regularly, even if only at night, can increase the animal's weight, improve their health, and increase their value.

Condition of one of the cows used in the pilot program, before being penned. The animal is small and thin.

Condition of the cow after being penned (sometimes all day, sometimes only at night) for 6 months. The cow's weight increased by 78kg and the estimated sale price increased by $300.

Integrated Ag

Farmers used the manure and urine from the penned animals to create good quality compost. One cow can produce approximately 550kg of dry organic material over 6 months. This amount of organic material can produce approximately 1 ton of very high quality compost.

Cow manure collected from 3 penned cows during the 6 month pilot program.

Farmers use manure and urine to produce compost. Farmers can reduce the amount of money they spend to buy either manure or other fertilizer, improve the quality of their soil, and increase their vegetable production.

Terracing

Farmers in mountainous areas can use terracing to expand the land available for vegetable production while also preventing erosion. Farmers work hard producing compost and improving their soils, so they need to protect that good soil from washing away.

Halarae Foundation, a Timorese environmental NGO, trained four DAC farmer groups located in steep areas how to make terraces in order to grow vegetables.

This picture shows good terraces with vegetable production at the DAC farmer group Sarlala, Aileu District.

Contour Lines

Farmers in mountainous areas can use contour line planting for reforestation, or for planting beans and maize. Planting seedlings along the contour line can protect hillsides against erosion and landslides.

Farmers learning to use an “A” frame to mark contour lines on their land.

After marking the contour lines, farmers can grow tree seedlings, bushes, or beans and maize. DAC and the farmer groups produced tree seedlings to distribute to all members for their own land.

AHDISTAL

DAC assisted the establishment and formal registration of the Aileu District Horticulture Association (AHDISTAL – Asosiasaun Horticultura Distritu Aileu). AHDISTAL includes 21 vegetable farmer groups with over 400 members.

Group leaders from 21 vegetable farmer groups meet during the establishment of AHDISTAL.

Elected leaders of AHDISTAL traveled throughout Aileu District to introduce themselves and the Association mission, vision and objectives to all 21 vegetable farmer groups.

Timor Aid

In 2012, DAC and Timor Aid worked together to develop the "Farming as a Business" training, which helps farmers transition from subsistence to commercial farming. Timor Aid has gone on to modify the training in order to deliver it for other organizations working in rural development.

Farmers learn to calculate profit and loss, and how to evaluate risk and investments. After completing this training, 225 farmers went on to make investments in their businesses.

Between 2012-2014, Timor Aid and DAC delivered this training to over 450 farmers. Timor Aid also delivered the training to 323 other farmers receiving assistance from organizations such as Mercy Corps and Seeds of Life. Timor Aid customized the training to address the needs of coconut oil, improved seeds, and fish producers.

Empreza Diak

The successful partnership with local NGO Empreza Diak has strengthened the market linkage between the farmer groups and the contract farming lead firms. Between 2012-2014, Empreza Diak developed a bookkeeping system that ensured clear, transparent information about sales and payments which met the needs of both farmer groups and lead firms. They provided training to 17 farmer groups with approximately 350 members, as well as to the staff of the lead firms. In addition, Empreza Diak has provided customized management capacity building and internal system design to the lead firm Dilimart.

UV Plastic Tunnel

UV plastic tunnels are used for protection from heavy rain and winds during rainy season, making it possible for farmers to grow high quality crops year-round. Tunnels are easy to construct, using local materials (bamboo and wood) for the frame. In the dry season, the plastic can be removed in order to extend its lifespan. With care, the plastic can last for up to 4 years before needing to be replaced. The cost for all the materials needed for one plastic tunnel is approximately $200.

Drip Irrigation

Drip irrigation allows farmers to ensure their vegetables have adequate, consistent water with a minimum of time and effort. Farmers using bucket watering can spend 4-6 hours daily just watering. With drip irrigation, they are able to focus more on caring for their crops or doing other activities. Drip irrigation provides a very efficient use of water, especially important in dry season and in locations that have limited water supply. If farmers have an appropriate source of water, the cost for an average drip irrigation installation is $130.

Water Storage

Lack of water, particularly during dry season, is a major problem for vegetable production. Farmers can build cement storage tanks, use plastic tanks, or use plastic-lined ponds to collect water, often overnight when supply is available. DAC has assisted farmers to place tanks where gravity assists with both water collection and distribution to their seedbeds.