



Seeds of Life
Fini ba Moris



Impact Assessment of Seeds of Life's Capacity Building Program 2006-2015



Timor-Leste Ministry of Agriculture and Fisheries
Seeds of Life / Fini ba Moris

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Impact Assessment of Seeds of Life's Capacity Building Program

2006-2015

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This document contains the author's findings and conclusions about the impact of the capacity building program of the Seeds of Life (SoL) project. The evidence collected relates a credible performance story and supports the contention that SoL's capacity building activities have made a significant contribution to observed benefits. Plausible association suggests that changes in individual capacity engendered by SoL have rippled out to bring positive changes at wider levels, have laid the foundation for future improvements in Timor-Leste's food security situation and that the contributions of its capacity building efforts are largely sustainable.

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Executive summary

“Timor-Leste’s food security situation is precarious. Food insecurity is common due to several factors including low crop yields, lack of income generating activities, limited purchasing power, drought, lack of infrastructure, and underdeveloped markets. Over one-third of the population regularly experiences food shortages” (WFP 2016).

Seeds of Life (SoL) was conceived in direct response to this situation. SoL is funded by the Governments of Australia and Timor-Leste with Australian funding through Australian Aid and the Australian Centre for International Agricultural Research (ACIAR). The Centre for Plant Genetics and Breeding (PGB) within The University of Western Australia (UWA) coordinates the Australian funded activities. Active in Timor-Leste since 2001, SoL’s goal is “improved food security through increased productivity of major food crops” and it worked to achieve this by identifying and disseminating improved high yielding varieties of major food crops and building the capacity of those individuals who collectively constitute the foundation of a national seed system.

The capacity building component of the project is central to SoL’s approach as people with specialized technical skills are in short supply in Timor-Leste. As stated in the country’s most recent Strategic Development Plan, “Timor-Leste currently faces critical human resource constraints across most areas of our economy, as well as in government administration. This skills shortage will become more problematic as government programs expand in areas such as health, education, petroleum and agriculture, and private sector investment increases” (SDP, 2011).

Capacity building in SoL focuses on enhancing the knowledge and skills of agricultural professionals in the Ministry of Agriculture and Fisheries (researchers, extension workers, administrators, seed production staff, managers), collaborating NGO staff, staff working directly for SoL and farmer groups involved in growing certified and commercial seed. Capacity building is done to “To strengthen and embed the skills, systems and institutional capacity required for the successful and sustainable operation of a national foodcrop variety testing and seed management and distribution system with the MAF”.

With the project coming to an end this study was commissioned to look back and assess its actual and potential accomplishments and both quantitative and qualitative evidence was collected and analyzed in the effort. The quantitative analysis provides information on training effectiveness as well as numbers and categories of individuals trained. Evidence for the effectiveness of SoL training was obtained from two sources. One was an analysis of the pre- and post test scores of students in two topics for which relatively complete information was available – English and Mathematics. Results clearly showed substantial knowledge gains were achieved as a result of instruction. Also examined were the results of self assessments of competency of MAF-SoL staff over several years. Again, evidence was found showing that staff felt that their competency had risen steadily as a result of training received and experience gained from working in the project.

Looking at numbers trained showed that a substantial number of individuals had benefitted. From 2006 to 2015 SoL has provided 10,363 training opportunities to 2,653 individuals representing 37,196 training days of instruction. Ten individuals associated with the project were able to complete their MSc studies in Australia and Indonesia with project support. Overall, 31% of all the individuals trained by SoL were women and women took advantage of 23% of the training opportunities.

The qualitative analysis is based on interviews with 38 ‘alumni’ of SoL training events as well as 5 SoL advisors. Their responses were used to develop what is known as a “credible performance story to substantiate the claim that a project has made a significant contribution to an observed change”. Adhering to this model the interviews focused on eliciting alumni opinions on changes associated with SoL training at three levels—individual, institutional and societal. Questions were also asked to assess the longer term potential impact.

There was universal agreement among MAF staff and other professionals interviewed that SoL training has had a positive impact on them as individuals. Improved skills and competence were cited most often and benefits highlighted included a better understanding of agricultural research, higher motivation, better problem solving, more confidence in carrying out job related tasks and in dealing with farmers. Collaborating farmer seed producers indicated that their knowledge and skills had improved particularly in regards to seed production and management of profitable seed production enterprises and in the basics of establishing and running successful Savings and Loan (S&L) operations.

These benefits to individuals were reflected in interviewees’ conviction that their training had positive effects on organizational/association performance. Many professionals highlighted that training had helped them to form more productive relationships with peers and colleagues and that it resulted in better communication and more authority in dealing with farmers while running training activities or organizing on farm demonstrations. Farmers indicated that the technical and management skills acquired through SoL training had resulted in increased efficiency in their seed production operations and in the S&L operations many farmer associations have established with SoL assistance.

There was a general consensus among all interviewees that the application of their enhanced skills and knowledge was beneficial for agricultural development in Timor-Leste and food security in the country. Alumni cited their role in promoting effective seed production practices, assuring quality control in seed production and helping farmers adopt improved seed storage practices. Collaborating farmers were overwhelmingly adopting SoL varieties and production practices (row seeding, weeding timing, irrigation) in their own production plots and were pleased both with the improved yields of their crops and the quality of the produce. The new S&L operations were seen as central to future financial success and as a way to infuse much needed capital into their groups and their communities. Some S&L operations now have substantial amounts of capital which members can borrow to fund important economic and social activities.

Questions regarding sustainability elicited the greatest diversity of opinion and the most concerns. MAF Senior Managers were confident that, as a result of SoL’s efforts and the existence of a cadre of trained staff, the national seed system that would survive essentially intact. Lower level professionals in MAF were somewhat less confident and were especially doubtful about MAF’s ability to successfully maintain the system without SoL’s support and assistance. Of particular concern was the future of training in MAF. There was wide agreement that it would become increasingly difficult for MAF staff to take advantage of additional needed training and for MAF as a whole to improve through staff development. Also cited as a potential problem was the difficulty of absorbing many of the new MSc graduates back into the Ministry.

MSc graduates and farmers were quite optimistic about the future. The graduates were confident that there were abundant opportunities available either with MAF or elsewhere and they would have no difficulties finding suitable employment where they could apply their knowledge and skills. Farmers were certain that MAF would continue to contract seed production. They also felt that there were growing opportunities for selling quality seed to other customers. And they were

especially proud of the success of their S&L operations and had no doubts that these would continue and grow.

Taking all the evidence into consideration it is apparent that SoL's capacity building effort has had a substantial positive impact on wide range of numerous individuals as well as the organizations and associations with which they are affiliated. And, while there are substantial challenges to overcome in the future, the enhanced knowledge and skills of SoL alumni has laid a solid foundation for future gains in agricultural productivity and food security in Timor-Leste.

Introduction and background

Seeds of Life (SoL) has been active in Timor-Leste since 2001 with a goal of "improved food security through increased productivity of major food crops". This focus on Food security is well justified. As the World Food Program reports, "Timor-Leste's food security situation is precarious. Food insecurity is common due to several factors including low crop yields, lack of income generating activities, limited purchasing power, drought, lack of infrastructure, and underdeveloped markets. Over one-third of the population regularly experiences food shortages" (WFP 2016).

SoL's approach combines two complementary and synergistic components – relatively simple agricultural technology (identification, evaluation, multiplication and dissemination of improved high yielding varieties of maize, sweet potato, rice, peanut and cassava) and an emphasis on building capacity of those individuals who collectively constitute the foundation of a national seed system.

That the technology is beneficial is unquestionable. As of early 2016, 18 varieties deemed suitable by the project have been released, "that grown under normal farmers' practice are 25-130% higher yielding than local varieties of the same crops" (SoL 2014). But, given the situation in Timor-Leste, and in the absence of SoL's contributions, it would be unrealistic to assume that this technology could have become available or that farmers would have become aware of these improved seeds and been able to acquire and evaluate them in their fields. For this to occur, there needed to exist a system that coordinates varietal identification, testing, multiplication, quality control and dissemination. And such a system is composed of people.

SoL's capacity building efforts target agricultural professionals in the Ministry of Agriculture and Fisheries (researchers, extension workers, administrators, seed production staff, managers), collaborating NGO staff, staff working directly for SoL and farmer groups involved in growing certified and commercial seed. The objective of SoL's capacity building efforts is, "To strengthen and embed the skills, systems and institutional capacity required for the successful and sustainable operation of a national foodcrop variety testing and seed management and distribution system with the MAF" (Abdon 2011). Its strategy strives to ensure that capacity building efforts are participatory, gender sensitive, flexible, program focused and systematic. Although SoL as a project was inaugurated in 2001, its comprehensive training program has been active only since 2006, following a training strategy developed that year by a team from the International Rice Research Institute and updated in 2010. Since 2012 the project's training activities have been guided by a Training Program Management Strategy 2012-2015.

After 15 years of activity, SoL is scheduled to cease operation in June 2016. As part of an effort to look back and assess its actual and potential accomplishments a number of studies have been contracted to document and gauge project impact in key aspects of its work. On the following pages, the author's findings and conclusions about the impact of its capacity building program are presented.

Methodology

This study uses both quantitative and qualitative indicators of impact. The quantitative analysis provides information on training effectiveness as well as numbers and categories of individuals trained. This information was derived from a detailed training database developed and maintained by SoL. The qualitative analysis is based on responses obtained through interviews with 38 'alumni' of SoL training events as well as 5 SoL advisors.

The results of these interviews were used to develop what is known as a "credible performance story to substantiate the claim that a project has made a significant contribution to an observed change" (Gordon and Chadwick 2007). This is an accepted component of an evaluation framework wherein qualitative approaches are used to substantiate the proposed linkages between the training provided and the intended or observed outcomes. A qualitative survey "can help to substantiate that the measured benefits are, at least in part, attributable to the training (Templeton 2009).

A credible performance story is one that allows for plausible association which is sometimes referred to as the Ripple Model. Hailey and James (2003) provide a good explanation of the model's underlying logic. They state that,

"The capacity building intervention is like a drop of rain or a pebble that lands in water - the ripples flow outwards to bring about changes at an individual level. For example, it is plausible that a training course may bring about improved knowledge, new skills and attitudes. If course participants have been able to implement their learning in their organizations, then it is also plausible that change may also be experienced at a wider organizational level. For example, the improved technical skills of staff and the improved functioning of the internal organization should also enhance the quality of services provided by the partner to the communities. Ultimately this should result in changes in the behavior of the ultimate beneficiaries. By using the concept of plausible association it is possible to judge whether change at one level does indeed ripple out to bring about changes at a wider level".

Adhering to this model the survey focused on eliciting alumni opinions on changes associated with SoL training at three levels—individual, institutional and societal. "Capacity resides within individuals, as well as at the level of organizations and within the enabling environment (also referred to as the societal level)" (UNDP 2008). Or, as noted by Templeton (2009), "In sum, the benefits of capacity building can flow to the trained individual, other workers in the organization, the organization as a whole and communities. The community-level impact of the capacity built arises from the outputs generated (and adopted) when this capacity is used".

This study went one step farther and made an attempt to assess the longer term impact potential. For, even if a capacity building effort resulted in substantial gains at each of the three levels, if the gains are unlikely to last without continued project assistance, the ultimate value of the intervention must be questioned. Thus, an additional area of the interview asked alumni to judge the degree to which they would be able to apply their knowledge and skills after SoL is no longer active in Timor-Leste.

Effectiveness

As a first step in determining training impact an effort was made to assess changes in knowledge resulting from training activities. This was done in 2 ways. The first was by analyzing pre- and post

test scores for courses in 2 representative topics for which inclusive data was available- English and Mathematics.

Figure 1 below shows averaged pre- and post-test scores for 264 learners who participated in 23 mathematics courses offered between 2010 and 2014. These figures clearly show substantial learning improvements at all levels of mathematics training.

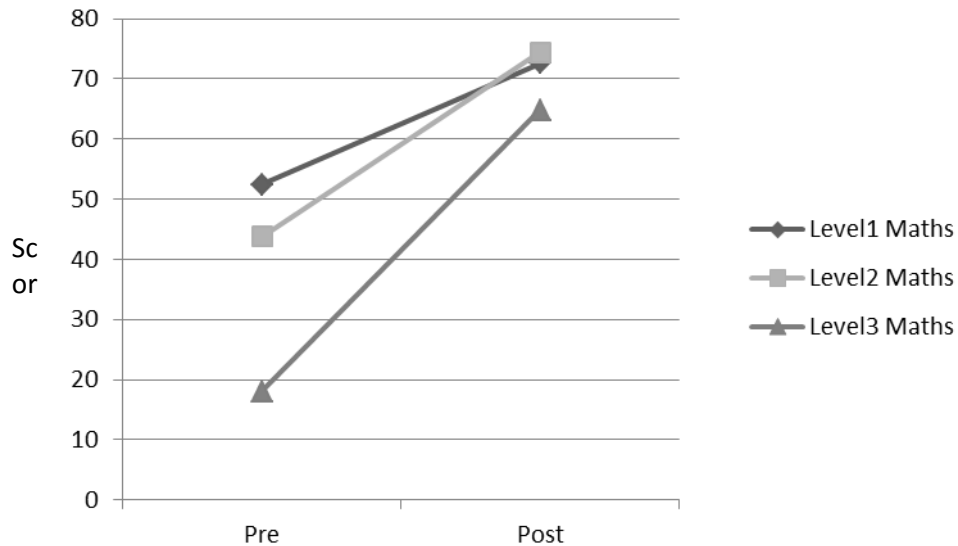


Figure 1. Averaged pre- and post-test scores for 264 learners in 23 mathematics courses offered by SoL between 2010 and 2014.

Similar gains were observed in an analysis of pre- and post-test scores for English courses. Figure 2 shows averaged scores of 1,247 learners measured before and after 26 course offerings.

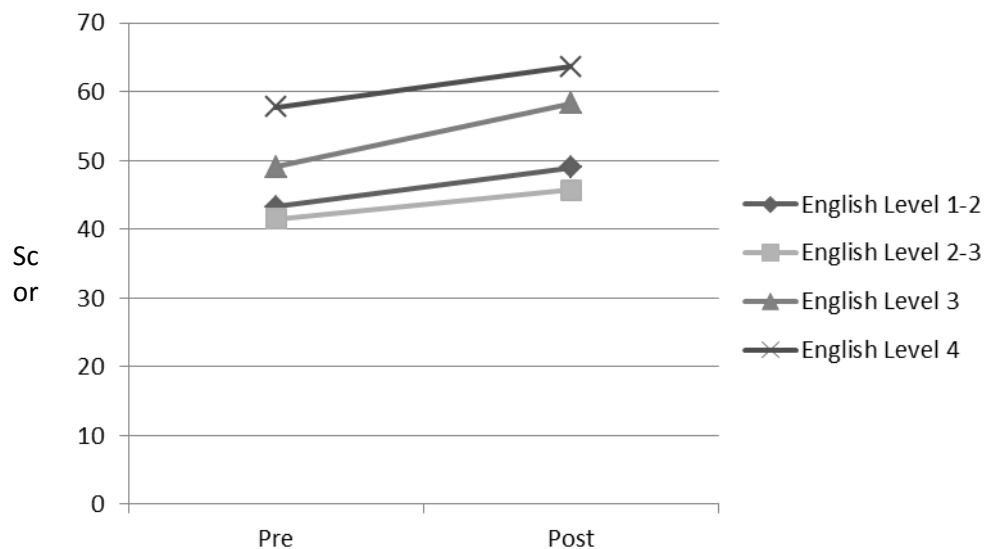


Figure 2. Averaged pre- and post-test scores for 1,247 learners in 26 English courses offered by SoL between 2010 and 2014.

While consistent and comprehensive pre- and post data were not available for many of the other topics taught, these results are considered to be indicative of the quality of SoL training and the substantial gains in knowledge associated with the project's training activities.

The second manner of documenting knowledge gains involved examining the results of self assessments of competency of MAF-SoL staff over several years - an exercise started in 2008 to obtain information on capacity development required to implement program activities. These competency assessments were “moderated self-assessments”, i.e. each staff member assessed his or her level of capacity for a range of competencies or skills on a scale of 1 to 4. The self-assessment were then often checked by the advisor who worked most closely with the MAF-SoL staff to see if this was a fair self-assessment, and – if he or she so wished – to either up- or downgrade the rating if there was a need for such a correction (SoL 2016).

The overall self-assessment scores from 2008 to 2015 are shown in Figure 3 with linear trend line. Numbers of self assessors for 2008 and 2009 are estimates based on supporting documentation.

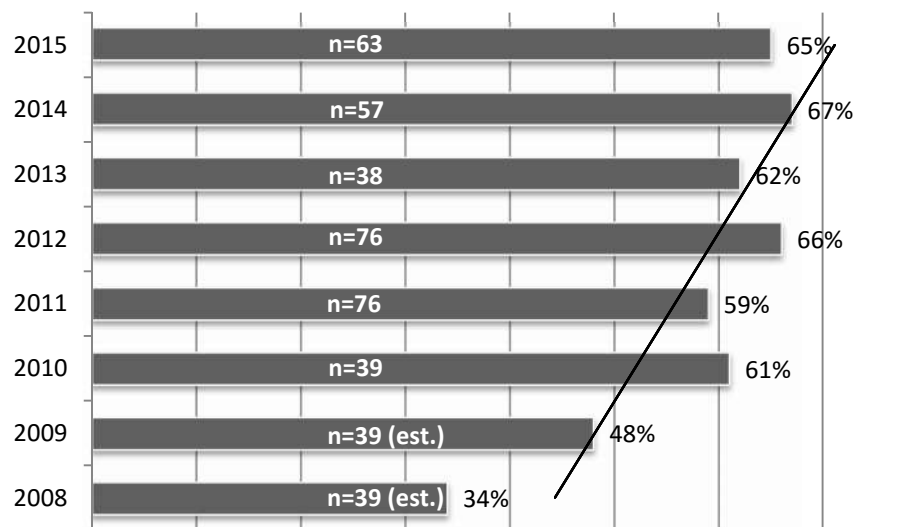


Figure 3. Self-assessment scores and number of participating staff 2008-2015 (SoL, 2016)

While indicative of overall increasing self perceptions of competence, it must be acknowledged that such measurements may not accurately reflect verifiable competency gains (Ward et al. 2002) (Brown and Harris 2013). Self assessment has, however, been shown to be a powerful learning tool and studies have confirmed that self-assessment contributes to higher student achievement and improved behavior (Ross 2006) and that the self-assessment process helps students develop greater awareness of the quality of their work and criteria by which their work can be evaluated (Brown and Harris 2013). Also affecting the validity of these measurements was that between years there were differences in the list of competencies against which the self-assessments were made, and differences in the categories and number of MAF-SoL staff who took part (SoL 2016).

Accomplishments: By the numbers

This section presents an analysis of 10 years of training data collected by SoL from 29 January 2006 through 11 January 2016. While a limited number of training activities will continue to be offered until the project closes in June 2016, what is presented here is felt to provide an accurate assessment of SoL’s accomplishments in terms of output.

As indicated earlier, SoL’s capacity building program focuses on 4 main target groups: staff of the Ministry of Agriculture and Fisheries, staff working in NGO’s collaborating with SoL, collaborating farmers and private seed producers and SoL project staff. Overall SoL provided 10,363 training opportunities to the various target groups with MAF staff the greatest beneficiaries (70%). The

number of unique individual participating was considerably lower (2,653) as most trainees attended multiple training events. The number of unique MAF staff represented 43% of the entire 2,196 staff of the Ministry. On average, each trainee took advantage of 4 training opportunities comprising some 14 days of training although a majority of individuals (58%) availed of just one training opportunity. Using unique individuals to look at numbers reached in each target group clearly shows that farmers comprised the largest group (55%) (Table 1)

Table 1. Number of opportunities and total training days offered to various target groups and count of unique individuals trained in each group 2006-2015.

Trainee Category	No. individuals	No. opportunities	No. days
MAF staff	955	7,338	32,169
NGO staff	195	260	517
Farmers	1,454	2,247	2,797
SoL staff	49	518	1,713
Totals	2,653	10,363	37,196

An overall indication of the degree to which individuals participated in numerous training events is provided in Table 2 below.

Table 2. Frequencies of multiple training opportunities received by individuals.

No. of training opportunities/individual	No. of individuals	% of individuals
>=100	4	0.15
75-99	10	0.38
50-74	16	0.60
25-49	45	1.70
10-24	97	3.66
5-9	314	11.84
2-4	663	24.99
1	1504	56.69
Totals	2,653	100.00

Further analysis showed that numbers of individuals attending multiple training events varied widely between target groups with MAF and SoL staff receiving the most intensive training. An indication of training intensity for each major target group is presented in Table 3.

Table 3. Relative training intensity for various target groups.

Target Group	Avg. no. Training Opportunities/Individual	Avg. no. Training Days/Individual
MAF staff	8	34
NGO staff	1	3
Farmers	2	2
SoL staff	11	35
Overall average	4	14

Looking at female participation indicated that overall, 31% of all the individuals trained by SoL were women and that women took advantage of 23% of the training opportunities. There was, however, wide variation depending on the target group. For example, among farmer collaborators women

comprised 38% of the participants and 40% of the unique individuals trained. This is in contrast to women employed by MAF where female participants comprised just 18% of those receiving training and 19% of the unique individuals. These numbers are, however, close to the 20% percentage of female employees in the Ministry. (Table 4).

Table 4. Percent of male and female participation in SoL training events by target group (2006-2015).

Target group	Individuals			Opportunities			Days		
	M	F	% F	M	F	% F	M	F	% F
MAF staff	788	181	19	6,001	1,337	18	24,625	7,544	23
NGO Staff	152	41	21	209	51	20	433	84	16
Farmers	865	578	40	1,393	854	38	1,702	1,095	39
SoL Staff	38	10	21	333	185	36	1,193	520	30
Totals	1,843	810	31	7,936	2,427	23	2,7953	9,243	25

SoL provides training opportunities in a number of topics considered to be essential for the efficient and effective functioning of a national seed program. Appropriately, the greatest number of training opportunities were provided in the area of seed production (Table 5).

Table 5. Number of training opportunities provided to target groups in various subject areas.

Topics	Target Group				Total	Total %
	MAF staff	NGO staff	Farmers	SoL staff		
Seed production	2,005	172	949		3,126	30
English	1,933	5	1	272	2,211	21
Statistics	838			3	841	8
Savings and loans	45	7	693		745	7
Gender	573	4	3	21	601	6
Mathematics	420	1		20	441	4
Computer application	414	5	3	4	426	4
Communication	380	21	1	10	412	4
Business planning	30	1	365		396	4
Agronomy	315	9	12		336	3
Administration and management	110	13	13	179	315	3
Nutrition	95	2	203	4	304	3
Information technology	77			4	81	1
Social science	40	19	4	1	64	1
Soils	45	1			46	0
Survey data collection and analysis	18				18	0
Grand Total	7,338	260	2,247	518	10,363	100

SoL employs a variety of educational approaches to teach this range of topics including in-country short course classroom training, workshops, international and local study visits and field demonstrations. SoL support was also provided for MAF personnel to study for MSc degrees in both Indonesia and Australia. A representation of the degree to which SoL applied each of these mechanisms is presented in Table 6 below.

Table 6. Number of training opportunities and training days provided through SoL’s main training delivery mechanisms.

Mechanism	# opportunities	% opportunities	# days	% days
Short-course	9,077	88%	23,804	64%
Workshop	894	9%	1,634	4%
Field Demonstration	209	2%	260	1%
Study Visit	173	2%	1,068	3%
MSc (Master's Degree Course)	10	0%	10,430	28%
Totals	10,363	100%	37,681	100%

Table 6 clearly shows that, in terms of opportunities provided, by far the greatest number of these were through short courses. In terms of training days, however, it can be seen that MSc training accounted for a 28% of the training days supported by the project. Ten MAF staff (7 male, 3 female) were supported to complete MSc programs at the University of Western Australia (6) and Bogor Agricultural University, Indonesia (4). Areas of study were Agronomy – Plant Breeding (5), Social Science (2), Agricultural Economics, Plant and Soil Science (1), Seed Science and Technology (1) and Agronomy – Tissue Culture (1).

While training for farmers and NGO and SoL staff covered only a limited number of positions and levels, training of MAF staff was comprehensive with a wide range of employees targeted – from support staff (drivers, guards, etc.) to senior staff. (Table 7)

Table 7. Number of training opportunities provided to various position levels in MAF (2006-2105).

Position	No. opportunities	% opportunities
Researcher	2,627	36%
Extension Staff	2,271	31%
Seed Production Staff	1,263	17%
Administration	703	10%
MAF Senior Staff	320	4%
Gender officer	96	1%
Support	58	1%
Totals	7,338	100%

Looking at SoL training over the years indicates an upward trend followed by a decline in 2014 and 2015 in both number of opportunities and in training days provided. (Figures 4 and 5). That numbers dropped over the last 2 years of the project can be explained by a number of factors. According to interviews with project staff, the reason for diminished opportunities was that there was less classroom training and more emphasis on coaching and mentoring as the project’s focus shifted from implementation to transition related activities. This required more on-the-job training to prepare the new managers and technicians to assume control of the system. The sharper drop in training days in later years is largely a function of MSc students completing their studies and returning to work in Timor-Leste.

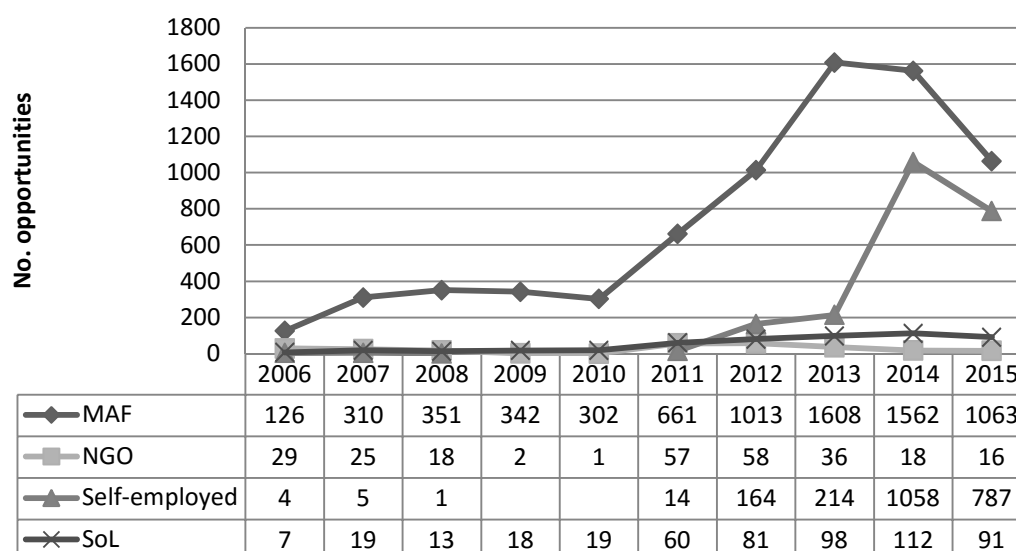


Figure 4: Number of training opportunities provided by SoL to various target groups by year 2006-2015 (n=10,363).

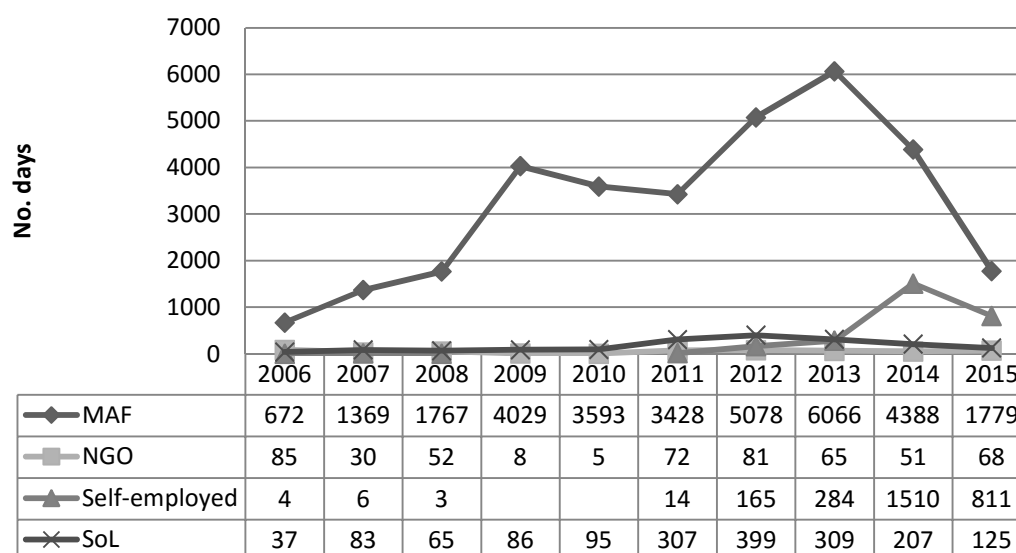


Figure 5: Number of training days provided by SoL to various target groups by year 2006-2015 (n=37,196).

As mentioned previously, although significant, on-the-job training through mentoring and coaching is not captured by SoL's training database. SoL advisors indicated that up to 70% of their time was allocated to activities of this nature and directed to MAF and project personnel, farmers and students in the Faculty of Agriculture at the National University of Timor Lorosae (UNTL). Beginning in 2006, the work of some 10 to 15 UNTL students per year was supervised and assistance provided by SoL advisors in the preparation and reporting of their final year research. Other training not reflected in the tables and figures above was SoL's practice of linking and collaborating with other organizations providing relevant training to SoL stakeholders. It must also be acknowledged that a major responsibility of the 370 Extension officers trained by SoL was to train farmer members of the Community Seed Production Groups (CSPGs) in such topics as seed production, post harvest and seed storage. This train-the-trainer activity would have reached up to 14,000 CSPG members.

Impact: Alumni insights

While the numbers are certainly impressive, the question arises about the actual importance of these accomplishments in terms of SoL's goal and objectives. Is this considerable investment of time and resources justified? Did this training really make a difference? If so, can these benefits be sustained into the future when project support is no longer available?

In order to provide answers to these questions 43 individuals were interviewed between 27 November 2015 and 10 February 2016. Interviewees represented all categories of training alumni as well as SoL advisors. Interviews were conducted in Dili and in 4 Municipalities throughout the country (Aileu, Baucau, Bobonaro, Liquica). (Table 8)

Table 8. Number and type of individuals interviewed.

Interviewee Classification	No, individuals interviewed
Farmer collaborators	8
MAF administrative staff	2
MAF extension staff	6
MAF researchers	7
MAF seed production staff	7
MSc graduates	4
SoL advisors	5
MAF senior managers	3
NGO Staff	1
Totals	43

Interviews focused on soliciting responses to 4 key questions:

- How has SoL training affected you as an individual?
- How has SoL training made a difference in your workplace?
- How has SoL training impacted your contribution to society?
- Is the training you received sustainable?

Impact on individuals

There was universal agreement among MAF staff and other professionals interviewed that SoL training has had a positive impact on them as individuals. Improved skills and competence were cited most often and benefits highlighted included a better understanding of agricultural research, higher motivation, better problem solving, more confidence in carrying out job related tasks and in dealing with farmers. As one MAF employee explained – “Before training seed was just seed. Now we know much more and can recognize classes and different characteristics of seed.” This confidence and competence led many to note that they were now much more autonomous and their dependence on SoL advisors for instruction or assistance had decreased dramatically. English training was greatly appreciated by all as it was felt to be a great asset in dealing with visitors and in accessing internationally published information. It also opened opportunities for study tours to foreign countries and was instrumental for admission to advanced foreign study opportunities. All MS graduates interviewed indicated that they had no ability to speak or read English before participating in SoL's English training program. The first hand exposure to foreign ideas and approaches to running a national seed system during overseas study tours was seen as extremely valuable especially by MAF senior management although many admitted that it was often difficult to apply this knowledge in Timor-Leste.

Collaborating farmer seed producers indicated that their knowledge and skills had improved particularly in regards to seed production and management of profitable seed production enterprises and in the basics of establishing and running successful S&L operations.

Impact on organizations/associations

These benefits to individuals were reflected in interviewees' conviction that their training had positive effects on organizational/association performance. Many professionals highlighted that training had helped them to form more productive relationships with peers and colleagues and that it resulted in better communication and more authority in dealing with farmers while running training activities or organizing on farm demonstrations. Attendance in SoL sponsored conferences, workshops and meetings was perceived as an extremely valuable networking mechanism particularly among senior management. SoL facilitated in-country meetings and collaborative planning with other directors was greatly appreciated and annual Municipal level work plans were considered to have improved tremendously. The 3 MSc plant breeding graduates interviewed were obviously disappointed that their plant breeding expertise could not be readily applied in Timor-Leste even though all recognized that it was important and hoped that MAF would emphasize this discipline in the future. They did, however, acknowledge that the application of other aspects of their training was benefiting MAF, and in the case of one, Catholic Relief Services (CRS). Cited as direct results of their work in MAF and for SoL was the institution of variety release documents characterizing new varieties and streamlining and improving the varietal release process. The MSc graduate working for CRS is proud to be able to support CRS efforts with ideas and technical support as well as training and mentoring CRS staff in the areas of statistics, experimental design, computer and report writing.

Farmers indicated that the technical and management skills acquired through SoL training had resulted in increased efficiency in their seed production operations and in the S&L operations many farmer associations have established with SoL assistance. They maintained that they were increasingly able to independently manage their operations and competent to collaboratively plan for the future and resolve problems arising in their associations.

Societal impacts

There was a general consensus among all interviewees that the application of their enhanced skills and knowledge was having a number of potential impacts on agricultural development in Timor-Leste and food security. Alumni cited their role in promoting effective seed production practices, assuring quality control in seed production and helping farmers adopt improved seed storage practices. Success in these endeavors was largely attributed to more effective farmer field days and better communication with farmers. The release by MAF of 18 official varieties was seen as a major accomplishment in which they felt themselves to be key players.

Collaborating farmers were overwhelmingly adopting SoL varieties and production practices (row seeding, weeding timing, irrigation) in their own production plots and were pleased both with the improved yields of their crops and the quality of the produce. As one farmer described his experience with a SoL sweet potato variety, "It produces more food for my family and also tastes good." Farmers in the community were showing increasing interest in learning more about their techniques. The new S&L operations were seen as central to future financial success and as a way to infuse much needed capital into their groups and their communities. Some S&L operations now have substantial amounts of capital which members can borrow to fund important economic and social activities.

Sustainability

It was clear from interviewee responses that SoL training was credited with positive improvements in individual competencies and organizational performance and that this had resulted in important changes in farmer fields and rural communities. But when the subject turned to the future there was considerable diversity of opinion about the degree to which the current achievements could be sustained when SoL comes to an end.

MAF Senior Managers were confident that the national seed system that was established with SoLs support would survive essentially intact. MAF, they indicated, is committed to encouraging farmer seed production groups and purchasing and distributing farmer grown seeds. They were appreciative of SoL training and felt that MAF staff were competent to independently continue all national seed related operations and that the transition process would proceed without major difficulties. Lower level professionals in MAF were somewhat less confident. While they agreed that the skill foundation has been laid and they are motivated to make the system succeed, they cautioned that this might not be enough to guarantee that a functioning national seed system would survive in the coming years. A key concern was with national commitment and ability of the government in general and MAF in particular to effectively support and manage a national seed system. There was general consensus that finance will be a problem in terms of both absolute amount and, more worrisome, timeliness of budget allocations. A major factor in budget delays was identified as the mismatch between the government budget cycle and the agricultural cycle. MAF budget is allocated by Parliament in December but funding is most critical in October just before the start of the main planting season. Budget allocations for maintenance and operational costs were projected to decline significantly. For example, a data management officer confided that his computer containing all seed distribution information for a Municipality is infected with viruses and his monitor is showing signs of imminent failure but has been told that there were no funds or maintenance, repair or replacement of computer equipment. Transportation is seen to be another victim of budget shortfalls. Extension officers are worried they will not be able to transport seed and that seed delivery to farmers will be too late for planting as vehicles are often out of service and take long to repair. This situation is seen to have consequences for Extension agents' ability to respond in a timely manner to farmers requests for assistance and seed with a resulting erosion of trust.

Of particular concern was the future of training in MAF. There was wide agreement that it would become increasingly difficult for MAF staff to take advantage of additional needed training and for MAF as a whole to improve through staff development. MAF staff noted that requests for training were not responded to, that training offered by MAF was not particularly relevant based on previous training and job responsibilities and that the trainee selection process was less than transparent. Other concerns about MAF administered training were that there was often poor communication between staff and supervisors and very little encouragement from supervisors for recently trained staff to share received information and skills with peers. Also cited was that support for recently trained staff to fully apply their new knowledge and skills was often minimal.

The future of the SoL trained MSc graduates, and their ability to contribute to MAF programs, was also widely regarded as a serious issue. SoL's investment in these individuals was considerable and included support for international travel, living expenses, research costs, tuition and research expenses. That these individuals can potentially make a major contribution to MAF and agricultural development in Timor-Leste is unquestionable. If all 10 are successfully integrated into MAF it will increase the number of post-graduates in the Ministry from the current 29 to 39 and allow MAF to take advantage of considerable new scientific and managerial expertise. But the integration process is facing difficulties. Although all individuals supported for MSc training were MAF staff at the beginning of their studies, they were not continued on MAF's staff roster during their absence and only 5 of the 10 have successfully achieved public service status in MAF. Of the others, 3 are working in MAF but under contract to SoL and 2 are employed in NGOs. A number of individuals

interviewed indicated that they felt that if MAF does not successfully recruit these qualified scientists, at a level that recognizes their qualifications, skills and expertise, the Ministry would be missing a valuable opportunity.

The MSc graduates themselves also shared some concerns during their interviews but were generally optimistic about their future prospects. They seemed to feel that they would not face serious difficulties in finding employment where their skills, experience and qualifications could be utilized whether this was in public service with MAF or elsewhere. They were confident that numerous opportunities were available in donor funded agriculture projects and that working in the private sector might be an attractive option. One has already initiated discussions with a major food processing operation to supply aflatoxin free maize.

Collaborating farmers were also generally positive about the future. Many were certain that MAF would continue to contract seed production and cited the government's policy to reduce seed imports. This confidence was supported by the statements of a National Director who confirmed that doing so was a MAF priority. All farmers wanted to continue their associations and many were convinced that there would be a market for quality seed even if MAF no longer contracted seed production. Some were actively exploring other customers and mentioned that they had been contacted by other farmers in the community not members of their association who were interested in purchasing seed. NGOs and development projects were seen as another potential outlet. One farmer association leader even stated that he has had to turn down requests for seed and offers of assistance from several organizations including IFAD, World Vision and GIZ because production is currently too low and he feared he would be overwhelmed with management tasks. His association has, however, accepted the donation of several sewing machines from the local church to provide off farm employment opportunities primarily for its female members. The S&L operations are obviously quite valuable income generating mechanisms and most associations proudly revealed their positive balances ranging from \$1,200 to \$6,000 that is being productively used by members to improve their livelihoods and local communities. It appears that strong, well managed associations have considerable potential to survive and thrive whether or not MAF's seed buying program is continued.

Summary and conclusions

From a quantitative perspective, there is little doubt that SoL's capacity building program has achieved impressive results. All measurements of training effectiveness showed positive gains in knowledge and competence. And the numbers of individuals receiving training and training opportunities provided were substantial. From 2006 to 2015 SoL has provided 10,363 training opportunities to 2,653 individuals representing 37,196 training days of instruction. Beneficiaries have included MAF staff, NGO collaborators, collaborating farmers and staff working directly for the SoL project. Ten individuals associated with the project were able to complete their MSc studies in Australia and Indonesia. Overall, women took advantage of 23% of the training opportunities and represented 31% of all unique individuals trained.

Additional information collected through interviews with alumni of these training events provides compelling evidence that SoL's capacity building program has been popular and successful. It appears that it has made great strides towards achieving its goal, "To strengthen and embed the skills, systems and institutional capacity required for the successful and sustainable operation of a national foodcrop variety testing and seed management and distribution system with the MAF". Substantial improvements were confirmed at all levels – individual, organizational and societal. Equally, or perhaps more important, there are strong signs that much of what the project has

accomplished in terms of capacity building will continue to provide benefits when SoL is no longer active in Timor-Leste.

This assessment was confirmed by the observations of SoL advisors interviewed. Changes in individuals highlighted by advisors included better technical skills overall, improved attitudes, more openness to change, better communication skills, higher confidence especially in dealing with farmers, enhanced abilities to argue a case based on scientific evidence and research results and more willingness to cooperate and work in teams and help colleagues. One advisor related that, in SoL's early days, MAF research staff could not read and understand experimental plot layout maps on paper and relate this information to physical plots on research stations and farmers fields. Now, these same individuals are doing combined yield analyses over time and multiple locations.

At the organizational level advisors agreed that MAF has made tremendous strides. Advisors characterized early MAF as lacking a culture of or appreciation for scientific agriculture and research. In those days the newly trained staff were seen as relatively insignificant "young kids" who would disappear as soon as SoL did. Over time, however, these kids have become more accepted and there was agreement that they have changed MAF culture in a positive way. Overall, advisors are confident that the MAF staff trained through the program are well prepared for dealing with the demands of the job and with future challenges. Seed production and research targets are now being met even with declining supervision from advisors and conflict among MAF staff has been reduced. MAF staff were seen as having improved tremendously in their ability to engage in informed conversations with each other as well as foreign visitors and collaborators on a range of important agricultural issues affecting the country. One result is that SoL trained researchers are being invited to participate in research and development activities by international agencies including an Australian university and FAO.

Has society benefited? Did SoL and its capacity building efforts achieve its goal of reducing food insecurity in Timor-Leste? Based on the findings of SoL's adoption surveys it certainly appears that this is happening. SoL varieties are being adopted by increasing number of farmers across the country, performing well and preferred by farmers who have tried them. And much of the credit for this achievement must go to those individuals who benefitted from SoL's capacity building activities. Advisors agree. While they admit that impact on national food security is still relatively small, it is significant and will increase if the national seed program continues.

The future is, of course, difficult to predict but there does seem to be a feeling of guarded optimism and a number of promising signs. The national government has gradually assumed financial ownership of MAF's research budget from SoL and covered half of the research expenses in 2014 and entire research budget of 2015. This level of support is expected to continue and MAF's most recent budget proposal explicitly includes the continued assistance of a SoL advisor as a private consultant after the project closes. It has also publically stated that MAF will continue to buy and distribute farmer produced certified and commercial seed for at least the next 3 to 4 years.

Taken together, it is maintained that the evidence collected for this study presents a "credible performance story" and supports the contention that SoL's capacity building efforts have made a significant contribution to observed benefits. Plausible association suggests that changes in individual capacity engendered by SoL have rippled out to bring positive changes at wider levels, have laid the foundation for future improvements in Timor-Leste's food security situation and that the contributions of its capacity building efforts are largely sustainable.

References

- Abdon, B. (2011) *Seeds of Life Phase 3 Training Program Management Strategy 2012-2015*. Seeds of Life.
- Brown, G., Harris, L. (2013) *The future of self-assessment in classroom practice: Reframing self-assessment as a core competency*. Frontline Learning Research, Vol. 2, No. 1, 2014. Available: <http://journals.sfu.ca/flr/index.php/journal/article/view/24/81>
- Gordon, J. and Chadwick, K. (2007) *Impact assessment of capacity building and training: assessment framework and two case studies*. Impact Assessment Series. Centre for International Economics, Canberra. Report No. 44, February. Available: <http://impact.cgiar.org/sites/default/files/pdf/76.pdf>
- Hailey, J and James, R. (2003) *NGO Capacity Building: The Challenge of Impact Assessment*. Paper presented to the New Directions in Impact Assessment for Development Methods & Practice Conference. November 2003. IDPM University of Manchester. INTRAC. Oxford
- Ross, J. (2006) *The reliability, validity, and utility of self-assessment*. Practical Assessment, Research and Evaluation. Volume 11 Number 10, November 2006. Available: <http://pareonline.net/pdf/v11n10.pdf>
- SDP (2011) *Timor-Leste Strategic Development Plan 2011 – 2030*. 228p. Available: <https://sustainabledevelopment.un.org/content/documents/1506Timor-Leste-Strategic-Plan-2011-20301.pdf>
- SoL (2012) *Seeds of Life 3 Program Performance Management Plan*. Seeds of Life.
- SoL (2014) *Seeds of Life 3 2014 Adoption Survey Report*. Ministry of Agriculture and Fisheries/Seeds of Life.
- SoL (2016) *2015 Competency Self-Assessments of MAF-Seeds of Life Staff*.
- Templeton, D. (2009) *A Framework for Assessing of the Impact of Capacity Building*. Contributed Paper prepared for presentation at the International Association of Agricultural Economists' 2009 Conference, Beijing, China, August 16-22, 2009. Australian Centre for International Agricultural Research. Available: http://ageconsearch.umn.edu/bitstream/51716/2/Assessing%20the%20benefits%20of%20capacity%20building_D%20Templeton_IAAE.pdf
- UNDP (2008) *Capacity Development Practice Note*. United Nations Development Programme 304 East 45th Street New York, NY 10017 USA. Available: http://www.unpcdc.org/media/8651/pn_capacity_development.pdf
- Ward, M., Gruppen, L. and Regehr, G. (2002) *Measuring Self-assessment: Current State of the Art*. Advances in Health Sciences Education 7: 63–80. Kluwer Academic Publishers. Available: <http://www.deptmedicine.utoronto.ca/Assets/DeptMed+Digital+Assets/CanMeds/Measuring+self-assessment+-+current+state+of+the+art.pdf>
- WFP (2016) *Timor-Leste Overview*. World Food Programme. Available: <https://www.wfp.org/countries/timor-leste/overview>