Seeds of Life
Fini ba Moris

Commissioned Study

To inform and guide national policies on food and seed security

Complementarity Between Maize Seed Production and Good Storage

By Philip Young,
Consultant to the Seeds of Life program

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Background

The Technical Advisory Group (TAG) which advises the Ministry of Agriculture and Fisheries' (MAF's) Seeds of Life III Program (MAF-SoL) recommended that MAF-SoL complete a series of studies which focus on issues which have the potential to influence and guide Timor-Leste's national food security policy, and its underlying national seed production and distribution policy. This recommendation reflects the TAG's (and other Development Partners') concerns that some current policies (such as rice importation and price subsidization) are impacting negatively on sectoral development initiatives, such as MAF-SoL's introduction of new staple food crop[1] varieties and MAF's plan to refurbish damaged irrigation schemes[2].

Therefore MAF-SoL employed a Consultant[3] to complete four studies[4]:

(i) An economic comparison of the impact of imported rice on the (irrigated[5]) rice production sector, and its cost-effectiveness, compared with investments in crop (production) inputs and distribution - to inform the food security policy;

(ii) An assessment of the effects on the agricultural sector of imported seed of untested varieties (which are) distributed free (to farmers) by MAF, compared with a research-based process of varietal identification (and associated) national seed production - to inform the policy on seed (production and distribution);

(iii) An assessment of the effects on the formal and informal seed sectors of targeting vs. non-targeting (for) the distribution of free seed by MAF - to inform the policy on seed; production and distribution; and

(iv) An assessment of the comparative impact of implementing the International Fund for Agriculture Development (IFAD) funded Timor-Leste Maize Storage Project (TLMSP) as currently planned (independent from MAF-SoL), compared with complementary collaboration with MAF-SoL in TLMPS's target districts.

This report presented here is on the fourth study.

[1] In this report staple food crops are defined as rice, maize, sweet potato and cassava (the latter considered to be roots and tubers).
[2] This example has been included because the conclusions from a recent appraisal of 10 such irrigation schemes (completed by the author – reference footnote 6) are directly relevant to the study Impact of Rice Imports on Rice Production in Timor-Leste Study.
[3] Mr. Philip Young.
[4] Note: the fourth study was not listed in the Consultant's Terms of Reference, but was completed as a matter of course because the information required was available from the first three studies, and from associated work completed by the Consultant on the International Fund for Agriculture Development's (IFAD's) Timor-Leste Maize Storage Project (TLMSP).
[5] The words in parentheses have been added to the Terms of Reference.

Table of Contents

List of Tables

Abbreviations and Acronyms

AusAID	Australian Agency for International Development
cif	Currency, Insurance and Freight
CSPG	Community Seed Production Group
EIRR	Economic Internal Rate of Return
FAO	Food and Agriculture Organization
FNSTF	Food and Nutrition Security Task Force – in MAF's National Directorate for Policy and Planning
FSS	Formal Seed Sector
IFAD	International Fund for Agriculture Development
ISS	Informal Seed Sector
MAF	Ministry of Agriculture and Fisheries
MAF-SoL	Ministry of Agriculture and Fisheries' Seeds of Life III Program
MCIE	Ministry of Commerce, Industry and Environment (previously MTCI)
MPS	Major Projects Secretariat (in Ministry of Finance)
Mt	Metric Tonne = 1,000 kg
MTCI	(former) Ministry of Tourism, Commerce and Industry
NDE	National Directorate of Statistics (in Ministry of Finance)
SDP	Strategic Development Plan
SoL	Seeds of Life
TAG	Technical Advisory Group – to MAF-SoL
TLMSP	IFAD's Timor-Leste Maize Storage Project
TLSLS	Timor-Leste Sustainable Livelihoods Survey

Executive Summary

Conclusions

1. There would be considerable complementarity between MAF-SoL and TLMSP if these programs are implemented in unison in the same target districts, sub-districts and sucos. For example the NPV (30%) of incremental net farm income from maize growing with MAF-SoL alone is estimated to be $535. This would increase to $820 with MAF-SoL and TLMSP. Contributions to this increase would be about 35% from TLMSP and 65% from MAF-SoL.

2. In terms of returns to family labour-day, it is estimated that MAF-SoL alone would increase this figure by $1.07 per day, and TLMSP alone by $0.62 per day. When combined the two programs would increase returns per labour-day by $1.70, a significant figure when it is considered that the current unskilled daily wage rate is about $3.00. Contributions to this increase would be about 36% from TLMSP and 63% from MAF-SoL.

3. There would also be considerable economic complementarity between MAF-SoL and TLMSP. For example the NPV (30%) of incremental benefits from maize growing with MAF-SoL alone is estimated to be $408. This would increase to $549 with MAF-SoL and TLMSP. Contributions to this increase would be about 26% from TLMSP and 74% from MAF-SoL.

4. These conclusions are as expected, and the incremental financial and economic returns and benefits generated through joint program implementation are substantial. In addition "twinned" implementation would reduce the risks faced by the individual programs, and lead to more efficient allocation of MAF's resources.

Recommendations

5. The managers of MAF-SoL and TLMSP, and the Program Directors from ACIAR/UWA and IFAD, should adjust their implementation plans and geographic targeting with the objective of generating the complementarity between these two programs which is indicated by the analyses completed for this Case Study. This process should be part of the preparation of Annual Work Plans for MAF-SoL and TLMSP.

1 Sources of Information and Data

6. The Consultant used information and data from many sources to undertake the various analyses required to complete the CSs. These are referenced in the text, and as footnotes and notes to tables. The key sources of data and information which should be referenced at the beginning of this report are:

   (i) Published information on the demand for and supply rice in Timor-Leste (in the Strategic Development Plan [SDP] – Table 8, page 120); and revised demand for and supply of rice based on assumptions which are less optimistic than those used in the SDP given the results from the 2010 national census and MAF's inability to fulfil its SDP mandate, because of, amongst other reasons of severe budget limitations;

   (ii) Published statistics on rice imports (from MAF's FNSTF) - based on data from Customs and line ministries with an involvement in Timor-Leste's food and nutrition sector); and published data and statistics on rice imports from the National Department of Statistics (NDE) in the Ministry of Finance;

   (iii) MAF-SoL's Annual Research Reports which contain reliable and statistically valid data on staple crop yields, plus other internal MAF-SoL reports on topics such as Annual Seed Production and Distribution;

   (iv) MAF-SoL's Baseline Survey for Phase III;

   (v) Information and data collected from interviews with private rice traders – respecting the confidentially of their private business dealings;

   (vi) World Bank unpublished reports on Timor-Leste's stale food situation and various analytical policy papers prepared under the Global Food Response Program (GFRP) Technical Assistance, which ran from October 2011 to June 2012; and

   (vii) The unpublished analyses which underpinned the Consultant's recent work for the Major Projects Secretariat (MPS) within the Ministry of Finance (MoF) on Irrigation Economics[6]; and

   (viii) The Detailed Design Report for IFAD's TLMSP.

[6] See "Final Appraisal Report: Appraisal of Seven Irrigation Schemes", October 2012.

2 Discussion of Issue and Background Information

2.1 Maize Storage Losses in Timor-Leste

7. Estimates of stored maize losses in Timor-Leste vary considerable, from: (i) FAO's unsubstantiated 2005 claim that farmers lose 30% of stored grain[7]; (ii) the TLMSP Design Team's estimate of 12% (based on defendable statistics, see Working Paper No. 3); (iii) MAF-SoL's Baseline Survey (Table 1) which reports an approximate "average" loss of 13.4%; and (iv) earlier work (2006) by Oxfam and UNTL which reported 45% losses[8].

Table 1: Maize Storage Losses Reported by MAF-SoL

Storage Method a/	No. hhs reporting losses	Average loss (%)
Storage in sack	656	14.8%
Storage above fire-place	658	13.9%
Hanging in trees	161	17.0%
Storage in metal drum	203	16.1%
Storage in plastic container	299	5.2%
Total b/ c/	1,977	13.4%

Source: Table 81, page 50, SoL 3 Baseline Survey Report, Vol. 2: Data Tables.
a/ Not all methods included. The MAF-SoL Baseline Survey covered 10 storage methods.
b/ 109 other hhs (5% of total) reported losses from other storage methods.
c/ "Crude" average.

8. The TLMSP is based on the importation (at least initially[9]) and distribution of 200L steel, air-tight, fuel drums for distribution to maize growers who will pay a contribution of $10/drum. The Project is based on very simple technology which has proven feasible on a small-scale – storing maize in air-tight containers prevents damage by weevils and rodents and thereby increases staple food and maize seed supplies.

9. These estimated maize losses under traditional storage methods indicate the need for a more "scientific" approach to calculating a reliable figure for use in project design and analytical work. This will be completed by TLMSP over the next three years. In the meantime it is advisable to treat the estimated percentage loss figure as a variable in models used to analyse impacts and

[7] Special Report, FAO/WFP Crop and Food Supply Assessment Mission to Timor-Leste, 1st June 2003, page 6: "post-harvest losses due to rodents and insects are high, approximately 20-30 percent in maize, and 5 percent in rice".
[8] For "modern" varieties stored in the traditional way, due to weevil attack 30-33 weeks after harvesting.
[9] Drums may be fabricated or manufactured in-country once the Project is underway and the three-year pilot proves that this simple maize storage technology is feasible, and financially and economically viable.

outcomes from projects/ programs so that sensitivity analyses can be completed. This is the approach used by this study – see Table 2 and Table 3.

2.2 Improved Maize Varieties and Complementarity with TLMSP

10. During the past few years MAF-SoL has released two maize varieties with proven potential to increase on-farm production by about 40%. These are Sele and Noi Mutin[10]. Given these potential production increases it seems logical to twin MAF-SoL's improved maize seed distribution efforts with the distribution of maize storage drums by TLMSP, with the objective of generating the expected complementarity between these two development initiatives. It is this logic which underlies the Terms of Reference for this study.

[10] Source: various MAF-SoL Annual Research Reports.

3 Brief Analytical Methodology

3.1 With and Without Project Analyses

11. In order to estimate the degree of complementarity between MAF-SoL and TLMSP it was necessary to design four "with project" (WP) and "without project" (WOP) production and financial models. These are shown in Table **2** and are: (i) WOP – neither MAF-SoL nor TLMSP (the base case); (ii) WP, MAF-SoL only; (iii) WP, TLMSP only; and (iv) WP, MAF-SoL and TLMSP together. The differential outcomes between these models (in terms of incremental maize supplies and equivalent annual increased cash flows) indicate the degree of complementarity between the models.

3.2 Financial and Economic Analyses Methodologies

12. Financial analysis is analysis at the farm-level and indicates the direct benefits for farmers and their families, whereas economic analysis assesses incremental benefits (differentials between models) in terms of the impact on Timor-Leste – based on the economic value of incremental supplies of staple food. This is why **Table 2** and **Table 3** were prepared - **Table 2** details the financial models for the four WOP and WP situations, and **Table 3** contains the equivalent economic analyses models.

13. The key variables "driving" the analytical models are show in red font in Table 2 and Table 3 and relate to maize storage losses (percent) and the number of 200L storage drums used by maize growing families. The main assumptions which underpin the financial and economic models are also apparent in Table 2 and Table 3 and their associated footnotes, and are not further elaborated in this study.

14. The models calculate static annual incremental cash flows and economic benefits, and then compare these over a 20–year period to enable the determination of Net Present Values (NPVs) at a high discount rate of 30%.

Table 2: Financial Analysis - Complementarity Between MAF-SoL and TLMSP

Financial Analysis: 1. Without SoL and Drums; 2. SoL Only; 3. Drums Only; and 4. SoL and Plus Drums

(All amounts in US$, December 2013 prices)

KEY PARAMETERS		WOPs	+SoL Only	+Drum Only	+SoL & +Drum
Crop area/HH	ha	0.70	0.70	0.70	0.70
Maize production	kg/ha	1,500	2,100	1,500	2,100
Maize production	kg/HH	1,050	1,470	1,050	1,470
Cumulative storage losses /1	%	**25.0%**	25.0%	5.0%	5.0%
No. of 200L drums	drums	0	0	**4**	4
Improved storage capacity	kg	0	0	640	640
Improved storage capacity: % of total production		0%	0%	61%	44%

WOPs = without SoL and Drums **Red font = variables for all models**

Static Cash Flow Models: Foodgrain Production, Utilisation and Purchase													
Model ----------->		**1. Without SoL and Drums**			**2. With SoL Only**			**3. With Drums Only**			**4. With SoL and Drums**		
	Unit	Unit Cost	Quantity	Value	Unit Cost	Quantity	Value	Unit Cost	Quantity	Value	Unit Cost	Quantity	Value
Total maize production	kg		1,050			1,470			1,050			1,470	
Less household consumption /2	kg		-870			-870			-870			-870	
Less retained seed /3	kg		-35			-35			-35			-35	
Less storage losses	kg		-263			-368			-135			-240	
Production surplus/ deficit	kg		-118			198			11			326	
Sales of surplus grain /4	kg	$0.80	0	$0	$0.80	198	$158	$0.80	11	$8	$0.80	326	$260
Purchases to cover deficit /5	kg	$0.80	-118	-$94	$0.80	0	$0	$0.80	0	$0	$0.80	0	$0
Net value of production less purchases				-$94			$158			$8			$260
Incremental costs of SoL maize variety and improved storage													
Cost of Sele maize seed 6/	kg	$2.00	0	$0	$2.00	7	$14	$2.00	0	$0	$2.00	7	$14
Cost of hired labour 7/	day	$3.00	0	$0	$3.00	20	$60	$3.00	0	$0	$3.00	20	$60
Storage maintenance costs /8	per drum	$1.00	0	$0	$1.00	0	$0	$1.00	4	$4	$1.00	4	$4
Total incremental costs				$0			$74			$4			$78
Static net cashflows				**-$94**			**$84**			**$4**			**$182**
Incremental static cashflows							**$178**			**$98**			**$276**

Household annual cashflow		**Yr 1**	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Yr 6**	**Yr 7**	**Yr 8**	**Yr 9**	**Yrs 10 - 20**	**NPV 30%**
Incremental net cash flow	**Model 2-1**	$178	$178	$178	$178	$178	$178	$178	$178	$178	$178	$590
Incremental net cash flow 9/	**Model 3-1**	$58	$98	$98	$98	$98	$98	$98	$98	$98	$98	$296
Incremental net cash flow 9/	**Model 4-1**	$236	$276	$276	$276	$276	$276	$276	$276	$276	$276	$886

Labour budget (person-days/ha)	**1. Without SoL and Drums**	**2. With SoL Only**	**3. With Drums Only**	**4. With SoL and Drums**
Land preparation	50	50	50	50
Planting	15	15	15	15
Weeding 1	75	75	75	75
Weeding 2	25	25	25	25
Harvesting	25	25	25	25
Drying	10	10	10	10
Shelling	10	10	10	10
Grain storage	5	5	5	5
Total days/ ha	215	215	215	215
Total days / 0.7 ha	151	151	151	151
Return to family labour ($/LD) 10/	**-$0.62**	**$0.56**	**$0.03**	**$1.21**
Incremental returns to family labour ($/LD)		**$1.18**	**$0.65**	**$1.84**

Footnotes:

1/ Cumulative % weight loss from rodent & insect damage, one full storage season. Calculated over total production; and over the portion of total production which is not stored in drums.

2/ Ave HH size 5.8 (2010 census data). Per capita annual consumption of cereals of 150 kg/pp/yr derived from World Bank's Sustainable Livelihoods Survey, 2008, expressed in kgs of maize equivalent. Balance of required calorie intake from production and purchase of rice, rootcrops, vegetables and various other sources.

3/ Without SoL: 25 kg/ha, 2 plantings (allowing for replanting in event of crop failure): With SoL purchase new seed every five years

4/ Surplus, if any, after HH requirements are accounted for. WP price for market sales costed at prevailing late season prices for all maize stored in drums, based on the ability to safely store grain and sell later in the year rather than immediately post-harvest as at present.

5/ Purchases of maize (or equivalent cereal) to cover any deficit in HH production. Costed at prevailing late season prices when these purchases are most likely to be made.

6/ Assumes that Sele seed is replaced every five years

7/ Assumes that and additional 20 labour days are hired to managed increased maize production.

8/ Maintenance cost based on 2% of capital cost per annum.

9/ Includes beneficiary co-payment of $10 per drum.

10/ Includes allowance for hired labour.

Note: crop production data derived from MAF's Commodity Profiles; Seeds of Life Annual Research Reports; pers. com. with MAF's Directors and Advisers, Oxfam and GTZ, and the World Bank's APIP Concept Note (revised).

Table 3: Economic Analysis - Complementarity Between MAF-SoL and TLMSP

Economic Analysis: 1. Without SoL and Drums; 2. SoL Only; 3. Drums Only; and 4. SoL and Plus Drums

(All amounts in US$, December 2013 prices)

KEY PARAMETERS		WOPs	+SoL Only	+Drum Only	+SoL & +Drum
Crop area/HH	ha	0.70	0.70	0.70	0.70
Maize production	kg/ha	1,500	2,100	1,500	2,100
Maize production	kg/HH	1,050	1,470	1,050	1,470
Cumulative storage losses /1	%	**25.0%**	25.0%	5.0%	5.0%
No. of 200L drums	drums	0	0	**4**	4
Improved storage capacity	kg	0	0	640	640
Improved storage capacity: % of total production		0%	0%	61%	44%

WOPs = without SoL and Drums **Red font = variables for all models**

Static Cash Flow Models: Foodgrain Production, Utilisation and Purchase													
Model ----------->		**1. Without SoL and Drums**			**2. With SoL Only**			**3. With Drums Only**			**4. With SoL and Drums**		
	Unit	Unit Cost	Quantity	Value	Unit Cost	Quantity	Value	Unit Cost	Quantity	Value	Unit Cost	Quantity	Value
Total maize production	kg		1,050			1,470			1,050			1,470	
Less household consumption /2	kg		-870			-870			-870			-870	
Less retained seed /3	kg		-35			-35			-35			-35	
Less storage losses	kg		-263			-368			-135			-240	
Production surplus/ deficit	kg		-118			198			11			326	
Sales of surplus grain /4	kg	$0.67	0	$0	$0.67	198	$132	$0.67	11	$7	$0.67	326	$218
Purchases to cover deficit /5	kg	$0.67	-118	-$79	$0.67	0	$0	$0.67	0	$0	$0.67	0	$0
Net value of production less purchases				-$79			$132			$7			$218
Incremental costs of SoL maize variety and improved storage													
Cost of Sele maize seed 6/	kg	$2.00	0	$0	$2.00	7	$14	$2.00	0	$0	$2.00	7	$14
Cost of hired labour 7/	day	$3.00	0	$0	$3.00	20	$60	$3.00	0	$0	$3.00	20	$60
Storage maintenance costs /8	per drum	$1.00	0	$0	$1.00	0	$0	$1.00	4	$4	$1.00	4	$4
Total incremental costs				$0			$74			$4			$78
Static net cashflows				**-$79**			**$58**			**$3**			**$140**
Incremental static benefits							**$137**			**$82**			**$219**

Household annual benefits		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yrs 10 - 20	NPV 30%
Incremental benefits	**Model 2-1**	$137	$137	$137	$137	$137	$137	$137	$137	$137	$137	$454
Incremental benefits 9/	**Model 3-1**	-$118	$82	$82	$82	$82	$82	$82	$82	$82	$82	$117
Incremental benefits 9/	**Model 4-1**	$19	$219	$219	$219	$219	$219	$219	$219	$219	$219	$572

Footnotes:

1/ Cumulative % weight loss from rodent & insect damage, one full storage season. Calculated over total production; and over the portion of total production which is not stored in drums.

2/ Ave HH size 5.8 (2010 census data). Per capita annual consumption of cereals of 150 kg/pp/yr derived from World Bank's Sustainable Livelihoods Survey, 2008, expressed in kgs of maize equivalent. Balance of required calorie intake from production and purchase of rice, rootcrops, vegetables and various other sources.

3/ Without SoL: 25 kg/ha, 2 plantings (allowing for replanting in event of crop failure): With SoL purchase new seed every five years

4/ Surplus, if any, after household requirements are accounted for. WP price for market sales costed at farm-gate import parity price for rice as rice and maize are direct substitutes.

5/ Purchases of maize (or equivalent cereal) to cover any deficit in HH production. Costed at prevailing late season prices when these purchases are most likely to be made.

6/ Assumes that Sele seed is replaced every five years

7/ Assumes that and additional 20 labour days are hired to managed increased maize production.

8/ Maintenance cost based on 2% of capital cost per annum.

9/ Includes Government cost of $50 per drum.

Note: crop production data derived from MAF's Commodity Profiles; Seeds of Life Annual Research Reports; pers. com. with MAF's Directors and Advisers, Oxfam and GTZ, and the World Bank's APIP Concept Note (revised).

3.3 Financial Analyses

15. Table 4 summarizes the financial models used to calculate "complementarity percentages" and to undertake sensitivity analyses. In summary it is apparent that there would be considerable complementarity between MAF-SoL and TLMSP if these programs were "twinned" and implemented in the same maize growing districts at the same time. For example (and using the "average" figures detailed in Table 4) the NPV (30%) of incremental net farm income from maize growing with MAF-SoL alone would be $535 and this would increase to $820 with MAF-SoL and TLMSP. Contributions to this increase would be about 35% from TLMSP and 65% from MAF-SoL.

Table 4: Financial Sensitivity Analyses – Complementarity Between MAF-SoL and TLMSP

SENSITIVITY ANALYSES	+SoL Only	+Drum Only	+SoL & +Drum	+Drum %	+SoL %
				SoL and Drum Contributions	
NPV incremental cash flow (@ 30%)					
1. Base case - 4 drums, 20% differential losses	$590	$296	$886	33%	67%
2. 4 drums, 30% differential losses	$479	$465	$944	49%	51%
3. 2 drums, 20% differential losses	$590	$148	$738	20%	80%
4. 2 drums, 30% differential losses	$479	$233	$711	33%	67%
5. "Averages"	**$535**	**$286**	**$820**	**35%**	**65%**
Incremental returns per family labour day ($/LD)					
1. Base case - 4 drums, 20% differential losses	$1.18	$0.65	$1.84	35%	64%
2. 4 drums, 30% differential losses	$0.96	$0.99	$1.95	51%	49%
3. 2 drums, 20% differential losses	$1.18	$0.33	$1.53	22%	77%
4. 2 drums, 30% differential losses	$0.96	$0.50	$1.46	34%	66%
5. "Averages"	**$1.07**	**$0.62**	**$1.70**	**36%**	**63%**

16. In terms of returns to family labour-day, MAF-SoL alone would increase this figure by $1.07 per day, and TLMSP alone by $0.62 per day. When combined the two programs would increase returns per labour-day by $1.70, a significant figure when it is considered that the current unskilled daily wage rate is about $5.00. Contributions to this increase would be about 36% from TLMSP and 63% from MAF-SoL (Table 4).

3.4 Economic Analyses

17. Table 5 summarizes the economic models used to calculate "complementarity percentages" and to undertake sensitivity analyses. The results are much the same as for the financial analyses - there would be considerable economic complementarity between MAF-SoL and TLMSP. For example (and using the "average" figures detailed in Table 5) the NPV (30%) of incremental benefits from maize growing with MAF-SoL alone would be $408 and this would increase to $549 with MAF-SoL and TLMSP. Contributions to this increase would be about 26% from TLMSP and 74% from MAF-SoL.

Table 5: Economic Sensitivity Analyses – Complementarity Between MAF-SoL and TLMSP

SENSITIVITY ANALYSES	+SoL Only	+Drum Only	+SoL & +Drum	+Drum	+SoL
				% SoL and Drum Contributions	
NPV incremental benefits (@ 30%)					
1. Base case - 4 drums, 20% differential losses	$454	$117	$572	20%	79%
2. 4 drums, 30% differential losses	$361	$259	$621	42%	58%
3. 2 drums, 20% differential losses	$454	$59	$513	12%	88%
4. 2 drums, 30% differential losses	$361	$130	$491	26%	74%
5. "Averages"	**$408**	**$141**	**$549**	**26%**	**74%**

4 Conclusion and Recommendation

4.1 Conclusion

18. There would be considerable complementarity between MAF-SoL and TLMSP if these programs are implemented in unison in the same target districts, sub-districts and sucos. This conclusion is as expected, and the financial and economic increments generated through joint program implementation are substantial. In addition "twinned" implementation would reduce the risks faced by the individual programs, and lead to more efficient allocation of MAF's resources.

4.2 Recommendation

19. The managers of MAF-SoL and TLMSP, and the Program Directors from ACIAR/UWA and IFAD, should adjust their implementation plans and geographic targeting with the objective of generating the complementarity between these two programs which is indicated by the analyses completed for this study. This process should be part of the preparation of the Annual Work Plans for MAF-SoL and TLMSP.