



**Seeds of Life**  
**Fini ba Moris**



## Commissioned Study

To inform and guide national policies on food and seed security



# Effects of Importing Maize and Rice Seed on Agricultural Production in Timor-Leste

By Philip Young,  
Consultant to the Seeds of Life program

January 2013



Seeds of Life  

---

Fini ba Moris



## COMMISSIONED STUDY

---

TO INFORM AND GUIDE NATIONAL POLICIES  
ON FOOD AND SEED SECURITY

# Effect of Importing Maize and Rice Seed on Agricultural Production in Timor-Leste

Suggested citation:

Young, Philip. 2013. *Effect of Importing Maize and Rice Seed on Agricultural Production in Timor-Leste*. Commissioned Study for the Seeds of Life program, Ministry of Agriculture and Fisheries, Dili, Timor-Leste

---

This study, or any part of it, should not be reproduced without the permission of Ministry of Agriculture and Fisheries, or the Seeds of Life Program. The findings, interpretations, and conclusions expressed in this report are entirely those of the author and should not be attributed in any manner to either the Ministry of Agriculture and Fisheries, or the Seeds of Life Program.

---

## 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<sup>1</sup> varieties and MAF's plan to refurbish damaged irrigation schemes<sup>2</sup>.

Therefore MAF-SoL employed a Consultant<sup>3</sup> to complete four studies<sup>4</sup>:

- (i) An economic comparison of the impact of imported rice on the (irrigated<sup>5</sup>) 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 TLMSP's target districts.

This report presented here is on the second study.

---

<sup>1</sup> In this report staple food crops are defined as rice, maize, sweet potato and cassava (the latter considered to be roots and tubers).

<sup>2</sup> This example has been included because the conclusions from a recent appraisal of 10 such irrigation schemes (completed by the author – reference footnote 7) are directly relevant to the study Impact of Rice Imports on Rice Production in Timor-Leste Study.

<sup>3</sup> Mr. Philip Young.

<sup>4</sup> 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).

<sup>5</sup> The words in parentheses have been added to the Terms of Reference.

# Table of Contents

Abbreviations and Acronyms.....	iv
Executive Summary .....	v
Conclusions .....	v
Seed Industry Size and Complexity .....	v
Recommendations.....	vi
1 Sources of Information and Data.....	1
2 Discussion of Issue and Background Information .....	2
2.1 Terms of Reference.....	2
2.2 Overview.....	2
2.3 Recent Seed Imports .....	3
2.4 Preferred Maize and Rice Varieties .....	3
2.5 Sources of Free Seed.....	4
2.6 Demand for Maize Seed.....	6
2.7 Demand for Rice Seed.....	7
2.8 Interpretation .....	7
2.9 Why not Procure Local Seed? .....	8
2.10 Impacts of Imported Seed .....	9
3 Analyses.....	11
3.1 Opportunity Costs – Sustainable Production Foregone .....	11
3.2 Free “Hand-Out” Syndrome and Impact on CSPGs .....	14
3.3 Why Not Buy Seed from MAF-SoL?.....	15
3.4 High Cost of Imported Seed .....	15
3.5 Emergency Situations .....	16
4 Conclusions.....	17
4.1 General.....	17
4.2 Seed Industry Size and Complexity .....	17
5 Recommendations .....	19

**List of Tables**

Table 1: Seed Imports into Timor-Leste in 2011 .....	3
Table 2: Number of Households Planting Different Maize and Rice Varieties in 2011..	4
Table 3: Percent of Households Sourcing Maize and Rice Seed by Variety in 2011.....	5
Table 4: Demand for Maize Seed .....	6
Table 5: Demand for Rice Seed .....	7
Table 6: Simplistic Estimation of the Impact of Imported Maize Seed.....	12
Table 7: Comparison of Time-Phased Economic Benefits from Seed Importation and Local Seed Production .....	13

## 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. The current practice of importing maize (and rice) seed and distributing it free-of-charge to Timor-Leste's farmers is not only very costly, but is having a major and negative impact on: (i) staple food production which is depressed because of the practice; and (ii) the emerging domestic seed industry. The two approaches to the provision of seed for Timor-Leste's farmers are "diametrically opposed", resulting in large direct and opportunity costs - the latter in terms of production foregone. For example, modelling completed as part of this Case Study shows that even under conservative assumptions, imported seed costs nearly \$20.00/kg when the cost of inefficient seed distribution and the opportunity cost of production foregone are included.
2. Another way to present a comparison of the current practice of seed importation and free distribution, with the alternative of focussed support for CSPGs, to calculate the "break-even" cost of Sele maize seed. In other words, *what would locally-produced Sele seed have to cost in order for the Net Present Value of the two benefit streams (from the two options - import seed or produce locally) to be the same?* The answer is a staggering \$32.00/kg.
3. Sele seed is currently selling for about \$1.50/kg (November 2012) and Timor-Leste is already growing about 17,750 Mt of Sele maize grain per annum. This means that there is a large existing production base from which Sele seed could be purchased through a domestic procurement system operated by MAF – there is no need to import maize seed of non-preferred varieties with poor germination percentages and weevil resistance.
4. The practice of handing out free seed is reinforcing an already-entrenched "dependency" mentality amongst Timor-Leste's farmers. This will become increasingly difficult to break unless some examples (such as no more free seed) are set and adhered to – of course with sufficient warning and support for alternative seed production programs. In conclusion, there is an urgent need for immediate rationalization of Timor-Leste's seed industry to avoid further inappropriate, non-productive and unsustainable investment in imported seed, and inadequate investment in the emerging domestic seed industry.

## Seed Industry Size and Complexity

5. "Are MAF-SoL's seed components "over-designed"? This question has been raised as part of this Case Study because if Timor-Leste needs about 750 Mt of maize seed each year, this translates "backwards" into an annual need of about 10 Mt of maize stock seed and about 0.2 Mt of maize foundation seed. Corresponding figures for rice seed indicate the need for 6 Mt of stock seed and 120 kg of foundation seed.

6. At present MAF-SoL is producing (annually) considerably greater tonnages of stock and foundation seed than these figures<sup>6</sup>. The success of the CSPGs, especially for maize, indicates that MAF-SoL's investment in a national seed industry may be "top-heavy" with too-greater a focus on the formal seed sector to the detriment of the informal sector. And perhaps, with only 45,000 and 95,000 households growing maize and rice, respectively, the current approach to seed industry development is too complicated. The question therefore needs to be asked: "*is there an easier way to provide good quality seed to Timor-Leste's maize and rice growers?*" More specifically, "*if the CSPG approach is functioning so well, why is there a need for such a large formal seed sector (Component 2 of MAF-SoL)?*"

## Recommendations

7. The analyses and conclusions for this Case Study indicate an urgent need for MAF, MAF-SoL, Development Partners, and NGOs to:
  - (i) Discuss the analyses undertaken for this Case Study, and the conclusions. The lead should be taken by MAF-SoL and a Seed Planning Workshop with the objective of preparing recommendations for any MAF-SoL design changes, particularly in light of the discussion in paras 48 and 49;
  - (ii) Based on the outcomes from this Case Study, define, design and cost a much clearer, more logical and less confusing Seed Industry Strategy which reflects the current draft Seed Policy and recognizes the outcomes and recommendations from this Case Study;
  - (iii) Prepare cases (for presentation to the Minister of MAF and the Ministry of Finance) which argue for changed or more flexible local procurement guidelines (to allow local public sector seed purchases), and additional investment in a national seed industry including emergency seed purchases, storage and distribution; and
  - (iv) Continue to discuss Timor-Leste's agriculture seed environment with all stake-holders with a view to retaining an element of flexibility in a revised Seed Industry Strategy in the event of unforeseen international and national circumstances.

---

<sup>6</sup> As advised by MAF-Sol, Component 2 was attempting to reach the target amounts of formal seed listed in the PDD. In 2011/2012, 39 Mt of Nakroma (rice), 24 Mt of Sele (maize), and 2.6 Mt of Utamua (peanut) seed were distributed against targets of 100 Mt of maize, 50 Mt of rice and 25 Mt of peanut seed. In 2012 these targets were reviewed and considered to be unnecessarily large for the same reasons as listed in para **Error! Reference source not found.** The targets are now 25 Mt of rice and maize seed, and 10Mt of peanut seed.



# 1 Sources of Information and Data

8. The Consultant used information and data from many sources to undertake the various analyses required to complete the studies. 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 confidentiality 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<sup>7</sup>.

---

<sup>7</sup> See “Final Appraisal Report: Appraisal of Seven Irrigation Schemes”, October 2012.

## 2 Discussion of Issue and Background Information

### 2.1 Terms of Reference

9. The Terms of Reference for this study are: *“An assessment of the effects on the agricultural sector of imported seed of untested varieties (which are) distributed free by MAF; compared with a research-based process of varietal identification and national seed production - to inform the policy on seed production and distribution”*. Note that the Terms of Reference refer to “untested” varieties even though most of the frequently-imported maize and rice varieties were tested by SoL during Phases I and II. Therefore this study ignores this particular point in the Terms of Reference.
10. In addition the Terms of Reference do not distinguish between the importation of maize and rice seed. Therefore, and based on the fact that MAF imports more maize seed than rice seed, and that the outcomes from an assessment of the effect of seed importation are likely to be much the same for maize and rice, this study focuses on the effects of importing maize seed.

### 2.2 Overview

11. MAF has been importing mainly maize and some rice seed since independence. The early rationale behind this practice was that many farmers lost their seed stocks at the end of the Indonesian occupation, and again in 2006 when cropped areas were small and therefore retained seed stocks low. This emergency response is understandable and acceptable, and was supported by Development Partners and NGOs as the immediate objective was to encourage rural households to increase staple food production (mainly maize and rice).
12. However 10 years later, and with projects/ programs such as MAF-SoL, three Rural Development Programs, and numerous NGO-supported activities focusing on seed production, distribution, and on-farm storage, the following question needs to be asked: *“What is the impact of continued seed importation by MAF on: (i) longer-term staple food production; (ii) the entrenched “hand-out” mentality in rural communities<sup>8</sup>; (iii) longer-term sustainability of attempts by MAF-SoL and others to establish communal seed production and storage groups; and (iv) MAF’s operational budget in terms of the direct and opportunity cost<sup>9</sup>”*.

---

<sup>8</sup> This applies to more than just seed – farmers in Timor-Leste expect all production inputs to be free. However the Minister of MAF recently indicated that this policy may be under review - at the launching of the IFAD-funded Timor-Leste Maize Storage Project.

<sup>9</sup> Imported seed is very expensive (Table 1) and these funds have a high opportunity cost. For example, international experience confirms high and sustainable returns from investment in agriculture Research, Development and Extension (RD&E) irrespective of where programs are implemented. Such investment generates economic returns of 40%, and up to 50% from RD&E investment in Asian countries. Source: Figure 7.2, page 166, World Development Report, 2008.

13. This study examines the impact of imported seed on these issues and attempts to answer some of the questions related to Timor-Leste's emerging seed industry, such as seed requirements and its focus, size and complexity.

## 2.3 Recent Seed Imports

14. Recent seed import figures from the Ministry of Finance's eProcurement system are presented in Table 1. In 2011 Timor-Leste imported 150 Mt of maize seed and 50 Mt of rice seed under contract numbers RDTL11004551 and 11004449. This seed cost \$794,000 (landed Dili) and the average cost per kg was about \$4.50 for maize and \$2.45 for rice. This means that the cost of imported seed delivered farm-gate would be about \$5.00/kg for maize and \$3.00/kg for rice. The question is: *"can maize and rice seed be produced in Timor-Leste at a lower cost, and are imported varieties under-mining the impact (in terms of increased food production and food security) of the improved food crop varieties released by MAF?"*

Table 1: Seed Imports into Timor-Leste in 2011

Seed Imports in 2011 a/			
1. Contract RDTL-11004451		2. Contract RDTL-11004449	
\$346,000		\$448,000	
Maize	\$224,000	Maize Only	\$448,000
Mt imported	50.00	Mt	100.00
\$/Mt landed	\$4,480	\$/Mt landed	\$4,480
\$/kg landed	\$4.48	\$/kg landed	\$4.48
Rice	\$122,000	Total	\$794,000
Mt imported	50.00	Maize	Rice
\$/Mt landed	\$2,440	Mt imported	150.00 50.00
\$/kg landed	\$2.44	\$/Mt landed	\$4,480 \$2,440
		\$/kg landed	\$4.48 \$2.44

Source: [www.eprocurement.gov.tl/awards](http://www.eprocurement.gov.tl/awards)

a/ Assumes 50% of contract 4451 is rice and 50% is maize - no information available.

## 2.4 Preferred Maize and Rice Varieties

15. It is necessary to understand farmers' preferences for different maize and rice varieties (and the sources of free seed – see Section 2.5) in order to measure the impact of seed importation. Therefore Table 2 was prepared to enable comparisons between imported maize and rice varieties (Arjuna and Kalinga for maize, and IR-64 and IR-8 for rice) and farmers' planted varieties. The key outcomes from this comparison are: (i) only 4% of farmers nominated Arjuna as their preferred maize variety and the figure for Kalinga was even less – 1%; and less than 1% nominated Suwan 5 (an earlier imported variety<sup>10</sup>); and (ii) 13% of farmers nominated IR-64 as their favoured rice variety and 5% preferred IR-8.

<sup>10</sup> A SoL variety which was not widely promoted due to weevil susceptibility.

Table 2: Number of Households Planting Different Maize and Rice Varieties in 2011

District a/	Number of Households Planting Different Maize Varieties b/								
	Sele	Batar Lais	Batar Bo'ot	Sub-Total Traditional	Suwan 5	Arjuna	Kalinga	Other	Sub-Total Import/Other
Ainaro	19	43	33	76				9	9
Aileu	27	18	38	56		2		2	4
Baucau	28	24	51	75		36	1	13	50
Bobonaro	32	96	124	220		2		1	3
Covalima	2	16	94	110		2			2
Dili	10	36	34	70		1	1	1	3
Ermera	18	127	102	229			2	2	4
Liquica	12	87	69	156			4	1	5
Lautem	73	42	38	80	3	31			34
Manufahi	6	50	60	110	1				1
Manatuto	6	46	49	95	1	1			2
Oecussi		18	160	178		6			6
Viqueque	140								0
Total 13 districts	373	603	852	1455	5	81	8	29	123
Total 11 districts	160	561	814	1375	2	50	8	29	89
% (11 Districts)	13%	46%	67%	>100%		4%	1%	2%	7%

Source: SoL 3 Baseline Survey Report - Vol 2: Data Table 31. 1,219 hhs interviewed from 11 districts.

a/ Viqueque and Lautem not included due to sampling error.

b/ 69% of farmers planted one variety and 29% planted two varieties; the reason why >100% of farmers grow Batar Lais and Batar Bo'ot.

District a/	Number of Households Planting Different Rice Varieties b/											
	Nakroma	IR-64	IR-54	IR-36	IR-8	IR-5	Mamb'o	Silaun	Nona P	Dinas	Forget	
Ainaro							1					
Aileu	4	2	1	1	2	1	2	2				
Baucau	35	15	2	7	7		16	42	1		28	
Bobonaro	11	4		2		1	4	1	3	52	3	
Covalima	1	17		4	1	2	8		1			
Dili												
Ermera		11		2			4			16	5	
Liquica												
Lautem	13	5	1	1	10			7	2		2	
Manufahi	1	2			14				1			
Manatuto	3	12	3	3	5	1			17	2	1	
Oecussi	3	8					36	2	2		81	
Viqueque	104											
Total 13 districts	175	76	7	20	39	5	71	54	27	70	120	
Total 11 districts	58	71	6	19	29	5	71	47	25	70	118	
% (11 Districts)	11%	13%	1%	4%	5%	1%	13%	9%	5%	13%	22%	

Source: SoL 3 Baseline Survey Report - Vol 2: Data Table 41. Total of 542 hhs interviewed.

a/ Viqueque and Lautem not included due to sampling error.

b/ 90% of farmers planted one variety and 8% planted two varieties.

## 2.5 Sources of Free Seed

16. Table 3 lists the various sources of maize and rice seed used by Timorese farmers in 2011, and shows the following:

- (i) For maize, 68% of famers received free Sele seed (mainly from MAF and NGOs);
- (ii) Forty percent of farmers received free Suwan 5 seed, 15% free Arjuna seed and 13% free Kalinga seed; and
- (iii) Forty five percent of farmers selected the Sele variety because it was free.
- (iv) For rice, 60% of farmers received free Nakroma seed from MAF and NGOs;
- (v) Thirty percent received free IR-64 seed, and nine percent free IR-8 seed; and
- (vi) Forty two percent of farmers selected the Nakroma variety because it was free.

Table 3: Percent of Households Sourcing Maize and Rice Seed by Variety in 2011

Source of Seed	Percent of Households Sourcing Maize Seed by Variety a/						
	Sele	Batar Lais	Batar Bo'ot	Suwan 5	Arjuna	Kalinga	Other
Own - saved from previous harvest	21%	75%	85%	40%	56%	88%	75%
Bought - in market	12%	18%	11%	20%	23%		19%
Bought - community seed bank/ group							
Bought - from relative/ friend	1%	2%	5%		5%		
<i>Sub-Total not free</i>	<i>34%</i>	<i>95%</i>	<i>101%</i>	<i>60%</i>	<i>84%</i>	<i>88%</i>	<i>94%</i>
Free - relative/ neighbour/ friend	2%	2%	2%	20%	13%		
<b>Free - Government</b>	<b>25%</b>	1%	1%			<b>13%</b>	6%
<b>Free - NGO</b>	<b>39%</b>	1%		<b>20%</b>	2%		
Free - Church	2%						
<i>Sub-Total free</i>	<i>68%</i>	<i>4%</i>	<i>3%</i>	<i>40%</i>	<i>15%</i>	<i>13%</i>	<i>6%</i>
Reasons for Selecting Variety	Sele	Batar Lais	Batar Bo'ot	Suwan 5	Arjuna	Kalinga	Other
Have always grown	28%	88%	83%	100%	87%	75%	
Only choice	7%	16%	32%		12%		
<b>Free</b>	<b>45%</b>	1%	1%		1%	<b>13%</b>	
More productive	48%	10%	17%		10%		
Better taste	45%	9%	13%		5%		
Preferred colour	7%	1%	7%		4%		
Easier to store	5%	3%	10%		1%		
Better suited to climate	27%	14%	20%		9%	13%	
Resistant to wind	1%	2%			2%		

Source: SoL 3 Baseline Survey Report - Vol 2: Data Tables 33, 35, 38, 39.

a/ Minor errors due to rounding to 1%.

Source of Seed	Percent of Households Sourcing Rice Seed by Variety a/						
	Nakroma	IR-64	IR-8	Mamb'o	Silaun	Dinas	Other
Own - saved from previous harvest	26%	70%	82%	79%	94%	80%	
Bought - in market	2%		3%	17%	2%	9%	
Bought - community seed bank/ group b/							
Bought - from relative/ friend	2%		8%	11%		1%	
<i>Sub-Total not free</i>	<i>30%</i>	<i>70%</i>	<i>93%</i>	<i>107%</i>	<i>96%</i>	<i>90%</i>	<i>0%</i>
Free - relative/ neighbour/ friend	2%	3%	3%	10%	2%		
<b>Free - Government</b>	<b>22%</b>	12%	3%	6%	2%	10%	
<b>Free - NGO</b>	<b>34%</b>	14%	3%	1%			
Free - Church	2%	1%					
<i>Sub-Total free</i>	<i>60%</i>	<i>30%</i>	<i>9%</i>	<i>17%</i>	<i>4%</i>	<i>10%</i>	<i>0%</i>
Reasons for Selecting Variety	Nakroma	IR-64	IR-8	Mamb'o	Silaun	Dinas	Other
Have always grown	19%	67%	82%	77%	69%	90%	
Only choice	7%	12%	13%	49%	11%	42%	
<b>Free</b>	<b>42%</b>	17%		4%			
More productive	47%	18%	3%	23%	2%	30%	
Better taste	56%	18%	5%	30%	2%	29%	
Preferred colour	19%	9%		13%			
Easier to store	11%	5%		24%		3%	
Better suited to climate	12%	14%	5%	46%	33%	36%	
Resistant to wind			3%			1%	

Source: SoL 3 Baseline Survey Report - Vol 2: Data Tables 44, 46, 48, 49.

a/ Minor errors due to rounding to 1%. Note; errors in figures for Nakroma and Mamberamo - totals not close to 100%.

## 2.6 Demand for Maize Seed

17. Table 4 details MAF-SoL's estimated annual demand for maize seed – about 2,275 Mt which equates to 750 Mt of seed based on a 33% Seed Replacement Rate (SRR). Application of the percentage use figures for Sele, Arjuna and Kalinga seed (from Table 2) reveals that the current annual production of these varieties (for food, not specifically seed) is about 17,740 Mt of Sele and 6,255 Mt of Arjuna and Kalinga – a total production of these preferred varieties of about 24,000 Mt. This means that only 3.1% of the production of these preferred varieties needs to be purchased by MAF to enable the ministry to be able to hand out free maize seed to all maize growers every three years (750 Mt per year).

Table 4: Demand for Maize Seed

District	Maize (ha)	Approx Maize Prod'n (Mt) c/	Seed Demand a/	Seed Needed b/	SoL Seed Production	% Supply: Impr Var	Approx Mt of Sele	Approx Mt of Arj & Kal
Lautem	15,898	20,318	477	157	3.9	2.5%	3,720	1,312
Bobonaro	10,733	13,717	322	106	6.6	6.2%	2,512	885
Viqueque	10,037	12,827	301	99	1.5	1.5%	2,349	828
Baucau	9,894	12,645	297	98	4.5	4.6%	2,315	816
Oecussi	8,740	11,170	262	87	0.0	0.0%	2,045	721
Covalima	8,700	11,119	261	86	0.0	0.0%	2,036	718
Manatuto	4,162	5,319	125	41	0.0	0.0%	974	343
Manufahi	2,372	3,031	71	23	5.5	23.4%	555	196
Aileu	1,654	2,114	50	16	3.8	23.2%	387	136
Liquica	1,329	1,698	40	13	7.0	53.2%	311	110
Dili	902	1,153	27	9	0.0	0.0%	211	74
Ermera	780	997	23	8	2.9	37.6%	183	64
Ainaro	603	771	18	6	10.2	170.9%	141	50
<b>Totals</b>	<b>75,804</b>	<b>96,878</b>	<b>2,274</b>	<b>750</b>	<b>45.9</b>	<b>6.1%</b>	<b>17,738</b>	<b>6,254</b>
<b>Total production (Mt) of Sele, Arjuna &amp; Kalinga (grain)</b>								<b>23,992</b>
<b>Total annual seed requirements/ total Sele, Arj &amp; Kal grain production (%)</b>								<b>3.1%</b>
<b>Maize seed import in 2011/ total Sele, Arj and Kal grain production (%) d/</b>								<b>0.6%</b>
<b>Planned maize seed import in 2013/ total Sele, Arj and Kal grain production (%) e/</b>								<b>1.2%</b>

Source: MAF-SoL, District Seed Balance Sheet in 2011/12 for Maize, collected from MAF-SoL office in December 2012.

a/ At 30 kg/ha.

b/ Assuming 33% SRR with quality seed.

b/ This indicates the need for about 10 Mt of stock seed, 0.2 Mt of foundation seed, and 4 kg of breeder seed.

(Source: MAF-SoL Formal Seed Production Advisor).

and 4 kg of breeder seed. (Source: MAF-SoL Formal Seed Production Advisor.)

c/ Based on 13% of area Sele (x 1.80 Mt/ha), 5% of area Arjuna & Kalinga (x1.65 Mt/ha), and 82% of area local (1.20 Mt/ha).

d/ 150 Mt.

e/ 290 Mt

18. In terms of maize seed imports by MAF in 2011 (150 Mt – see Table 1) this represents only 0.6% of the total production of the preferred varieties. MAF's planned maize seed import in 2013 of 290 Mt is only 1.2% of the total production of preferred varieties. These very low figures raise the question: "why did MAF import 150 Mt of expensive maize seed in 2011 (about \$5.00/kg delivered farm-gate) when Timor-Leste is already producing about 24,000 Mt of these preferred maize varieties?"
19. At the time this report was prepared (Nov, 2012), Sele maize seed was being sold at \$1.50 per kg compared with the imported price of \$4.50 per kg. Domestic



procurement would be much cheaper if quality seed was available in sufficient quantities.

20. If local contract Sele seed growers were offered (say) \$2.50/kg it would be possible for the ministry to purchase 520 Mt of Sele seed for \$1.3 million of import expenditure. This is about 70% of the total annual demand for maize seed – see Table 4.

## 2.7 Demand for Rice Seed

21. The same situation applies to the demand for rice seed – see Table 5. Timor-Leste is already producing 14,500 Mt of preferred rice varieties (Nakroma and various IR varieties) compared with an annual demand of 1,350 Mt and a replacement need of 446 Mt (or 3.1% of current total production of the preferred varieties). Therefore the questions posed in Section 2.6 for maize can also be asked of rice – *“why import rice seed when there are ample seed supplies in-country, provided procurement and logistics can be organized and managed?”*

Table 5: Demand for Rice Seed

Rice Area (ha)	Annual Rice Prod'n (Mt) a/	Annual Seed Dem. (Mt) b/	Annual Seed Need (Mt) b/	Approx Mt Nakroma c/	Approx Mt IR Vars c/
45,000	50,000	1,350	446	5,500	9,000
Total production of preferred varieties (Mt)					14,500
<b>Total annual seed needs/ total preferred variety grain production (%)</b>					<b>3.1%</b>
<b>Est. rice seed import (2011)/ total preferred variety grain prod'n (%) d/</b>					<b>0.3%</b>

a/ Grain not paddy.

b/ Based on 30 kg/ha and 33% SRR.

c/ See Table 19; 11% farmers grow Nakroma and 18% grow IR varieties.

d/ Based on estimated import in 2011 of 50 Mt of rice seed.

## 2.8 Interpretation

22. Table 2 and Table 3 reveal the following in terms of understanding the relationships between preferred maize and rice varieties, and imported (and subsidized) varieties:
- Rice farmers preferentially grow a much wider range of varieties than maize farmers. If a 5% minimum is used as a cut-off, rice farmers grow seven preferred varieties and this is probably higher as 22% of interviewed farmers could not nominate a preferred variety. For maize, farmers prefer only three varieties although there is probably a range of local varieties included in the Batar Lais and Batar Bo'ot categories.
  - There is reasonable “correlation” between preferred rice varieties and the imported varieties (for IR-64 and IR-8) but this is not the case for maize – none of the imported maize varieties (Suwan 5, Arjuna and Kalinga) are preferred.

- (iii) This raises the question: “*why buy seed of non-preferred rice and maize varieties, when preferred varieties can be purchased from Timorese farmers?*” One possible answer is that Government procurement guidelines and rules are not sufficiently flexible to enable the process to be completed efficiently and therefore it is easier to simply purchase seed from over-seas<sup>11</sup>. The other possible answer is that it is MCIE’s mandate to purchase “surplus” grain from growers and therefore there is a conflict of interest between the two ministries.

Comments on the data presented in Table 4 and Table 5 are given in Section 0 and Section 2.7.

## 2.9 Why not Procure Local Seed?

23. This question has been posed and analyzed in Section 2.6 and Section 2.7, but warrants further consideration as the logic for local seed procurement is so strong. This approach would inject at least \$1.00 million into rural communities every year (assuming that the current policy of free agricultural production hand-outs continues) and if local seed can be procured for a reasonable margin over current market prices, “savings” could be reallocated into other operations and investments.
24. This approach would be more sustainable and reliable than annual seed importation because: (i) international supplies of maize and rice seed are unreliable<sup>12</sup>; and (ii) the Government procurement process is slow. There are reports of imported seed being delivered too late in the season for recipient farmers to be able to plant, whereas if (maize) seed is procured after harvest in about May it could be distributed well-in-time for sowing in the following November. In addition, imported seed often sits in very hot containers on Dili’s wharf and this results in poor germination percentages, whereas MAF has good quality seed stores which could be used for locally-purchased seed.

---

<sup>11</sup> The Consultant has anecdotal information from MAF staff that national procurement guidelines are not amenable to the procurement of numerous small parcels of seed.

<sup>12</sup> This is one reason why non-preferred varieties are often imported – seed of the preferred varieties is simply not available.

## 2.10 Impacts of Imported Seed

25. First impressions are that it is logical to import seed when farmers periodically face situations in which they have no seed at the beginning of cropping seasons because: (i) grain production in the previous season was insufficient to produce a surplus which could be retained as seed; (ii) the retained seed was eaten during the “hungry season”; or (iii) the seed was destroyed by pests because of poor storage conditions.
26. In the past a humanitarian response by MAF, Development Partners and NGOs was reasonable but now that a national variety testing and seed multiplication and distribution system is in place (with a strong focus on Community Seed Production Groups) [CSPGs], it is important to understand the impact of seed importation in terms of the questions posed in para 12 and repeated below in para 28.
27. Now that 10 years have passed since the first “seed crisis”, and with projects/ programs such as MAF released, three Rural Development Programs, and NGO-supported activities focusing on seed production, distribution, and on-farm storage, the following questions need to be asked: “*What is the impact of continued seed importation by MAF on: (i) longer-term staple food production; (ii) the entrenched “hand-out” mentality in rural communities; (iii) the longer-term sustainability of attempts by MAF-SoL and others to establish communal seed production and storage groups; and (iv) MAF’s operational budget – direct and opportunity costs?*”
28. These questions are further-discussed below.
  - (i) *Is seed of imported varieties producing the same quantities of maize (and rice) which would be produced if MAF-SoL’s improved food crop varieties were grown by farmers who receive free seed, assuming that imported seed is delivered in time for “normal” planting times<sup>13</sup>? This question relates to the opportunity cost of using imported rather than locally produced maize (and rice) seed. If there is a sustained yield difference, then this represent a substantial ongoing cost associated with seed importation in addition to the direct cost of importing and distributing seed.*
  - (ii) *Is seed of the imported varieties being retained by recipient farmers for subsequent production seasons, or are farmers becoming so accustomed to hand-outs of free seed that there is no incentive to grow and store their own seed? This question relates to a much larger and potentially more serious situation in Timor-Leste’s agriculture sector. MAF’s budget remains inadequate for the ministry to fulfil its SDP mandate<sup>14</sup> but farmers are now so used to 100% subsidies for all production inputs that it will be difficult to “wean” them off such expectations. As discussed in Young,*

---

<sup>13</sup> Farmers often complain that free seed is delivered too late. This problem could be related to the procurement guidelines issue referred to in para 22. Source: evidence collected by MAF-SoL staff.

<sup>14</sup> Even though the ministry’s 2013 budget of \$24.2 million is an increase of \$7.4 million, or 44% over the 2012 budget. MAF needs an annual budget of about \$75 million under the “10% of ESI” budget allocation guideline. Source: Halving Hunger: Meeting the First Millennium Development Goal through “Business as Unusual”. International Food Policy Research Institute, Washington, D.C., June 2010.

(2013) there are many reasons why Timorese farmers are not responding to growing market incentives, and dependence on free hand-outs is just one such reason.

(iii) *Is seed of imported varieties impacting negatively on MAF-SoL's (and others') attempts to establish sustainable CSPGs based on the distribution of improved varieties (such as Sele maize and Nakroma rice) followed by on-farm seed production by individual farmers, and communal storage? MAF-SoL has allocated considerable resources to this program<sup>15</sup>. Importing seed competes with this program and it may be time to rationalize these two programs to avoid unnecessary competition, reduce opportunity costs, and to encourage sustainable local seed production systems.*

---

<sup>15</sup> MAF-SoL's budget is AUD27.58 million over five years of which \$25.00 million will be funded by Australia and AUD2.58 million by the Government of Timor-Leste.

## 3 Analyses

### 3.1 Opportunity Costs – Sustainable Production Foregone

29. Because considerably more maize than rice seed is imported (Table 1) this case study focuses on attempting to quantify the impact of imported maize seed only. The impact of imported rice seed would not be anywhere near as large as the importation of maize seed (approximately 25% - based simply on imported seed tonnages [50 Mt/200 Mt]), and the underlying principles behind the arguments that seed should not be imported are the same for both crops.
30. In order to estimate the opportunity cost of importing maize seed it is necessary to make a series of assumptions to be able to track the impact of imported seed, as follows:
- (i) Imported varieties are assumed to be direct substitutes for non-imported varieties. That is, if farmers receive free imported maize seed they will not use any other variety. This means that if (say) 300 Mt of maize seed (as planned for 2013) is imported and distributed, this will displace about 270 Mt of seed of non-imported varieties (allowing for late seed delivery, pre-delivery and transport “losses”, and on-ward sales into local food markets)<sup>16</sup>. In addition the comparative models need to be adjusted to ensure that the areas (ha) planted are directly comparable.
  - (ii) The yield differentials (Mt/ha between imported and non-imported varieties) need to be known (from MAF research trials and On-Farm Demonstrations and Trials [OFDTs]) or estimated, as do the differential grain storages losses from weevil infestation (assuming traditional storage methods – see Philip Young, 2013d for a more detailed analysis of maize storage losses).
  - (iii) The level of seed retention by recipient farmers of the imported variety for use in following season(s) needs to be known, or estimated as a variable; and the number of years for which farmers retain seed of imported varieties needs to be known, or estimated as a variable. In addition there needs to be an estimate of the SRR for non-imported varieties.
  - (iv) The level of support for CSPGs needs to be defined (and assumed) as this has a major impact on the frequency of variety “top-up” and/ or replacement as lines are contaminated and/ or new varieties are released, for example the potential for partial replacement of Sele with Noi Mutin.
  - (v) A non-imported variety needs to be selected as a “comparator” with imported varieties, and Sele is the obvious choice.

---

<sup>16</sup> As with the anecdotal evidence on late free seed deliveries, there is also anecdotal evidence that some free seed is on-ward sold for a range of purposes.

31. Table 6 is a simplistic estimation of the cost of using imported maize seed in Timor-Leste and shows that even under conservative assumptions, imported seed costs about \$19.70/kg when the costs of inefficient seed distribution and the opportunity cost of yield foregone are included. This is about four times the direct cost of importing seed.

Table 6: Simplistic Estimation of the Impact of Imported Maize Seed

Seed Source/ Variety ----->	Imported	Sele
ISPG support a/	No	Yes
Total Mt of seed b/	300	300
Mt of seed planted c/	210	285
Ha planted d/	7,000	9,500
Yield (Mt/ha grain) e/	1.50	1.80
Total maize production (Mt)	10,500	17,100
Storage losses (%) f/	25%	15%
Storage losses (Mt)	2,625	2,565
Net maize production (Mt)	7,875	14,535
Economic Value (\$/kg) of net production g/	\$0.66	\$0.66
Gross Economic Value of production (\$ million)	\$5.198	\$9.593
Economic cost of seed (\$ million) h/	\$1.500	\$1.500
Net Economic Value (NEV) of maize production (\$ million)	\$3.698	\$8.093
NEV Sele minus NEV imported seed (\$ million) i/		\$4.396
<b>Differential NEV (per \$/kg imported seed)</b>		<b>\$14.65</b>
<b>Total cost of imported seed (\$/kg) inc. opportunity cost</b>		<b>\$19.65</b>

a/ Assumes that recipients of free seed are not members of ISPGs.

b/ Based on planned maize seed imports in 2013.

c/ Assuming pre-planting "losses" and poor germination for imported seed

d/ Assuming 30kg seed/ha for all varieties.

e/ Based on MAF-SoL results from OFTDs.

f/ Higher losses for imported varieties - farmers do not value seed & assume repeat allocations.

f/ No use of 200 L drums - traditional storage methods, better care of Sele seed which is valued.

g/ Using farm-gate import parity price for rice (\$660/Mt) assuming direct substitution.

g/ Includes value of retained seed.

h/ \$5.00/kg for imported seed, and \$5.00/kg for Sele seed (farm-gate prices).

i/ Value of production foregone due to seed importation.

32. In order to further test the conclusions in para 0 the Consultant prepared longer-term and more detailed seed import impact models with the objective of comparing the Net Present Value (NPV) of the Economic Benefits generated under the two seed-supply scenarios. This is detailed in Table 7 and shows:
- If 300 Mt of maize seed are imported and distributed in Year 1 (as planned for 2013) the NPV (at 30%) of the maize value foregone because of seed importation is about \$7.61 million.
  - Sele seed would have to cost \$32/kg for the NPV of the two net benefit flows to be the same; NPV of differential = zero. This is a very high figure and confirms the direct and opportunity costs of importing and distributing maize seed in Timor-Leste, particularly as good quality Sele seed can be purchased in Timor-Leste from CSPGs for \$1.50/kg, and the full economic cost of Sele seed is about \$5.00/kg.



Table 7: Comparison of Time-Phased Economic Benefits from Seed Importation and Local Seed Production

Annual Flow of Economic Benefits	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total	
<b>Imported Seed (assuming 300 Mt/year)</b>												
Total seed imports (Mt) a/	300	300	300	300	300	300	300	300	300	300	3,000	
Mt of seed planted, @ 30kg seed/ha b/	210	210	210	210	210	210	210	210	210	210	2,100	
Ha planted c/	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	70,000	
Yield (Mt/ha grain)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
Total maize production (Mt)	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	105,000	
Storage losses (%)	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	
Storage losses (Mt)	2,625	2,625	2,625	2,625	2,625	2,625	2,625	2,625	2,625	2,625	26,250	
Net maize production (Mt)	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	78,750	
Economic Value (\$/kg) of net production d/	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	
Gross Economic Value of production (\$ million)	\$5.198	\$5.198	\$5.198	\$5.198	\$5.198	\$5.198	\$5.198	\$5.198	\$5.198	\$5.198	\$51.975	
<b>Economic cost of imported seed (\$ million)</b>	<b>\$5.00</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$1.050</b>	<b>\$10.500</b>	
<b>Net Economic Value (NEV) of production (\$ million)</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$4.148</b>	<b>\$41.475</b>	
<b>Sele Seed</b>												
Equivalent ha planted e/	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	70,000	
Total seed used @ 30kg seed/ha (Mt) f/	210	210	210	210	210	210	210	210	210	210	2,100	
Yield (Mt/ha grain)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	
Total maize production (Mt)	12,600	12,600	12,600	12,600	12,600	12,600	12,600	12,600	12,600	12,600	126,000	
Storage losses (%)	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	
Storage losses (Mt)	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	18,900	
Net maize production (Mt)	10,710	10,710	10,710	10,710	10,710	10,710	10,710	10,710	10,710	10,710	107,100	
Economic Value (\$/kg) of net production d/	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	\$0.66	
Gross Economic Value of production (\$ million)	\$7.069	\$7.069	\$7.069	\$7.069	\$7.069	\$7.069	\$7.069	\$7.069	\$7.069	\$7.069	\$70.686	
Economic cost of local Sele seed (\$ million)	<b>\$5.00</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$1.050</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$1.050</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$1.050</b>	\$4.200	
<b>Net Economic Value (NEV) of production (\$ million)</b>	<b>\$6.019</b>	<b>\$7.069</b>	<b>\$7.069</b>	<b>\$6.019</b>	<b>\$7.069</b>	<b>\$7.069</b>	<b>\$6.019</b>	<b>\$7.069</b>	<b>\$7.069</b>	<b>\$6.019</b>	<b>\$66.486</b>	
<b>NEV Sele minus NEV imported seed (\$ million)</b>	<b>\$1.871</b>	<b>\$2.921</b>	<b>\$2.921</b>	<b>\$1.871</b>	<b>\$2.921</b>	<b>\$2.921</b>	<b>\$1.871</b>	<b>\$2.921</b>	<b>\$2.921</b>	<b>\$1.871</b>	<b>\$25.011</b>	
<b>NPV (30%): Opportunity Cost of Importing 300 Mt seed (\$ million)</b>	<b>\$7.612</b>	<b>"Breakeven" Sele Price: NPV = \$0 -----&gt;</b>					<b>\$32.00</b>					

Minor errors due to rounding.

a/ Based on MAF's 2013 plans to import 290 Mt of maize seed, rounded up to 300 Mt per annum for 10 years.

b/ Allowing for late imported seed delivery, other "losses" and low germination. Only small losses of Sele as is assumed that this seed is owned by ISPGs.

c/ Assumes farmers with imported seed retain sufficient seed to plant 50% of their farm the year after initial seed receipt, and that they then require a 100% "hand-out" the following year.

d/ Using farm-gate import parity price for rice (\$660/Mt) assuming direct substitution.

e/ For valid comparative purposes, the areas planted to maize must be the same.

f/ Assuming (rather unrealistically) that Sele seed has to be handed out every third year.

### 3.2 Free “Hand-Out” Syndrome and Impact on CSPGs

33. This entrenched constraint to agricultural development in Timor-Leste is sector-wide and applies to all production inputs - fertilizer, mechanization and fuel, irrigation water, etc., not just seed<sup>17</sup>. This is an unfortunate legacy resulting from the crisis which the sector endured post Indonesian occupation, and post the civil disturbances in 2006. However expectations are now so entrenched that it will take a major change in policy and some tough and politically-unpopular decisions to break this habit and to gradually “wean” Timor-Leste’s farmers off this expensive (if fully implemented<sup>18</sup>) and high-opportunity cost strategy.
34. There are signs that Government may be re-thinking this strategy. The Minister of MAF recently made public statements about the need for Timorese farmers to be more independent and less reliant on hand-outs, but inclusion of an allowance to import 290 Mt of maize seed in MAF’s 2013 budget (at a cost of about \$1.30 million) does not support this statement.
35. In terms of the impact of free seed hand-outs on this “syndrome”, it is clear that continued distribution of free seed reinforces farmers’ dependence and also under-mines programs such as MAF-SoL which are attempting to establish a national seed industry with particular support for small-scale private sector seed industry investment in the form of CSPGs. The irony of this situation is that MAF Sol is a fully national program and MAF is expected to progressively take responsibility for at least partial funding. This means that in effect MAF is “competing with itself”. On the one hand the ministry is importing and distributing expensive seed (and the 2013 budget indicates that this practice will continue) and on the other the ministry is attempting to develop a sustainable domestic seed production industry. This scenario is clearly unsustainable and needs to be rationalized as soon as possible.
36. A good example of why there needs to be immediate rationalization of the free seed hand-out program comes from Baucau where MAF-SoL’s largest contract rice seed grower is located. This contractor has successfully formed a small contract seed production cooperative and has about 5 ha under Nakroma seed production. The farmer is now one of the wealthiest in Timor-Leste, but in 2010 he received free hand-outs of rice seed varieties he does not grow, in addition to free fertilizer<sup>19</sup>. Such practices indicate poor targeting of free seed hand-outs (seed requirements are compiled by MAF’s Suco Extension Officers and FAO then assist with seed distribution) and even poorer monitoring of impact.

---

<sup>17</sup> The one exception is the recent agreement with the Government that MAF can charge farmers a \$10 contribution for a 200L maize storage drum which is valued at about \$50 – an 80% subsidy.

<sup>18</sup> At present MAF’s budget is nowhere near sufficient for the ministry to be able to provide production inputs free of charge to all of Timor-Leste’s farmers if the “market” for these inputs was fully satisfied.

<sup>19</sup> Source of information: MAF-SoL Design Team 2010 – pers. com. with the farmer.

### 3.3 Why Not Buy Seed from MAF-SoL?

37. By the end of 2013 MAF-SoL will be supporting about 1,000 CSPGs who should have about 200 Mt of mainly Sele seed stored for their own use. In addition and as discussed in Section 2.6, Timor-Leste is already producing about 17,750 Mt of Sele maize annually. Although some of this may not be suitable for seed it is not unreasonable to assume that, with the right level of financial incentive (an attractive maize seed price offered by MAF) about 30% of the 17,750 Mt could be purchased as seed. This is equivalent to 5,325 Mt of Sele seed which is nearly 18 times the import tonnage budgeted for by MAF on an annual basis (about 300 Mt). For the 2013-2014 season it is planned that 126 ton of commercial maize and over 60 ton of commercial rice seed be available for sale. These tonnages can be expanded with forward contracting.
38. It is difficult to estimate the price which MAF would have to pay for locally-produced Sele seed in order to incentivize maize farmers to become specialist seed producers. However when it is considered that: (i) Sele seed was sold by MAF-SoL's CSPGs for \$1.50/kg leading up to the 2012 planting season; (ii) MAF is already paying about \$5.00/kg (farm-gate) for imported maize seed; and (iii) MAF can pay up to \$19/kg if a "break-even" situation is the objective (para 31), it is apparent, as a matter of priority, that MAF should be organizing the purchase of locally-grown maize seed.
39. It is recognized that Timor-Leste's Government procurement guidelines and recommendations are not conducive to local purchasing, and that MAF would need to establish an efficient seed purchase, storage and distribution system. However these two "constraints" should not be allowed to over-ride the sound economic logic outlined in this study. The direct and opportunity cost of the current seed import and distribution practices are huge (Section 3.1). Once MAF and the Ministry of Finance are aware of these costs it should be possible to prepare cases for the promotion of changed domestic procurement guidelines, and for additional investment in Timor-Leste's domestic seed industry.
40. The case for the purchase of locally-produced maize seed is very strong and logical. However this study recognizes that a seed emergency response plan needs to be in place in the event of a poor production season or losses due to locust plagues. This situation is further discussed in Section 3.5.

### 3.4 High Cost of Imported Seed

41. Table 7 indicates that the GOTL could spend about \$15.0 million over the next 10 years on maize seed alone. If the cost of rice seed is included, the total cost of imported seed could be as high as \$2.00 million per year. Another way to analyse this situation is to ask the question: "*if an additional \$2.00 million per annum were to be invested in Timor-Leste's national seed industry, would the returns to this investment be higher than simply spending the funds on free, imported seed?*" Intuitively the answer to this question is a categorical "yes" because at present these funds are generating negative returns – see Table 7. However on a more positive note and based on MAF-SoL's (and NGOs') experience with the

development and support of about 1,000 CSPGs (by end 2013) it is apparent that the investment of an additional \$2.00 million per year in this sub-sector would generate considerably higher returns than the current expenditure practice. The study Benefits of targeted vs non targeted seed distribution examines the returns from investing in Timor-Leste's domestic seed industry in more detail.

### 3.5 Emergency Situations

42. Experience from the past indicates that Timor-Leste is always subject to seasonal vagaries and the negative impact on food and therefore seed production. A good example is the unfavourable climatic conditions in early- to mid-2010, and in late 2010 (incessant heavy rains which damaged rice crops at the point of harvest [June 2010], and prevented maize planting [December 2010]).
43. Therefore rather than relying on seed importation to fill seed supply gaps (a practice which has become entrenched and to some extent is now the norm and not the unusual) Timor-Leste should develop a domestic system which enables the purchase and storage of sufficient reserves of emergency seed to be able to cope with a climatic disaster. Such a system would not be cheap to establish and operate, but it should not cost \$19,000 per Mt<sup>20</sup>. This point is beyond the scope of this study but it needs to be recognized and factored into future sectoral planning.

---

<sup>20</sup> See para 45.

## 4 Conclusions

### 4.1 General

44. The current practice of importing maize (and rice) seed and distributing it free-of-charge to Timor-Leste's farmers is not only very costly, but is having a major and negative impact on: (i) staple food production which is depressed because of the practice; and (ii) the emerging domestic seed industry which is being supported through MAF-funded investment programs. The two approaches to the provision of seed for Timor-Leste's farmers are "diametrically opposed", resulting in large direct and opportunity costs - the latter in terms of production foregone. For example, modelling completed as part of this study shows that even under conservative assumptions, imported seed costs nearly \$20.00/kg when the cost of inefficient seed distribution, and the opportunity cost of production foregone, are included.
45. Another way to present a comparison of the current practice of seed importation and free distribution, with the alternative of focussed support for CSPGs to calculate the "break-even" cost of Sele maize seed. In other words: *"what would locally-produced Sele seed have to cost in order for the Net Present Value of the two benefit streams (from the two options - import seed or produce locally) to be the same?"* The answer is a staggering \$32.00/kg.
46. Sele seed is currently selling for about \$1.50/kg (November 2012) and Timor-Leste is already growing about 17,750 Mt of Sele maize grain per annum. This means that there is a large existing production base from which Sele seed could be purchased through a domestic procurement system operated by MAF - there is no need to import maize seed of non-preferred varieties with poor germination percentages and dubious weevil resistance.
47. The practice of handing out free seed is reinforcing an already-entrenched "dependency" mentality amongst Timor-Leste's farmers. This will become increasingly difficult to break unless some examples (such as no more free seed) are set and adhered to - of course with sufficient warning and support for alternative seed production programs. In conclusion, there is an urgent need for immediate rationalization of Timor-Leste's seed industry to avoid further inappropriate, non-productive and unsustainable investment in imported seed, and inadequate investment in the emerging domestic seed industry.

### 4.2 Seed Industry Size and Complexity

48. *"Are MAF-SoL's seed components "over-designed"?* This question has been raised as part of this study because if Timor-Leste needs about 750 Mt of maize seed each year, this translates "backwards" into an annual need of about 10 Mt of maize stock seed and about 0.2 Mt of maize foundation seed. Corresponding figures for rice seed indicate the need for six Mt of stock seed and 120 kg of foundation seed.

49. At present MAF-SoL is producing (annually) considerably greater tonnages of stock and foundation seed than these figures<sup>21</sup>. The success of the CSPGs, especially for maize, indicates that MAF-SoL's investment in a national seed industry may be "top-heavy" with too-greater a focus on the formal seed sector to the detriment of the informal sector. And perhaps, with only 45,000 and 95,000 households growing maize and rice, respectively, the current approach to seed industry development is too complicated. The question therefore needs to be asked: "*is there an easier way to provide good quality seed to Timor-Leste's maize and rice growers?*" More specifically, "*if the CSPG approach is functioning so well, why is there a need for such a large formal seed sector (Component 2 of MAF-SoL)?*"

---

<sup>21</sup> As advised by MAF-Sol, Component 2 was attempting to reach the target amounts of formal seed listed in the PDD. In 2011/2012, 39 Mt of Nakroma (rice), 24 Mt of Sele (maize), and 2.6 Mt of Utamua (peanut) seed were distributed against targets of 100 Mt of maize, 50 Mt of rice and 25 Mt of peanut seed. In 2012 these targets were reviewed and considered to be unnecessarily large for the same reasons as listed in para **Error! Reference source not found.**. The targets are now 25 Mt of rice and maize seed, and 10Mt of peanut seed.



## 5 Recommendations

50. The analyses and conclusions for this study indicate an urgent need for MAF, MAF-SoL, Development Partners, and NGOs to:
- (i) Discuss the analyses undertaken for this study, and the conclusions. The lead should be taken by MAF-SoL and a Seed Planning Workshop held before the MAF-SoL Mid-Term Review with the objective of preparing recommendations for any MAF-SoL design changes, particularly in light of the discussion in paras 48 and 49;
  - (ii) Based on the outcomes from this study, define, design and cost a much clearer, more logical and less confusing Seed Industry Strategy which reflects the current draft Seed Policy and recognizes the outcomes and recommendations from this study;
  - (iii) Prepare cases (for presentation to the Minister of MAF and the Ministry of Finance) which argue for changed or more flexible local procurement guidelines (to allow local public sector seed purchases), and additional investment in a national seed industry including emergency seed purchases, storage and distribution; and
  - (iv) Continue to discuss Timor-Leste's agriculture seed environment with all stake-holders with a view to retaining an element of flexibility in a revised Seed Industry Strategy in the event of unforeseen international and national circumstances.