

Introducing System of Rice Intensification in Timor Leste – Experiences and Prospects

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Abstract

Since several years rice production receives prominent attention in the agriculture strategy of Timor Leste. The total production is estimated at about 27,000 tons per year. However, local supply doesn't meet the demand of the country's fast growing population of more than 1 million people. Productivity has an estimated average of 2 t/ha. The Ministry of Agriculture and Fishery (MAF) puts emphasis on increasing the paddy production area as well as the productivity of the rice production areas.

In 2007 RDP II started to introduce the System of Rice Intensification (SRI) to the two districts of Bobonaro and Covalima in Timor Leste. The paper describes the approach and experiences with SRI introduction under the special situation of ICM (Integrated Crop Management) already being introduced earlier. The approach incorporates introducing SRI through the government extension service structure.

Within two years the number of farmers practicing elements of SRI increased from around 50 to almost 1300 in the current season, while the average yield increased from about 3 t/ha to around 5 t/ha (around 60%). MAF has endorsed SRI as one of three national strategies to intensify rice production in Timor Leste. Special mechanisms are presented for monitoring elements of SRI application.

This paper outlines prospects and challenges for further promotion of SRI in Timor Leste. It includes the comparison with other rice intensification measures, as well as the need for qualified extension staff. Special reference is made to stimulate self-help with SRI under the strong presence of donor and developing agencies.

Keywords : System of Rice Intensification, Integrated Crop Management, Extension system, Timor Leste

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Introduction

Since the restoration of independence of Timor Leste in 2002 the country's economy remains to depend largely on agricultural production. Agriculture sums up to about one third of the national GDP, giving a source of income to more than 80 % of the Timorese population (Correia et al. 2009). Within the agriculture sector, rice production gains increasing relative and absolute importance (MAF 2008). To date, rice production is still targeted to satisfy the domestic demand of the fast growing population. The local demand at 90 kg per capita amounts to 77,200 tons annually (MAF 2008: 2). The local production was estimated to be 27,000 tons of milled rice (FAO 2003), equivalent to 45,000 tons of paddy at 60% milling efficiency. The gap of about 50,000 tons plus the estimated need for cross-substitution for other staple food is being filled with rice imports, costing the government estimated 78,000 tons x 750 \$ (2008 prices) = 58.5 million US Dollars annually (MAF 2008: 2). This figure might further increase due to rising food prices on the world market. It is therefore not surprising that the government is emphasizing strategies to increase domestic production.

In 2007 the EU/German Government co-financed Second Rural Development Programme (RDP II) started its implementation with GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit) and other partners in the two western districts of Timor Leste, Bobonaro and Covalima. Both districts cover different agro-climatic zones ranging from coastal areas, low land areas to upland areas in the central hills of the country. In 2008, the total rice production area amounted 5,004 ha in Bobonaro and 4, 015 ha in Covalima (MAF 2008: 2). In terms of percentage to national rice production, Bobonaro and Covalima districts are the 1st and 5th most important districts of all 13 districts of Timor Leste with 20.7% and 10.0% respectively (MAF 2008:2). One of RDP II's objectives is to increase agriculture production through innovative technologies and by strengthening MAF services.

The introduction of SRI in Timor Leste

In spring 2007 GTZ started to introduce the System of Rice Intensification (SRI) to farmers in Bobonaro district in the frame of RDPII. Both, GTZ staff and farmers knew about and partly practiced Integrated Crop Management (ICM) already, which had been introduced under previous GTZ project activities operating from the eastern districts. ICM in Timor Leste was understood quite different than in Indonesia as described by Anischan Gani et. al., undated). While ICM and SRI recommendations were very similar in Indonesia, the ICM package in Timor Leste differed quite substantially in their principles, with ICM focusing strongly on high input practices ranging from tractor ploughing to the use of chemical fertilizer and pesticides. Therefore the introduction of SRI

would provide a real low input rice production techniques, suitable for the Timorese farmers, who can hardly afford to buy chemical fertilizer. Moving on from the existing ICM to SRI also provided the opportunity for international networking with the regional and international SRI community. As ICM recommendations had been implemented with significant success, the introduction of SRI caused some confusion among Ministry staff, GTZ staff and farmers initially, as the similarities and differences weren't always very clear. Table 1 depicts the differences between ICM and SRI as used in RDP II.

Table 1. Comparing ICM and SRI in Timor Leste

ICM recommendations (in Timor Leste)	Technical Elements	SRI recommendations
<i>Area estimation Ploughing with tractor</i>	Land preparation	<i>Good leveling Beds with Drains</i>
<i>Improved varieties, ie IR64</i>	Variety	<i>Any variety</i>
<i>Use of good seed</i>	Seed	<i>Seed selection with salt water test</i>
<i>Mat nursery 10 kg/ha</i>	Nursery	<i>Tray nursery 5 kg/ha</i>
<i>One seedling 12-14 days old Line transplanting 25x25cm to 30x30cm</i>	Transplanting	<i>One seedling 8-12 days old Grid (caplak) At least 25x25cm, better 30x30cm to 50x50cm</i>
<i>1st weeding: 15d after transplanting 2nd weeding: 25d after transplanting 3rd weeding: 35 days after transplanting</i>	Weeding	<i>4 weedings with 10 days interval starting 10 days after transplanting Concept of getting air to the roots</i>
<i>Feed the plant concept Leaf Color Chart (LCC) 2 applications of chemical fertilizer</i>	Soil nutrition	<i>feed the soil concept Compost preferred Chemical fertilizer optional</i>
<i>1-3 cm of standing water level</i>	Water Management	<i>Intermittend flooding with periods of no standing water</i>
<i>As IPM (see ICM manual)</i>	Pest control	<i>Not part of SRI</i>
<i>See ICM manual</i>	Harvesting	<i>Not part of SRI</i>

Although the above mentioned differences are more on a technical level, the major difference between the two lies in the shift in paradigms. SRI is rather an open concept of different practices

than a pre-described technology (Uphoff 2003; Stoop et al. 2002; Anthofer 2004). The latter appeared to be a major obstacle for the understanding of SRI, because staff and farmers in Timor Leste are very much accustomed to follow and implement technologies with rather inflexible but input demanding recommendations. As the initial success with ICM was obvious, especially as long as seeds and fertilizers were made available, the approach to disseminate SRI could not simply be a “replacement strategy”, but a way of downscaling ICM to the essential elements of SRI. So the approach concentrated on the key elements of SRI and separated other topics, such as fertilizer recommendations, use of Leaf Color Chart, plot area estimation, crop cut procedures and post harvest issues, which were all included in the ICM extension package.

Dissemination of SRI was continued through a field demonstration strategy after the staff was trained on the key elements of SRI. Extension staff of MAF wasn't existing at that time, so the existing project staff was re-oriented from ICM to SRI first. Meanwhile MAF recruited one field extension worker for each village, and half of them in the western districts of Timor Leste received a one week training on SRI, while the extension workers in the eastern part of the country received ICM training instead. The “upgrading” from ICM to SRI concentrated on tray nursery, transplanting of one young seedling with at least 25cm spacing, which were marked by a grid. Improving organic matter with compost or mulching and the use of a mechanical weeder were further aspects of SRI promotion. For at least one season the terms of ICM and SRI were used synonymously in the project area, while the cultivation practices were monitored for respective elements separately. Water management is known to be highly important but one of the most difficult-to-follow elements of SRI (Uphoff, Kassam 2008, Anthofer 2004) and could not be addressed in the target area with the required necessity yet.

Achievements with SRI promotion and dissemination

The implementation of SRI with pilot farmers went parallel with the promotion of SRI at the ministry level of MAF. The organization of a study tour on SRI to Bali and Lombok for government officials helped to realize the potential of SRI for Timor Leste's national goals of increasing rice production. It was therefore an encouraging step by MAF to include SRI as one of three national strategies of improving rice production, together with ICM and a Hybrid rice programmes (Fontes 2008).

Within two years of introduction RDP II achieved quite considerable progress with SRI in the field, too. The development of SRI farmers in the two target districts increased to several hundreds within only 2 seasons (see table 2).

Table 2. Number of SRI farmers and SRI production data

Parameter	Season 2006/2007	Season 2007/2008	Season 2008/2009
<i>No. of SRI farmers (n)</i>	35	450	1228
<i>Total area (calculated)</i>		297 ha	982.4 ha
<i>Average plot size</i>		0.66 ha	0.80 ha
<i>Average yield</i>	3 t/ha	4.3 t/ha	5.3 t/ha
<i>Minimum Yield</i>		1.4 t/ha	1.6 t/ha
<i>Maximum yield</i>		6.8 t/ha	10.0 t/ha
<i>National average(MAF estimates)</i>	2 t/ha	2 t/ha	2.5 t/ha
<i>Bobonaro average (MAF estimate)</i>		2 t/ha	3 t/ha
<i>Estimated total SRI production</i>		1,277 tons	5,206 tons

But the question of a SRI versus a non-SRI farmer remains a continuous topic of discussion. The project's approach encourages farmers to start SRI with a small part of his plot or maximum half hectare of a one hectare plot. This procedure allows the farmer to compare among "treatment" and "control" plots. Timorese farmers, however, are not used to this approach, as they rather implement a new technique on the entire plot as "instructed". This behavior is unknowingly encouraged by providing free farming inputs, as well as from the fact that MAF is setting overall targets in hectares from national level. These policies discourage farmers to try and compare new techniques by themselves. Furthermore, it affects farmers' perception of the overall national extension strategy and hinders participatory development in general.

Under these circumstances the project developed a monitoring system, whereby the key elements of SRI are being monitored separately. They include the type of nursery, amount and type of seeds used, age and number of seedlings transplanted, transplanting distance, frequency and type of weeding and water management. Yields are being recorded in different ways. Crop-cuts are being performed according to IRRI standards on unspecified number of plots. Additionally, yield data are based on farmers' reports. In this way we could also include farmers, who say that they are following the ICM technology into the data base.

According to the above stated data, yields from farmers practicing one or more elements of SRI

averaged 5.32 t/ha, based on 26 number of crop-cut data in 2009. Unfortunately, no equally accurate crop-cut data are available for conventional rice production practices. In Bobonaro, average production was reported to be 2.0 t/ha and 3.0 t/ha in 2007 and 2008 respectively. According to this, farmers who practiced at least some SRI elements had on average 56% or 2.3 tons higher yields compared to their conventional fellow farmers. These data fully confirm the experiences with SRI from other countries in the region and worldwide (Uphoff 2008, Shuichi Sato and Uphoff undated).

SRI yields range from the lowest of 1.6 t/ha to the highest of 10.0 t/ha. From other observations it is known that first SRI yield increases are easiest achieved on small plot sizes. The above mentioned SRI yields were achieved on an average plot size of 0.8 ha, ranging from 0.5 ha to 1.5 ha.

The range in SRI yields also reflect the range in number and quality, with which the different SRI elements have been implemented. Yet some of the monitoring data with regards to the different elements need to be interpreted carefully, for example the transplanting distance. The qualitative elements like water management are even more inaccurate for systematic analysis. But with increasing experiences by the EW, the quality of these data shall also improve.

Experiences made and Challenges ahead for SRI in Timor Leste

There has been remarkable achievement in the field by introducing SRI to Timor Leste, and the participating farmers increased their production and their production efficiency. These achievements were realized under rather difficult conditions in terms of financial and human resources, farmers' attitudes and behaviors, and in terms of poorly developed agriculture service structure. Yet, the number of farmers practicing SRI continues to grow and Timor Leste is ready to be included in the world-wide list of SRI countries.

Support and ownership from the policy level is strongly needed for successful SRI dissemination. Only then can the efforts expand beyond project level. As SRI is very suitable for poor farmers, there is a great opportunity for poverty reduction policy and at the same time a risk of political capture. Both have to be balanced.

Timor Leste has started only recently to build an agriculture extension service in the field by recruiting around 400 field extension staff. It was a good opportunity to attach the SRI dissemination to the pre-service training of the extension workers. Experiences from other countries normally report introduction of SRI with NGOs or projects. In Timor Leste the attempt is made to mainstream SRI right from the beginning within MAF. It appears to be much harder to implement through civil servant extension workers than through NGO staff, because in comparison to civil servants, NGOs are generally more likely to identify themselves with the content of their mission. A civil servant

extension worker, instead, very often becomes a mere carrier of a government message or recommendation. But if an EW isn't fully convinced about SRI, he or she has little chance to disseminate SRI convincingly to farmers. So while a government endorsement of a programme is necessary, but normally not enough. Additionally, further ways of SRI dissemination can be potentially considered in future. Experiences from other countries underline the impact of SRI spread especially from farmer-to-farmer (Uphoff, Kassam 2008).

Initially it was found to be advantageous, that several farmers were very familiar with key elements of SRI from ICM experiences, such as seed saving nursery and line transplanting of young single seedlings. Like many other agriculture programmes ICM was introduced and perceived by farmers as a full package coupled with several farming inputs. Introducing SRI demanded much more self-help and pro-active participation from the farmers, which is possible only if they understand why they are doing what they are doing. This applies for the extension workers as much. However, this understanding will further improve with increasing ownership of SRI by farmers.

Facing all the difficulties and confusions between ICM and SRI, why was it felt necessary to move ahead with the change? Although the technical similarities between the two might be obvious at a first glance, the underlying paradigm is substantially different. In order to successfully promote SRI, one has to understand clearly the SRI principles as an open system of techniques focusing sustainable soils for improved production. Another added benefit was seen in the opportunities of international networking, as SRI experiences are being gathered world wide these days.

One major obstacle experienced in SRI dissemination stems from the interferences from other projects and programs in the same area with different, sometimes contradicting messages or objectives. This experience is very prominent in Timor Leste, which has a very high presence of donor agencies and other development actors, often resulting in confusion and "project-mode thinking" of farmers and decision makers.

Lastly, the underdeveloped facilitation skills of extension staff, coupled with the low self-help esteem and self-determination are additional difficulties for SRI dissemination. SRI demands pro-active farmers who have the will to move forward. The wide spread practice of providing farming inputs free of charge by many development actors will ultimately undermine the self-reliance of farmers, the more so the less it is developed already.

Conclusion

Introducing SRI in Timor Leste has been a remarkable achievement so far, in spite of the partly difficult specific circumstances. Different or competing approaches – including ICM - for

rice intensification appear to be the most prominent challenges for SRI dissemination. On the other hand, success factors include a genuine political will and support will the Ministry side, and a clear understanding and confidence on SRI from the side of extension staff.

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