



Comparison of System of Rice Intensification (SRI) Practices in Irrigated and Rainfed Areas of Cambodia

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Abstract Based on principles of the System of Rice Intensification (SRI) practices, farmers need to manage properly the water level in the paddy fields to get higher yields. It is only in the irrigated area where farmers can control the water level. However, the practice of SRI has been disseminated to farmers also in rain-fed areas in Cambodia. Therefore, the study aimed to compare the SRI results done so far by farmers in irrigated and rain-fed areas and explain the SRI practices in both areas. Irrigated and rain-fed areas in Kampong Speu Province of Cambodia were selected as study areas. In irrigated areas, five farmers from upstream and downstream were selected. In rain-fed areas, five SRI farmers were also chosen. In-depth interview was conducted with field observation. The results showed that farmers at upstream can grow rice twice (late ripening variety-LRV and early ripening variety-ERV) per year. Farmers at downstream and in rain-fed areas can grow rice only one time (ERV) per year. There is an irrigation system at downstream area, but farmers cannot grow rice twice due to the lack of irrigation facilities, poor water distribution, and geographic condition. In rain-fed area, drought occurs in some years; so water availability is a big concern. In both areas, LRV conventionally provides the yield from 2.31 to 2.36t/ha. SRI way can improve the yield up to 3.30t/ha to 3.70t/ha. Besides same provided yields, farmers have applied almost same SRI principles such as reducing seeds for sowing (up to 50%) and chemical fertilizers (20% to 40%), raising nursery bed, and transplanting with fewer seedlings. So, the study concludes that SRI practices in rain-fed areas are similar with ones in irrigated area. Although irrigation system is a big advantage, controlling water in paddy fields in both areas is still a problem since irrigated facilities are poor.

Keywords system of rice intensification (SRI), irrigated area, rain-fed area, early ripening variety, late ripening variety

INTRODUCTION

In spite of the fact that several big NGOs such as Oxfam/GB and GTZ have played an important role in supporting local NGOs to implement and disseminate SRI in several provinces in Cambodia (CEDAC, 2004), most Cambodian farmers cannot practice SRI well due to inadequate irrigation systems and other inputs. Proper management of water level in paddy fields is one of the fundamental practices of SRI that produces higher yield. Today only 16% of total cultivated areas have been irrigated, revealing that Cambodia is using only 1% of its total water resources in Agriculture (Ngin, 2010). However, currently, SRI techniques are being promoted in rain-fed areas (Tsurui, 2010). This is surprising since it is hard for farmers in rain-fed areas to practice SRI without proper irrigation systems. Thus, it is worthwhile to know how much farmers in rain-fed areas earn after applying SRI techniques since only irrigated farmers can benefit from these

techniques before. Therefore, this study aimed to compare the SRI results produced by farmers in both irrigated and rain-fed areas, and to explain the SRI practices in both areas.

MEHODOLOGY

The study was conducted in Kampong Speu province in Cambodia. Two types of SRI farmers in Chbar Mon City were selected as key informants for irrigated areas. Five Farmers in Srae Thnal village (upstream) are represented as Farmers A1-A5, and five Romleang village farmers (downstream) are represented as Farmers B1-B5. The other five SRI farmers in Samraong Tong District were selected as key informants for rain-fed areas. They are represented as Farmers C1-C5. Qualitative and quantitative approaches were mainly used. Primary and secondary data collections were utilized to get needed information from various existing sources and field works.

Primary Data: The research employed the following data collection to get the needed data:

In-Depth-Interview: Fifteen classified farmers (A1-5, B1-5, and C1-5) were thoroughly questioned about SRI results, performances, perceptions and willingness to continue SRI.

Village observation: Village resources, farming land and the status of agricultural practices in the village can be noticed in order to create real images for the research.

Secondary data: Documents related to the concept of SRI are reviewed. Those documents can be reached by accessing the websites, libraries, reports, or research journals, etc.

Data analysis is done by using both descriptive and statistical analysis. Data are condensed and critically analyzed in order to respond to the above-mentioned objectives.

RESULTS AND DISCUSSION

Comparison of rice yield between SRI and Conventional ways

Before following the SRI techniques, farmers were told that SRI can provide higher yields. This established a reason for farmers in study areas to decide to apply these techniques. Based on the interviews with SRI selected farmers, some have made comparisons of SRI to conventional methods by applying these techniques in different plots. Without conducting experiments, a researcher simply asked farmers to compare the yields of conventional plots and SRI plots during 2009-2010.

Table 1 Comparison of average rice yield between SRI and Conventional ways

Area (t/ha)	Farmers	Seasons	Varieties	Methods	Average Yield
Irrigated Upstream	A1-A5	Dry (2009)	ERV	Conventional	2.25
		Rainy (2009, 2010)	LRV	<i>SRI</i>	3.51
Irrigated Downstream	B1-B5	Rainy (2009, 2010)	LRV	Conventional	2.31
				<i>SRI</i>	3.70
Rain-fed	C1-C5	Rainy (2009, 2010)	LRV	Conventional	2.36
				<i>SRI</i>	3.20
					2.31
					3.30

As shown in Table 1, in the upstream portions of the irrigated areas, the average yield for Late Ripening Variety (LRV) conventionally is 2.31 t/ha; while SRI way can improve the yield up to 3.70 t/ha. For the downstream and rain-fed areas, the average yield of conventional methods is almost the same as upstream yields, approximately 2.31 to 2.36 t/ha. SRI method yields are slightly less compared to those of upstream, at roughly 3.20 to 3.30 t/ha. However, the difference was not as much as expected. It can therefore be concluded that SRI practices in both areas provide nearly

the same results because they have not applied all the SRI techniques. Moreover, irrigation systems in irrigated area do not greatly help improve the SRI results. Although there are irrigated facilities, good water distribution and the functions of facilities remain poor. It can be said that irrigation systems in Cambodia are not on big scale but of a small farming scale. Therefore, it is hard for farmers to use the irrigated facilities to full capacity because they have a limited knowledge in operating those facilities.

Rice cultivation practices in irrigated area and rain-fed area

In irrigated areas, most farmers are able to perform rice cultivation two times per year for the early ripening variety (ERV) and late ripening variety (LRV); especially in upstream villages because of the water availability through canals and rainfall. Some farmers still practice conventional farming; while some farmers have practiced SRI. In the case of the selected upstream farmers (A1-A5), some of them apply both conventional and SRI methods in different plots to be compared. The others have already applied SRI method for all of the plots. On the other hand, upstream farmers are likely to use water inefficiently. Although there are irrigation facilities, water is not distributed properly because farmers have limited knowledge on operation of these facilities. This makes downstream farmers suffer from water shortage. Then downstream farmers including selected farmers (B1-B5) do their farming one time per year for LRV only. As with upstream farmers, downstream farmers apply both conventional and SRI methods in separated plots or two-part divided plots.

In rain-fed areas, the majority of farmers are able to perform rice cultivation only once per year for LRV due to insufficient water or less rain. The main water storage for rain-fed area is a big reservoir. In case that there is no enough rain, farmers need to save water in the reservoir for other works such as daily life use, animal raising and vegetable watering. Under the support from NGOs on the SRI dissemination, farmers in the rain-fed areas have learnt what SRI is. According to the conducted interviews, some of the selected farmers (C1-C5) have applied both conventional and SRI methods in different plots for comparison. Nevertheless, some farmers have fully applied SRI to all the plots. Again the interviews with farmers reveal that in some years with little rain, rice plants are in tiller and panicle initiation stages. This significantly worsens the yield. However, if there is enough rain from early in the cultivation season, the rice plants will grow well and provide a high yield. But some farmers hesitate to drain water out when there is too much water in the paddy field because they are afraid of facing water shortages. This is one reason that SRI farmers in rain-fed areas face difficulty controlling water in the paddy field since the water availability is unpredictable.

Degree of Adoption of SRI principles by selected farmers in study areas

Under the past support from CEDAC (Cambodian Center for Study and Development in Agriculture), selected farmers started to practice SRI techniques since 2006. CEDAC introduced SRI with 12 principles and strongly recommended farmers to follow them (JICA, 2008). However, according to the interviews with the 15 selected farmers about their farming practices during 2009 and 2010, once CEDAC was removed, farmers became unable to follow all the principles. In irrigated areas as well as in rain-fed areas, farmers cannot apply all the 12 SRI principles (Table 2). In irrigated areas, roughly 76% of upstream farmers can adopt the SRI principles; compared with only 62% of downstream farmers. In addition, in rain-fed area, 68% of farmers can adopt SRI principles. Two principles stood out as being adopted by rain-fed and downstream farmers but not by upstream farmers. Those include the principle to "transplant seedlings younger than 15 days" adopted at level of 40%, 10% and 0%; and the principle to "transplant seedlings 25-40 cm apart" adopted at level of 60%, 80% and 0% by rain-fed farmers, downstream farmers and upstream farmers respectively. Nevertheless, there is one principle adopted only by upstream farmers. It is that which says to "weed at least 2-4 times a season" with adoption rate 40%. For the rest, the average rates of adoption are somehow the same. Therefore, it can be said that rain-fed farmers have stronger commitments towards following SRI principles. On the other hand, most farmers