

## **Proposed Strategies to Utilize the Potential of Rice Production in Cambodia**

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*By Yang Saing Koma (CEDAC)<sup>2</sup>*

### **1. Introduction**

Rice is the most important staple food crop for Cambodians, and around 60-65 percent of Cambodians (out of 14 million people) are involved in rice farming or make their living from rice farming. Rice is also one of the major export commodities of Cambodia. During the 60s, Cambodia was one of the key rice-exporting nations in the world. But, as the nation has plunged into civil war and internal conflict, rice production stagnated, and the nation has become a net rice importer. Since the country has returned to peace and enjoys political stability, especially during the late 1990s and early 2000s, there has been a steady increase in rice production. For example, for the season 2007/2008, the Ministry of Agriculture, Forestry and Fisheries (MAFF) has reported that the country produced 6.7 million tons of paddy,<sup>3</sup> an increase of 50 percent compared to 1997/98,<sup>4</sup> with a surplus of more than 2.5 million tons of paddy.

This trend of increasing rice production along with the recent large increases in the price of rice in world markets presents a new opportunity for rice farmers and the national economy. Recently the Cambodian Government announced the plans to expand rice production for export up to 8 million tons by 2015.<sup>5</sup>

This policy note discusses the potentials of the rice sector in Cambodia, and how the country can utilize this potential for the benefit of small farmers and the national economy on a sustainable basis, particular with utilization of the System of Rice Intensification (SRI).

### **2. Existing Rice Intensification Program in Cambodia**

Cambodia covers an area of 181,035 km<sup>2</sup>, with a population estimated at 14 million in 2008. Total cultivated area is around 3.1 million hectares, while the total land area suitable for agriculture is more than double of this -- 6.7 million hectares. Compared to its major rice-exporting neighbors, Thailand and Vietnam, Cambodia has a greater potential area per capita for rice cultivation.

According to data from MAFF, the area cultivated for rice in the 2007/2008 season is 2.58 million hectares, around 83 percent of the total agricultural cultivated area. Rice is cultivated in two different seasons, namely:

- **wet season** when rice is cultivated mostly under rainfed conditions, around 85 percent of the total rice production area; and
- **dry season** when rice is grown mostly with flood recession water supply, around 15 percent of the total cultivated area.

Average rice yield in the wet season is 2.40 tons per ha, while rice yield in the dry season is around 3.96 tons per ha. Based on official data from MAFF<sup>6</sup>, rice yield in the wet season has been increasing from less than 2 tons per ha in 1990s to more than 2 tons per ha in 2000s

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<sup>1</sup> CEDAC: Centre d'Etude et de Développement Agricole Cambodgien/Cambodian Center for Study and Development in Agriculture.

<sup>2</sup> Yang Saing Koma is the president of CEDAC: yskoma@online.com.kh

<sup>3</sup> Speech of the Minister of Agriculture during the annual MAFF conference, 2-3 April 2008.

<sup>4</sup> MAFF, Annual Statistics 1997-98.

<sup>5</sup> Mekong Times, 25-27 April, 2008.

<sup>6</sup> Annual Statistics of MAFF from 1997/1998 to 2006/2007

while rice yield in the dry season has been increasing from less than 3 tons per ha to more than 3 tons per ha in 2000s. The increase of rice yield is partly due to the increased use of chemical fertilizers and improved varieties, and to training and extension support for rice intensification provided by MAFF and various development projects of bilateral aid agencies, local and international NGOs.

The mainstream intensification efforts (with the exception of IPM and some sustainable agriculture programs) emphasized the increased use of external inputs, especially new varieties and recommended fertilizers. As a result, we have seen around 85 percent of the dry season rice being cultivated with IR varieties, especially IR-66. However, in the case of wet season, most farmers still use their traditional varieties, except for early wet-season rice (which is less than 10 per cent of the cultivated rice area) when farmers use short-duration and photo-insensitive IR varieties. Overall, the Green Revolution approach has been mainly adopted for dry-season rice.

In 2000, CEDAC began introducing an **alternative rice intensification program**, known as System of Rice Intensification (SRI). During the first year of introduction, only 28 farmers were prepared to try out SRI ideas, but the number of SRI farmers has been increasing rapidly, reaching more than 82,000 in 2007,<sup>7</sup> with around 60,000 of them are supported directly by CEDAC. The number of SRI farmers is expected to be more than 100,000 in 2008. It is important to note one of the key factors for the rapid increase of number of SRI farmers is the leadership of the Minister of MAFF, H.E. Dr Chan Sarun, especially since 2005. The Minister of Environment, H.E Dr Mok Mareth is another important government figure who helps to promote SRI since he attended the SEED (Supporting Entrepreneurs for Sustainable Development) Award ceremony in New York in April 2005, organized by IUCN, UNDP and UNEP.

#### **What is SRI?**

System of Rice Intensification (SRI) is a set of improved management practices in rice cultivation aiming at creating optimal conditions for growth in **roots and tillers**.

As root growth increases, there will also be more tillers and more grains per plant.

The basic SRI ideas or principles include:

- Growing healthy, vigorous and **younger seedlings** for transplanting by using **healthy, full-grained seeds** which are sown in the **upland nursery bed**, similar to that of a vegetable bed.
- **Wider spacing** between each rice plant, preferably with **one seedling** per hill and with wider and **equal spacing** between each hill.
- **Shallow** transplanting, just 1-2 cm deep.
- Improved **soil aeration** by avoiding continuous field saturation with flooded water.
- Frequent **weeding** to control weed competition and for active **soil aeration**.
- Increased **organic matter** in the soil through application of compost, which increases **soil biological activity**.

Given the increases in yield attained, with reductions in seed and water requirements, and thus greater profitability for farmers, the government officially began promoting SRI in 2005. Now all Provincial Departments of Agriculture (PDAs) are implementing SRI extension in their rice programs. There are also at least 47 NGOs and development projects involved in promoting SRI in different parts of Cambodia. Since 2004, there is a national SRI secretariat hosted by MAFF's Department of Agronomy and Agriculture Land Improvement with

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<sup>7</sup> SRI Secretariat (2008), SRI Annual Report 2007.

technical support from CEDAC and funding support from GTZ (German Technical Cooperation Agency), Oxfam America and GB, FAO and HEKS (A Swiss NGO).

According to data from the SRI Secretariat based in MAFF, the 82,000 farmers using SRI are cultivating an area of around 47,000 ha, i.e. 2.2 percent of the total wet-season rice area. On average, they are producing 3.56 tons per ha, about 1.16 tons per ha more than with conventional cultivation methods. This amounts to an additional benefit of 54,520 tons of paddy per year for Cambodia in 2007, worth around 11 million USD at the December 2007 price of paddy. In addition, SRI farmers have been able to reduce their use of chemical fertilizer by around 50 % compared to conventional practices, by an amount equal to 75 kg per ha. Reducing fertilizer applications by 3,525 tons adds USD 1.5 million<sup>8</sup> to farmer income. In addition, SRI farmers are saving about 55 kg of seeds per hectare compared to non-SRI farmers. This seed-saving adds another 2,585 tons to Cambodian rice supply, worth an additional USD 0.5 million. Thus, the total monetary benefits gained in 2007 were already around USD 13 million.

Independent evaluation of SRI impacts in Cambodia sponsored by GTZ (German Technical Cooperation Agency) in 2004 concluded that if just 10% of Cambodian rice farmers would convert just 42% of their rice area to SRI, the economic benefit to the nation would be \$36 million per annum, more than enough to justify an extensive program of training for SRI within the agricultural extension system.<sup>9</sup>

According to the experiences of best Cambodian rice farmers, with the proper use of SRI practices, they can harvest up to 7-9 tonnes of paddy per ha (double the current SRI average) under rainfed condition using traditional varieties.<sup>10</sup> This presents a huge potential in term of increasing rice productivity within the traditional and rainfed rice farming systems of Cambodia, which are found in areas of greatest socio-economic need.

Aside from the food security and economic development benefits of SRI, reduced use of agricultural chemicals means less pollution of soils and water. Higher productivity per unit of land allows farmers to take some land from paddy to grow more fruits and vegetables to improve their diets and incomes and it removes pressure from encroaching into more sensitive ecosystems. By using SRI, farmers also may eventually qualify for credit through carbon-offset and other environmental programs being developed.

### **3. Strategies for increasing rice production**

There is still huge potential for expanding rice production in Cambodia as current rice productivity is still low, and there is possibility for expanding rice cultivated area, especially if the methods of production do not depend on investments in expensive large-scale irrigation facilities. It should be possible to have two rice crops per year on about 40 percent of rice-cultivated area in the wet season, namely, early wet-season rice (depending on rain) and late wet-season rice (using recessional water supply). In order to use this existing potential wisely, the following strategies are proposed to the government, donors, NGOs and development partners:

1. Implementing and supporting an SRI dissemination program which ensures that all rice farmers in Cambodia can learn about SRI ideas and can adapt these ideas to their own resource endowments and constraints to improve their rice production. This can

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<sup>8</sup> Fertilizer price prevailing in 2007.

<sup>9</sup> Anthofer, Juergen et al. (2004).

<sup>10</sup> CEDAC (2008), Report on National Prize for Best SRI Farmers in 2007.

be done first by identifying and selecting 'key farmers' from rice-farming communes all across Cambodia. There are now capable and motivated farmers willing to participate in such a program in almost all districts of Cambodia. Second, this initiative should enable 'key farmers' to establish demonstrations in all rice-growing communes throughout the country and to conduct farmer-to-farmer training and extension activities. Such an effort would require USD 5-6 million per year for the period of 5 to 8 years, an amount less than 2 % of existing development assistance provided to Cambodia every year since 1993.

2. Implementing and supporting a nationwide community-based seed selection program to ensure that all farmers have access to good quality, locally-produced seeds. This can be done by selecting a few farmers per village to be trained and specialized as community-based rice seed producers. Some of the preferred varieties will be current 'modern' varieties, but since SRI methods give very good results with consumer-preferred 'traditional' varieties, the seed production program should include also the latter.
3. Promoting a nationwide soil fertility management program, especially the promotion of green-manure cultivation during the early wet season, cultivation and use of nitrogen-fixing trees, and making and using compost. This can be done in integration with the SRI extension program. Where limitations on biomass supply constrain compost production, this program would support evaluations, demonstrations and promotion of biomass production to enhance soil fertility. This will benefit crops beyond rice.
4. Development of small and medium-scale irrigation facilities and participatory irrigation management, especially for the purpose of supplementary irrigation in the wet season. While SRI reduces irrigation requirements, its results are greatly enhanced by improved water control to be able to apply small amounts regularly and reliably, so that the economic returns to such investment are very high. This program could be made attractive to donor agencies that want to help promote food security and poverty alleviation.
5. Development of local production of appropriate implements for SRI production, specifically soil-aerating mechanical hand weeders and roller-markers or other tools for enhancing SRI crop establishment in a labor-saving way. Local enterprises that fabricate these can enhance local employment while also improving labor productivity and incomes.
6. Development of better storage, milling and marketing capacities

The combination of the first five above-mentioned strategies would enable rice farmers generally to increase their yields to around 3-4 tons per ha in the wet season. Implementation of strategy 4 would lead in particular to the expansion of rice cultivated areas in the early wet season to about 0.8 million ha. These strategies if implemented successfully would enable Cambodian farmers to produce around 12-13 million tons of paddy per year, or around USD 4,000 to 5,000 million per year.<sup>11</sup> This is about double the current production level, and would give a surplus of around 7-8 million tons of paddy per year (4.5 million tons of milled rice, worth around USD 3,000 million annually). This would allow Cambodia to become the second or third largest rice-exporting nation as well as to contribute to ensuring world food security. In order to gain more benefits from rice exports, Cambodia needs also to develop more and better storage and milling capacities than it now has, a sixth suggested strategy. There is need for better organization to handle the direct export of milled rice, rather than rely on the current unorganized, informal system for export of paddy. Direct export of milled rice would create many jobs in the country and would also produce abundant rice husk and rice bran that has multiple uses, especially for improving animal husbandry and soil fertility.

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<sup>11</sup> Prices as of early June 2008.

Further, if there were better market organization, rice bran oil could be exported profitably, as a product increasingly valued for its multiple health benefits (<http://www.ricebranoil.info/>).

The above-listed strategies to increase rice production through SRI methods would require a leading role by the government, although strategy 5 could be left to the private sector with just a little government initiative needed. Storage, milling and marketing development (strategy 6) would probably best be undertaken by the private sector and by farmers' cooperatives or companies, although it can succeed better with supportive government policies that create a conducive environment for appropriate investments.