



Lessons Learned From the Spread of SRI in Cambodia

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By **Rick Burnette**

Director, ECHO Asia Regional Office

In a 2001 *ECHO Development Notes* article, “SRI, the System of Rice Intensification: Less can be more,” ECHO first reported on SRI’s radical rice production steps including:

- Transplanting rice seedlings when the first two leaves have emerged, usually sometime between 8-15 days old.
- Transplanting seedlings singly rather than in clumps.
- Wide spacing of seedlings, usually no less than 25 cm x 25 cm.
- Maintenance of moist but unflooded conditions in the paddy.
- Weeding by hand or with a mechanical rotary hoe.
- Using organic inputs such as compost, green manures and other biomass.



Since 2001, a combination of farmer groups, non-governmental organizations and governmental agencies across Asia have evaluated and promoted the rice production system. Now, eight years later, country-wide reports from across Southeast Asia and adjoining regions are showing varied levels of adoption by rice producers.



A Bird’s Eye View of Regional SRI

For a bird’s eye view of the status of SRI in Southeast and East Asia, a website called the “SRI Homepage/System of Rice Intensification” (<http://ciifad.cornell.edu/sri/index.html>), a collaborative effort of [Association Tefy Saina](#), Antananarivo, Madagascar and the Cornell International Institute for Food, Agriculture and Development ([CIIFAD](#)), provides a country by country report on global SRI activity. For example, the website shares that between

2007 and 2008, SRI cultivation in China’s Sichuan Province jumped from 116,667 ha to 204,000 ha (<http://ciifad.cornell.edu/sri/countries/china/index.html>).

While the website offers little SRI 2008 production data for Thailand, Malaysia, the Philippines and Laos, there is information about approximately 11,000 ha under SRI cultivation in parts of Indonesia (<http://ciifad.cornell.edu/sri/countries/indonesia/index.html>). In addition, 50,000 farmers in the Kachin and Shan States of Myanmar were reported to be using some combination of SRI (<http://ciifad.cornell.edu/sri/countries/myanmar/index.html>) with 95,000 farmers in Vietnam’s Ha Tay province using similar methods (<http://ciifad.cornell.edu/sri/countries/vietnam/index.html>).

Among Southeast Asian countries, Cambodia stands out in terms of SRI adoption. According to the website’s country report, (<http://ciifad.cornell.edu/sri/countries/cambodia/index.html>) using data from the Cambodian Ministry of Agriculture, Forestry and Fisheries, by the end of 2008 there were 104,750 households in 4,200 villages on 58,290 ha (2.7 percent of the country’s total rice area) using SRI methods.

Focus on Cambodia

Reports of SRI growth in Cambodia raise a number of questions. For instance, what might predispose Cambodian farmers towards being open to SRI? How does accessibility to natural resources such as farmland and irrigation (or the lack of such access) affect this response? Do Cambodian farmers, NGOs and government agencies offer examples for other regional SRI proponents to follow? And might such lessons be applied to other innovations in sustainable agriculture?

With regard to reported high adoption rates of SRI in Cambodia, in April 2009 the EAN editor conducted an interview with Yim Soksophors, Junior Program Officer for CEDAC (Centre d'Etude et de Developpement Agricole Cambodgien), based in Phnom Penh.

Soksophors has worked with CEDAC since 2003, serving as a field worker involved with the promotion of SRI and other field programs related to agricultural extension and rural development. The following is a compilation of the initial interview and follow up correspondence with Sopsors:

How did CEDAC become aware of SRI?

Dr. Yang Saing Koma, president of CEDAC, first read about the emergence of SRI in a 1999 LEISA magazine article. With his interest piqued, Dr. Yang began to experiment with the novel rice production approach in his own personal rice plots.

How was SRI adapted for Cambodia?

Beginning with the earliest efforts of Dr. Yang and an initial group of farmers, CEDAC used participatory action research to gather and analyze information related to local adaptation and adoption of SRI. Initially, Dr. Yang cooperated with Mey Som, a farmer with a 0.6 ha field located in Trapaing Raing village in the Ang Snuol district of Kandal province. Then in 2000, CEDAC began formal cooperation with 28 farmers in four provinces (Kandal, Prey Veng, Kompong Thom and Kompong Cham).

How fast did the Cambodian SRI adoption rate grow during the following years? By 2005, 40,000 farm families in 2,500 villages of 20 provinces had adopted or adapted some form of SRI. And by 2007, 80,000 farm families in 24 provinces had adopted/adapted SRI techniques.

How are figures related to the overall adoption of SRI being compiled?

CEDAC cooperates with the Cambodian government in staffing a SRI Secretariat who is responsible for collecting SRI data from all NGOs and provincial agriculture departments. Updated reports are available at the Ministry of Agriculture, Forestry and Fisheries website (www.maff.gov.kh) and the Cambodian Food Security website (www.foodsecurity.gov.kh).

Was a coalition of other NGOs and research organizations involved in the early evaluation of SRI?

Other NGOs were not so involved in the evaluation and promotion of SRI until around 2005. In September of that year, CEDAC and 30 other non-governmental organizations working on ecological agriculture and rural development set up the Network of Ecological Agricultural Development in Cambodia (NEDC). By then the Cambodian Provincial Department of Agriculture had also become involved.

What were some of the basic extension approaches related to early SRI work?

CEDAC has used farmer-to-farmer extension approaches to train rice growers in SRI techniques. For instance, during SRI Transplant Days, farmers can have both a firsthand look and a chance to

participate in the establishment of SRI plantings. By such direct involvement, farmers are better able to understand important SRI concepts such as the appropriate stage to transplant seedlings as well as proper transplanting distances and the importance of placing seedlings in straight lines. Additionally, CEDAC also organizes group trainings so that farmers can master key practices such as the selection of good seed and how to improve top soil fertility.

Even more important is SRI Harvesting Day, during which participating farmers conduct a crop cut exercise. During such an activity, a number of 2 m x 2 m plots are cut in SRI and conventional rice fields. Examining rice stalks cut from poor, medium and good yielding areas in both types of fields, farmers join together to compare the number of tillers and panicles per hill as well as the total number of grains produced. At the end of the crop cut exercise, the differences in crop performance among both systems is quite convincing for many farmers, helping them to consider the suitability of SRI.

Additionally, during the growing season, between transplanting and harvest, interested farmers participate in farm visits to see production in both SRI and non-SRI fields in order to compare differences in ongoing crop growth and management.

Data collection is also an important aspect of promoting SRI. Cooperating farmers involved in both SRI and conventional rice production are taught to keep essential records throughout the growing season including:

- Production technique (SRI or non-SRI)
- Inputs (amounts of composts, etc.)
- Rice growth observations (i.e., number of tillers)
- Problems encountered and methods of solving
- Yields

After harvest, CEDAC sets up thematic workshops that include experienced SRI farmers, non-cooperating farmers and local government officials (e.g., village chiefs, commune council members) in order to exchange information about SRI production. During these post-harvest workshops, the participants:

- Share practical experiences related to SRI techniques, especially best practices
- Review problems
- Review solutions
- Set up action plans for the next growing season

Key SRI farmers serve not only as models but as resource persons, training other rice producers in their own village-based farmer associations (VBA).

All in all, such farmer-to-farmer methodologies, especially training rice growers to become farmer trainers and activities related to Transplant and Harvesting Days, have been the most important practices related to SRI promotion.

What training materials have been developed to assist with promoting SRI?

Initially, media such as SRI booklets, leaflets and big pictures were developed for training purposes with an SRI video produced a few years later. Most recently, Oxfam-America collaborated with CEDAC to produce the popular *Do You Speak SRI?* instructional video (released in 2008). The new video production has been extremely helpful in training and promoting SRI, especially among illiterate farmers.

However, the most widely used media tool used by CEDAC to promote SRI is the monthly *Farmer Magazine*.

The SRI videos are especially useful to show during the beginning of the rainy season when farmers are beginning to prepare for rice planting. However, the monthly *Farmer Magazine* offers regular information about recommended agricultural practices, especially SRI, throughout the entire year.

How does Cambodian SRI differ from other forms of SRI being promoted around the world?

In practice, Cambodian SRI is quite similar, using 12 basic steps. But techniques can be altered depending upon local farming conditions. For example, fields with less fertile soil may require closer planting distances than in more fertile fields. In SRI fields with particularly rich soil, seedlings are sometimes planted 40-50 cm apart. However, under most conditions SRI planting distances are 20-30 cm.

Although SRI generally stresses the use of one seedling per hill, Cambodian farmers plant 2-3 seedlings per hill in paddy fields prone to flooding which tend to have more problems with seedling cutting crabs.

[Ed. The following is a summary of the 12 key SRI practices being promoted by CEDAC:

- *Level the soil of both the seedbed and rice field.*
- *Apply natural fertilizer (especially compost).*
- *Weed frequently to improve soil aeration (2-4 times).*
- *Wider spacing between hills.*
- *Transplant seedlings quickly and carefully.*
- *Transplant seedlings in a square pattern.*
- *Maintain lower level of water in the rice field.*
- *Transplant fewer seedlings per hill; preferably one seedling (maximum of three).*
- *Transplant young seedlings, ideally less than 15 days old.*
- *Shallow transplanting.*
- *When transplanting, softly uproot seedlings to avoid trauma, especially to the roots.*
- *Transplant only healthy seedlings.]*

Do Cambodian farmers tend to follow the 12 key SRI practices?

If farmers can apply all 12 steps then yields are usually best. But even when Cambodian farmers cannot apply all 12, they can still adapt to certain environmental limitations. For example, practices may need to be adjusted where fields receive too much water. In such cases extra seedlings are planted due to the threat from crabs.

And in response to poor moisture conditions, three seedling beds may be planted at slightly different times. Should transplanting need to be delayed due to inadequate moisture, a batch of later-sowed seedlings can be available when there is finally sufficient moisture in the field. Even under normal conditions, multiple seedling beds with varied sowing times can enable farmers to carry out more extensive plantings without worry of seedlings becoming too old.

Typically, most farmers carry out at least five steps. But those who apply eight to 10 steps often get better results.

[Ed. One issue sometimes raised concerns SRI data and practices. While statistical data is helpful in measuring the spread of SRI in Cambodia, an understanding of the exact criteria that is used to

qualify adopters would also be useful. For example, considering the 12 key SRI techniques, exactly how many of the practices (or which practices) must be implemented before a farmer can be considered an adopter?]

Is the adoption rate of SRI among Cambodian farmers continuing to grow or has it begun to plateau?

SRI adoption is continuing to grow. More farmers are adopting key practices such as reducing the quantity of seeds, using younger seedlings, transplanting fewer seedlings per clump, using wider plantings, applying compost and reducing chemical fertilizers.

In addition, based on a 2008 report by the Cambodian Ministry of Agriculture, Forestry and Fisheries, overall SRI yields are almost double that of conventional rice.

[Ed. According to the “SRI Activities in Cambodia” report included in the SRI Homepage/System of Rice Intensification website <http://ciifad.cornell.edu/sri/countries/cambodia/index.html>, 2008 data from the Cambodia SRI Secretariat shows, “On average, SRI methods are giving yields of 3.53 tons per ha, about 1 ton more than with conventional cultivation methods and 40% more than the national average yield of 2.54 tons per ha.” It was also reported that the average yield “increased by half a ton per hectare compared with 2007, possibly reflecting the spreading adoption of SRI methods without farmers using the whole set of practices.”]

Are there certain regions in Cambodia where SRI has been adopted or is it widely accepted throughout the country?

SRI is being adopted in every region but must be adapted to local conditions. For example, in non-irrigated rice production areas, SRI is being adapted for upland rice production. This is being done by:

- Limiting seeds planted per hill to 2-3 (as compared to several in traditional plantings) with wider distances between hills.
- Or sometimes transplanting upland rice seedlings from beds to hill fields (1-3 seedlings per hill), although this method seems to yield less than direct planting.

Are organic fertilizers (e.g., compost) always used?

Most farmers use compost although many also use such natural fertilizers in combination with chemical fertilizers. However, organic rice growers use only compost.

[Ed. Regarding the use of compost in Cambodian SRI systems, CEDAC recommends 10-15 tons of compost per ha. But in real practice the application rate is significantly lower, as farmers only apply as much compost as they can manage. Tom Post, Asia team leader for the Christian Reformed World Relief Committee (CRWRC), states that as soils in Cambodia’s rice production areas are quite poor overall, even small amounts of compost are able to make a significant difference in improving soil fertility and rice yields.

But paddy field soil improvement has its challenges. Farmers in the Ponlerk community of Takeo province south of Phnom Penh, where the Wholistic Development Organization (WDO) works, indicated that if paddy fields are too far from homes then farmers are less likely to apply compost due to the difficulty of transporting such fertilizers.

Similarly, WDO partners report that green manures, such as mung bean and cowpea, which are grown in the paddy and plowed into the soil prior to cropping rice, are not widely used because cows tend to graze the paddy fields. But when grown, green manure cover crops (gmcc) are planted

in fields closer to homes because farmers can monitor their paddy fields and better protect the gmcc crop from cows.]

So why is SRI spreading so widely in Cambodia, especially compared to neighboring countries?

Initially, only a few Cambodian NGOs were committed to promoting SRI. However, when SRI performance proved exceptional, the Ministry of Agriculture began to promote the technique as well. Cambodian Minister of Agriculture Chan Sarun even wrote his dissertation on SRI and played a major role in promoting the technique countrywide.

However, the main factor related to the spread of SRI in Cambodia is that when prospective farmers are able to see the results of model SRI farmers, they are often more willing to give the technique a try.

Are labor needs a factor in whether SRI is adoptable or not?

Initially, more effort is needed to implement SRI as new skills are required in order to prepare adequate seedbeds, select good seed, properly transplant healthy seedlings and establish rows in straight lines. But as farmer skills become better developed, less effort is needed.

Even more effort is needed for weeding SRI fields. However, a special rotary hoe has been developed that makes weed removal between straight rows of rice plants less difficult. And farmers generally recognize the additional benefits related to weeding, including aeration which improves paddy soil condition and ultimately crop performance.

Cambodian SRI Adoption: Widespread but Uneven?

David Strong, a long time Compassion and Mercy Associates (CAMA) development worker based in Battambang in northwest Cambodia, has been involved with SRI promotion since 2004. But despite SRI's reported popularity in much of Cambodia, David has seen very limited adoption in his region.

David offers two key observations related to the low adoption rate of SRI in the Battambang region. One factor is that whereas SRI appears to be more manageable for small farms, rice producers in northwest Cambodia, long considered the nation's "rice bowl," tend to work tracts of land larger than farms in many other parts of the country.

Also, because most farmers in northwest Cambodia rely "100% on nature," SRI is perceived as risky with regard to water accessibility during the transplanting stage. For example, should rainfall be inadequate during the early growing season, young rice seedlings in SRI fields may die unless water can be pumped in from a nearby water source.

While CAMA continues to actively promote SRI in the Battambang area, regarding the potential of the technology in the region, David surmises that "the jury is still out if it will catch on up here in the northwest."

Gleaning Cambodian SRI Lessons

So are there lessons to be gleaned from the SRI experience in Cambodia?



Some have observed that the significant spread of SRI is based upon the supreme importance of rice in the country. As CEDAC's Dr. Yang states, "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." As a result, the potential of SRI to benefit small farmers and the national economy on a sustainable basis is broadly appealing.

Beside CEDAC's role as a major SRI promoter, the spread of these rice production practices in Cambodia appears to have been significantly enabled by the effective cooperation of a wide range of stakeholders. For instance, since 2004, the influential position of the SRI Secretariat has been hosted and supported by a unique Cambodian government/NGO coalition.

Additionally, the development of culturally appropriate SRI instructional media in support of effective farmer-to-farmer extension programming is another key component related to SRI's growth in Cambodia.

Although still uneven, SRI's adoption in Cambodia is clearly widespread. And given that its introduction and initial promotion occurred less than a decade ago, Cambodia's coalition of SRI promoters appears confident about the future role of the rice production system.

[Ed. ECHO's first report on SRI, "SRI, The System of Rice Intensification: Less Can Be More" was published in EDN Issue 70 (Jan 2001). Over the next two years, SRI-related updates included "SRI Feedback from Our Network," EDN Issue 71 (April 2001) as well as "SRI and Stemborer," EDN Issue 72 (July 2001), and "SRI Update," EDN Issue 77 (October 2002). Each of these archived EDN articles can be accessed via the following link:

<http://www.echonet.org/content/agriculturalResources/830>

The most recent SRI article was included in EDN Issue 102 (January 2009), "Can a Consensus be Reached on the Benefits of SRI?"

<http://www.echonet.org/repository#490:d:Issue102NewSite> .]

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