

# Observations of SRI in Nakorn Sawan, Thailand

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I recently had the opportunity to travel from Chiang Mai, Northern Thailand, to Tambon Thamai, a town located in Nakorn Sawan Province, about 500 kilometers from Chiang Mai. Nakorn Sawan is located in central Thailand, where Thailand's four great rivers meet (the Ping, Wang, Yom and Nan). The purpose of my trip was to visit Wanpen and her daughter Pijarinee. This mother-daughter pair have been growing rice using SRI for several years.



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A picture of Nakorn Sawan, with the confluence of the four rivers. Picture by Jida Jirwatchradetch.

Where these four rivers meet, one finds flat land and rich soil. This region is well known throughout Thailand as a rice production area. Rice farmers in this area are able to cultivate rice year round. Some farmers will cultivate two crops of rice, while many cultivate up to three. Most commonly, farmers grow the variety 'Korkor Forty-Nine,' a brown brown leafhopper resistant variety that matures in 107 days. This variety produces a good yield and farmers are able to grow it three times per year. Some rice farmers also produce jasmine rice.

In Nakorn Sawan, rice is typically established using one of three methods: broadcasting, hand transplanting, and mechanical transplanting. Each method has strong and weak points. Broadcasting saves time, but requires more seed (maximum amount needed is about 125 kilograms/acre). Machine transplanting is quick and uses less seed (about 40 kilograms/acre), but the machine is expensive. The traditional method, transplanting seedlings by hand, requires the same amount of seed as the machine, but with added labor input.

Farmers using the traditional planting method are faced with three main problems: the quantity of seed that is required, the cost of labor, and the high cost of inputs. Solutions that enable farmers to overcome these three main challenges will be of high interest for farmers in this area (and likely elsewhere, too). Kularb Kerdsawad, the village head man, explained to me that farmers in this area typically apply fertilizer at a minimum of 20 kilograms/rai/ crop (50 kilograms/acre/crop) and harvest rice at 800 – 1,200 kilogram/ rai/ crop (2,000-3,000 kilograms/acre/crop). With this method, rice will stand in the paddy water until just a couple weeks before harvest, when the farmer will dry the paddy to make harvesting easier.

In reality, rice is not a water plant; it is traditionally grown in water for ease of weeding and weed control. Each rice seed has the potential to produce more than twenty tillers (each tiller consisting of a new stalk with roots and leaves). However, with the traditional method, seedlings are transplanted in bunches and tillering potential is lost due to competition between adjacent rice plants. The System of Rice Intensification (SRI), as promoted by Norman Uphoff and others, suggests that yields can be maximized by using the following practices: 1) transplant young, single seedlings to increase growth potential and reduce competition, 2) avoid trauma to the root when transplanting, 3) give rice wider spacing to maximize growth potential, 4) keep paddy moist but not always flooded (alternating between wet and dry), 5) actively aerate the soil, and 6) enhance soil organic matter.

SRI was first tried by farmers in Thailand over ten years ago. However, many farmers struggled to avoid trauma to the seedlings and to transplant young seedlings using human labor. Additionally, trying to draw lines (for even spacing of the transplants) was difficult and required labor and time.

In response to these challenges, several farmers began to practice the “parachute method” of rice transplanting, in which rice seedlings are “parachuted” into their place in the paddy using a throwing motion. Further advances on this have been created around Thailand, including a “dart transplanting method with roller planting marker line drawing” developed by Wanpen, the farmer in Nakorn Sawan whom I went to visit. With Wanpen’s innovations (methods ideal for SRI farming) a roller planting marker machine is used to make very straight lines throughout the field; these lines can then be used for spacing rice transplants, which are thrown like darts at the appropriate target. Both the dart method and rolling planter marker machine will be explained in further detail in the Thai Natural Farming Journal articles included in this ECHO Asia Note. Below, I will explain how Wanpen has utilized both innovations in her SRI practices.

## Wanpen Seedling Preparation

Many different substrates can be used for growing rice seedlings. Wanpen uses forest soil for her seedlings. She harvests forest soil, then breaks the soil into a powder and keeps it in a bag until she is ready to use it. She believes that the forest soil contains all the nutrition that rice seedlings need, with an ideal soil structure that makes it easy to dart the seedling. Forest soil is often cheaper than compost from the market, which costs about 4-5 THB/ Kilogram (\$0.12-\$0.15 USD/kg).

To produce the dart rice seedlings, Wanpen soaks the seed in salt water (with enough salt in the solution that an egg placed in the solution half floats and half sinks) to separate bad seed. The good seed will sink while the bad seed will float. After removing the bad seed, she soaks the good seed in normal water for one day, then lets it sit out of water for a day to help the rice germinate. A white dot developing on a grain of rice is an indicator that the root is developing.

For conventional rice, which typically uses 10-15 seedlings per planting hole, Wanpen places the forest soil in a plastic tray with 434 holes, and places several seeds in each hole. She then covers the entire tray with 80% black shadecloth netting. The black



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shadecloth will help to prevent the seeds from splashing out when the tray is watered. Depending upon the amount of space available, she can start the seedlings either under a shadecloth enclosure (watering once a day) or outside (watering twice a day). Adequate soil moisture must be maintained while the seeds are germinating.

Rice will germinate and grow up through the shadecloth netting within 4-6 days. Wanpen removes the shadecloth when the rice has grown through the netting and is about 3-5 centimeters high. The seedlings can then sit in the nursery until the farmer requires them (for conventional rice, the seedlings may be as old as 30 days at planting).

For SRI seedlings, Wanpen uses the same kind of tray, but will fill each tray hole with half the amount of soil and place one seed in each hole. Each hole is then covered with soil and black shadecloth, and treated similarly to the conventional rice seedlings. SRI seedlings will stay in the tray for only 12 days before being transplanted into a paddy field.

## No-Burn Paddy Preparation

In Thailand and other rice-growing countries of Southeast Asia, the paddy is commonly burned to clear the stubble and any remaining residue in order to help speed the preparation process. In addition to creating air pollution, burning the paddy negatively impacts the soil by volatilizing nutrients and burning off organic matter, which is necessary to create healthy soils. The farmers around Nakorn Sawan have adopted a no-burn paddy preparation method, which helps to ensure the health of their soils by maintaining organic matter and nutrients, reducing air pollution, and allowing them to plant again in a timely fashion. For more information about uses of rice straw and why ECHO Asia does not advocate burning of paddy, see the ECHO Asia Note



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(Above) Forest soil, (Below) seedlings in tray

**"The Amazing Effects of Rice Straw**

([http://c.ymcndn.com/sites/www.echocommunity.org/resource/collection/0ADF35ED-72B3-44AA-92B5-D50F9B4A741D/EAN\\_4\\_-\\_January\\_2010.pdf](http://c.ymcndn.com/sites/www.echocommunity.org/resource/collection/0ADF35ED-72B3-44AA-92B5-D50F9B4A741D/EAN_4_-_January_2010.pdf)) by Winfried Scheewe (2010).

The farmer group in Nakorn Sawan advocates the following preparation:

- Apply microorganisms (IMOs, EM or others at about 1L/rai (2.5L/acre)), then immediately flood paddy for about ten days.

- After ten days, turn the soil over (using a tractor or water buffalo).

- Let paddy sit for about five days, to allow microorganisms in the flooded paddy to

complete the fermentation of the stubble.

- Plough the land once again.

- Level the land, including a drainage line at the side of the paddy or at the proper place.

- Draw lines with roller planting marker machine to mark the transplantation targets.

**Transplantation of rice seedlings using Wanpen's dart method The farmer group in Nakorn Sawan uses the following method for transplantation of rice:**

- Remove the seedling trays from nursery.

- Place the trays in a bag (rice bag or animal feed bag, etc.) to keep the seedlings cool and moist.

- Transport seedling trays to the paddy field.

- Each darting person should roll up the seedling trays and place them in their side bag. Typically, each person can carry 3-5 trays.

- Make straight lines across the paddy with the roller planting marker tool, using a string line as a guide. Lines should be spaced 30 x 16 cm.



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No-burn paddy preparation.



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- "Targets" are formed where perpendicular lines intersect. Now people can begin to throw seedlings like darts at the cross section targets. To minimize risk of injury, darters should keep their backs straight and walk forward.

- The darting method, an innovation specifically designed for SRI, requires 90 trays/rai (225 trays/acre).

- Wanpen's family and enterprising farmers have begun micro-enterprises by growing and selling seedlings for darting at 15 THB/ tray (\$0.50 USD).

- The cost of seedlings grown in trays for one rai is (15 THB x 90=1,350 THB, or 3,375 THB/acre)(\$112.50 USD)

- For the SRI method, the paddy should be dried out for 5-7 days after planting.

**Paddy Maintenance The farmer group in Nakorn Sawan uses the following practices for maintaining their SRI rice paddies:**

- 15 days after transplanting, the farmers apply nitrogen at a rate of 10 kilograms/rai (25 kilograms/acre).

- 50 days after transplanting, the farmers apply NPK at a rate of 10 kilograms/rai (25 kilograms/acre).

- Farmers weed when necessary. Those using SRI often employ a cono-weeder to simultaneously weed and aerate the soil, improving microbial activity.

- The farmers use proper water management for the crop, according to SRI principles.

- The farmer group in Nakorn Sawan let Azolla grow in a lower trough at the edge of a



(/resources/0b154c2e-1c32-4bf9-a7c3-bb7ae176ccf4)Paddy preparation and dart transplanting.

over the paddy (Pijarinee and Wanpen method). Azolla is a green manure cover crop that is capable of fixing nitrogen, and has a C:N ratio of 8:13. It is also a very good natural weed control, because it can cover the water surface, blocking sunlight and inhibiting weed growth. Azolla is also beneficial because it is able to absorb heavy metals from dirty water.

- Dry the paddy 2-4 weeks before harvest.

- Harvest the abundant rice!

Kularb, a village head man, asserts that even 40-day-old seedlings can be used with the SRI method, but there will be fewer tillers than when rice is transplanted at 12 days old (seedlings with 3 leaves). In his experience, if conventional rice produces an average of 14 seedling tillers with 150 seeds per tiller, it is capable of producing 1,000 kilograms per rai or 2,500 kg/acre. He found that when using SRI ('Riceberry' variety), one plant could produce nearly 40 seedling tillers (even during the dry season), amounting to a nearly threefold increase in grain.



(/resources/9f21154d-2c8c-43a0-a10b-7fb0761e5e9)



(/resources/cf94db1a-a838-4d46-b0c0-3733a105ecf4)Azolla along paddy and in paddy.



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Kularb, the village headman, counting his tillers

Wanpen and her daughter not only produce seedlings (single SRI seedlings and multiple conventional seedlings), but can also be hired to dart other farmers' rai with her seedlings. She will charge 1,800 THB per rai (140 USD/acre) for rice darting labor. Ten darting laborers can dart 7 rai/day (2.8 acres/day), allowing her to make a revenue of 12,600 THB/day and paying each worker 300 THB/day.

### Final Reflections

The farmers in Nakorn Sawon have created a great system. In addition to growing rice for their own harvest, they have also started growing rice seedlings for the government's rice department. Growing rice with SRI is a very good way to keep breeds pure, due to the fact that each clump or planting station is produced from one seed, allowing farmers to more easily remove any seedlings that do not express desired traits. Also, when grown using SRI practices, rice plants produce seed

of good quality and weight, with good germination.

Mother Teresa once said, "I can't do what you can do and you can't do what I can do, but together we can do a great thing." Billy Graham noted that the Christian life is not a program but a process. I have often heard that development also is not a project but a process. From my own experience, I would like to conclude that the adoption of

SRI in Thailand has been an evolving process. At first, we tried very hard to practice single transplantation, but it was difficult. The farmers of Thailand developed the parachute method, but the rows and column spacing was difficult to control. Finally, Wanpen, the Nakorn Sawan farmer, developed the darting method that I have shared with you today. I hope you find useful for your own agriculture practices. SRI is not a fixed system, but a process. We need to focus on the flexible system and not approach SRI as a cookbook "silver bullet" approach. SRI can be adapted to each of our unique contexts.

### Useful Links

- IFAD's Page on SRI ([http://www.ifad.org/english/sri/index\\_full.htm](http://www.ifad.org/english/sri/index_full.htm))
- Cornell University's Page on SRI (<http://sri.ciifad.cornell.edu/>)
- Wassan's Page on SRI (<http://www.wassan.org/sri/>)
- SRI India (<http://www.sri-india.net/>)
- Video about SRI in the Mekong Basin (<http://www.youtube.com/watch?v=b31LgNMu-hg>)

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## Permanent Links

### Autres ressources recommandées

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