



**Simple and Effective
SRI and Agriculture Innovation**



*Lightly uprooting the seedlings to minimize root damage
Photo: SRD*

Rice is the main food for half of the world's population and the most important source of jobs and income for millions of rural farmers. However, there are some challenges in rice production. Current practices in rice cultivation have been encouraging genetic homogeneity that makes rice less resistant to pests and diseases. They also consume the increasingly scarce resource of water - up to one-third of annual fresh water consumption in the world is used in rice production.

Year-round inundation of rice fields with over-application of chemical fertilizers facilitates the emission of greenhouse gases and global warming. Overuse of chemical fertilizers and pesticides contaminates soil and water. Rice production is a labor-intensive industry in which women play significant roles, alongside having to take care of children and do housework.

Viet Nam is one of the leading countries in the world for production of rice and

a leading exporter of rice in recent years. Its production is dominated by small-scale farmers, with about 9 million farmer households growing rice - 85 per cent of them in northern Viet Nam - possessing less than 0.5 hectare of rice land per household. Overuse of chemical fertilizers and pesticides in rice production is having a negative impact on the environment and health of communities. Increasing scarcity of water resource is constraining the expansion of irrigated rice production.

Farmers would benefit greatly from being able to produce more rice with less requirement of inputs of water, chemicals, seed, and labor. The System of Rice Intensification (SRI) offers farmers this opportunity, facilitating increases in income, improved food security, less negative impacts on the environment, ensuring a more sustainable rice production system, and strengthening farmers' capacity to cope with climate change.



Weeding and soil aeration should be done at least twice, at 10-12 days and 25-27 days after rice transplanting
Photo: Oxfam

System of Rice Intensification (SRI) is a five-principle system that enables rice to grow best. Field preparation is similar to present practice, taking care to make the field as level as possible.

- 1 Seedling age:** Transplant young seedlings, at 2-2.5 leaf stage for normal field, or 4-5 leaf stage on alkaline soil, taking them quickly and gently from upland nursery.
- 2 Number of plants per hill and spacing:** Single plant per hill at desired spacing should be planted at the intersections of a grid, usually 25x25 cm. Slip the root in sideways at a shallow depth for bountiful root growth.
- 3 Water management:** Intermittent irrigation 3-4 times per crop season, keeping soil moist but not inundated.
- 4 Weeding and pest management:** Weeding and soil aeration should be done at least twice, at 10-12 days and 25-27 days after rice transplanting.
- 5 Nutrient management:** Fertilizing reasonably at different stages of rice growing. Encourage the use of organic and compost fertilizers, as much as available.

Rice will be healthier and give higher yield when:

- Roots are given conditions to grow strongly and profusely
- Individual rice plants give more tillers, with more productive tillers per hill and per sq. meter
- High number of well-filled grains per tiller

SRI - a Potential to be Explored Fully

The Ministry of Agriculture and Rural Development reports that in 2011 there were 1,070,384 farmers - about 70 per cent of whom are women - applying SRI, on 185,065 hectares (457,110 acres) of their rice fields. The number of farmers using SRI practices in Vietnam has quadrupled since 2009.

"Until recently we lacked experience with SRI adoption in Viet Nam. Now we have seen that SRI helps farmers to increase economic returns and to adapt to climate change. Researchers and farmers should coordinate to explore the potential of SRI".

*Dr. Bui Ba Bong, Vice Minister,
Ministry of Agriculture and Rural Development*

SRI – Simple and Efficient

S is for spacing and aerating
Young seedlings, compost fertilizing
No pests, higher yield
Hard working leads to better life

R is for intermittent irrigation
Easy to adopt 5 principles

I is for saving seed, less labor
Less water and pesticide
Less pollution
You and me are happy to do this

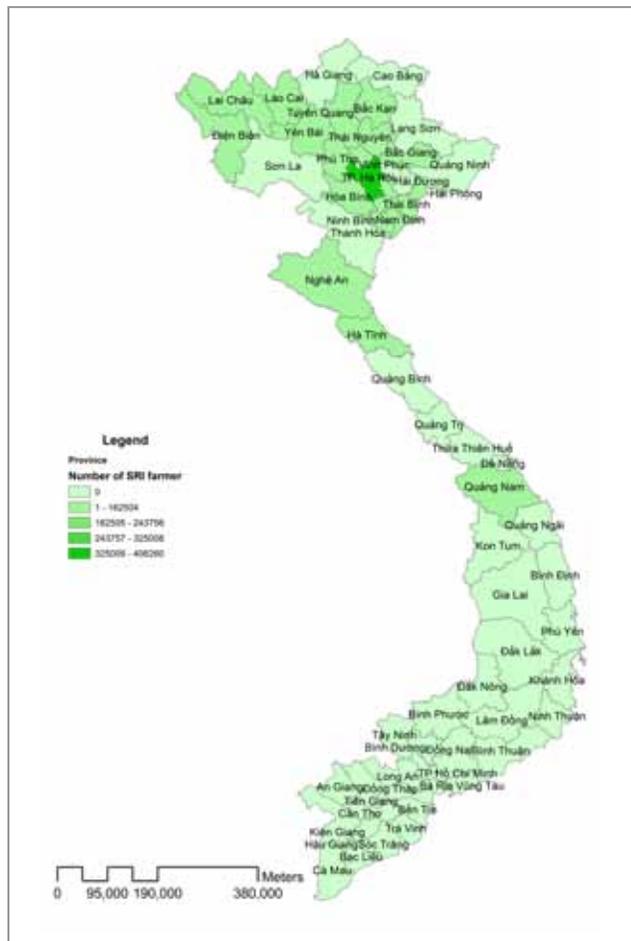
*Poem by Nguyen Xuan Van,
Plant Protection Station
Do Luong district, Nghe An province*



*Seeds displayed at National SRI day in January 2012
Photo: Oxfam*



Number of SRI farmers by end of winter spring 2011 crop season



Source: PPD

Overview of SRI Adoption and Agriculture Innovation in Vietnam

Profile of SRI Adoption and Scaling Up

2003	SRI was introduced to 3 provinces - Hoa Binh, Ha Noi, and Quang Binh- through integrated pest management (IPM) operations managed by Plant Protection Department.
2003-2005	SRI was adopted on 2-5 hectare scale in 12 provinces in the north and central of Vietnam with the participation of 3,450 farmers.
2005-2006	SRI received support and assistance from a number of projects and programs of international and domestic institutions, NGOs, research centers.
2007	<p>Community-based SRI adoption model was developed in Dai Nghia Agriculture Cooperative in cooperation with PPSD of Ha Tay province (now part of Ha Noi) assisted by Oxfam.</p> <p>Outcome of the model served as important basis for MARD to approve Decision 3062/QD-BNN-KHCN dated 15 October 2007, recognizing SRI as a technical advance and encouraging SRI adoption and expansion in provinces with local budgets.</p>
2009	There are 264,000 farmers who adopted SRI on 85,422 hectares of rice land.
2011	SRI adoption attracted the participation of 1,070,384 farmers on 185,065 hectares of rice land.

SRI has now been adopted in 22 provinces: Ha Noi, Ha Tinh, Nghe An, Phu Tho, Thai Nguyen, Yen Bai, BacKan, BacGiang, Dien Bien, Ha Nam, Hai Phong, HoaBinh, Hung Yen, Lai Chau, Lao Cai, Nam Dinh, NinhBinh, Quang Nam, Thai Binh, TuyenQuang, VinhPhuc, and Lang Son.

SRI is supported and adopted by international and national institutions:

Biodiversity Conservation in Asia Program (BUCAP), IPM component of the Agriculture Sector Program Support (ASPS) of DANIDA, FAO's Program for Vegetable IPM in Asia, Asia Institute of Technology (AIT), Center for Sustainable Rural Development (SRD), World Vision, Thai Nguyen University, Ha Noi Institute for Agriculture, and GTZ/GIZ.



*Women farmers visit rice field
Photo: Oxfam*

Community-Based Approach in Delivering SRI to Farmers

In 2007, with the support of Oxfam, the Plant Protection Sub-Department of Ha Tay province (now part of Ha Noi) in coordination with the agricultural cooperative in Dai Nghia deployed a community-based SRI adoption model.

This process proved the advantages of SRI compared to current rice cultivation methods. Rice plants were healthier; rice fields had less disease. On average, profit was increased by VND2 million (about \$110) per hectare, as production costs were reduced nearly 40 per cent per kilogram. Water consumption was reduced up to one-third. These were motivating findings.

Farmers and technical staff work together to design a trial plot field, on which they can evaluate methods of transplanting, water management, and fertilization. Farm Field School classes are held throughout the crop season. Farmer-participants pay regular visits to the rice field and discuss the observed evidence in the field. The knowledge gained helps them become more confident in making decisions on adjusting crop management to fit with specific local conditions. More than 1,000 farmers have participated in this community-based SRI adoption model.





Women farmers share SRI adoption experience in Farmer Field School
Photo: Oxfam



Farmers testing SRI planting techniques
Photo: Oxfam

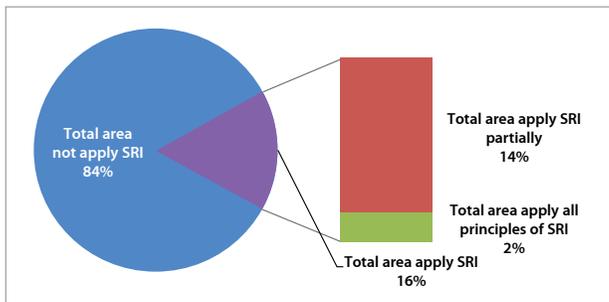
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Based on accumulated field experiences, a manual on field practice for SRI adoption has been developed to serve as a training document for local SRI training of trainers (TOT), Farmer Field School curriculum, and SRI coaching in communities.



Woman farmer from Yen Bai province shows the productive and quality features of SRI paddy at SRI Adoption Workshop for Cambodia and Vietnam in January 2010
 Photo: Oxfam

Overview of SRI application in Northern provinces of Vietnam

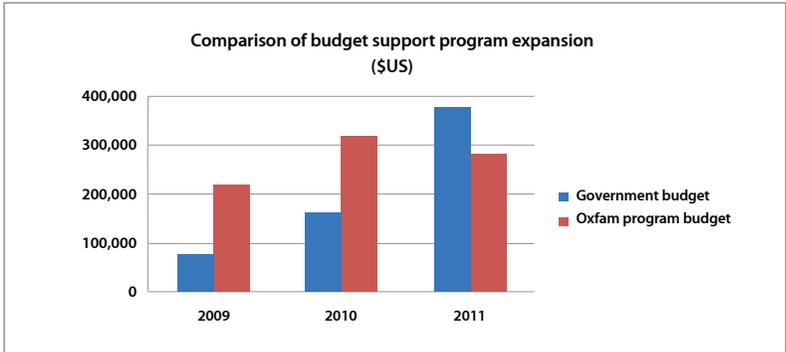


SRI adoption has covered 16 per cent of the rice land in the north and 6 per cent of rice land in the country



To support sustainable development in Viet Nam, since September 2007, Oxfam has been providing assistance for program strengthening and community capacity-building for SRI adoption and agriculture innovation in 6 provinces in the north of Viet Nam.

Budget of 6 provinces and Oxfam contribution for expansion of SRI adoption in 2009-2011 period (Unit: USD)



At least one core group of key farmers should be set up in each commune to further promote SRI and other agriculture innovations

Farmers are Interested to Adopt

Everyone Can Learn and Apply SRI

Ms. Hoang Thi Hong and Ms. Hoang Thi Thanh – members of the Community Livelihood Club of Yen Kien commune, Doan Hung district, PhuTho province - only completed 3rd grade, the lowest level of education among club members. They worried whether they could follow well the instruction when participating in the training on new SRI techniques. Therefore they worked very hard to learn, listening to the teacher and practicing SRI principles carefully. In the end, they both achieved the highest yields among the SRI rice-club members.

Source: Center for Community Development, Viet Hung

Adopt SRI Despite Old Age

As her grown-up children have all left to work and live elsewhere, 70-year old Nguyen Thi Bun in village 1, Dong Phu commune, Chuong My district of Ha Noi, still takes care of her rice field every day. She said that rice production is no longer a burden since the Department of Plant Protection and Oxfam experimented with SRI in her commune. She has adopted SRI in the last 6 rice-crops, with the productivity increasing as experience accumulated. With the new techniques, she can get about 250kg of rice per sao (360sq.m.), about 25 per cent more than before adopting SRI.

“I hope farmers in other communities will become proactive in adopting this new cultivation method to overcome difficulties”.

Source: Oxfam





Determines to Use the New Technique

Nguyen Dinh Tan and his family live in village 3, Xuan Hoa commune, Nam Dan district, Nghe An province. His wife did not participate in SRI trainings; she only heard about it and remained skeptical. In summer 2009, while Tan was away, she transplanted rice at high density as with traditional cultivation methods on their whole 0.5 ha of rice field. When Tan came back, he harrowed the whole field, and applied SRI method instead. This gave them very good harvest and higher productivity in that season. Now, his wife has faith in her husband and SRI methods – sparse planting, surplus grain. His family since has applied SRI on all of their rice fields.

Source: Oxfam

Each farmer is an expert in testing innovations and techniques on their own fields.

Rice is the main food source of half population in the world

Photo: Vu Thanh Tung/Oxfam

A Future Out of Poverty with SRI

In village 10, Bao Dap communes, Tran Yen district, Yen Bai province, 57 out of the 60 households are agricultural-based families. For years, Mr. Nguyen Van Thinh's family was one of the three poorest families in the village. His wife could not share field work with him due to her poor health. His family has just 5 sao (1800 sq.m.) of rice field. Previously he cultivated rice with traditional methods that required large inputs of seed, fertilizer and pesticide that he could not afford. Therefore the highest productivity harvested was 1,300 kg of paddy per sao.



We met Mr. Think on an early May day at the Farmer Field School . He just received 30 kg of rice as food aid from the commune. In the recent crop season, with encouragement from the Commune and District Plant Protection Station staff, Mr. Think participated in the FFS and has an SRI trial on 2.5 sao of his rice field. He excitedly said he would have a good first SRI harvest in the next month as the rice in his field is growing very well; each hill has healthy plants and more productive tillers and a greater number of grains per tiller. On Mr Think's SRI trial rice field, there is no need to

spray pesticides and he invested less seeds. On his other 2.5 sao of rice land, where he invested more seed, and hired workers to spray pesticides 4 times, the rice was not looking as good as in his SRI field.

Excited from the results of this SRI field test, he said that in next cropping season he will apply SRI on all of his field. He believes that he will no longer need to receive rice aid and soon will be off the list of the poor families in his village.

*Source: Center for Community Development,
Viet Hung (CCDV)*



*Leaders of People's Committee and PPSD of Ha Tay province visit SRI field
Photo: PPSD of Ha Noi city*



*Innovation of rake ruler to make the intersection of grid helps transplanting rice at desired distances.
Photo: PPD*

Seeing is Believing

By early 2011, there are 38 members in Che Village's Voluntary Extension Club (VEC), gaining ten more members since the club was established. Each member contributes from VND1,000 to VND5,000 per month to help with the operation of the club. Some club members earn their

contribution to the club by exchanging labour in transplanting rice in SRI method. Seeing the results and benefits of SRI such as increasing productivity, while reducing inputs and labour, all club members are encouraged to apply SRI on their own rice land.

Source: Ms. Trieu Thi Hue, chair of VEC in Che village, An Thinh commune, Van Yen district, Yen Bai province

TEN THINGS TO REMEMBER

(Song in Quan Ho melody)

First, we expect to visit our field regularly,
Then second, we work hard at learning, and
Third, we work hard in the field.

Fourth, we try to protect spiders, and
Fifth, we control pests for saving us labor and money.

Sixth, we consider the changes of weather, and
Seventh, we remember the field cycles of pests.
Eighth, we follow the technical principles taught to us, and
Ninth, we know all the rice diseases.

Tenth, we adopt SRI which brings green riches as a token of my love for you.

Source: Plant Protection Station in Do Luong district

Stakeholders Talking on SRI

The Highest Return on Investment

Mrs. McKinley and Mr. Miller

The key investors of the SRI program in Vietnam

My husband and I first visited Vietnam about 20 years ago. We were struck by how hard everyone worked-especially the women. And by people's optimism, despite many difficulties in their lives. This moved us to take action ourselves. First, in support of Oxfam's partnership with the Vietnam Women's Union to expand and professionalize its micro-finance banking. We returned year after year to visit these successful women entrepreneurs in their new homes, and hear about the progress of their children in school.

In 2006, Oxfam presented us with the opportunity to make another difference in the lives of rural women. Would we fund a pilot project to demonstrate how rice could be cultivated by small scale farmers in a more productive, profitable, and healthy way? Based on the successful launch of such an activity in Cambodia by Oxfam, we were happy to give it a try in Vietnam.

We could not be more pleased with the outcome of this venture. Women farmers, in particular, have welcomed the opportunity to experiment with alternative cultivation techniques, and significantly improved their confidence and capability to apply what they've learned in the most appropriate ways. In the process, both their rice yields and winter crop productivity have improved. Their profits have grown. The health of the land and their own health are also better.

Our initial investment has been more than matched by the financial commitments of Vietnam's local and provincial governments. And the increase in profits enjoyed by one million farmers has delivered the best "return on investment" we have ever made. We would like to congratulate everyone who worked so hard to make this happen!

It is estimated that SRI farmers have made an addition income of VND 370 billion (USD 17.7 million) in spring crop season of 2011

Source: Oxfam

The Tripod Balance Relationships

*Mr. Ngo Tien Dzung – Vice Director of Plant Protection Department (PPD),
Ministry of Agriculture and Rural Development (MARD)*

In 2002, one Indonesian farmer shared his SRI adoption experience at a national workshop on integrated pest management (IPM) organized by FAO. This experience provoked me to explore on the potential for introducing and adopting SRI in Viet Nam in order to help our farmers by reducing production costs and increasing productivity.

In the spring crop 2002-2003, three partners including IPM teachers, farmer groups and myself from the Ministry started to evaluate SRI on Vietnamese rice fields, documenting SRI advantages over current rice practices. From our experiments, we see that SRI can save up to 80 per cent of seed, and increase yields remarkably. SRI rice plants are healthier - their disease resistance is improved and they do not lodge (fall down). Soil quality in SRI field is also better. The results made us believe that SRI is the key to opening

a new approach to rice cultivation in Vietnam.

Another tripod relationship started in 2006 when I met Mrs. Le Minh from Oxfam and Professor Norman Uphoff from Cornell University, USA. They shared with me their ideas on sustainable SRI adoption in Viet Nam. We coordinated an elaborate plan for realizing the idea, including fund raising. We since have exchanged information, shared experience, and built a SRI network at Mekong region and globally.

I am satisfied and honored that our efforts have received support from millions of farmers. In the future we shall replicate and develop more SRI tripod balance relationships – at farmer community, at provincial and at regional levels that will enable farmers to reduce poverty, and enjoy sustainable and healthier agricultural production.

Small investments in SRI bring in-hand large benefits to farmers: increasing income, improving production to GDP, strengthening social capital and long-lasting protection for the environment.

Message From the Other Side of the Globe

To: Ngo Tien Dzung, DDG/MARD, and Le Minh, Oxfam Associate Country Director, Vietnam, Co-chairs of the Vietnam SRI Coordinating Committee

From: Norman Uphoff, Senior Advisor, SRI International Network and Resources Center, Cornell University, USA

The news has reached us in Ithaca, New York that the number of farmers using and benefiting from the ideas and methods of the System of Rice Intensification (SRI) has now passed **1 million**. We in SRI-RICE network congratulate you and all those working with SRI methods, especially the million-plus farmers now utilizing SRI, for transforming rice production practices for the benefit of farmers, consumers and the environment. Raising the productivity of land, labor, capital, seed, and (especially) water, all at the same time, is a great accomplishment.

Farmers in Vietnam have demonstrated benefits from SRI management beyond just more **yield, water saving, and net income**. They have shown also that SRI rice plants have greater resistance to **pests and diseases**, to the hazards of **drought**, and to the damage caused by **storms and typhoons**. Bringing out these capabilities in well-managed rice

crops will become more important as Vietnam and other countries must cope with climate change.

Farmers have also played an important role in the dissemination of SRI knowledge and techniques and in extending them to other crops, such as minimum-tillage potato production. Vietnamese farmers and the personnel working with them deserve congratulations for such initiatives and dedication to making agriculture a more productive and more modern enterprise.

In many countries we have seen that the opportunities of SRI are bringing researchers, farmers, NGOs, universities, local governments, and others more together. All are challenged to understand better and to take advantage of the productivity gains that have been previously overlooked in agronomic theories and practice. That SRI and its derived applications with other crops

have proceeded in a farmer-centered manner does not diminish the role and further contributions of scientific workers. We see SRI as opening doors for better, more cooperative connections so that research, extension and practice can make progress together. This should be a three-cornered relationship rather than just a linear one. Multi-institutional and multi-level collaborations have been a trademark of the SRI movement so far, and it is hoped that this cooperation will continue and expand.

There are still millions of Vietnamese farmers who need to know about and gain confidence in the agroecological methods of SRI. I hope that farmers

will help the government and NGOs with this task. We are learning in other countries such as India, Pakistan and Ethiopia that SRI ideas and methods can be extended profitably to other crops like wheat, sugarcane, millet, legumes and vegetables. Happily, 'the SRI story' is just beginning. Vietnam has already written a very excellent 'chapter' in this book. We look forward to further progress in Vietnam and to more 'chapters' still to come.

A goal for all countries that have rice production would be to have SRI methods in use on 25 per cent of their rice land by 2025.



*Women farmers in Dong Tru commune, Dong Anh district showing the differences of SRI plants
Photo: Elske van de Fliert*

Wetland Rice and Climate Change





Water - Confronting Growing Natural Resource Scarcity

- The growing scarcity of water threatens 2 billion of the earth's population
- Up to one-third of annual fresh water consumption in the world is used in rice production.
- A paddy field takes 3,600 liters in an hour, or the amount of water drunk by 1,000 people in an hour.
- By 2025, it is estimated that nearly one-quarter of 79 million hectares of wetland rice land will lack water – this area now provides three-quarters of the rice for the world.
- One-third of the volume of methane gas emission from rice lands can be reduced if they are drained at least once during the crop season and rice straw is returned onto the field after harvest rather than being burned or removed.

SRI recommends that farmers drain their fields 3-4 times during each rice crop season and return rice straw after composting.

*Visible cracks in drainage SRI field
Photo: PPD*

Environmental Pollution

- The use of nitrogen fertilizers has increased 20 times in last 50 years. It is becoming a major factor increasing greenhouse gas emissions of nitrous oxide (N_2O) and methane (CH_4), and acid rain.
- Wetland rice production consumes about 16 per cent of the nitrogen fertilizers manufactured in the world, but rice plants can absorb only 30-50 per cent of applied nitrogen fertilizers.
- Under inundated field conditions, 60-70 per cent of applied nitrogen fertilizers is usually wasted and flows out to contaminate drinking water sources, poison fish species, and this adversely affects ocean ecology.

In Viet Nam, SRI adoption enables farmers to reduce their applied nitrogen fertilizers by 20 per cent

Source: PPD





*45 tillers per hill of sticky rice variety Nep Cai Hoa Vang in Phuc Tho commune, Ha Noi city.
Photo: PPD*

SRI enables farmers to improve their resilience capacity and adaptability to climate change along with many other benefits

Higher yields per unit of land,

Grain yields are increased on average by 20-50%, but often more. This not only generates better returns to labor and capital invested in more food, but releases some land and labor for other productive activities. Higher productivity per unit of land reduces pressure to expand cultivated area.

Lightened workload for women

Women farmers widely report that SRI methods save them time and reduce the drudgery of rice cultivation, due to less time for transplanting, and less time working with pesticide sprays.

Reduced irrigation requirements

With SRI, irrigation water use is generally reduced by 25-50 per cent. Farmers can continue to cultivate rice where water is becoming scarcer or rains unpredictable, and can mitigate losses from late monsoons or less rainfall. Less water used means more water is freed up for other crops.

Reduced seed rate

Since farmers need 80-90% fewer seeds for transplanting, they need much less space for seed storage and nurseries. Smaller nurseries are easier to manage and require a lot less land.

Reduced reliance on chemical fertilizers, herbicides, and pesticides

The high cost of fertilizer and other inputs is one of the main attractions for farmers to use SRI as it allows them to reduce their chemical applications without loss of yield. Fewer chemicals around farmsteads has health benefits for people, their livestock, and the environment.

Resistance to damage from extreme events like rain and wind storms

A fallen (lodged) crop is vulnerable to rotting and also is more difficult to harvest. SRI practices produce larger, deeper root systems that make rice plants less susceptible to being blown down or pushed over.

Increased resistance to pest damage

Climate change is expected to increase the prevalence and distribution of pest species as temperatures and rainfall patterns change. With SRI management, farmers observe less loss to pests and diseases.

Increased drought tolerance

SRI rice plants exhibit stronger root systems that grow deeper into the soil profile; hence they can access deeper reserves of soil moisture (and nutrients). This is particularly important given the increasing risk of drought due to exhaustion of water resources and rainfall variations during the growing season.

Fewer seeds and shorter time to planting enables farmers to recover faster

If a farmer's crop succumbs to adverse weather patterns, SRI enables farmers to replant their crop more quickly and

cheaply since SRI requires only one-fifth of the seeds, and seedlings can be transplanted within 10-15 days of sowing in the nursery, rather than 20-30 days with conventional methods.

Sustain traditional varieties, increase production and add economic value

With SRI methods, farmers are able to achieve higher yields from their traditional varieties. Studies have shown that many traditional varieties offer higher iron and protein content and better prices in the market. They also are better adapted genetically to a range of climate stresses. Rehabilitation and conservation of local varieties can give more genetic diversity for dealing with adverse growing conditions, maintaining robustness in the rice gene pool.

Improved farmer knowledge, experimentation and innovation

Good SRI extension enhances the confidence and innovation of farmers. SRI encourages farmers to take more responsibility for adaptation and innovation, contributing to human resource development in rural areas. It increases farmers' being able to identify and exploit other innovations as they emerge.

Diversified cropping systems

With higher yields per unit of paddy land, farmers could convert part of their land to growing more nutritional and more profitable crops such as fruits, vegetables, legumes and small livestock that diversify their diets and raise incomes. More diversification of cropping systems also helps to restore biodiversity and sequester carbon in the soil.



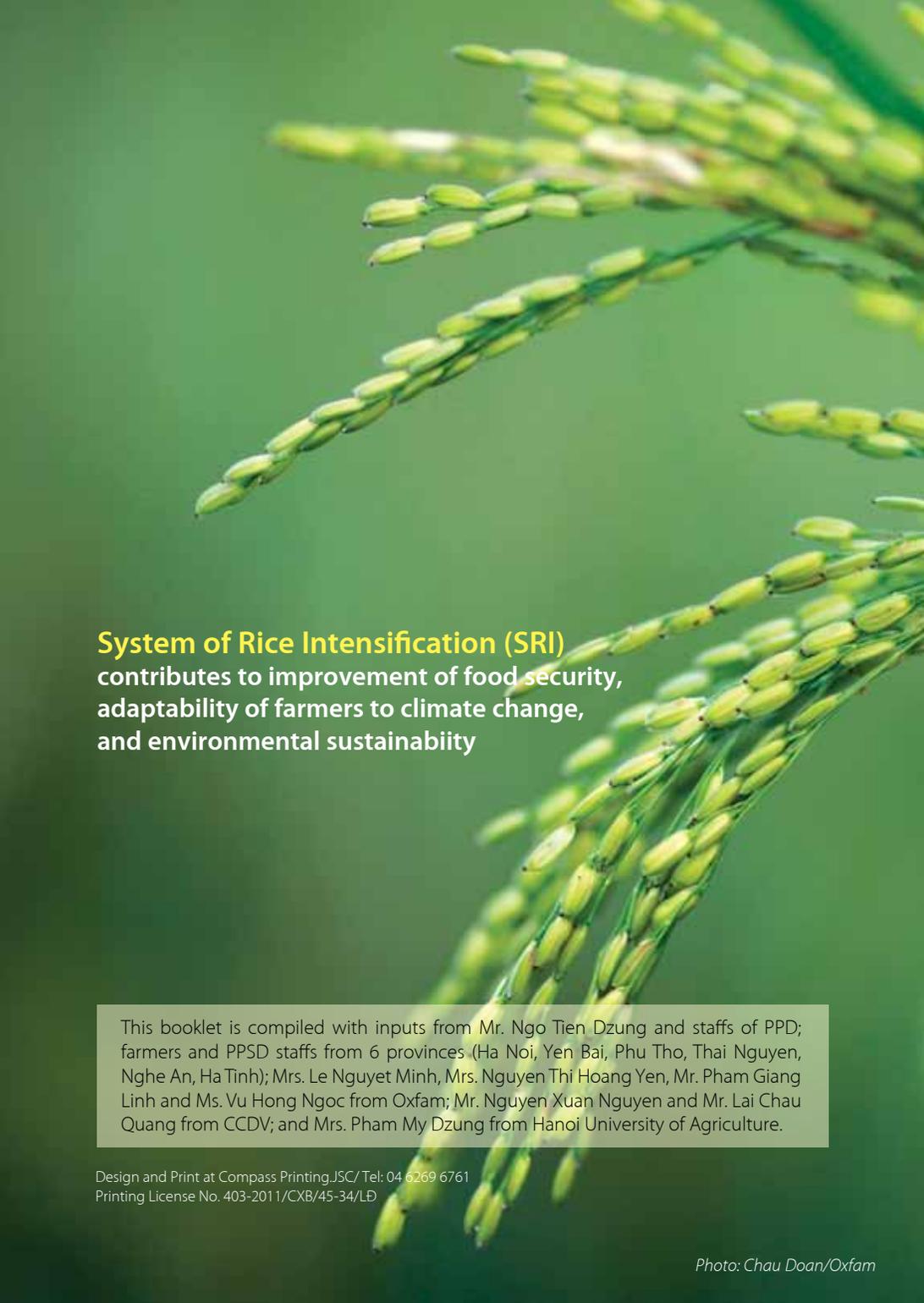
Transplant seedlings with large spacing in SRI field



Roots system of SRI rice (left) and conventional rice (right)



SRI field (left) and conventional field (right) after storm in June 2003, Ha Noi city



System of Rice Intensification (SRI)
contributes to improvement of food security,
adaptability of farmers to climate change,
and environmental sustainability

This booklet is compiled with inputs from Mr. Ngo Tien Dzung and staffs of PPD; farmers and PPSD staffs from 6 provinces (Ha Noi, Yen Bai, Phu Tho, Thai Nguyen, Nghe An, Ha Tinh); Mrs. Le Nguyet Minh, Mrs. Nguyen Thi Hoang Yen, Mr. Pham Giang Linh and Ms. Vu Hong Ngoc from Oxfam; Mr. Nguyen Xuan Nguyen and Mr. Lai Chau Quang from CCDV; and Mrs. Pham My Dzung from Hanoi University of Agriculture.

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