SUSTAINING AND ENHANCING THE MOMENTUM FOR INNOVATION AND LEARNING AROUND THE SYSTEM OF RICE INTENSIFICATION (SRI) IN THE LOWER MEKONG RIVER BASIN (SRI-LMB) REPORT

REGIONAL WORKSHOP
Novotel Sukhumvit, Bangkok, Thailand
1-2 November 2018

Organized by the ACISAI, AIT
Disclaimer

This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility of the Implementing Partner and can in no way be taken to reflect the views of the European Union.

http://www.sri-lmb.ait.asia
Final Regional Workshop, SRI-LMB
1-2 November 2018
Novotel Sukhumvit, Bangkok, Thailand

SRI-LMB hosted by the ACISAI Center. AIT

SRI-LMB partners

SRI-LMB is financed by the EU

http://www.sri-lmb.ait.asia
ACKNOWLEDGEMENT

This is to acknowledge that this workshop would not have been successful without active participation and contribution from regional partners (FAO and Oxfam) and country project partners of the SRI-LMB including Cambodia, Laos, Vietnam and Thailand. We acknowledge the support from the ministries involved in implementing the project in all four countries, MAFF in Cambodia, MAF in Laos, MARD in Vietnam, and MoAC and MOE in Thailand, and for their active participation and contribution to the workshop.

We also wish to express our thanks to Dr. Eden Woon, the AIT President, and Mr. Jerome Pons, Head of Cooperation-Regional, European Union Delegation to Thailand, for their gracious presence and contribution to the workshop, to Prof. Amir Kassam, Visiting Professor, School of Agriculture, Policy and Development, University of Reading; UK, for his valuable inputs, to SRI international leaders from Asia, Africa and beyond for their excellent contribution and feedbacks, to Dr. Shweta for her inputs as rapporteur, to Dr. P. K. Viswanathan for compiling the workshop inputs and assisting in preparation of the report. Last but not the least, sincere thanks need to be sent to all SRI-LMB staffs in Cambodia, Laos, Vietnam and Thailand and to all my AIT buddies!
ABOUT THE PROJECT

SRI-LMB, an EU-financed regional project, aims to contribute towards enhancing the resilience of rainfed farmers confronting climate change variability in the Lower Mekong River Basin (LMB) region. It brings various stakeholders together working at global, regional, national, and local levels. The purpose of the project is to increase crop yield, productivity and profitability on a sustainable basis from smallholder farmers’ rice fields in rainfed areas of LMB.

The project through its actions aims to address the food security and livelihood issues of small farming households by developing adaptive measures against climate change. The project has been implemented in four LMB countries: Cambodia, Laos, Vietnam and Thailand. The total period for implementation is 72 months (2013 - 2018), and the total cost of action is approximately 3.4 million Euros, with 85% contribution from the European Union.

The project is led by the ACISAI Center of the Asian Institute of Technology (AIT) and implemented in partnership with FAO, Oxfam, the SRI-Rice Center at Cornell University, and the University of Queensland, together with many national partners coming from ministries, national universities, and NGOs.

CONTACT

Dr. Abha Mishra
Project Manager, SRI-LMB
ACISAI Center,
Asian Institute of Technology, Thailand
Phone: +66-2-524-5826
FAX: +6685-323-5828
E-mail: abhamishra@ait.asia

Mr. Jerome Pons
Head of Cooperation
Delegation of the European Union to Thailand
E-mail: Jerome.PONS@eeas.europa.eu
# ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACISAI</td>
<td>Asian Center of Innovation for Sustainable Agriculture Intensification</td>
</tr>
<tr>
<td>AIT</td>
<td>Asian Institute of Technology</td>
</tr>
<tr>
<td>DAEC</td>
<td>Department of Agriculture Extension and Cooperative</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>FPARs</td>
<td>Farmer’s Participatory Action Research</td>
</tr>
<tr>
<td>GDA</td>
<td>General Directorate of Agriculture</td>
</tr>
<tr>
<td>GOV</td>
<td>Government of Vietnam</td>
</tr>
<tr>
<td>LMU</td>
<td>Local Management Unit</td>
</tr>
<tr>
<td>MAF</td>
<td>Ministry of Agriculture and Forestry</td>
</tr>
<tr>
<td>MAFF</td>
<td>Ministry of Agriculture, Forestry and Fisheries</td>
</tr>
<tr>
<td>MARD</td>
<td>Ministry of Agriculture and Rural Development</td>
</tr>
<tr>
<td>MoAC</td>
<td>Ministry of Agriculture and Cooperatives</td>
</tr>
<tr>
<td>PCU</td>
<td>Project Coordination Unit</td>
</tr>
<tr>
<td>PMU</td>
<td>Project Management Unit</td>
</tr>
<tr>
<td>PPD</td>
<td>Plant Protection Department</td>
</tr>
<tr>
<td>SRI</td>
<td>System of Rice Intensification</td>
</tr>
<tr>
<td>SRI-LMB</td>
<td>Sustaining and Enhancing the Momentum for Innovation and Learning around the System of Rice Intensification (SRI) in the Lower Mekong River Basin</td>
</tr>
</tbody>
</table>
**TABLE OF CONTENTS**

ABOUT THE PROJECT .......................................................................................... 4
ACRONYMS ........................................................................................................... 5
TABLE OF CONTENT .......................................................................................... 6
EXECUTIVE SUMMARY ....................................................................................... 8
1. BACKGROUND ................................................................................................. 10
2. PURPOSE OF THE WORKSHOP ....................................................................... 11
3. PARTICIPANTS AND SESSIONS ...................................................................... 11
4. SESSION, LEARNING AND OUTPUTS .............................................................. 12
   Opening Remarks .............................................................................................. 12
   Keynote Address: Transforming SRI as SCI under Conservation Agriculture Regime .......... 13
   Morning Session 1: Sustainable Agriculture Intensification for Food Security and Climate Smart Agriculture ........................................................................................................... 15
   Key Results from the SRI-LMB ........................................................................ 15
   Strategies to Maintain Momentum: SRI-LMB Achievements and the Way forward .......... 20
   Afternoon Session 1: Regional Perspectives ...................................................... 22
   Why does it pay to invest in smallholder agriculture, women farmers and landless when it comes to food & nutrition security: Key policy options for the SRI-LMB countries .................................. 22
   Impacts, Efficiency and Livelihood Impacts of SRI: Mid-Term Evaluation Results .......... 23
   Afternoon Session 2: Country level experiences .............................................. 26
   1. SRI: Key Learnings from Cambodia ............................................................. 26
   2. SRI: Key Learnings from Laos PDR ............................................................ 28
   3. SRI: Key Learnings from Vietnam .............................................................. 30
   4. SRI: Key Learnings from Thailand .............................................................. 33
   Session 2 on Day 2: Sustainable Agriculture Intensification in Asia and Beyond .......... 38
   ‘Save and Grow’: Rice Landscapes and Farming Systems for more than just rice ......... 38
   SRI Networks around the World: Where to next and how to make policies responsive? .......... 41
   SRI Innovations with Plastic Mulch practices and economic cum environmental benefits .......... 45
   SRI in India: Scaling UP SRI/SCI for Agro-Ecological Innovations for Food Security .......... 47
   SRI in Africa: Experiences and Learning Network ................................................. 52
   Sustainable Intensification through SRI: The Bangladesh Experience ......................... 54
   Block Chain for Livelihoods from Organic Rice in Cambodia .................................... 57
   Monitoring, Evaluation and Learning (MEL) from SRI Capacity Building in Laos PDR .......... 59
   Understanding the Patterns of Change Resulting from the SRI Capacity Building Interventions in Four LMB Countries ........................................................................... 61

Accelerating momentum for social, economic and environmental improvements in the SRI-LMB region: Planning for the next phase of the SRI-LMB ......................................................................................................................... 68
Planning for the next phase of the SRI-LMB ................................................................ 72

http://www.sri-lmb.aist.asia
5. CLOSING REMARKS ........................................................................................................ 76

Workshop Schedule ........................................................................................................... 77

ANNEX I
Workshop Schedule ........................................................................................................... 77

ANNEX II .......................................................................................................................... 82
List of Participants ............................................................................................................ 82

ANNEX III ........................................................................................................................ 90
Workshop Presentations and Other Online Resources ....................................................... 90
Press Release .................................................................................................................... 90
Workshop Presentation ...................................................................................................... 90
Workshop Pictures ........................................................................................................... 90
Project Videos .................................................................................................................. 90
EXECUTIVE SUMMARY

The Regional Workshop of the Project titled “Sustaining and Enhancing the Momentum for Innovation and Learning around the System of Rice Intensification (SRI) in the Lower Mekong River Basin (SRI-LMB)” was held during 1-2 November 2018 at Bangkok Thailand. The event was organized by the Asian Centre of Innovation for Sustainable Agriculture Intensification (ACISAI), AIT. The purpose of the workshop was to share the results of the project learnings on SRI and its contributions to food security and household incomes, climate change adaptation and mitigation, and impacts of market participation, and to identify opportunities for acceleration of smallholder agriculture development and climate-smart practices in the region and beyond.

Approximately 75 representatives participated in the two-day workshop, including representatives from the European Union, the Food and Agriculture Organization of the United Nations, Oxfam America, SRI-Rice at Cornell University, the University of Reading, the University of Queensland, the Ministries of Agriculture and Cooperatives of Thailand, of Agriculture and Rural Development of Vietnam, of Agriculture, Forestry, and Fisheries of Cambodia, and of Agriculture and Forestry of Laos.

With the support of ministries and government agencies in all four countries, Cambodia, Laos, Thailand and Vietnam, the project functioned well in building capacity and confidence among farmers and other stakeholders involved in the programme. More than 15,000 farmers participated directly in the farmer-led field trials located in 33 districts of 11 provinces of the four LMB countries. The number of farmer participatory experiments conducted under this programme was more than 1,500: 121 at 60 action research sites in 2014, 465 at > 173 sites in 2015, and then 1,134 at > 582 sites in 2016-17.

The workshop reported that in comparison with the pre-project baseline performance, **SRI practices helped to improve livelihoods across the LMB region by increasing rice yield by 52%, farmers’ net economic return per hectare by 70%, labour use efficiency by 64%, water productivity by 59%, and fertilizer use efficiency by 75%. The total energy input required for farming operations decreased by 34%, along with significant reductions in per-hectare greenhouse gas emission, respectively by 14% with irrigated rice production and by 17% with rainfed cropping. Overall, the project has helped small-scale holders, and women in particular, in the Lower Mekong Basin countries to have more sustainable livelihoods. This was done by using innovative techniques such as SRI to increase productivity and generate more income and, at the same time, to reduce adverse impacts on the environment, thus making rice cultivation more sustainable.**

The workshop also highlighted that the policy environment across the LMB study countries is at different stages of development and yet evolving and that policies need customization based on requirement and contexts. Nevertheless, the SRI-LMB has facilitated the development of informal farmers’ groups in 11 provinces across all four countries by engaging 15,000 farmers in trials and adaptation of new ideas, plus (less directly) 30,000 farmers over the past five years. These groups, if
strengthened further can provide a basis for developing effective farmer organizations that can accelerate sustainable rice intensification and diversification along with market development for smallholders. More importantly, the reported beneficial outcomes (economic, social and environmental benefits) of SRI project, along with the participatory approach involved in the wider adoption of SRI practices, will contribute to achieving the sustainable development goals (SDGs).

The workshop concluded with the recommendations that the next phase of the SRI-LMB should see the integration of SRI and Conservation Agriculture practices along with market development for smallholder agriculture development.
**1. BACKGROUND**

The project for “Sustaining and Enhancing the Momentum for Innovation and Learning around the System of Rice Intensification (SRI) in the Lower Mekong River Basin (SRI-LMB: [www.sri-lmb.ait.asia](http://www.sri-lmb.ait.asia)) led by the ACISAI Center ([http://acisai.ait.ac.th/](http://acisai.ait.ac.th/)) at the Asian Institute of Technology (AIT, [www.ait.asia](http://www.ait.asia)) and financed in large part by the European Union, in partnership with Food and Agriculture Organization of the United Nations (FAO) and Oxfam America, together with government ministries and national universities of Cambodia, Laos, Vietnam and Thailand, has implemented a “more intelligent pathway” for cultivating healthy and profitable rice. SRI is an emerging alternative technology to conventional rice cultivation practice that adds a social dimension for improving farming along with new knowledge to produce more healthy and profitable crops using less water, less seed, and fewer external inputs through the more skillful management of plants, soils, water and nutrients.

The Project was implemented in food-insecure rainfed rice production areas from 2013-2018. More than 15,000 farmers participated directly in the farmer-led field trials located in 33 districts of 11 provinces of the four LMB countries. The number of farmer-participatory experiments conducted under this EU-funded project is more than 1,500: 465 at >173 sites in 2015, and then 1,134 at >582 sites in 2016-17. The objective was to develop location-specific technology using the principles of SRI and Farmer’s Field School platforms for initiating farmers’ participatory action research. Documenting the results and sharing them with the immediate communities and the community at large through an inclusive participatory process from local to national and regional level was at the core of the project.

In additional, the existing government policies were studied within the context of sustainable and climate-resilient food-secure rainfed smallholder systems, and evidence-based suggestions for a better set of policies were generated through a participatory consultation process working closely with all relevant stakeholders, including policy makers in the respective countries.

With this background, the SRI-LMB organized the final workshop of the project from 01-02 November 2018 at Novotel Shukhuvit, Bangkok, Thailand. The workshop was attended by SRI-LMB stakeholders from all four Mekong River Basin countries (Cambodia, Laos, Vietnam and Thailand); EU representatives; FAO; Oxfam; SRI-Rice, Cornell University, USA; University of Queensland, Australia; international NGOs and other institutions/organizations working on the similar subjects. The purpose of the workshop was to share the results of the SRI-LMB and also to identify opportunities for scaling-up and scaling-out smallholder agriculture development and climate-smart practices in the region and beyond.
2. PURPOSE OF THE WORKSHOP

The purpose of the workshop was to:

**Share the results on SRI’s:**
- Contributions to food security and household incomes
- Impacts of market participation
- Climate-change adaptation and mitigation
- Building momentum for economic and environmental improvements in the region

**Identify the opportunities for:**
- Acceleration of smallholder agriculture development and climate-smart practices;
- Scaling-up and scaling-out the learning and accelerate the momentum for economic, social and environmental improvements in the region

3. PARTICIPANTS AND SESSIONS

Approximately 75 representatives participated in the two-day workshop that included representative farmers, provincial coordinators, national coordinators and members of the SRI-LMB project implementing consortia from the four project countries; regional project partners (FAO, Oxfam, SRI-Rice/Cornell University, USA, and University of Queensland, Australia) and implementing ministries from the four countries (MAF, Laos; MAFF, Cambodia; MARD, Vietnam; and MoE and MOAC, Thailand, representative of the EU Delegation to Thailand (Head of Cooperation-Regional and Attaché Cooperation, Delegation of the European Union to Thailand, representative of the SRI International and National Network, SRI-MAS. Others were local, national and regional NGOs and organizations working on the similar mandate areas.

The Workshop was organized in two parts:

- **Learning Exchange Session** (Sharing key results from the project; exchange lessons learned from similar efforts regionally and/or internationally on food security, climate-change adaptation and mitigation; climate-smart practices, sustainable rice production.
- **Planning Session** (planning for scaling-up and scaling-out the learning and accelerate the momentum for economic, social and environmental improvements in the region

http://www.sri-lmb.ait.asia
4. SESSION, LEARNING AND OUTPUTS

Opening Remarks

The two-day Regional Workshop started with welcome addresses and opening remarks by Dr. Eden Y Woon, President, Asian Institute of Technology, and Mr. Jerome Pons, Head of Cooperation, Delegation of the European Union to Thailand. While delivering the inaugural remarks, Dr. Eden Woon, AIT President, remarked that: “The intensification of smallholder agriculture, with its emphasis on diversity, synergy, recycling, integration into the global economy, and social processes that value community participation and empowerment could be one of the viable options for meeting present and future food needs. More particularly, with recent developments in the climate change debate as well as the Paris Agreement and with stated policy on ASEAN food security, the relevance of SRI-like work has become more central to regional needs for sustainable development”. While acknowledging the support and resources extended by the EU for implementing the SRI-LMB Project under the auspices of ACISAI, AIT, Dr. Woon appreciated the contributions that the project has made in harnessing the benefits of SRI in improving the livelihoods of the farmers in the region. The SRI project becomes a critical one as rice is the major source of food security and growth of the economies in the LMB region.

Reiterating the role and legacy of the European Union in the development of the South and South East Asian region, Mr. Jerome Pons, Head of Cooperation at the European Union Delegation to Thailand, observed that: “the European Union is committed to the achievement of the world’s Sustainable Development Goals (SDGs) and, in particular to the eradication of poverty and hunger. This project is helping small-scale holders, women in particular, in the Lower Mekong Basin countries to have sustainable livelihoods. This is done by using innovative techniques to increase productivity, and generate more income and, at the same time, to reduce the impact on the environment, thus making rice cultivation more sustainable”.

In his remarks, Mr Jerome Pons emphasized that SDGs are a priority of the EU for the next 10 years and with its continued engagement in Research and Development (R&D) in 60 different countries, the EU will work towards the strengthening of the small-scale agriculture through developing climate-smart agriculture using less inputs and producing more and ensuring its sustainability. The imperatives of producing quality food and organic products seem to be assuming importance with initiatives to address climate change problems and building resilience. More interestingly, SRI project is to be seen from the long-term perspective of sustainable agriculture, as already there is an increasing share of the organic farming in the global agriculture output. This shift in the focus of global agriculture is a reflection of the shift in agriculture development policy from ‘quantity of agriculture output to quality of agriculture output’, as happening especially in the developed countries (including EU for instance). In this regard, it may be SRI project has shown its potential in terms of increased yield and its sustainability in the region along with immense scope for integration of SRI with other agriculture practices, including fisheries in the region.
Dr. Abha Mishra, Director, Asian Center of Innovation for Sustainable Agriculture Intensification (ACISAI) at AIT and the Team Leader (SRI-LMB Project) elaborated on the contents of the workshop and its expectations. Dr. Abha Mishra underscored that: “The SRI-LMB has facilitated the development of informal farmers’ groups in 11 provinces across all four countries by engaging 15,000 farmers in trials and adaptation of new ideas, plus indirectly benefitting 45,000 farmers over the past five years. These groups, if strengthened further, can provide a basis for developing farmer organizations that can accelerate sustainable rice intensification and diversification along with market development for smallholders. So it is important to incentivize them in their climate-smart practices and to offer them opportunities to become ‘agri-preneurs’. Dr. Abha Mishra concluded that in order to achieve the objective of scaling up of SRI adoption to reach the mark of 1 million farmers with a coverage of 2 million ha of land, the project has identified three components, viz., (a) development of farmers’ network under SRI; (b) integration of SRI practices with conservation agriculture (CA) practices; and (c) further scaling up and scaling out of SRI.

Keynote address: Transforming SRI as SCI under Conservation Agriculture Regime

The keynote address was delivered by Dr. Amir Kassam, Visiting Professor, School of Agriculture, Policy and Development, University of Reading, UK and Moderator of the FAO-hosted Global Platform for Conservation Agriculture Community of Practice (CA-CoP). The theme of the address was “Mobilizing greater crop and land potentials: Integrating System of Rice Intensification with Conservation Agriculture”. By and large, the keynote speech discussed the importance of planning for the opportunities emanating from wide-scale adoption of SRI and its scaling up for the benefit of farmers in the LMB region with an eventual transition towards an agriculture development pathway integrating SRI with Conservation Agriculture (CA). The principles of CA are in harmony with nature with its characteristic features being regenerative, self-protecting and climate resilient mitigating the adverse effects of climate change.

It is important to revisit the agriculture development experience in the post-war era with science and technology assuming a totally different role at present in terms of addressing the pressing challenges of enhancing soil and land productivity (thus restoring and rehabilitating the degraded farm lands) while protecting the living species on the ground and below the ground. The conventional agriculture practices, including land preparation, regular tillage, clean seedbed, along with intensive usage of agro-chemicals have exposed the soils to degradation of various kinds leading to severe erosion, loss of organic matter, reduced biodiversity, and many other negative effects. These effects along with the intensive usage of agro-chemicals have caused significant changes in the agrarian landscape, even destroyed the living organisms, adversely affecting the soil functional capacities and the landscape processes. As per the Millennium Ecosystem Assessment 2005, 89% of our ecosystems degraded or severely degraded and only 11% in reasonable shape. About 400-500 million ha of land is abandoned (from farming).
This has seriously affected the existing land resources, its provisioning services and regulatory aspects, including water cycling and carbon cycling functions. The agrarian landscape of countries in the LMB region is not an exception to this global trend of increasing land degradation, which invariably calls for a ‘new paradigm of sustainable intensification of land use and ecosystem management. The challenge here is ‘how do we achieve this objective by adopting the SRI, which entails different practices of crop, water and nutrient management?’ The SRI principles need to be broadened from the perspective of ‘sustainable intensification of farming system’ or system of crop intensification (SCI), which, when integrated with conservation agriculture (CA), could act as a major aspect of smart or climate resilient agriculture leading to increased factor productivity as well as diversification of species and cropping systems under the CA integrated crop intensification regime (Figure 1).

![Figure 1: Contribution of Sustainable Intensification farming system practices to important ecosystem services](image)

Nevertheless, wider promotion (scaling up and scaling out) of conservation agriculture (CA) needs an array of measures, such as: (a) policy support and incentives, removal of contradictory policies; (b) creation of farmer associations, empowerment and farmers’ participatory engagement; (c) farming infrastructure and equipment (gender friendly) with immense potential for labour saving as well as resources saving, especially, water; (d) strengthening partnerships between public, private and civil sectors; and (e) institutional support for promotion of farm education/ vocational training, research/ science/ technology involving all stakeholders engaged in the service of CA.

http://www.sri-lmb.aist.asia
Morning Session 1: Sustainable Agriculture Intensification for Food Security and Climate Smart Agriculture

Session Chair: Dr. Max Whitten

Key Learnings with the SRI-LMB for Food Security and Climate-Smart Agriculture

The Technical Session 1 started with the presentation by Dr. Abha Mishra, Director, Asian Center of Innovation for Sustainable Agriculture Intensification (ACISAI) at AIT and the Team Leader (SRI-LMB Project). She shared her region-wide experiences working through the SRI and its implementation with a focus on the “Key Learnings with the SRI-LMB for Food Security and Climate-Smart Agriculture”. The presentation gave a synoptic view of the implementation and outcomes of the SRI project during the period spanning 72 months started on 1 January 2013 to 31 December 2018. The programme was initiated with financial support under the EU’s initiative on Global Programme on Agricultural Research for Development for Food Security. The SRI-LMB focused on component 1 of this programme: Research and Technology. Initially planned to cover 30 provinces, the project covered 33 provinces in four LMB countries, viz., Cambodia, Laos, Vietnam and Thailand. The total cost of the project was estimated at €3.4 million (with 85% EU contribution). The Project partners included AIT, FAO, Oxfam and Project Associates were SRI-Rice, Cornell University, and the University of Queensland, Australia. The project benefitted 15000 farmers directly and 30,000 farmers indirectly with a definite gender impact as women accounted for 58% of the total farm families benefited.

At the operational level, the implementation of the SRI project received greater support from 78 ministry staffs, 17 researchers, 30 project staffs along with the involvement of several ministries from the four countries, viz., Ministry of Education (MOE), Thailand; Ministry of Agriculture and Forestry (MAF), Lao PDR; Ministry of Agriculture, Forestry and Fisheries (MAFF), Cambodia; Ministry of Agriculture and Rural Development (MARD), Vietnam; as well as Universities, viz., Rajabhat University, Thailand; Royal University of Agriculture, Cambodia; Hanoi University of Agriculture, Vietnam; and Nabong College of Agriculture, Lao PDR. The project used SRI as an ‘entry point’ to develop low cost solutions for farmers to raise the productivity and profitability. The action was implemented in 582 research sites covering 2634 farmer’s led field trials across all four countries. In comparison with the baseline performance, the economic and livelihood impacts of the project were quite impressive in terms of a 52% rise in rice production corresponded with 70% rise in net on-farm returns; 64% rise in labour productivity; 59% higher water productivity; energy savings of 34%; and a notable reduction in greenhouse gas (GHG) emissions from irrigated rice (14%) and rainfed rice (17%) fields across the 4 LMB countries.

The presentation by Dr. Mishra has clearly brought in the striking geographical, demographic and socio-economic features of the smallholder farm households of the LMB regions. These features are also

http://www.sri-lmb.ai.asia
identified as the important challenges of farming in the region. With 60 million population in the region, almost 90% of the farm holdings are smaller in size and an average farmer is more than 50 years old. More than 60% of the farmers are women. The region grows only one crop of rice and almost 60% of the rice area is rainfed providing 75% of the calorie requirements. The eventualities of low farm productivity and declining profitability ratios have resulted in outmigration of the farmers as well as increasing trend of youth leaving agriculture. Hence, the important challenge is ‘how to make the farming economically and socially attractive in a rapidly changing environment and the ensuing threat of climate change-induced farming risks in the region’.

The modalities and structure of project implementation were elaborated in the presentation by Dr. Mishra depicting the regional and country-level SRI-LMB partnerships, programme implementation consortia, structure at the provincial level, important activities that formed part of implementation of the project, etc. Accordingly, the major project-specific activities implemented were: (a) Capacity building interventions and Farmer-led field experiments; (b) Review and reflections at regional level Regional workshops; (c) Review and reflection at local level Provincial workshop; and (d) Review and reflection at country level National workshops, as presented in Figure 2.

![Figure 2: SRI-LMB Major Activities](image)

The sub-components of the major activities were intended to: (a) understand the pattern of change among different group of farmers through monitoring, evaluation and learning; (b) Policy research and dialogue on pro- poor options and policy advocacy recommendation; (c) (d) Participatory Rural Appraisal; (d) Mapping the Baseline status; (e) Trainings for CFPAR and FPAR implementation and for MEL work; and (f) Documentation and sharing learning with a wider audience.

A perfect system of data management was set up at the regional level and the data were clustered under three performance indicators based on performance indicators for sustainable rice cultivation as developed by the Sustainable Rice Platform (SRP) affiliated with the International Rice Research...
Institute and UN Environmental Programme\(^1\). GHG emissions due to SRI farming practices were estimated based on the input use following the protocol developed by Yan et al. 2005; IPCC 2006 and Mossier et al 1998. All emissions were expressed as CO2 equivalent per ha per year. Analytical procedures included Random effect analysis as well as standard statistical analysis involving ANOVA and descriptive statistics.

The three major indicators of project performance were the effects in terms of: (a) Improved Livelihoods; (b) Resource Use Efficiency; and (c) Climate Change Mitigation. Improved livelihood effects were measured by using indicators, such as: productivity or yield (tons/ha); profitability or net return (US$/ha); labour productivity (kg of rice yield/man-day of labour). Resource use efficiency was assessed in terms of water productivity (kg of rice yield/m\(^3\) of water input); inorganic fertilizer use efficiency (kg of rice yield/kg of inorganic fertilizer); and total energy (chemical, mechanical and biological) input (GJ/ha). The effects of Climate Change Mitigation were examined by measuring the greenhouse gas (GHG) emissions – CH4, N2O, CO2 (tCO2 eq./ha) and the GHG emissions (rainfed and irrigated scenarios).

The figure below presents the major impacts of the SRI project in terms of: (a) profitability (economic returns); (b) labour productivity; (c) water productivity; (d) input use efficiency (mineral fertiliser savings and energy savings); and (e) reduction in greenhouse gas (GHG) emissions in comparison to the baseline scenario with significant effects on sustainable livelihoods of the farming community in the region (see Figures 3-8 below).

---

\(^1\) http://www.sustainablerice.org/assets/docs/SRP%20Performance%20Indicators%20v%201.00%20Apr%202015.pdf

http://www.sri-lmb.ait.asia
Besides the analysis of the economic and technical performance of SRI at the aggregate level of the four countries, the paper by Dr. Abha Mishra also presented the country-wise scenarios. Some of the interesting observations emerging from the analysis of country-level performance of farms adopting SRI are:

(a) Economic productivity of SRI farms was higher in rainfed compared to irrigated system;
(b) Organic SRI was more profitable than inorganic SRI;
(c) Majority of the farmers have preferred the SRI practices of wider spacing while planting as well as use of fewer seedlings per unit area; and
(d) Higher average yield and net returns from the SRI spacing method in comparison to the spacing adopted in conventional rice farming.

One of the major social benefits of SRI project as revealed from the summary analysis presentation by Dr. Abha Mishra is that the project was quite successful in terms of promoting farmer participatory action and research (FPAR) approach amongst the farmers group involving 15000 farmers directly and reaching out another 30,000 indirectly, majority (56%) of them being women farmers. More importantly, the reported beneficial outcomes (economic, social and environmental benefits) of SRI project, along with the participatory approach involved in the wider adoption of SRI practices will eventually promote the sustainable development goals (SDGs) underlying the principle of green growth (cleaner, more efficient and more resilient farming system) as presented in Figure 9 below.
The country-wide presentation of the SRI impacts as presented by Dr. Mishra also dealt on the policy environment and the institutional responses to the adaptation of SRI in the LMB regional context. The interface between the FPARS and the policy environment for promotion and wide-scale adoption of SRI will be further strengthened in the second phase of the SRI-LMB project. It was highlighted that the policy environment across the LMB study countries is at different stages of development and yet evolving and the policies need customization based on requirement and contexts. Nevertheless, the promotion and scaling up of SRI can be the next step in the order of progression starting from Laos PDR, followed by Cambodia, Vietnam and Thailand. Thailand and Vietnam can initiate integration of SRI and Conservation Agriculture along with market development.

**Dr. Mishra** concluded her presentation by listing the important challenges confronting the scaling up of SRI in the LMB countries. These challenges are multi-dimensional and all-encompassing in terms of: (a) land access and exclusion of women; (b) gender and tenurial insecurity; (c) dominance of smallholders and landlessness amongst women headed households; (d) lack of education and training; (e) constraint to market integration; (f) limited access to capital and input resources; (g) lack of gender-friendly farming techniques and infrastructure; and (h) women health and child protection issues. It is all the more important to explore the potential of farmers’ collective action evolved through the process of experiential capacity building activities to accelerate the scaling up of SRI and market development. What we might need is to make use of this collective action as a strategic instrument for evolving farmers’ companies/ co-operatives with a greater stake in the market.

These companies/ cooperatives would focus on: (1) Production planning, input-output services with an objective to accelerate adoption of ecologically-sound SRI and Conservation Agriculture; (2) Post-harvest management including marketing and value addition; and (3) Institutional arrangements for capturing economies of scale for commercialization of rainfed agriculture through mutually beneficial
partnership with private sector. The ulterior goals of the farmers’ collective action could be to: use SRI activities to empower farmers for equitable development, reduce the cost of farming, gaining access to high quality inputs through FO managed input-output services, creation of local employment opportunities and poverty reduction in the region.

**Strategies to Maintain Momentum: SRI-LMB Achievements and the Way forward**

Dr. C. M. Wijayaratna, Independent Consultant, Agriculture Strategy Specialist, New Zealand, spoke on the ‘Strategies to Maintain Momentum: SRI-LMB Achievements and the Way forward’. In his presentation, Dr. Wijayaratna, appreciated the successful outcomes of the project as implemented in the four SRI-LMB countries and thanked all stakeholders, including the EU, project partners and local agencies for its effective implementation. It was highlighted that the project has gained both national and international recognitions in a shorter period and had immense benefits as the farming communities who adopted SRI had also developed a sense of ownership of the project. Sharing his rich experience of working on SRI along with Prof. Norman Uphoff in India and Sri Lanka, Dr. Wijayaratna described the strategies to keep pace with the momentum of the SRI-LMB project in its second phase of implementation.

Following an overview of the important achievements of adoption and adaptation of SRI, the presentation by Dr. Wijayaratna has discussed some of the recommendations emerging from the policy studies undertaken on the SRI practices in the region. He also highlighted the imperative for collective action as a driving force for scaling up of SRI involving all its components, such as production planning, input-output services, along with emphasizing the need for ensuring quality of food and market promotion of the SRI. A critical aspect of collective action should be to ensure that the SRI programme in its next stage should attracting the women and youth as the key stakeholders in implementation of the project.

On the rationale of the follow up project on SRI (Phase II), Dr. Wijayaratna noted that the ASEAN Food Security’s Action Plan 2015-2020 has identified “SRI and conservation agriculture as climate-smart integrated practices to be implemented in ASEAN member states to address the future risk associated with climate change”. Apparently, the SRI-LMB was a timely intervention and it has paved the way for more intensive and wider application of “SRI-centred climate-smart and profitable agriculture”. In its extension for the second phase, the SRI principles could be broad-based in terms of system of crop intensification (SCI) to cover other crops. To make this a reality, efforts are needed for:

(a) a planned crop diversification along with development/adaptation and adoption of agro-ecological farming methods; and (b) development of low-cost, location-specific and demand-driven technologies.

The processes of mechanization as well as post-harvest management including value addition, which have already been started in Phase 1, have more potentials for scaling in Phase II of the project.

At the same time, Dr. Wijayaratna noted that further research required to examine the dynamics of local adaptation of SRI and SCI in terms of: (a) the specific practices chosen by farmers; (b) the main reasons for choosing each practice or a cluster of practices; (c) the modifications done in the practice(s); (d) the
statistically significant (if any) in the location-specific pattern of adoption and the reasons for choosing “package(s) of practices” or “modifications”. Invariably, the future research should involve multiple disciplines (e.g. soil physics, plant’s bio-chemical reactions, socioeconomics).

Active participation of women and youth in the SRI programme is yet another area needing attention. The envisaged system of crop intensification (SCI) on the lines of SRI should enable the small farm producers to diversify their market-driven activities “creating” more opportunities for women, including in input-output services and value-chains (through FO- managed Collective Action), with proper policy and institutional support. These measures, if promoted along with provision of performance-based incentives, such as credit, infrastructure like storage /processing, would help attract the rural youth and thus reversing the rural-urban migration. At the same time, policies and special programs are also needed to help close the gender gap in agriculture and rural employment.

Capacity building of stakeholders through formal trainings and education is also equally important in addition to capacity building of the farmers in the Phase II of the project. This should include special mechanisms for building the capacities of other important stakeholders, like the government agencies including Ministries, Departments and Universities. The capacity building programs could include short, medium and long-term training, support to “exchange-programs”, national and international conferences / workshops, study tours, etc.

Dr. Wijayaratna concluded his presentation by reiterating that ‘SRI has demonstrated that it is higher-yielding, water-saving, time-saving and climate-smart. With such advantages, SRI can lead the way to poverty reduction, especially as the majority are resource-poor, small farmers vulnerable to climate change. They are the major suppliers of staple food in Asia. If farmers’ collective action (CA) is supportive of SRI utilization, it can benefit urban residents also, and especially the urban poor who spend a larger portion of their meagre incomes on rice. This should become less expensive with higher efficiency and productivity in rice-growing’.

During the discussions that followed Dr. Wijayaratna’s presentation, questions/ comments were made by Dr. B.C. Barah [Former Chair Professor (NABARD), Indian Agricultural Research Institute, New Delhi] and Prof Bancy M. Mati [Director, WARREC and Coordinator, SRI Project, Nairobi, Kenya], it was pointed out that the successful implementation and upscaling of SRI would call for serious involvement of the policy makers not only in the process of implementation, but also in the empirical research and evaluation so that the advocacy needed could move in the right direction. It was also highlighted in the discussion that as many as 15 organisations (national and international), including Ministries/ government departments are engaged in the SRI project implementation across the four countries and there should be a consensus on the policy prescriptions as well as the actions undertaken. An integrated approach to SRI was proposed wherein the farmers manage farming activities with necessary policy support as well as provision of financial incentives (such as subsidies) made by the relevant state/ national agencies. In this regard, citing the experience from Indian states, Dr. Wijayaratna commented that though the states, Odisha and Chhattisgarh have started giving subsidies to farmers to adopt and scale up SRI, subsidies have not helped the farmers in Odisha to scale up SRI adoption.
Afternoon Session 1: Regional Perspectives

Session Chair: Ms. Lucy Fisher

*Why does it pay to invest in smallholder agriculture, women farmers and landless when it comes to food & nutrition security: Key policy options for the SRI-LMB countries.*

The afternoon session of Day 1 (1 November 2018) was replete with presentation by Oxfam on policy studies and country-level case studies of SRI experiences being presented by co-ordinators of SRI-LMB project in the respective countries as well as project partners, such as Oxfam.

The first presentation was made by Ms. Sopheavy Ty [Head of Portfolio Management Unit-Asia, Oxfam America, Cambodia] on the topic, “Why does it Pay to Invest in Smallholder Agriculture, Women Farmer and Landless when it comes to Food & Nutrition Security: Key Policy Options for the SRI-LMB countries”. The SRI assumes relevance in the Asian context as rice is the most important crop grown in Asia, providing livelihood for millions farmers. The small-scale producers are responsible for the supply of rice. At the same time, issues of food and income insecurity have been on the rise in Asia, in particular, due to increased pressures and competition for land, water and inputs. Also, it is widely known that women play a major role in rice farming in all countries in Asia: transplanting, weeding and harvesting – their work being mostly unrecognized. Women also lack ownership of land have very limited access to finance, extension services and other technical support. These constraints and challenges facing the Asian smallholder agriculture need proper attention and one of the important priorities would be to invest in agriculture for reasons of food (also nutritional) and employment security in Asia.

Citing an Oxfam Internal Report in 2015, Ms. Sopheavy Ty observed that an amount of US$ 12 million will have to be invested for improving SRI adoption in agriculture, while SRI offers a return on investment (ROI) to the tune of US$ 478 million. Asian smallholder farming sector is also beset with several other challenges in terms of: inadequate education and training; inadequacy of traditional and indigenous knowledge to overcome the climate change induced risks; lack of access to information and training in case of new farming methods; inadequate supply of food in relation to burgeoning demand for food leading to loss of income and competitiveness; poor economic geography and infrastructure to achieve and maintain quality; issues of sanitary and phytosanitary measures and their compliance; engaging the private sector companies in farm business activities; limited access to capital and input resources; remoteness of farms and requirements of high collaterals/ interest rates for farm credits, including informal credit sources. Apparently, these challenges are compounded by other external factors, including the bottlenecks in the policy environment affecting trade, industrial expansion, issues of migration, etc, to mention a few.
In this regard, the key policy options for LMB countries as suggested by Ms. Sopheyavy Ty include the following:

- Invest in agriculture to continue in order to ensure food security and employment security;
- Education program for crop holiday time as alternative livelihood;
- Modernize agriculture technique and building knowledge of SSFs to take advantage for a higher price;
- Look at alternative, high value crops or value added systems that can help SSFs increase their income;
- Market information with the use of digital sources (smart phone);
- The respective LMB governments should develop policies and ensure appropriate implementation to enable SSFs play a significant part of the macro-economic scenario of each country;
- A integrated policy that agriculture ministry needs to coordinate with other departments and develop a vision for a practical policy and also to include gender issues;
- Beyond policies, stricter implementation with bottom-up coordinating mechanism; and
- Role of private sector

Following the presentation by Ms. Sopheavy Ty, a question was raised by Dr. B.C. Barah concerning the suggestions of involving many actors (multiple stakeholders), diversification of crops under the SRI framework and integrating policy beyond agriculture based on SRI. It was replied that these issues are important and need to be discussed at length involving the farmer groups engaged into SRI as well as other stakeholders, especially, the national and international agencies within the LMB region.

**Impacts, Efficiency and Livelihood Impacts of SRI: Mid-Term Evaluation Results**

The second paper presented by Dr. Norida Mazlan (authored with Norida Mazlan and Anni Mitin and Dr. Anizan [Malaysian Agroecology for Sustainable Resource Intensification, Malaysia] was titled, “Key Findings of the Evaluation of the SRI-LMB Project”. The paper discussed the results of the Mid Term Evaluation (MTE) of the SRI-LMB project as implemented in the four countries. The broad objectives of the MTE were to: (a) assess the progress made by SRI-LMB project towards achieving the expected results; (b) explore the purpose and overall objective; and (c) document the lessons learned and make recommendations for improving project implementation and achievements. The specific objectives were to: (a) assess the relevance of the project; (b) assess the efficiency of project implementation; (c) assess the effectiveness of project implementation; (d) assess the impact of project on society; and (e) assess the sustainability of project implementation.

The paper initially discussed the methodology adopted for undertaking the MTE, which included different components, such as desk review, focus group survey (FGS) covering 234 farmers, case studies and key informant interviews (17 numbers). A brief depiction was made about the working of field missions in the four countries, followed by the discussion on the FGS, describing the details about
the demographic and socio-economic characteristics of the surveyed farms. It was observed that women respondents formed the majority (68%) in the age group of 41-60 years with average age ranging from 52 in Cambodia, 43 in Laos, 49 in Thailand and 50 years in Vietnam. Majority are with secondary level of education and number of family members was 4-6, of which, 1-3 members worked in the farm. The average rice planted area ranged from 2.48 ha in Thailand to 2.33 ha in Laos, 0.58 ha in Cambodia and to the lowest of 0.18 ha in Vietnam. However, the area planted with SRI method varied across countries with the highest area size of SRI farm reported from Thailand (0.62 ha), followed by Laos (0.34 ha), Cambodia (0.25 ha) and Vietnam (0.11 ha). With 70% of the SRI farms dependent on rainfed farming, almost 59% of the farms adopted partial mechanisation.

The paper by Dr. Norida then discussed some of the important aspects of SRI-LMB project implementation in the countries, which included: (a) relevance of the project to the needs of the beneficiaries, communities and stakeholders; (b) perceived and realized efficiency as well as the factors affecting the efficiency of the project; (c) impact of the project on the livelihoods of the respondents; (d) empowerment of women; and (e) the prospects of continuing the project after its completion of the first phase.

On the question of relevance of the project to the needs of the beneficiaries and communities, it was observed that the participants faced several issues in continuing with the conventional rice cultivation. The issues raised included unpredictable rain, high production costs, high seed rate, pests and diseases, poor soil quality, etc. A significant proportion of the respondents indicated their perceptions about the efficiency of the SRI-LMB program, which included: (a) non-disruptive timing and schedule; (b) efficient and timely communication; (c) local leadership engagement; (d) skilful and knowledgeable trainers; and (e) improved quality time with family. At the same time, the farmer participants also expressed their views that the efficiency in the implementation of the project is affected by several factors. It was reported that: (a) the SRI FPAR processes are time demanding; (b) the participants do not get sufficient technical assistance from local office; (c) insufficient notice; (d) inadequate follow-ups done; (e) staff unapproachability; (f) unidentifiable SRI experts; (g) postponement of the program; and (h) last minute cancellations.

More importantly, the SRI-LMB project implementation identified certain attributes that determine its efficiency, such as:

(a) Innovative alliance-building adopted in the program, which is highly participatory by design contributed to the cost-effectiveness of the project through multi-stakeholder supports, providing financial and technical assistance beyond the means of the project, where necessary;

(b) The project delivers extensive outputs within the expected period achieving large outreach capacities and scale;

At the same time, some concerns were shared by the respondents that:

a) Stretching the budget to cover too many activities could eventually limit follow-up actions and compromise quality of the outputs; and
b) Greater involvement of local leaders such as the Village Chiefs is important, as it has tremendous opportunity to bridge the gap between their communities and state officials.

According to the participants, the trainings provided to them and SRI principles and practices applied by them resulted in major gains in terms of betterment of farming practices as well as a major change in their attitudes as also evident from Figure 10.

![Figure 10: Principles & practices applied based on trainings and major gains](image-url)

Accordingly, the major gains in the practices reported were that 90% of the respondents are able to share knowledge in the community, 88% could participate in the field experiments, 88% could organize community events, 70% involved in participatory action research and 51% did update the farmer’s diary (Figure 10).

The livelihood impacts of the LMB programme was also highlighted in the paper by Dr. Norida Mazlan. Significant proportions of the participants have reported betterment in their livelihood status, measured in terms of improvement in farm productivity (27%), human capital (25%), financial capital (22%) and social capital (21%), though with country differences as evident from Figure 11.

![Figure 11: Livelihood Impacts of LMB programme](image-url)
Thus, with immense benefits realised in terms of positive outcomes in human, social, financial, natural and physical capital of the farmers, the program also offered strong flexibility in the role of women. Similarly, farmers’ and policy makers’ confidence in the role of SRI in poverty alleviation improved. In view of these outcomes and prospects of SRI, almost 87% of the participants have positively responded that they would continue adopting SRI practices in the future as well.

The paper by Dr. Norida Mazlan concluded that SRI practices offer immense opportunities for making rainfed farming system more productive and sustainable involving smallholder poor farmers. The participating farmers indicated strong likelihood and commitment to continue with SRI practices. Nevertheless, continued technical support is necessary and the skills, combined with knowledge, social and political empowerment could be applied for other crops, and other livelihood environments. Continued adoption and adaptation can take place through farmer-to-farmer learning. Farmers have ownership in the PAR process that they were particularly proud of and would continue to promote. It was also highlighted that market access for the SRI products was not prioritized in the scope of the current program and this would be one of the key areas that need consideration in the next phase of the SRI-LMB project. It also calls for collaborative support from the national governments and the results of the project might help to influence the policy formulation and future interventions. The importance of dissemination and publication of the project findings was also highlighted and these publications in the form of research articles and policy briefs, should be peer-reviewed, credible and citable. These science-based evidences for SRI can be made prominently accessible on project related websites and other public domains.

The discussions that followed the presentation included two questions. The first one was seeking clarification on the wide differences observed in case of SRI rice planted area in Vietnam (0.11 ha) compared to other countries (0.62 ha in Thailand, 0.34 ha in Laos, and 0.25 ha in Cambodia). It was reported that this difference has come mainly due to the smaller average size of farms in Vietnam compared to the rest. Another point was about the need for harmonized training taking into consideration of the requirements of the countries. It was observed that the specific requirements for training and capacity building activities have been drafted in the respective local languages of all countries, except the Laos PDR.

The post-coffee break session of Day 1 (November 1) was scheduled with the country level experience sharing of the key findings from SRI project implementation. The entire session from 2.20 pm to 5 pm was chaired by Mr. Jan Willem Ketelaar [Chief Technical Advisor for FAO’s Inter Country IPM/ Pesticide Risk Reduction Programme, FAORAP, Bangkok].

**Afternoon Session 2: Country level experiences**

1. **SRI: Key Learnings from Cambodia**

The first presentation was made by Mr Kong Kea [Country Coordinator, SRI-LMB Project; Deputy Director, Department of Rice Crop GDA, MAFF, Cambodia]. The presentation was titled, ‘SRI-LMB...
learning from Cambodia: Key findings and Recommendations’. The overall objectives of the programme were to: (a) develop common understanding among participants about the concept and principles of SRI and the relevance of rice production in rainfed ecosystem; (b) develop practical understanding of setting field experiments, observation of the key indicators, develop data formats and data analysis from actual field conditions; (c) understand FPAR process and its concepts and discuss curricula and session plan for the upcoming FPAR; (e) discuss and integrate gender aspect into learning curricula practice of FPAR process; and (f) learn about Monitoring, Evaluation and Learning (MEL) aspects to support FPAR works.

The major project activities were planned and implemented during the period 2014 to 2017. The project was implemented in 3 provinces, viz., Takeo, Kampot and Kampong Speu and from each province, three districts were selected for implementation of the project. From each district, four target communes were selected for implementation. The FPAR implementation was reported to be a major success in the study provinces and a total of 127 FPARs were organized for farmer training with a total participation of 3543 farmers, majority of them (61%) being women during the project implementation period (2014-17). The gender dynamism continued in the post- FPAR activities with the rate of women participation rising to 69% as compared to 61% during the FPAR phase.

**Yield gains, and Net returns across the FPARs in Cambodia**

Mr Kong Kea’s presentation also discussed about the impacts of FPARs in terms of yield gains and cost benefit aspects. The yield benefits following FPAR SRI demonstration for transplanting (4189 t/ha) was 33% higher than the FP farms (3139 t/ha) and the net returns was more than double for FPAR (US$ 400/ha) compared to FP (US$ 175/ha). Similarly, SRI demonstration for direct seeding resulted in a yield increase of 21% (4268 t/ha) over FP (3530 t/ha). The resultant net return was 76% higher for FPAR (US$ 463/ha) compared to FP (US$ 262/ha). Significant savings in seed rate use also was achieved post FPAR compared to non-FPAR plots. As regards the yield benefits, it was observed that Non-FPAR and Control farmers received rice yield less than 2t and 2.1 to 2.5t/ha. In contrast the FPAR farmers received rice yield from 2.6 to more than 4 tons per ha more than Non-FPAR and Control farmer. In general, the FPAR farmer got more rice yield than Non-FPAR and Control farmer. In terms of farm expenditure for cultivation, FPAR farmers expended lower than the non-FPAR and control farmers.

That said, Mr Kong Kea also observed that there are serious constraints in the adoption of all SRI practices in case of the FPAR farmers. For instance, while 40% of the farmers experienced labour shortage, 25% of them identified lack of water as the major constraints in the adoption of all SRI practices in Cambodia farms. Nevertheless, a smaller percentage of FPAR farmers (8%) also reported the difficulties in the application of SRI practices as it requires better transplanting skills. For better adaptation of SRI, the farmers suggested four measures, viz., (a) ensuring higher prices for rice and availability of low cost chemical inputs; (b) access to water; (c) introduction of new techniques for crop production, mechanization for transplanting and weeding; and (d) new rice varieties. The key lessons learnt from the FPAR implementation process in Cambodia were:
• The quality of FPAR depends on the facilitation of skills and technical knowledge of SRI Trainers, and frequent monitoring by the PMU officer and LMU.
• The success of field experiment depends on the site selection, the activeness of cooperator farmer, and the follow up by the SRI Team.
• Farmers believed that they can plant the traditional rice variety using SRI practices in September and early of October when they faced problem with drought for a long time.
• Lack of labor is a major constraint for promotion of SRI.

The important recommendations emerged from the paper by Mr Kong Kea included: (a) Continue doing research and development technologies to be smarter, and to be easily adopted by farmers with less adverse effect on environment; (b) Expanding research on SRI activities in the upland provinces; (c) To encourage sustainable and conservation agriculture and promote organic and safe product to market to get premium price for their product; (e) Scaling up and scaling out participatory action research in collaboration with research and academic institutions.

In the discussions that followed, a question was raised by Prof. Bancy M. Mati that, ‘whether direct seedling and transplanting had resulted in a significant yield difference for SRI farms’ and ‘how significant was the differences in the performance of SRI farms over non-SRI?’ This question was answered by the author, reflecting that SRI practices have shown definite advantage over the conventional transplanting method. If irrigation is available and can be managed, direct seeding with low seed rate gets higher yield than conventional random transplanting, but it depends on the fertilizer application, if sufficient the yield is maximized. The differences in the yield level of SRI farms was already highlighted in the several presentations.

2. SRI: Key Learnings from Lao PDR

The paper discussing the SRI-LMB learnings from Laos PDR was presented by Mr. Thongsvanh Phathalavong [Deputy Director General, Dept. of Technical Extension and Agro-processing (DTEAP), MAF, Lao PDR], Mr. Viengxay Photakoun [Country Coordinator, SRI-LMB Project and Deputy Director of Agro-Processing and Agribusiness Promotion Division (DTEAP), MAF, Lao PDR], and Kongsy Xayavong [DTEAP, MAF, Lao PDR].

The project approach was based on the principles of SRI and Farmer Field School (FFS). The initial group of district and farmer trainers (FTs) were trained on experimenting with SRI at provincial level at the Central Farmer Participatory Action Research (CFPAR) sites. They in turn, conducted training for other farmers and led experimentation centered on local-specific problems at the Farmer Participatory Action Research (FPAR) sites in various districts. The project was implemented in the three provinces, viz., Vientiane Province (VangVieng, Feuang and Meun districts), Khammouan province (Nakay, Ghommalath and Mahaxay districts) and Savannaketh (Xonabouly, Champhone and Songkhone districts). The entire period of implementation was from June 2014 to August 2018. A total of 82 FPARs were organized involving a total of 2,134 farmers (55% being women participants). A comparison in the yield of SRI farms in relation to the FP, had shown that SRI yields were higher by
27-35% across the three provinces. The average yield of SRI farms (4136 kg/ha) was higher by 30% over FP farms (2896 kg/ha). The number of tillers per sq mt. was 17-23% higher in SRI farms compared to FP farms, average number of tillers being 152 for SRI farms, compared to 123 tillers/ sq.mt. in case of FP farms. SRI farms also yielded higher number of grains per panicle (125) as against FP farms (116).

The key lessons learnt from SRI implementation in case of Laos were:

- The Country Programme Management Unit (PMU) office should prepare activity work plans well in advance and communicate these to all project partners promptly for the necessary technical review and administrative action;
- Improving cooperation and communication between PMU, LMU, FAO in BKK and AIT is essential;
- Capacity building of various stakeholders involved in field activities is essential;
- Organizing provincial workshop and training to exchange knowledge and experiences;
- It is essential to deliver technical support for managing the snail in rice fields, preferably based on good IPM practices;
- Some farmers’ experienced more weed problems in their SRI Rice fields. Since there were no rains after transplanting, it was difficult to manage weeds. Families, where men migrated for employment faced labor shortage, which also affected weed management;
- Weeds control, snails control, pest and disease control by using IPM;
- Using young seedlings, single seedling and wider spacing during transplanting and drained water out for two weeks during vegetative growth stage can provide yield advantage in rice cultivation.

The major recommendations that emerged from the SRI implementation in Laos were:

(a) Providing assistance for farm mechanization, by conducting trials exploring direct-seeder and/or single seedling transplanters and weeder can help families deal with labour shortage; this especially will be useful for those families where male members migrate away from their farms in search of employment;

(b) In Vientiane province the farmers adopted SRI practices without chemical fertilizer and pesticide usage. We can promote organic rice farming by using SRI principle and FFS among these farmers and link them with organic produce markets as to avail of premium prices and to enhance their incomes;

(c) SRI practices should be integrated with duck and fish rearing in order to increase rice yields and incomes. The design of the rice-fish farms should allow for regular draining of fields for purposes of creating alternate wet and dry conditions, as key SRI practice to promote soil and crop health; and
(d) SRI practice is also suitable for rice seed production. For example, in Songkhone and Xonabouly districts the Farmer Trainers had gained experience.

The paper by Mr. Thongsvanh Phathalavong, et al., also discussed the action programmes for scaling out of SRI in the current regions and other provinces of Lao PDR. While the Farmer trainers will continue to use SRI-LMB approach for rice seed production in the Vientiane and Savannakhet provinces, in Khammouane province, especially the Nakai district will continue to use SRI-LMB approach to expand to the new zone, where in the resettlements areas, the farmers have less land only 0.3-0.5 ha per family. In this region, the poor farmers need to produce rice for their consumption. The presentation concluded with a proposal to continue the second phase of the project with continued support and collaboration between AIT, the EU, FAO and the national government agencies, especially, MAF.

The discussions on the presentation on Laos centred on ‘the continuance of the project in Laos in the next phase’. Questions were asked by Dr. B.C. Barah, viz., ‘given the achievements that Laos has gained due to the SRI intervention, what as a policy maker needs to do once the project completes in 2018?, and ‘what if the partners fail to support it’?. The response to this question was indirectly pointing towards the need for further support from the SRI-LMB project partners to continue the programme in view of the food security concerns that Lao PDR would face in the future.

3. SRI: Key Learnings from Vietnam

The country paper on Vietnam was presented by Dr. Nguyen Quy Duong [Vice Director General, Plant Protection Department (PPD), Ministry of Agriculture and Rural Development (MARD), Vietnam] and Mr. Do Hong Khanh [National IPM Coordinator, PPD, MARD, Vietnam].

The importance of SRI in Vietnam emerges from the fact that 67% of population of the country are living in the rural areas and engage into agriculture production and thus, agriculture is an important economic sector of Vietnam. The extent of women participation in agriculture is as high as 84%. The adoption of SRI adoption has been quite significant in the country, that SRI covered 30 per cent of the rice land in the north. Out of this 30%, hardly all principles of SRI are applied in 6% of the area and in rest of the 24% area, SRI principles are partially implemented.

A total of 72 FPARs were implemented involving a coverage of 2084 farmers, 80% of them being women farmers. There are about 3000 farmers, who have not participated in FPAR but still apply SRI principles partially in rice production. The major experiments implemented involving the SRI practices, included: (a) density planting experiments (experiment on number of hills/m²); (b) experiment on number of seedlings/hill; (c) experiment on seeding rate; (d) experiment on weed management; (e) experiment on method of nitrogen application; (f) experiment on method of potassium application; and (g) experiment on water management.

Yield gains, and net returns from SRI plots in Vietnam

http://www.sri-lmb.ait.asia
The farmers adopting SRI practices have reported significant gains in yield and net returns in comparison to the FP farmers not adopting SRI practices, as evident from Figures 12 and 13.

Figure 12: Yield gains and net returns in SRI Demonstration and FP Practice Plots (Bac Giang), 2015, 2016 and Spring season 2017 (n = 36)

Figure 13: Yield Gains and Net Returns in SRI Demonstration and FP fields in Ha Tinh 2016, 2017 (n = 36)

The SRI practices also had shown significant reduction in cost of inputs, especially, the seed variety and pesticides, in comparison to the FP field as also evident from Figures 14 and 15.

Figure 14 & 15: Expenditures for SRI and FP Fields during Summer 2015 & 2016
SRI-LMB in Vietnam: Key Learnings & Recommendations

- The important learnings from the SRI-LMB project implemented in Vietnam were:
- Selection of the experiments to solve the problems in the locations: e.g., transplanting density or seeding rates for broadcasted rice. Almost all experiments and SRI demonstration fields gave high yields and reduced expenses so the farmers and local leaders are interested and support the project.
- Selection of fields for experiments should be according to the purpose of experiment, e.g., if one of the objectives of the experiment is to show results of water management regimes (i.e., draining at tillering stage and keeping water in at dough and ripening stage), the sites should be selected where the most impact can be demonstrated. For example, selecting sites with access to irrigation facilities or fields that allow control of water application.
- Better preparation is needed before implementing field experiment including selecting farmers, selecting fields, selecting and layout of experiments and defining the survey methods.
- The groups should be ready to deal with severe weather conditions as flooding, drought, pest and disease occurrence.
- District trainers should be equipped with enough knowledge as to be able to explain to farmers about problems faced during the implementation of the field experiments.
- It is a must to keep records in the field diary on the basic data to calculate productivity, benefits and other things related rice production.
- Select core farmers with good technical knowledge and experience and enhance their capacities on SRI through FPARs using Farmer Field School (FFS) approaches. The model using core groups of farmers to support Farmer Trainers and District Trainers can be used to convince local leaders and other farmers in the community about the SRI project.
- The project provides a technical entry point to work with communities. The application of one or all of the SRI principles will depend on the local conditions.
- To help farmers apply SRI practices and principles, we need to enhance their knowledge and change their attitudes (i.e., about old practices). On the other hand, we also need to change the thinking of the government technical staff and managers and lobby for support from local leaders.
- The main local rice varieties should be used for the experiments.

The major recommendations from the Vietnam SRI case study were that: (a) Local authorities should focus on directing and guiding farmers to apply the SRI program on a large scale; (b) Project continue to support programme expansion in the coming years, particularly in rainfed areas; (c) Continue to implement field experiments to evaluate the programme's results and to encourage farmers to participate; (d) The European Union and AIT should provide funding to expand SRI on other crops (peanut, soybean, corn, etc.).

In the discussions that followed the Vietnam case study, a question was raised as to ‘How do the SRI practices are promoted involving collective action amongst the participating farmers?’
It was reported that farmers are selected to participate in the SRI process and those joining the programme are also encouraged to join the various activities. The activities are designed in such a way as to ensure community participation and this paves the way for collective action. Majority of the participants being women, including women leadership further fosters collective action in SRI activities.

4. SRI: Key Learnings from Thailand

The country analysis of SRI adoption and its impacts in Thailand included six brief presentations by SRI project Co-ordinator and farmer representatives from three provinces, Uttaradit, Sisaket and Surin. The presentations were made by Ms. Wirawan Thancharoen [Smart and SRI-LMB Project Farmer, SRI-LMB Project Farmer Coordinator, VTDC Center, Uttaradit, Thailand]; Mr. Phayat Seetha [Smart and SRI-LMB Project Farmer, Key farmer on organic and integrated farming, VTDC Center, Uttaradit, Thailand]; Mrs. Rungnapa Choocherd, [NFE Volunteer Teacher, Provincial Office of the Non-Formal and Informal Education, Surin, Thailand]; Mrs Rumpoeng Sorathaworn [Graduate of Charles Sturt University, N.S.W., Australia, Smart & SRI farmer, Member of Moon River Agricultural Networking group]; Ms. Yaowalux Kulto [Subject Matter Specialist, Head of Seed Development Group, Sisaket Seed Center, Rice Department, Ministry of Agriculture and Cooperatives]; Mrs. Yupaphin Siyongyod [President- Big Plot farming group, Organic rice cultivation group, Learning center on agricultural value addition and Village Head, Uthumporn Phisai district, Sisaket].

The case studies have discussed several aspects of SRI project as implemented in Thailand and their benefits. It was observed that earlier the farmers used a lot of seed and now, it has been significantly reduced to 2kg rice per rai or 12.5 kg/ha (6.25 rai = 1ha). Similarly, cost reduction was quite substantial in SRI. Once labour used to be a problem, which is no longer an issue as they work in group. The earlier belief amongst the farmers was that SRI will not work, which is no longer a belief. Rather, farmers consider that growing SRI rice motivates them, as they are able to consume healthy rice (food). The neighbourhood farmers also learn about SRI and increasingly adopt the SRI way of growing rice. Farmer cooperatives are established at the village level, which make them stronger and learn from the SRI project.

Mrs. Rungnapa Choocherd (Smart Farmer) presented the SRI experiences of growing rice in Surin Province, Thailand. The project was introduced in three rainfed districts of Srikoraphum, Thatum and Chumponburi. The important SRI practices followed were seedbed preparation and transplanting. After 3 years of SRI experience, farmers found that SRI reduces cost of inputs. Though paddy rice output is not different from conventional method, SRI rice was showing tolerance to drought, and it was easy to control weeds in SRI farms in comparison to conventional rice farms. Based on the successful outcomes, farmers expressed their intentions to continue SRI practices in the future. However, the farmers also reported several problems that needed immediate attention. The problems reported were: (a) droughts leading to weed growth, too much; (b) more water (due to heavy rain) often results in problems of draining water out for facilitating the growth of rice; (c) shortage of water sources during early growth stage; (d) shortage of labour; and (e) farmers are afraid to shift from conventional rice method to SRI. To continue adoption of SRI, farmers expressed that they need support from the government to improve
the products, facilitate marketing of the produce and transfer of knowledge to the youth (creating an Education Fund for farmer children), etc.

In her address, Ms. Yaowalux Kultothanked the SRI project for establishing the Sisaket Seed Center early in 2018 with a mission to produce good quality seeds and distribute to the farmers. With this, there are 28 seed centers in Thailand, and farmers are able to meet their seed demand. Efforts are now on to introduce SRI seed production in Thailand. Latest new project highlighted is the Big Plot project.

Mrs. Yuphaphin Siyongyod shared her experiences on the impacts of SRI Uthumporn Phisai district, Sisaket. Most villagers are farmers and do silk weaving. It was observed that seed and soil quality were not good in the past. After taking the position of the village head, she started working on Kings Project and had started working on the Big Plot project 5 years earlier. Currently, the farmers use machines for direct seeding, and more machines are needed now for the purpose of seeding. Seed produced are sent to the seed center. She recommended that farmers should avoid burning the rice crop residues after harvest. Soil conditions is to be improved for improving the seed quality and its growth. She also suggested to reduce the usage of chemical fertilizer. With more adoption and scaling up of SRI, farmers can ensure enough food, good sleep and no debt.

The discussion session following the SRI case studies from Thailand included a major question on the burning of crop biomass, raised by Dr. Amir Kassam. Dr. Kassam asked, ‘Is crop biomass burning a major issue in Thailand and other countries?, what the farmers do with the biomass?’ To this question, the response came from the country SRI project representatives. It was reported that in Thailand, it was a problem earlier, and currently farmers do not burn the crop biomass; they make compost instead. In Vietnam, it was observed that, burning is quite common, while some grow potato after making compost out of the crop residue. In Cambodia also, straw is burnt commonly, but wet season rice husk and straw are collected and used as feed for cows and other cattle. In Cambodia, farmers also plough the crop residue back to the soil and integrate it with the topsoil. Some farmers are reported to make straw mushroom and keep as compost, especially during the wet season. In Laos, straw is used a feedstock,
while some use it as manure in the rice field, while some part is still burnt by the farmers and grow peanut after ploughing the field.

Following this, **Mr. Thongsa**, a farmer representative from Thailand made a brief talk, in which, he thanked the project partners for launching the SRI programme for the benefit of farmers in the region. He mentioned that farmers have learnt many things and with these learnings have moved beyond the traditional cultural practices for reducing cost of production in the prime place. The trainings and demonstration plots under SRI carried forward several new lessons, especially, helping the farmers to make better seed selection and other farm management practices. Now, a majority of farmers realize that SRI rice can grow well at reduced cost and is better for the environment. Farmers also have learnt techniques for making bio-fertilizer for low cost and healthy rice produce.

**Mr. Yuttakarn Kaewkamthong** [Rice Department, Ministry of Agriculture and Cooperatives, Thailand] made a presentation on the SRI-LMB experience in Thailand and recommendations for future SRI activities and market development in the context of Thai rice policy, ASEAN policy and good agricultural practices for sustainable and quality rice production. The major focus of the presentation was to discuss the changing facets of Thailand’s rice economy, the policy changes affecting the agricultural production sector and the relevance of SRI programme in the emerging context of climate change. Rice production in Thailand has reached surplus production level in recent years and the country has also been facing problems of extremes of climate change in the form of droughts and floods in various areas. These emergent scenarios necessitated the country to adopt new policies concerning rice production and addressing climate change problems.

One of the major policy initiatives was to reduce the area under rice production to overcome the surplus production. Accordingly, the first season crop of rice is being replaced with mixed crops and more emphasis is being given for increasing productivity and quality control in the second rice crop production season. Similarly, the third crop of rice is being replaced with other crops, where rice production has become non-profitable with yield declines. This policy is being considered as a strategic attempt to contain surplus rice production and balance the market demand. At the same time, the country has been facing several challenges in rice production, which include: (a) changing attitude of the farmer; (b) development of infrastructure and management; (c) technology advancement for cost reduction; (d) agro-climatic zoning for better production planning; (e) creating marketing linkages for increased value addition (through product diversification, processing, packaging and branding); and (f) networking of farmers.

The presentation also described about the new agricultural standards that the Government of the country has been promoting in recent years in the form of good agricultural practices (GAP) that integrates the elements of efficiency and sustainability in agricultural production systems. Under the GAP, the government provide new technologies to the farmers and provide new opportunities in the form various support measures, viz., land, seed, logistic, water management, finance and marketing, to make agriculture production process more efficient and rewarding. **Mr. Yuttakarn Kaewkamthong** concluded his speech by emphasizing the relevance and need for promotion of SRI in the country in the
context of the changing scenario of agriculture development under global market integration and climate change.

In the discussion session, a question was asked by Dr. P.K. Viswanathan that, ‘whether the shift in the agricultural policy of the country concerning the control of rice production is a short term or long-term policy?’ To this, the response was that the policy is part of a long-term strategy of Thailand to reorient its agricultural development programmes in order to take advantage of the opportunities emerge from globalisation and respond to the challenges posed by climate change risks.

The technical session of Day 1 (1 November 2018) was concluded with an excellent Wrapping Up session by Dr. Amir Kassam. Dr. Kassam appreciated the great interest shown by the AIT President in supporting the SRI project and extending his wholehearted support for extending the project to the next stage. Dr. Kassam highlighted the point that the SRI-LMB project initiated by the AIT with support from the EU, FAO, the country governments and other agencies have laid down a solid foundation for the entire region to adopt it and scale up. At the same time, he cautioned that the SRI as it was adopted in the region should not be seen as an end in itself. More concerted efforts are required to take the SRI forward to broaden its scope from a mere cropping practice to a system of agriculture that addresses the larger and much pressing concerns of sustainable agriculture development in the region in particular. SRI as a system of agriculture should be taken to the next level of its expansion, by which the SRI should be made as an integral aspect of conservation agriculture in order to address the problems of land degradation, loss of soil fertility, empowerment of women, increased youth participation through in the programme and mobilization of the communities for collective action leading to economic and social development and welfare.

In this regard, one may endorse an important point made by Dr. Kassam that: ‘getting youth to agriculture as professional managers of the resources of production (i.e., land, water and capital equipments involved in farm production) that are integral for sustainable agriculture development in the region in particular. Yet another important point that came up in the wrapping up session by Dr. Kassam was the contradiction seen in the scaling up of SRI in the economies of the region, as emerge from the country presentations. He raised an important question that: “Even when the results and impacts of SRI as revealed by the country studies show strong positive benefits, the country governments tend to show no positive response in terms of creating avenues for the wider promotion and adoption of SRI practices”. In fact, this point needs much more elaboration in the discussions and a deeper understanding as regards the real constraints and challenges that come up in the way of state promoting the SRI in the countries in the region.

Dr. Amir Kassam also cautioned that the observed impacts of SRI in the countries in the region should not make us complacent, as the current rice yield levels reported in the SRI farms (i.e., 3500-4500 kg/ha) are much lower than the rice yields reported from the conventional rice farms in countries such as Egypt or China. According to him, the recent shift in policy of rice cultivation in Thailand is a matter of concern, where the cultivation of rice area is being curtailed in the context of continued surplus production of rice. The policy shift, which seems to promote monoculture of commercial crops, such as maize may turn out to be environmentally unsustainable and hence, such policies need a critical
examination in the merging context. Such policies go against the interests of harnessing the environment and natural resources in the wake of increasing climate change induced extreme events.
Session 2 on Day 2 of the Workshop: Sustainable Agriculture Intensification in Asia and Beyond

Session 2 on Day Two of the Workshop (2 November 2018) was started with a brief presentation by Dr. P.K. Viswanathan [Professor (Economics & Sustainability) Amrita Vishwa Vidyapeetham, Kochi, India], which was a reflection based on the presentations of the Day 1. Session two was chaired by Dr. C.M. Wijayaratna. The theme of the Session 2 was: “Sustainable Agriculture Intensification in Asia and Beyond” and was intended to share the lessons learned from the SRI and similar efforts regionally and/or internationally on food security, climate change adaptation, mitigation, climate-smart practices and sustainable rice production.

Save and Grow’: Rice Landscapes and Farming Systems for more than just rice

The first presentation was by Mr. Johannes W. Ketelaar, Chief Technical Advisor for FAO’s Inter Country IPM/Pesticide Risk Reduction Programme, FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. His presentation was on ‘FAO’s initiatives on Sustainable Agriculture Intensification: Updates, Results to Date and Future Planned Work’. The presentation by Mr. Ketelaar on the FAO initiatives on sustainable agriculture intensification was highly relevant and contextual, as many of the SRI practices as introduced in the SRI-LMB project have been based on the FAO framework and guidelines for Sustainable Intensification of Crop Production where SRI has been included as one of the approaches for sustainable intensification², as acknowledged by Dr. Abha Mishra in her remarks in the previous day.

The prime objective of the FAO initiatives on sustainable intensification of smallholder crop production in Asia is focused on conservation and management of green and inclusive rice landscapes. In this regard, the purpose of the presentation was aimed at communicating the results and policy advice for more productive, resource use efficient, resilient and climate-smart rice farming systems for food and nutrition security in Asia. The FAO policy on sustainable intensification of rice production is based on the principles of Save and Grow (Figure 17), wherein, it considers adoption and scaling up of SRI practices as one of the crucial aspects for development of sustainable intensification of rice production.

Figure 17: Sustainable Agriculture Intensification: FAO's Save and Grow framework

The FAO’s ‘Save and Grow’ approach to sustainable agriculture intensification was put into practice within context of the Regional Rice Initiative implemented in selected Asian countries, including the Lao PDR, during the period 2013-2018. Accordingly, Mr. Ketelaar observed that the ‘Save and Grow’ in practice makes good agronomic and ecological sense, enhances farming system profitability and sustains local food and nutrition security.

However, quality education for smallholder farmers through Farmers Field Schools is essential, while enabling policies, extension services, investments and inclusive partnerships are needed for scaling out the rice sector transformation towards greater sustainability. Effective and strategic communication for development, including for generating high-level national policy support, can facilitate such efforts. In this regard, Mr. Ketelaar also made a mention of the innovative and strategic communication products (videos, posters, brochures, case studies, papers) developed in Lao PDR within context of FAO’s Regional Rice Initiative.

Mr. Ketelaar then discussed about the Green Rice Landscapes policy initiative, which is based on an innovative communication for development strategy being implemented in the Lao PDR with FAO support. The RRI results demonstrated clearly that it is possible for smallholder rice farmers ‘to produce more and better with less inputs in a more sustainable way’. This initiative promotes cereal production as an integrated and diversified system including rice/ fish-duck as well as rice-vegetable production systems. The integration of rice with fish (and other aquatic biodiversity resources) helps achieve a
balanced diet and good health. Marketing of fresh vegetables produced, for example, on the rice bunds helps generate cash income. These systems are also perceived as enriching the soil health and conserving vitally important ecosystem services and goods, along with conserving trees in the rice landscapes. The climate-smart agriculture aspects in this case are also clear as well as the potentials of large-scale adoption of small-scale mechanization options for more efficient production and processing of farm produce with less labor inputs. The potential role of private sector for development of more rewarding value chains for smallholder farmers was also acknowledged. Concluding, Mr. Ketelaar also highlighted the importance of investments in farmer training for up-scaling of such green and more inclusive rice-based farming systems at landscape level.

Mr Ketelaar, then discussed in more detail the case of Save and Grow Green Rice Landscapes implementation in the Lao PDR during the period 2015-18/19. The case presentation included discussion on process and results of Farmers Field School interventions: (a) the assessments and field trials (e.g. rice-fish); (b) curriculum development; (c) training of trainers; (d) implementation of 63 FFSs in 18 districts in 6 provinces training 1,838 (47% women) farmers trained; (e) assessment of results/ adoption (involving the National University of Laos); (f) communication material development (2018-19), etc. The results of the adoption of Save and Grow practices in the Lao PDR during 2016-17...
indicated that the rice yields increased by almost half (48.3%) to 4.3 ton/ha (in case of Save and Grow) compared to 2.9 tons/ha in the case of control. The use of inputs, especially, seeds reduced by more than 38% from 121 kg/ha (control) to 74 kgs/ha (Save and Grow) and the farm income increased by almost 76% from 742 US$/ha (control) to 1,304 US$/ha versus 742 (Save and Grow). The farming systems were diversified by growing rice with fish. The presentation also highlighted the importance of: (a) formulating communication strategies and messages (2018/19) based on the encouraging results for all relevant stakeholders; (b) Connecting to key Lao development policies and strategies (e.g. Green Growth); (c) Development of case studies, posters and videos (in both Lao and English); (d) Communicating results to policy makers and development partners; and (e) development of proposals for scaling out of the Save and Grow initiatives.

The FAO presentation concluded with a video on “Green Rice Landscapes in the Lao PDR”, one of the key communication products developed by FAO and MAF within context of the RRI interventions. The video communicates the Save and Grow FFS results and policy lessons learned to a wider audience of local, national and international stakeholders and development partners for the purpose of scaling out the Save and Grow for Green Rice Landscapes capacity building work.

**SRI Networks around the World: Where to next and how to make policies responsive**

The second presentation was made by **Ms. Lucy Fisher** [Director of Communications, SRI International Network and Resource Center (SRI-Rice), IP/CALS, Cornell University, New York, USA] on international, regional and national networks for sustaining the SRI learning momentum. The presentation started with an overview of the progress of SRI networks around the world. SRI has been validated in 60 plus countries in Asia, Africa, and the Americas, with an estimated 10-20 million people practicing SRI methods. According to Ms. Fisher, **SRI Networks** represents an ‘eco-digital commons’ – an international network of thousands of farmers and other stakeholders practicing or supporting a form of “open-source agronomy” for rice cultivation.

![Figure 18: Global Adoption of SRI in 2016](http://sri.cifad.cornell.edu/images/global/SRI_World_Map_2016)
In terms of spread of these networks, there are 3 global SRI networks based at Cornell University, Ithaca, NY; 2 regional SRI networks based in Latin America and Africa; and 11 national SRI networks spread across Bangladesh, Cambodia, India, Indonesia, Japan, Malaysia, Nepal, Philippines, Sri Lanka, Taiwan and Vietnam. Of the 11 national SRI networks, the first was formed in Philippines (SRI Pilipinas) in 2002 and the latest one was established is in Taiwan in 2016.

However, with such an increase in the number of SRI networks reported, it is important to discuss and understand some pertinent questions, such as: ‘What do these networks need?’, ‘What do these networks have to offer each other?’, ‘How can we better connect them to support each other?’; and ‘What things can the networks do together that they can’t do by themselves?’ These questions become all the more important especially when we realize that, despite their successes within their own countries, there is not much interaction taking place between the regional and national SRI networks.

Ms. Fisher provided details information on three of the eleven national networks. The Philippine National SRI network, called SRI Pilipinas organizes radio shows, place hotline advertisements in the local and national newspapers, organizes one-day or season-long trainings on request (SMS module or in person), provide primers, videos and SMS instructions (delivered/ provided on request), and maintains a national discussion group. There is at least one SRI-Pilipinas contact in all 81 provinces and out of the 1,633 towns in the Philippines and 872 are reported to have at least one hotline contact. The Japan SRI network (J-SRI), which was founded in 2007 at the University of Tokyo, has about 300 members, and out of this, about 60 members meet every other month. The Taiwan Society of Conservation Agriculture (CA-SRI) was founded in 2016 and based at Caremed, a health supplies company with social enterprise orientation. With a membership of about 60 people, it convenes meetings every second year. Beginning with 2 field projects of 2 ha in 2016, the project area was expanded with a third project measuring 13 ha in 2017.

There are three global SRI networks, including SRI International Network and Resource Center (SRI-Rice), an SRI Equipment Network, and an SRI Research Network. Of these, the SRI-Rice Network (http://sririce.org) provides free online SRI resources and advice and maintains several other social media and online resources, including Facebook (English and Spanish); Twitter; a video library; a presentation database; a research database; the SRI Equipment Innovators Forum, etc. The primary website maintained by the SRI-Rice network usually gets 4,000 visitors per month from 90 countries.

That said, Ms. Fisher observed that SRI-Rice faces difficulties at the global level in responding to requests for specific information at the national and local levels. This includes requests for information such as: (a) where to acquire appropriate equipment that is useful for SRI at specific sites in Asia, Africa, and Latin America; and (b) information on developing domestic / international markets for rice produced with SRI methods in specific countries. It may be quite likely that the regional and national networks could help maintain this information as well as create mechanisms for effective marketing/trade of the rice produced using SRI methods. She mentioned that there is a SRI Equipment Network...
which currently operates through the SRI equipment innovators exchange (a Facebook group with 350 members). This network was organized following an SRI equipment workshop in 2014 at the Asian Institute of Technology (AIT).

Ms. Fisher then described the SRI Global Research Network, which also maintains a database of publications and theses currently comprising over 1,400 research items. This database is rich in terms of research publications, presentations and reports. For instance, the database provides access to 1,104 journal articles from Africa, Asia, Europe and the Americas; 216 research items from China; 152 research items from Indonesia; 123 research items from Africa and 589 research items from India (Figure 19).

![Figure 19: The SRI Global Research Network](image)

She raised an important question: ‘What does the Global SRI Research Network need from national and regional networks?’ While items that are available online can easily be added to the current database, the Global Research Network needs help from national and regional networks to find the research that is not published online, research published in languages other than English, as well as research carried out by farmers and NGOs that does not appear in academic publications, etc. The Global SRI Research Network can, however, serve as a central platform to allow SRI researchers worldwide to: (a) easily locate SRI research (1,000+ items) (journals articles, theses, etc.); (b) share new research with colleagues; (c) gain access to expensive subscription articles; (d) work out priorities / SRI research agenda; (e) share/learn about better research methods; (f) avoid duplicating research; and (g) facilitate multi-country research collaborations.

---

3 This equipment includes weeders, transplanters, markers, drum seeders, etc.

http://www.sri-lmb.ait.asia
The presentation by Ms. Fisher also discussed the regional SRI networks and their current status. Accordingly, it was observed that the SRI network in Latin America (SRI America Latina Network) was started in 2009 with listserv with Cuban leadership. The Latin America SRI workshop was conducted in Costa Rica in 2011. The listserv was replaced by a Facebook group run from Costa Rica since 2013. The workshop in 2017 re-established the regional network with a second regional workshop. Currently, the Inter-American Institute for Cooperation on Agriculture (IICA), which has a regional SRI project since 2015, has an important leadership role in the SRI America Latina Network. Whereas in Africa, while the 13 country World Bank-funded SRI-WAAPP project in W. Africa was effective, the project is now closed. A West Africa SRI Facebook exists that includes some participants. Currently, with the SRI Africa Information Center (www.sri-africa.net), which was formed in Kenya in 2018, is expected to expand to become a SRI Africa Network for the entire continent. In Asia, a WhatsApp group was formed in 2015 for SE Asians from the national networks to get to know each other. A meeting to form an SRI Asia regional network was held in Johor Bahru, Malaysia, during October 2018. Hopefully, this regional network will be operational during 2019.

The presentation by Ms. Fisher ended by highlighting the need for engaging and strengthening the SRI networks’ abilities to create a more enabling policy environment for wider promotion and scaling up of SRI. This emphasis on the policy environment becomes all the more important in a context when there is a persistent lethargy amongst the planners and government circles to embrace SRI, which is perhaps preventing the SRI movement from getting a wider acceptance and support for scaling up and scaling out of SRI methods in the African, Asian and Latin American countries. According to her, creating a more favourable policy environment for SRI will happen only when:

(a) farmer demand is substantial and government officials, donors, and others are made aware of it;
(b) consumer demand for rice grown with SRI methods increases and government officials, donors, and others are aware of it;
(c) the agricultural research community is aware of SRI research findings and develop a favourable opinion of SRI; and
(d) policymakers, donors, researchers and the general public recognize that there is a demand and develop a favorable opinion about SRI and are motivated to take action.

Equally important is to consider ‘how to work towards creating a more favourable policy environment worldwide.’ This could be helped by bringing farmer voices to the forefront through stories, interviews, news clips, etc. Educating the general public about SRI through more positive articles / media about SRI for a wider distribution may also be tried, covering specific issues of interest like women, youth, and climate change. Educating journalists about SRI practices is yet another strategy that could help promote SRI worldwide. Focusing on quality research on SRI methods and presenting the findings at more conferences and events where researchers participate is also an important suggestion. More presentations on the successful outcomes and benefits of SRI at important global events such as COP24 will also help promote SRI adoption. Other ideas include: (a) addressing specific issues that the national governments are especially interested in; (b) provision of consumer education by SRI rice traders,

http://www.sri-lmb.ait.asia
SRI innovations with Plastic Mulch practices and economic cum environmental benefits

A quite interesting and altogether different idea was presented by Mr. Hillario Padilla (Senior Agro-Ecosystem Office, Kadoorie Conservation China Department, Kadoorie Farm & Botanic Garden, Tai Po, Hong Kong) in his paper, titled “SRI with plastic mulch: Experience in Sichuan, China”. Mr. Padilla started the presentation by introducing the concept and usage of plastic mulching in SRI farms in China which has proven to be highly beneficial in terms of providing significantly higher yields along with the potential for cost reduction, especially, use of less fertilizers. It has been observed from the SRI experiments that the higher yields obtained from the SRI fields had resulted in a 66-75% reduction in chemical fertilizer use when plastic mulching was adopted. The average reported productivity of SRI rice farms was 10.5 tons/ha.
With this initial success as reported, there has been large-scale promotion of ‘SRI with plastic mulching’, with this innovative practice being adopted in 500,000 ha of area (450 ha organic) in the Sichuan Province of China. The comparative performance of the SRI field with plastic mulch was seen to be much better in terms of vigour of the rice plants and absence of weeds in comparison to the SRI farms managed with standard practices (Figure 20). The plastic covered SRI field seemed to be highly tolerant to the drought conditions prevailed in comparison to the standard field. The yield of the plastic mulched organic rice was also reported to be significantly higher than the SRI rice grown with standard methods (Figure 21). At all levels of fertilizer, plastic mulch was found to outperform straw mulch and traditional rice farming.

Moreover, the SRI farms with plastic mulch practice was also found to be free from negative externalities as caused by the environmental problems caused due to indiscriminate usage of chemical fertilizers, pesticides and weedicides. Accordingly, it was observed by Mr. Padilla that the plastic-mulched SRI farms outperform the standard SRI farms in terms of carbon footprint reduction, due to a reduction in use of nitrogen leading to a corresponding reduction in costs of cultivation. The SRI with plastic-mulch system is also found to be efficient with respect to economic and environmental benefits emanating from savings in water, savings in energy, and savings in labour use per unit of cultivated area. For instance, it was observed that irrigation costs were saved to the extent of $72.25/ha [irrigation expenses for plastic mulch was $8.31/ha compared to $80.56/ha for standard]; fertilizer expenses saved to the extent of 83.7 kg/ha [106.05 kg/ha for plastic mulch compared to 189.75 kg/ha for standard method] and a substantial reduction in labour costs to the extent of 172.5 persons/ha from 348 persons/ha in case of standard method to 175.5 persons/ha in case of SRI plastic-mulch practice.

The farmers practicing SRI with plastic mulch also seems to have found a solution to the problem of using plastic as a mulch material by using biodegradable plastic mulch. Mr Padilla also spoke about the various farm implements and innovative farming practices being adopted by the farmers practicing plastic-mulched SRI. Specifically, these innovative practices and farm management equipment included: method of triangle planting; adopting spacing that allows the sun to hit the base of the rice plants (Fukuoka’s experience), which prevents unproductive tillering at later growth stage; adopting

Figure 21: Yield of plastic-mulched organic SRI rice vs. standard SRI rice
different methods of using seedlings (single and three seedlings) per clump; use of log with spikes to mark triangle planting holes; ditch irrigation that helps save water, makes the raised-bed aerobic, and reduces CH₄ emissions.

The presentation by Mr. Padilla also underscored the opportunities for intensifying SRI integrated with Conservation Agriculture (CA). In this regard, options of organic no-till rice-canola rotation are worth considering for promotion since plant residue from canola oil (rape seed) is used as mulch for rice. A comparison of average yield levels of different practices with combinations of plastic mulch combined with straw mulch along with options of ‘no-till and with-till’ revealed that the practice of ‘no-till with straw mulch with plastic mulch’ yielded more than the traditional rice as well as the plastic-mulched SRI with tillage practices. This highlights an essential feature of Conservation Agriculture that ‘SRI with plastic mulching along with continuous straw mulching eventually out-yields plastic mulch yields’. Further, the experiments (in collaboration with the Institute of Soil Science, China Academy of Science in 2010) on the effects of SRI with plastic mulching on the reduction of carbon footprint (CH₄ emissions in particular) revealed that CH₄ fluxes and emissions during the rice-growing period decreased by 85%. Thus, a key message that emerges from the SRI with plastic mulch experience in Sichuan province is that plastic mulch is a core element that warrants scaling-up in the region in view of its multiple benefits in the form of economic, environment as well as ecosystem functions.

The presentation by Mr. Padilla generated lots of interest among the participants, and there were a number of questions, most being clarificatory in nature. Several of the queries expressed concerns that ‘if plastic is covering the surface of the soil where rice is planted can this be considered as a mulch or as a simple plastic cover?’ A suggestion that came up in this context was that instead of mentioning it as plastic mulch, it may be worth referring to it as plastic cover. However, given that the paper also discussed the usage of biodegradable plastic as the material for soil cover, the idea of plastic mulch can pass the test as an authentic material worth wider promulgation.

**SRI in India: Scaling UP SRI/ SCI for Agro-Ecological Innovations for Food Security**

The next presentation was by Dr. B.C. Barah [former Chair Professor (NABARD), Indian Agriculture Research Institute, New Delhi], who delivered a talk on the topic, “Governance and Up-scaling Strategy for Agro-Ecological Innovations for Food Security (special focus on SRI/SCI experiences in India”). Dr. Barah started his presentation highlighting the precariousness of Indian agriculture which faces the huge challenge of declining productivity growth (Deceleration) of major food crops (cereals), viz., rice and wheat. He observed that the response to the existing technology has not been satisfactory in the recent decades, warranting the acceptance of alternative agriculture development paradigms. It is in this context, the concepts of SRI and SCI assume relevance in India with a huge potential for promotion and scaling up. The Indian Agriculture Research Institute (IARI) has scientifically validated the principles of SRI through on-station field trails of rice and wheat.
According to him, Indian agriculture is constrained by the dominance of 125 million farming families (owing less than 2 ha each), of which almost 85% are small and marginal farmers. Grown on approximately 45 million ha area, rice is the staple food crop consumed by 90% of the population. It is interesting to note that almost 60% of rice grown under rainfed conditions. The decline in cereal productivity in the recent decades has become a matter of concern in view of increasing food insecurity, calling for innovative strategies. He suggested a multi-pronged approach towards achieving food and livelihood security in India. Drivers of the multi-pronged approach are:

(a) Production increase emphasising on increasing area, production and productivity of crops, crop diversification, and a reduction in post-harvest losses;

(b) Resource conservation with focus on water promoting conjunctive uses, achieving water use efficiency, and promotion of water-saving technologies;

Cost reduction possibilities by adopting smart nutrient management practices (to overcome imbalance in NPK ratio & micronutrient deficiency, and the positive impact of soil health card); low-input agriculture (in view of high & rising input costs, use of biofertilisers, Paramparagat Kheti Saardhak Yojana assume significance), therefore, adopting farming systems approach. Rather than growing food in isolation, farming system approach combines silvi/horticulture as well as biomass management;

(c) Professionalization and diversification of agriculture emphasizing on imparting skills for developing non-farm sector (NFS), including vocational courses in formal school syllabus (electives and practical training), and linking farmers to markets;

(d) Focus on rainfed areas with strategies to bridge yield gaps, adoption of appropriate technology, and watershed approach (strengthening farm ponds and microirrigation); integration of livestock and non-farm income/employment, crop and asset insurance, etc.

Dr. Barah then discussed the role of the National Consortium of SRI/SCI (NCS), India, its mission and activities. The consortium was formed in 2006, as it coincided with the holding of the 1st National Conference on SRI and the 2nd International Rice Congress (in the presence of SRI participants from nine countries, Dr. Norman Uphoff moved the idea of the NCS). The Consortium includes an informal coalition of practitioners, research scientists, policy makers, resource institutions, farmers, and social workers across India. The members have voluntarily come together to advance the science, practice and policy measures of SRI. The Mission Statement focuses on ensuring sustainable income and food security for farmers and their households, especially the vulnerable sections, through accelerated adoption of science-led SCI, while achieving increased productivity and resource conservation. Financial support for the NCS is provided by several agencies, including SDTT, NABARD, WWF, WU, HIVOS, ICCO, OXFAM and RRA (Revitalizing Rainfed Agriculture).

\[4 \text{ Source: doubling farm income, NABARD 2016.}\]
According to Dr. Barah, SRI heralds a significant change for smallholder farming systems for more sustainable household food and livelihood security. SRI with appropriate technologies has the potential to address food security challenges, and thus it is an inclusive socio-economic entity. It is believed that to realize the fuller potential of the SRI, it is important to approach and implement the same with a proper understanding of the three integral aspects of the system, such as: (a) the science of SRI; (b) the practice of SRI, and (c) the policy on SRI. First, when it comes to the science of SRI, it is important to identify the factors that enable the realization of the fuller expression of the genetic potential of the rice plant, along with its multiple functions, such as the role in conservation of natural resources, reduction in cost of cultivation, and maintaining the soil health and avoiding nutrient mining.

Second, the practices of SRI become popular due to quantified tangible benefits, the acceptance, adoption and adaptation of SRI practices, and the efficiency and efficacy of input use and resource-saving benefits of SRI in terms of savings in seed, water, fertilizer, labour, and maximize organic soil supplementation. Third, the upscaling policy relies on: (a) create an enabling environment for further up-scaling it to achieve household food security; (b) help smoothen the input-output delivery system and knowledge empowerment; (c) facilitate innovation in institutional architecture for wider impact and sustainability; and (d) promote agricultural diversification and income generation for livelihood security and income.

Viewed from the perspective of inclusive growth outcomes, SRI comes as an effective mechanism accepted by resource-poor families, which not only contributing to the household food security but ensure availability of home-grown food grains to small and marginal farmers. As an inclusive and sustainable system, SRI helps conserving precious soil and water enhancing the environment’s carrying capacity for future generations.

Dr. Barah recounted that the National Consortium has made significant achievements in India in terms of: (a) formation of state-wide networks: Banglar SRI, AP SRI Consortium, Orissa Learning Alliance; (b) on-station scientific validation of SWI, helping in mainstreaming R&D system; (c) inclusion of SCI in national and state-level programs; (d) Policy dialogue with National Food Security Mission (NFSM); (e) partnership with National & State Rural Livelihood Missions; and (f) other policy dialogues: a special group was constituted for the 12th Five-Year Plan in India, the Government of India in association with NCS and suggested suggested innovative institutional architecture for up-scaling SRI; and (g) Listing more than 600 Indian research paper on SRI/SCI, (h) evaluating the performance of indigenous paddy varieties; (i) quantification of disadoption of SRI; and (j) understanding the state-led SRI scale-up processes and models.

Besides, various activities under the NCS (policy dialogue) included policy consultations to update the stakeholders on the SRI/SCI activities; and organising a National Conferences and Policy Consultation on SRI in India, involving the Ministry of Agriculture, Govt. of India, ICAR, NAC, Govt. of India, NAAS and civil society organizations for developing an up-scaling strategy for SRI/SCI. The RRA (Revitalizing Rainfed Agriculture) Network has helped NCS strengthen efforts to connect the stakeholders and expand the consortium. Policy conferences as well as policy dialogues were also held. In order to address the issues of governance and up-scaling of SRI, efforts were made by the NCS to

http://www.sri-lmb.aist.asia
understand the state-driven SRI scale-up processes in the states of Bihar, Jharkhand, Odisha, Chhattisgarh and Tripura.

The NCS also undertook investigations to compare the performance of indigenous paddy varieties under SRI and traditional (non-SRI) practices in six states: Chhattisgarh, Odisha, West Bengal, Maharashtra, Meghalaya, and Tamil Nadu. A study on the dis-adoption of SRI tried to identify cause-and-effect relationships by: (a) assessing the performance of SRI in rainfed areas and its impact on household food security; (b) analysing the perceptions and preferences of the practice; and (c) deriving the policy imperatives emerging from the investigations.

The promotional activities undertaken by the NCS have resulted in a wider upscaling of the SRI/SCI across states in India, and it was observed by Dr. Barah that approximately three million farmers have adopted SRI/SCI in about a million hectares partially or fully (Figure 22). While the SRI practices have been adopted in most states, a few states such as Andhra Pradesh, Bihar, Jharkhand, Karnataka, Odisha and Tamil Nadu have adopted SRI in a large number of districts.

Dr. Barah also spoke about broad-basing the concept of SRI into SCI, by spreading the practices to other crops in India: wheat, rajma, sugarcane, maize, finger millet and soybean. The spreading SRI practices to other crops is a case of innovation spill-over, and the benefits can be multidimensional as reported in the case of SRI. Dr. Barah proposed an institutional architecture for the wider promotion and scaling up of SRI/SCI in India. The proposed institutional architecture will work under five streams, comprised of (i) Ministries of Agriculture and Rural Development along with (ii) other agencies such as NARS (KVK and SAU) and line departments at streams i & ii; followed by (iii) autonomous and state-level agencies such as SERP (Society for Elimination of Rural Poverty), BRLPS.
(Bihar Rural Livelihoods Promotion Society); then (iv) agencies such as NABARD and NGOs; and (v) corporate actors and NGOs (often with donor support). Along with this, there will be state-Level resource organisations (SROs, knowledge bodies) which have capacity-building support roles integrating the various agencies, such as DOA, KVK, NGOs, CSO, CBOs, etc. (with representatives acting as master trainers). Below the SROs, there will be Village Resource Persons (VRPs) who will work through the grassroots-level farmer groups, farmer field schools (FFS) and self-help groups (SHGs), ultimately reaching out to the farmers at the bottom level.

The National Consortium on SRI (NCS) will formulate policies with support from Department of Agriculture (DOA), research and development (R&D) organisations, universities, innovation brokers, farmers, etc. The institutional architecture will also have proper mechanisms for monitoring and evaluation, feedback as well as and support systems for funding the various activities, and capacity-building programmes. On the whole, the NCS will come out with appropriate policies aimed at three critical areas, such as production technology, knowledge delivery, and farmer mobilization. Under (i) production technology area, efforts should be on scientific validation of SRI protocols and include recommendations for packages of practices (PoP) in agricultural plans, and encourage more experimentation in the NARS. (ii) Knowledge delivery is core of the processes including activities such as capacity development, creation of institutional architecture and mobilization of local knowledge and resources, as well as linking mainstream R&D with policy. (iii) Farmer mobilization activity should promote activities such as participatory institution building and farmer alliances, benefit sharing, and involving farmers in decision-making and planning processes.

Dr. Barah concluded his presentation by discussing the major challenges for upscaling policy for promotion of SRI/SCI in the Indian context. It was observed that re-orienting farmers towards management and knowledge on rice agro-ecology is an important challenge in the first place. Second, enhancing the investments for developing land and water resources in large scale is a major challenge. Third, establishment of decentralised manufacturing of SRI implements and appropriate distribution system is yet another challenge. Fourth, creating cadres or champions of SRI from among the Resource Farmers is a challenge needing greater attention. The other important challenges include: mobilisation of organic matter and resources for improving soil productivity; establishment of research back-up and support; mainstreaming R&D, policy regimes and practicing farmer collaborations: e.g., exchanges among SWI farmers in Rajasthan, Uttarkhand and Bihar.

Finally, Dr. Barah argue the case for an Asia-wide Alliance of National Networks (AANN) to synergize experiences, expertise and resources for improving food and livelihood security. According to him, the AANN will be able to provide several benefits in terms of: (a) quality knowledge of agro- ecological innovations for climate-smart sustainable production systems; (b) vibrant MIS and data bases; (c) strengthening research capability and capacity building; (d) influence with policy makers; (e) facilitate fund raising; (f) understanding of extension mechanisms (moving from existing to innovative system); and (g) partnership and peer interaction. Nevertheless, the success of the AANN presupposes a definitive role for the NCS with respect to: (a) knowledge transfer, especially with respect to application of SRI on other crops (SCI); (b) facilitate policy dialogue in other Asian countries; (c) design and
support research studies for improving practices and evaluate inputs; (d) quality monitoring and evaluation of ongoing programs; and (e) a strong HRD program among stakeholders.

**SRI in Africa: Experiences and Learning Network**

The next presentation was by **Prof. Bancy M. Mati** [Director, WARREC and Coordinator, SRI Project, Jomo Kenyatta University of Agriculture and Technology (JLUAT), Nairobi, Kenya] on the topic, “System of Rice Intensification in Kenya & Towards SRI-Africa Learning Network”. The presentation started by highlighting the increasing rice deficit in the region where imports keep growing as Africa’s rice production cannot suffice. The demand for rice has been on the increase in Africa owing to the growth in population, urbanization, and changing culinary preferences.

Africa’s rice production is about 26.4 million tons of paddy or 17.3 million tons of milled rice. Rice is grown in 38 African countries. Yet all of the countries in Africa are net importers of rice. Rice yields are low, less than 3 tons/ha (against a potential rice yield of 15 tones/ha under best management and best conditions). The traditional agronomic practices result in low productivity of rice, and water management poses major challenges, from water scarcity to poor drainage of seasonal excesses. The rice grown under flood conditions (3,000 -5,000 litres/kg of grain) also does not yield the optimum levels, despite utilizing so much water. Fully-flooded paddies become habitats for water-borne disease vectors, particularly mosquitoes carrying malaria. Water scarcity is severe in many parts of Africa, even within irrigation schemes.

In Africa, SRI has been adopted with six major components (deviating from the conventional flooded paddy). These components are: (1) transplanting very young seedlings; i.e. at 12 to 14 days old, instead of the conventional 3-4 weeks; (2) raising the seedlings in un-flooded nurseries well-supplied with organic matter; (3) transplanting seedlings at wider spacings and in lines, usually 20x20 cm; (4) transplanting only one seedling per hill, NOT in clumps of 3-4 seedlings; (5) alternate wetting and drying (AWD) of the paddy field (do not continuously flood the soil) to ensure aeration of the root zone; and (6) weed control preferably done with a simple mechanical rotary weeder that aerates the soil.

She presented a historic profiling of SRI activities implemented in Kenya. SRI was introduced in Kenya at the Mwea Irrigation Scheme in August 2009. The initial partners were JLUAT, NIB, AICAD, WB, WBI, MoA, MWI, KARI, Cornell University (USA), Mwea Irrigation Scheme and MIAD, and farmers. From August 2009 to January 2010, only two pioneer farmers accepted to do trials voluntarily, and on-station research trials started at MIAD, supported by AICAD.

From April 2010, JLUAT Innovation Fund supported for 3 years an SRI research and capacity-building project in Mwea. From June 2011, NIB supported a six-month project to up-scale SRI in 4 schemes, i.e. Ahero, West Kano, Bunyala and Mwea, and SW Kano (2012). In 2013, a lack of funds affected SRI promotion, but farmers continued to adopt SRI, learning from each other. In 2014, NIB provided funding for developing a marketing value chain for SRI. Also in 2014, AICAD provided funding for SRI research on labor requirements and weeds. In 2016, AgSRI, a social enterprise consulting firm based in Hyderabad, India, funded a project of extension for SRI in Western Kenya.
Research on SRI is also taken up at the doctorate and graduate levels, assessing the upscaling of SRI, doing cost-benefit analysis of SRI, as well as the effects of SRI on mosquito survival rates. Participatory research on SRI was also promoted, besides providing ToT training and field visits, special training for women, invited trainers supported by World Bank Institute for farmers from India and Japan. Exchange visits for farmers and staff as well as capacity-building activities were also organised under which at least 3,000 individuals trained on SRI, and some 5,400 farmers had adopted SRI in Mwea, Ahero, West Kano, and Bunyala irrigation schemes by October 2018.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Rainfall (m³/ha)</th>
<th>Irrigation water (m³/ha)</th>
<th>Water use (m³/ha)**</th>
<th>Water Productivity (kg/m³)</th>
<th>Savings on irrigation water (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basmati 370</td>
<td>613*</td>
<td>2,821**</td>
<td>6,422</td>
<td>11,610</td>
<td>9,035</td>
</tr>
<tr>
<td>BW 196</td>
<td>696*</td>
<td>3,464**</td>
<td>11,573</td>
<td>15,691</td>
<td>12,269</td>
</tr>
<tr>
<td>R 2793-80-1</td>
<td>613*</td>
<td>2,644**</td>
<td>10,420</td>
<td>15,096</td>
<td>11,033</td>
</tr>
</tbody>
</table>

* Rainfall water was drained from SRI plots hence lower than that in the CF plots

Source: Omwengo et al, 2014

Figure 23: Water savings and water productivity benefits of SRI vs Conventional flooded paddy in Mwea Irrigation System

The benefits of SRI adoption in Kenya included: increase in rice yields compared to conventional rice practices; higher returns on investment (30-50% increase in net income) compared to lower returns in conventional rice cultivation; savings in irrigation water and higher water productivity for SRI rice compared to the conventional flooded paddy; savings in quantity and costs of seeds; savings in fertilizer; savings in weeding over manual weeding due to adoption of rotary weeding (Figure 23 & Figure 24).

**Benefits of SRI: Less Inputs, Less Water Utilized**

1) SRI uses less seed & farmers saved up to 80% of the cost of seed
2) Use of organic manures saves on costs of fertilizers.
3) Fertilizers are applied to individual plants (not broadcasted) – less amounts used
4) Rotary weeding saves up to 75% on costs compared to manual weeding
5) In Mwea, SRI saved 25-33% of water used in irrigation

Figure 24: Other benefits of SRI vs Conventional flooded paddy in Mwea Irrigation System
According to Prof. Mati, the major challenges faced in promoting adoption of SRI were that: farmers tend to be resistant to change with traditional mindsets and scepticism. The other issues included: A higher incidence of weeds under SRI; the non-availability (or lack) of rotary weeder and equipment; lack of funding to maintain the momentum of projects; shortage of SRI-trained personnel and extension workers; and lack of a SRI value chain for the system to be self-propagating and more remunerative to farmers.

She also highlighted the need for developing an SRI-Africa Network. By now, based on the successful outcomes, the scientific basis for adoption of SRI has been proven, and SRI is being adopted in over 20 countries in Africa. However, the main gap is in knowledge flows, flows upwards to reach policy makers, and flows laterally to reach many farmers and extension workers. Africa is a continent fragmented by national boundaries, languages, geographic zones, and cultural barriers. Numerous opportunities for promotion of SRI have been missed as there exist a technological divide between scientists and farmers. It was suggested that networks can break these barriers and help establish human resource pools, their contacts and specific needs/facilities.

The need for creating the SRI-Africa network was discussed by Prof. Mati towards the end of her presentation. The main objective of the network would be to build a vibrant Africa-wide Community of Practice on SRI, for knowledge sharing, advocacy, cooperation, and action. More specifically, it was suggested to: a) build SRI-Africa network (www.SRI) for peer support and as a learning and knowledge sharing platform on SRI; b) gather, contribute to, share and utilize knowledge and best practices on SRI to facilitate more informed choices; c) resource mobilization to support SRI actions; d) implement programmes/projects & activities that lead to upscaling of SRI – including meetings, exchange visits, etc.; and e) work towards establishing strong national SRI networks that can implement projects, starting with national workshops which can culminate in to an Africa-wide SRI network. Kenya also has developed a web portal for knowledge-sharing with support from the Cornell University SRI-Rice baseline database.

**Sustainable Intensification through SRI: The Bangladesh Experience**

The next presentation by Dr. A. M. Muazzam Husain [Co-ordinator, National SRI Network & Chairman, Bangladesh Rice Foundation, Bangladesh] discussed the case of sustainable intensification of farming through SRI sharing learning and updates from the Bangladesh experience. The topic of the presentation was: “Experience with SRI in Bangladesh through Promotion and Networking”.

Compared to many in the ASEAN region, Bangladesh was one of the early starters of SRI, which first adopted SRI practices during the boro (winter season) of 1999-2000 in Kishoreganj district by the Department of Agriculture Extension (DAE) and CARE/Bangladesh. Following adoption, the yield of SRI rice was observed to have increased to 6.5-7.5 t/ha. The Bangladesh Rice Research Institute (BRRI) also conducted experimental trials on SRI in its Comilla sub-station and documented a yield increase of 1 t/ha attributable to the adoption of SRI methods. Following these initial successes, Prof. Norman
Uphoff visited Bangladesh in December 2000 and gave seminars at both BRRI and BRAC on the SRI methodology.

Subsequently, a working group was formed, and small-scale trials on SRI were undertaken. In January, 2002, multiple organizations interested in SRI formed a Steering Committee, and SRI activities were formally initiated. The committee included BRAC, BRRI, DAE, CARE, and Syngenta BD Ltd. Plans were drawn up in September 2002 for a systematic 2-year evaluation of SRI under PETRRA project of IRRI/Bangladesh funded by DFID (UK) PETRRA-IRRI/BD with approved three sub-projects. A consortium of BRAC, CARE/POSD, SAFE-BD, and Syngenta BD Ltd. jointly undertook one sub-project in 8 Upazilas of four districts; 2 smaller sub-projects were undertaken by two BRRI scientists.

As per the BRAC-led study, per-hectare paddy yields were reported to be increased to 6.1-8 t/ha, with an average yield increase of 30%, cost reduction of 7%, and seed saving of 58%. The adoption of SRI had also increased significantly from 25% in the first year to 62% in the second year. The SRI acreage increased by 90% during the second year; and the number of participating farmers increased from 487 in the first year to 1,028 during the 2nd year.

These evaluation studies by the BRAC and BRRI provided a solid base of knowledge for understanding SRI method in Bangladesh. Overall results in general were encouraging with respect to yield and profitability, and these created a positive perception among farmers positive towards SRI. Further, the OXFAM-GB program in Bangladesh carried out a three-year project in its River Basin Project areas under a SRI team led by Prof. Husain, convener of the National SRI Steering Committee. The results of this study showed average yield of SRI plots to be 6.6t/ha in comparison to 5.3 t/ha in non-SRI plots during the 1st year; 25% higher yield, which rose to 27% in the 2nd year. Profitability was 78% higher in SRI plots. As a result, the number of farmers adopting SRI method significantly increased during the second year. However, transplantation of young seedlings during winter cold waves in Boro season was hampered, and proper water management for scattered farms was found difficult.

SRI progressed further in Bangladesh, and in February 2006, the SRI National Network Bangladesh (SRI-NNB) was formed with membership from government research and extension organizations, NGOs, private organizations in an extended meeting of the Steering Committee. SRI-NNB headquarters were set up at the Bangladesh Rice Foundation office in Dhaka. SRI-NNB organized five national workshops for sharing experiences of several SRI programs. In these workshops, policy-makers, scientists, GO and NGO SRI activists, and farmers all participated. Results of various SRI programs were discussed, and promotion of SRI was recommended through a GO-NGO coordinated approach in these workshops.

Several other activities were undertaken over time. The DAE signed an MOU with BRF that included the promotion of SRI in Bangladesh; Training of trainers was conducted with DAE staff; SRI manuals, brochures and CDs were published or prepared and distributed. Prof. Uphoff provided modest funding to assist these efforts. ADRA International helped with producing a CD on SRI. The Bangladesh Agricultural University (BAU) was brought into action on SRI along with some other organizations. A National Dialogue was organized in October 2012 with a follow-up meeting held later in the year.

http://www.sri-lmb.aite.asia
Following the national dialogue, a new era of SRI movement started in Bangladesh. SRI-NNB functions were de-centralized, and member organizations were assigned to carry out their respective SRI action programs. Coordinating function including training, motivational programs, and monitoring SRI programs was given to the SRI-NNB.

Before long, the SRI activities in Bangladesh also found a strong place in its R&D programmes. For instance, BRAC conducted a three-year program (AFSP) on SRI in northern and southern districts covering 6,693 farmers for validation and dissemination of SRI. SRI-NNB conducted TOT for the BRAC staff, and a block system was adopted for facilitating irrigation management according to SRI precepts. Yield of BR-28 variety with SRI management was 16% higher compared to BRRI method, and it was 52% higher than with farmers’ practices. With SRI, the benefit-cost ratio was 2.6 compared to 1.25 with farmers’ practice. The evaluation found that higher yield, lower seed rate, lower irrigation cost, less pest infestation, and lower labour cost contributed to the highest profitability of SRI over other methods. Farmers continued to adopt SRI after the program was over.

Further, BRAC’s Research and Evaluation Division conducted two studies in collaboration with Monash University in Australia to find out more about the adoption and diffusion of SRI. First phase of this study found that yield in SRI was 15% higher with 14% increase in revenue. SRI adoption rate was found to be three times higher than that in the control group. Provisional findings based on the second-phase report indicated that repeated training induces more farmers to adopt SRI, which also increases farmers’ yield and profits significantly. A BRAC intern’s report based on FGDs further suggested that adoption of SRI increased yield and profitability. However, good water management was identified as a major constraint in adoption of SRI, which could be overcome if the community approach for water management is adopted, which will help farmers to practice SRI more efficiently.

The research evaluations on SRI were continued further in Bangladesh. For instance, the Rural Development Academy (RDA), Bogra, when it conducted SRI trials during 2012-13 found encouraging results. The RDA undertook a major five-year action research project in 2015-16 on “Extension and Dissemination of Modern Water-Saving Technologies and Management Practices to Increase Crop Production” with 200 project sites in 40 districts of Bangladesh, funded by the Government of Bangladesh. SRI was one of the important components of the project as the project adopted mechanized transplantation method, raised beds, and used tricho-compost. RDA formed water user groups and signed contracts with water suppliers. Results indicated that at the end of the 3rd year, yield increased by 20-25%, with a seed saving of about 50%, irrigation water saving (volume) of 18-22%, and cost savings to the extent of 21-27%.

Simultaneously, the Bangladesh Agricultural University (BAU) conducted several field trials, and a number of MS and PhD dissertations were also undertaken on SRI adoption practices and impacts in Bangladesh. Broadly, these researches found that SRI is more suitable in boro (rabi) season than in kharif season, as water management challenges are created by the monsoon rain. Transplantation of 8-day old seedlings with a spacing of 30X30 cm gave higher yields (8 tons/ha during rabi, 6 tons/ha during kharif). The alternate wet and dry (AWD) method with SRI saves water use by 18-22%, and it lowers irrigation cost by 21%-27%, while increasing average yield by 10-15%.
Engagement of communities was identified as a major stronghold of the SRI initiatives in Bangladesh according to Dr. Husain. It was observed that the Block / Community approach as used by BRAC and RDA was found to be effective in improving water management and cost reduction. Like the engagement of community activities, women’s participation is also seen to be quite important for promotion of SRI in Bangladesh. Women are traditionally involved in transplantation, post-harvest activities, and seed preservation in many areas of Bangladesh. In SRI, women are more involved in all these activities. For instance, during SRI trainings, women farmers took an active part as group members. Women have more access to micro-finance in projects that provide for production groups. Landless farmers and sharecroppers also participate as SRI production-group farmers. Mechanization is providing increasing employment opportunities for landless farmers in operating and maintenance of machinery, but promoting such opportunities can be enhanced by government and NGO initiatives.

As regards future plans and recommendations for continuation of SRI in Bangladesh, Dr. Husain underscored the need for exploring funding sources for promoting and expanding SRI across the country and throughout the seasons wherever feasible. This primarily requires conducting a nation-wide survey to identify suitable new areas for SRI expansion; undertaking promotional activities such as: (a) develop updated SRI manual, leaflets, and videos for large-scale distribution; (b) strengthen training, monitoring, evaluation, and learning of SRI programs; and (c) strengthen market linkages through community involvement. Government-level policy support and action should be there to promote SRI for attaining food security in Bangladesh. In this regard, supportive actions are necessary with respect to: (a) appropriate water management through community engagement in coordination among water owners and water user groups; (b) repeated training and demonstrations on SRI must be undertaken for farmer group members to improve their use of SRI methods; (c) inclusion of SRI in the DAE extension training curricula; and (d) government, donor and INGO support should be provided to SRI-NNB to facilitate its coordinating function to expand SRI in a sustainable manner.

**Block Chain for Livelihoods from Organic Rice in Cambodia**

The next presentation was by Mr. Phay Cheth [Programme Coordinator, Resilience Oxfam, Cambodia] on the topic “Block Chain for Livelihoods from Organic Cambodian Rice – BLOCRICE”. The presentation was started with describing the concept of Block chain and its usage in the SRI rice context in Cambodia.

According to Mr. Cheth, in Cambodia, a vast majority of the farm households are small-scale farmers (80%) and possess farm lands of 1-2 ha producing 2.5 to 3 tonnes of organic paddy rice per year. There are many actors in the rice supply chain, and farmers in particular are facing challenges in accessing market information so their production can be remunerative. The BlocRice system is using innovative

---

5 A block chain is a decentralized, distributed, and public digital ledger that is used to record transactions across many computers, so that the record cannot be altered retroactively without the consensus of the network.
block chain technology to register and share relevant information among all actors in the supply chain (see Figure 25 below).

![Figure 25: Innovative Block chain Solution for organic SRI promotion in Cambodia](image)

The Block Chain system as depicted in Figure 25, created for the promotion of organic SRI in Cambodia, is expected to: (a) help reduce the layers in the rice value chain and make it more efficient and effective; (b) bring farmers and other actors on the same platform; (c) secure cashless payment through the bank; and (d) build traceability, transparency and trust. This Block Chain platform is being developed through a collaborative approach between Oxfam, AmruRice and Sano Rice, Schuttelaar and other partners. It aims to improve ultimately the livelihoods of organic rice farmers in Cambodia. The project is intended as a pilot which -- if successful -- can be scaled up to other farmer cooperatives in the rice supply chain and other commodities.

All relevant actors, from farmers and agricultural cooperatives, up to Sano Rice, will share relevant information, from planting of the crop to the manufacturing of rice cakes. This information is processed via block chain technology after being entered by the supply chain partners themselves via smartphone. Some progress has already been reported in the setting up of the Block Chain system by signing a MoU with the National Designated Authority besides organizing an official inception and awareness
workshop. Established cashless payment for farmers with Acleda Bank and a BlocRice application has been developed with about 50 farmers registering for the same.

This Block Chain system engages with the relevant actors in the supply chain and facilitates knowledge transfer into local language and culture. Further, agricultural extension services are provided to farmers, with training of committee members (AC) and information then rolled-out to other farmers. The proposed action plan is to develop and test the Block Chain as a community development tool, and success could lead to scaling up of the public Block Chain infrastructure and applying it in other value chains (Figure 26). This system could then help influence the food companies, retailers and other relevant players for improving the levels of social compliance in food chains.

**Figure 26: Block Chain Scaling Plan for organic rice in Cambodia**

- Completing phase I with 50 farmers by March 2019;
- Documenting the result, lesson learned and disseminating;
- Getting engaged other partners, private sector companies, and support from the Government.

**Monitoring, Evaluation and Learning (MEL) from SRI Capacity Building in Laos PDR**

The next presentation was by Mr. Hemantha Kumar Pamarthry [Independent Development Consultant, Chennai, India] titled “Monitoring, Evaluation and Learning (MEL) Study for understanding the pattern of change resulting from SRI capacity building interventions in Laos PDR.” The major objectives of the MEL Study in Laos were to: (a) document, analyse and understand how SRI-guided crop management practices will potentially affect crop performance / cropping systems including both direct effects on the crop itself (yield, maturity and tolerance of abiotic and biotic stresses) and indirect effects on environment; (b) summarize the patterns of change among different groups of farmers (FPAR, non-FPAR and Control Groups) due to direct and indirect effects of FPARs; and (c) chart the patterns of change geographically and by social groups.
The three geographical locations selected for the study were: Savannakhet, Vientiane, and Khammouane provinces. A total of 34 villages were covered under the study with three districts (FPAR & NFPAR) from each province, as well as another one district and one village (within the district) from each province to act as a control group. The distribution of sample villages spread across the three provinces, with the highest number of 14 villages selected in Vientiane; 11 villages in Khammouane provinces, and 9 villages from Savannakhet. Out of the 278 sample farmers (50% women), 75 were practicing FPAR group farmers; 54 non-practicing FPAR group farmers; 92 NFPAR and others; and 57 as control group.

Most farmers reported to have followed transplanting (96%). About 125 farmers (47% women) used seeds in the range of 51-100 kgs/ha. Only 35 (28%) farmers among them were following FPAR / SRI. Almost 89% of the sample farmers were totally dependent on rainfed agriculture and were not following any irrigation practices. Hardly 10% of the farmers were using irrigation with a frequency of 3-4 times (8.3%) and 1-2 times (2%). Usage of chemical fertilizers and combinations of chemical and organic fertilizers were also observed across the farmer categories. A majority (42%) reported using only chemical fertilizers at the aggregate level, while 15% were using only organic fertilizers. About 27% of the farmers were not using any fertilizer among both the FPAR/ SRI and NFPAR/ SRI categories.

As a majority of the farmers had small landholdings, family labour was their major source of labour, and only in rare cases did they hire outside labour, then mainly for harvesting. It was observed that labour costs for NSRI farms was as much as 200% higher than on SRI farms. In terms of average tillers per sq m, 40% of the FPAR farmers and 37% NFPAR farmers reported 151-200 tillers per sq m as against only 30% of the control group; 37% of the NFPAR farmers reported 201-250 tillers per sq m against 17% in the case of FPAR and 22% in the case of control farmers.

There was significant yield advantage for farmers with FPAR/ SRI in the case of yield classes above 3.1 tons/ ha compared to lower yield classes as evident from Figure 27. This trend was more pronounced in the case of the yield class above 4 tons/ ha in Vientiane and Savannakhet in particular. In the case of Khammouane, more farmers reported higher yield levels in the range of 3.1 to 4 tons/ ha compared to Savannakhet and Vientiane provinces. The economic returns from FPAR/ SRI was also found to be much higher for a larger number of farmers compared to the control group. Almost 62% of the FPAR/ SRI farmers reported profits, while 67% of the control group farmers reported losses in rice cultivation (Figure 28).
The major gains realized by a majority of the farmers (70 to 74 out of 75 farmers) by adopting SRI were gain in knowledge, gain in time, and improving relationships.

Some of the major challenges being reported for the scaling up of SRI in the three provinces included: (a) mountainous terrains make adoption of SRI difficult; (b) “SRI is labour-oriented, and getting timely labour and the expenses for this make SRI difficult”; and (c) “Since SRI follows single-seed method, many times snails and crabs eat away the seeds that are sown for transplantation”.

Mr. Pamarthy concluded his presentation by making some suggestions for the way forward. He questioned the mindset of concerned stakeholders in not scaling up SRI much, despite the economic and social advantages of the same. Due to above-normal rainfall and other unfavorable climatic conditions this crop season, the Laos government is taking several steps to ensure food security for the people. SRI methodology could be the ideal answer for dealing with such conditions in the future. But mindsets need to be changed for favouring a wider scaling-up of SRI practices. There is immense potential to expand SRI to other districts of existing provinces and also taking up in new provinces. In order to address these questions, he feels that it is important to engage in activities such as capacity-building, especially, in crop economics and commercial farming and marketing; Continuous guidance for farmers with linkages to knowledge and markets, giving incentives perhaps through awards, and perhaps offering some feasible / reasonable subsidies.

**Understanding the Patterns of Change Resulting from the SRI Capacity Building Interventions in Four LMB Countries**

The last presentation of Session 2 was by Dr. Abha Mishra, who presented a paper “Understanding the Patterns of Change Resulting from the SRI Capacity-Building Interventions in Four LMB Countries through Monitoring Evaluation and Learning”. The main objective of the study was to evaluate and learn about the patterns of change in SRI-LMB region among different groups of farmers due to direct
and indirect effects of Farmers’ Participatory Action Research (FPAR) interventions for promotion and scaling up of SRI. The methodology adopted for the study included pre- and post-intervention surveys from 30 districts in 10 provinces from the 4 LMB countries. The purpose of the assessment was to learn from the evolution of farmers’ practices at FPAR and non-FPAR sites with respect to the pre-project baseline scenario, and with the respect to the control groups. The groups compared were three:

(a) **FPAR group**, which was comprised of farmer participants in the direct interventions of the project, which included attendees from both CFPAR and FPAR;

(b) **Non-FPAR group**, which included farmers from the same villages/neighbourhoods where the FPAR has been conducted, but who have not attended and followed the project’s direct interventions, but who could be indirectly influenced by their neighbours who attended FPAR; and

(c) **Control group**: Farmers with similar agro-ecological and socio-economical profiles as the FPAR group, but who had not been directly or indirectly influenced by the project’s interventions.

The baseline surveys in the four countries were undertaken during January 2014 in Thailand and Cambodia, then in June 2014 in Vietnam, and in December 2014 in Laos PDR. The MEL surveys (pre- & post-FPAR) were undertaken in Thailand and Cambodia during 2014-15, 2015-16 and 2017; November-December 2015 and 2018 in Laos PDR; and between July 2015 and November-December 2017 in the two regions (Bac Giang and Ha Tinh) of Vietnam. The MEL surveys were undertaken by ACISAI (AIT) involving four country-level organizations as partners: the Royal University of Agriculture (RUA) Cambodia; the NCA in Laos PDR; the Hanoi University of Agriculture in Vietnam; and Ubon Ratchathani Rajabhat University (UBRU) in Thailand. The respondents for the MEL surveys were selected randomly using stratified sampling methods (see Figure 29 below).

---

**Figure 29: Number of respondents covered in the MEL surveys in the 4 LMB Countries**
Local MEL survey monitors were selected and trained (one from each district were selected for data collection by the national universities). Questionnaires were developed, adapted and translated into the local language. These questionnaires were pre-tested, adjusted and finalized. The MEL study protocol was developed in consultation with regional and national partners. The study protocol was developed based the defined SRI crop management practices and the SRI transition process. Data were collected pertaining to the broad areas of (a) crop management practices applied w.r.t SRI principles, and cost and benefits to the households; (b) women farmers’ socio-economic status and overall well-being; and (c) responses of farmers to extreme events (drought/flood/pests/disease outbreak), if any.

The indicators selected for the MEL study were: (a) for crops and cropping systems – (changes in yield, changes in maturity period, changes in farming systems (diversification of crops/livestock); (b) for socio-economic aspects – changes in net on-farm return, relative changes in food security, changes in labour requirements; and (c) for exposure and sensitivity to extreme events -- data analysis. The data analysis was performed using various exploratory and descriptive statistical analysis and tests, including analysis of variance (ANOVA); cluster analysis, regression analysis, etc.

The presentation by Dr. Mishra also made a detailed account of the results of the MEL surveys. One of the important trends that has emerged in agriculture in the LMB region with respect to age distribution and gender is what is referred to as ‘the feminization of agriculture’, with women farmers accounting for a larger share of farm households in Cambodia, Thailand and Vietnam. The percentage of women farmers in these countries ranged from 65-70% in Thailand and Cambodia to 80-85% in Vietnam. However, Laos PDR was an exception, where the proportion of women farmers was close to 40%. Quite interestingly, the average age of rice farmers was the lowest at 40-45 years in Laos PDR, while the average age was 50-55 years in Thailand and Vietnam, and 48-50 years in Cambodian (Figure 30).

The average size of farm holdings was found to be the lowest in Vietnam (0.25 to 0.5 ha) as compared to 3-4 ha in Thailand, 2-3.5 ha in Lao PDR, and 0.75 ha to 1 ha in Cambodia (Figure 31).
Following the introduction of SRI, the adoption of specific SRI practices has increased in Thailand, Vietnam, and Cambodia. The rate of adoption of various SRI practices, such as fewer seedlings/hill or fewer seeds/hole, wider spacing, application of organic manure, etc., had increased in Thailand, Vietnam and Cambodia over the past 2-3 years.

The practices of fewer seedling per hill and wider spacing, along with younger seedlings, have enabled the SRI rate of adoption to rise over the past 3-4 years following SRI training activities in these countries (Figure 32 a & b). Not surprisingly, the adoption of various SRI practices mentioned above was highest among FPAR farmers as compared to non-FPAR farmers as seen in Figure 33. It was observed that seedlings/hill and spacing have the highest impact in group formation than any other SRI principles. The incremental yield benefits as well as the increase in net returns realised from these SRI practices was the reason for wider adoption of these two practices. The increased net return was due to cost.
reduction and also due to higher yields and so higher benefits. Overall economic benefits were higher in FPAR farmers’ fields (Figures 33 and 34, respectively).

![Figure 32b: Farmers (%) in FPAR and Non FPAR groups adopting SRI practices](image)

![Figure 33: Yield of rice under SRI with and without FPAR](image)

![Figure 34: Average net returns in all four countries among FPAR, NFPAR and Control groups](image)
As evident from Figure 34, the average gain in economic returns was 14% in Cambodia; in Thailand it was 38%; in Laos it was 33%, whereas in Vietnam it was three times higher with respect to the Control farms. It was also quite interesting to observe that farmers in Thailand and Vietnam, in particular, also reduced their use of inorganic fertilizers over the three years of SRI adoption, which suggests that more awareness and experience in SRI practices have turned out to be highly beneficial for farmers, resulting in a significant reduction in their use of expensive agro-chemicals, fertilizers and pesticides. This is seen in Figure 35. The application of manures increased in Thailand, with a slight increase in Vietnam.

![Figure 35: Reduction in the application of inorganic fertilizer and pesticides usage under SRI](image)

The other important findings were that women farmers have reported higher yield and higher net returns from their farms compared to their male counterparts, as evident from Figure 36.

![Figure 36: Relatively higher yield and net returns realized women farmers from SRI farms compared to men farmers](image)

As a result of the beneficial outcomes as observed, there was a significant increase in the number of farmers adopting the new practices following the FPAR training the farmers received. In Thailand, the SRI adoption was 34% in 2014, which increased to 65% in 2016; In Cambodia, the rate of adoption increased from 35% to 38%; and in Vietnam, 70% FPAR farmers applied SRI practices after the training. The increased benefits that women farmers have obtained also was reflected in terms of increased women’s participation in decision-making during last one year. The major areas in which women farmers took decisions included household farming, household use of the earned money, participation in local elections, marriage and other household events, as well as social events.

The major conclusions emerging from the MEL surveys as presented by Dr. Mishra were the following:
1. The analysis of SRI adoption and practices being followed in the four LMB countries showed that ‘SRI farmers’ are not practicing 100% SRI as per the SRI definition. They seem to have modified the practices according to their needs and adapted and applied them to suit the local conditions.

2. The common principles, which were the guiding force for SRI adaptation, were increase in yields, increase in benefits, and reduction in cost of cultivation. Even though farmers have not applied the full principles of SRI, the SRI intervention offered increased yields and net return in all four countries. The average increase in yield reported was 7-18% whereas average net return reported ranged from 15% to three times more.

3. Fewer seedlings/hill and wider spacing were the most preferred practices, if they applied transplanting method for crop establishment, and wider spacing and fewer seeds/hole if they used the direct-seeding method. The reason for wider adoption was higher yields and higher net returns from these two practices compared to others. In Thailand, motivating factors were reduction in inputs (seeds and labour costs), increased yields, and better paddy price.

4. The adoption response was based on the agronomic and economic performance of the practices in the SRI fields and was linked with the input (labour, seeds, fertilizers) and output (paddy price, incentive, where applicable) price policies of the countries. This was visible in Thailand and Vietnam, which focused on the reduction of input use (seeds, chemicals and labour) through training intervention, whereas in Cambodia and Laos, interventions appear to be mixed, encouraging good practices such as SRI and also encouraging application of increased doses of fertilizer, both organic and inorganic. Although Laos’ average fertilizer dose at FPAR sites was less compared to the baseline survey, this was due to the fact that many FPAR farmers did not apply any fertilizer at their SRI/FPAR sites, especially in the sites located near mountain areas.

5. The analysis clearly brings out a gender dynamism in SRI adoption and practices. Adoption of SRI practices seems to be more prominent at women farmers’ fields. They have not only reported better adoption of practices but also higher yields and higher net returns. They have also reported less labour use. They stay at home, so they are in a better position to take care of their fields with regular supervision and so with less field maintenance costs (other costs).

6. Labour and fertilizer were the two main inputs where costs saving was significant, if they tend to reduce the costs of cultivation such as in Thailand and Vietnam. In Thailand, introduction of direct seeder was one of the approaches that reduced labour and seed use. A similar trend was followed in Cambodia in 2016, where more than 50% farmers undertook SRI with direct seeding.

7. Training and capacity building on SRI practices appeared to be one of the hallmarks of the SRI-LMB project in the four countries. It was found that training on the production methods that conserve natural resources seems to improve soil health and to enhance ecosystem services and would strengthen sustainability of the production system and resilience capacity of the smallholder farmers.
8. Whatever the location-specific adaptation and adoption processes used and results achieved, it was clear from the results that this project has demonstrated that even under rainfed condition, the farmers have achieved yields more than the national average, and this even with just partial adoption of SRI. This is a remarkable achievement. The next phase should target yields of 4.5 to 5 t/ha under rainfed conditions.

9. The study brings out that improved farmer’s connectivity to markets along with farmer compliance with market standards would be required to maximize the benefits arising from the adoption of SRI. Laos and Cambodian farmers apply less chemical fertilizers and more organic manures. Both countries have a good environment for organic rice/crop production. However, at present there is no remuneration for quality rice. This could be changed through the development of farmers’ cooperatives and by changing price policy to compensate for their higher quality produce.

10. Mobilisation and collectivism among the farmers is another important strong aspect of the SRI interventions as evident from the surveys. SRI-LMB has already created informal farmers’ groups in 11 provinces across all four countries through the involvement of 30,000 farmers directly in project activities over the last five years. These groups can be further strengthened to develop farmer’s cooperatives at district and province levels, and also at the country level, to accelerate the sustainable rice intensification along with market development for smallholders.

**Accelerating momentum for social, economic and environmental improvements in the SRI-LMB region: Planning for the next phase of the SRI-LMB**

Session 3 of the Workshop was scheduled for the late evening of 2nd November 2018. The theme of the session was “Accelerating momentum for social, economic and environmental improvements in the region”. The moderators of the session were Dr. Amir Kassam and Dr. Abha Mishra. The aim of this session was to discuss, deliberate and draw on the strategic directions for the future project activities and prepare a roadmap for the future course of action for the SRI-LMB project.

Before starting the agenda for the Session, a paper was presented authored by Mr. Md. Enamul Haque [Coordinator, Nutrient Management for Diversified Cropping (NUMAN) and Conservation Agriculture Projects, Bangladesh] on “No-Till Crop Establishment of Transplanted and Direct-Seeded Rice in Conservation Agriculture”, presented by Dr. Amir Kassam. The presentation started by discussing the relevance of conservation agriculture (CA) as an agriculture practice with immense potential for integration with SRI practices. Conservation agriculture works out to be beneficial in the emerging context of climate risks, and the economic benefits of CA will be in terms of savings in labour and time, savings in fuel and water, lowering the costs of production, etc. In fact, CA practices are well-developed for dryland and non-rice crops, but practicing CA in rice-based systems remains a challenging task, because the machinery and technology developed for CA is for 4-wheeltractors, and it is difficult to
come to terms with using this technology in farms which are small in size as is typical for Asian agriculture.

In this regard, farmer innovations become very important, and Mr. Haque introduced an innovative machine called the Versatile Multi-crop Planter (VMP), which was an outcome of innovations with small-scale planters. The VMP is relevant for small-scale farmers as it can help them in multiple ways: (a) reducing crop establishment costs by 30-60%; (b) reducing diesel fuel use by up to 80%; (c) reducing labour requirements by 16-54%; (d) reducing irrigation water use by up to 36%; (e) reducing CO₂ emissions by up to 82%; (f) increasing grain yield by up to 40%; (g) increasing profits by up to 546% (Figure 37). Besides these benefits accruing from the use of VMP, the cumulative on-farm benefits of adopting CA works out to be as much as Australian $700/ha/year for 1 ha of farm.

Mr. Haque then described about the Manual for CA in rice systems, which has been developed by him in collaboration with several other researchers and practitioners. Then he discussed about ‘how to incorporate rice in CA’. The two options suggested were: (a) non-puddled transplanting of rice in paddies; and (b) non-puddled direct-seeded rice (DSR) in paddies. He then explained the technical processes (methodology of non-puddled rice, Option 1) and farm-level practices involved in the use of the two options as part of CA along with the use of VMP (figure 38).
Then Mr. Haque described the non-puddled rice establishment trials in Bangladesh. These experiments included 150 on-farm monsoon-season (aman) and dry-season irrigated (boro) rice experiments conducted in 8 Upazilas (sub-districts) of Bangladesh during 2013 to 2015. Each field was treated as a replicate for both crop establishment types. Treatments consisted of two rice establishment methods: (a) conventional-puddled (CP) transplanting; and (b) non-puddled (NP) transplanting. Farmers in aman season used a range of rice cultivars. BRRIdhan-28 was used in all locations in all years for boro season. For (a), 25-36-day-old and 35-55-day-old seedlings were transplanted in the aman and boro seasons, respectively. No significant differences were observed between NP and CP with respect to the total labour cost for aman-season rice cultivation during 2013 and 2014. However, significantly higher (P<0.01) cost for total labour use was recorded in 2015 in CP, and significantly higher total labour cost for boro-season rice cultivation was also reported for CP compared to NP during 2013, 2014, and 2015.

As regards the profitability of rice cultivation during aman and boro seasons, it was found that out of 66 farmers growing rice in the aman season, 49 farmers (74%) achieved higher yield with NP, and 53 out of 66 farmers (80%) who practiced NP reported higher net returns than with CP. During the boro season, 75% had the same or higher grain yield with NP. In the boro seasons of 2013, 2014 and 2015, the net return was higher (in 90-92% of cases) in NP than with CP (Figure 39).

In order to understand the level of farmers’ acceptance of the non-puddled transplanting and how their expectations changed over time following the interventions, focus group discussions were conducted in
all 3 years. Questions were asked about the cost of land preparation, labour use, weed control, water use, grain yield and the difficulties faced when adopting the transplanting practices. In boro season of 2013, about 55% of farmers reported that the adoption of NP reduced land preparation cost, but after 6th season, this perception increased to 92%. While 50% farmers in the 2013 boro season reported higher grain yield, this increased to 70% at the end of aman season 2015. Farmers’ perception and experience on the negative aspects of NP declined over time at the Alipur, Choighati and Digram locations.

The major findings based on the non-puddled (NP) rice experiments during both aman and boro rice involving 150 farmers during 2013, 2014, and 2015 were:

1. Transplanting of rice seedlings in NP was feasible as a farm practice; the cost of rice cultivation was reduced, while gross margin was increased by NP.

2. Over three consecutive years comprising six rice seasons, there was generally no significant yield difference between NP and CP. However, in the boro season of 2015, NP produced significantly greater grain and straw yield of rice than CP.

3. Farmers perceptions about benefits of NP increased over time and their perceptions about negative aspects of NP decreased over time. These findings were consistent over farms on alluvial and High Barind Tract soils.

4. In farmers’ fields, strip tillage, flooding of soils for 24 hours, and then transplanting rice into non-puddled soil could be a profitable, labour-saving option for rice establishment under CA systems.

Mr. Haque then elaborated on the Option 2: the Strip-Planted Direct-Seeded Rice Experiment and its performance outcomes. The experiment was located in Durgapur, Rajshahi, Bangladesh. The variety planted was BRRI Dhan48, and transplanting was done in March, 2018, in the case of DSR 22 with 25-day-old seedlings. The harvest was done during July, 2018. Rice seed sowing was done using VMP.

Two treatments were adopted: T1: Land puddled by 2WT with 4 tillage passes. Recommended basal fertilizers were applied during field preparation. 25-day old seedlings were transplanted manually in the fields. Weed control was done by pre- and post- emergence herbicides. All agronomic management was done as recommended. For T2: Pre-planted herbicide (Roundup) was sprayed 1 day before planting to control pre-germinated weeds. 2-3 cm strips were made by VMP and sown with 24 hours-primed seed and blended basal fertilizers in a single-pass operation. Pre- and post-emergence weeds were controlled by herbicides. All agronomic management was done as recommended.

Results of from the Option 2 experiment revealed that: Non-significant higher rice grain yield was obtained from DSR (2.91) over puddled transplanting. However, significantly higher net profit was reported from DSR over puddled transplanting. The results point out that although DSR does not have significant grain yield advance, it provided greater profitability over puddled transplanting. With SRI yield and profitability can be greater,

http://www.sri-lmb.ait.asia
Mr. Haque concluded his presentation highlighting the imperatives for moving towards CA and for integrating SRI with CA, along with appropriate development of on farm management technologies. Accordingly, he observed that CA can be practiced at all scales, involving heterogeneous farm size classes and varied technologies. CA can also help diversify the cropping systems by broadening the scope of agriculture to agroforestry systems, perennial crops, vegetables, food crops such as wheat and rice, and other crops such as potato, soya and corn, to list a few.

The no-till system of crop cultivation is an integral aspect of CA, and examples are many, including those in North Korea, Bihar in India, CA-SRT rice-based system in Maharashtra, raised-bed zero-till in China, etc. Quite interestingly, the transition from zero-tillage to CA has taken hardly two and half decades and has proven to bring South American agriculture out of its stagnant state almost 25 years ago through reversal of soil degradation. The documented benefits of Conservation Agriculture in India reveal that it improves the carbon sustainability, enhances productivity, saves irrigation water by 25% in RW systems, 70% in diversification, reduces energy use by 70% in rice-wheat systems, by 30% in maize-wheat systems, and provides options for diversification and intensification with high-value crops such as vegetables, legumes, and maize.

Globally, the total extent of CA was reported to be 180 million ha, accounting for close to 8% of the global crop land area, with the large concentration of CA in South and North America accounting for almost 75% of the total area under CA, followed by Australia and New Zealand (12%), while the share of Asia so far is hardly 8%. So, Asia has the real challenge, to overcome: ‘how can a larger part of its agriculture be transformed into CA (while integrating SRI/SCI) and thereby offer to help meet the global food security issues’.

Planning for the next phase of the SRI-LMB

The SRI-LMB, as planned initially, was initiated to achieve higher productivity and profitability through sustainable agricultural intensification principles on smallholder farms since the ‘yield gap’ is more prevalent there than anywhere else. Further, there are potentials and opportunities for the expected surplus of ‘green’ products (fresh or processed items) and services from smallholders to enter into remunerative markets that could provide additional income to them along with other associated benefits mentioned above.

The project in its first phase established effective linkages with local, national, and international actors and addressed the ‘yield gap’ using SRI as an ‘entry point’. To capitalize on the success of SRI-LMB, and for addressing the concerns related to food security, climate change, and rapidly increasing market need for quality and healthy agricultural produce, the SRI-LMB aims to expand its activity beyond the farm level, and beyond Asia, through research, applied research, and capacity-building interventions, fostering public-private partnerships and market linkages. This session was designed to understand the needs of the SRI farmers and other stakeholders who are involved in SRI activity in the region and beyond. The discussion revolved around the following points:
(a) Development of farmers’ networks (formalization of networks) through SRI activities for smallholder market development (partnership with market stakeholders)

(b) Integration of SRI practices with conservation agriculture principles and pilot testing in LMB regions and beyond, leading to development of climate-smart practices

(c) Scaling-up and scaling-out the SRI-LMB learning in the region and beyond (targeting numbers and areas).

Accordingly, a questionnaire was prepared and feedback was collected from the participants. The key question was:

*Which activities do you think should be prioritized to further benefit the smallholder farmers in your country/region.*

1. Development of farmers’ networks (formalization of networks) through SRI activities for smallholder market development (partnership with market stakeholders)
2. Integration of SRI practices with conservation agriculture principles and pilot testing in LMB regions and beyond, leading to development of climate-smart production systems and practices.
3. Scaling-up and scaling-out the SRI-LMB learning in the region and beyond (targeting numbers and areas).
4. Activities 1 & 2
5. Activities 1, 2 & 3

Based on individual preferences, the participants formed three groups:

Group 1: Development of farmers’ networks (formalization of networks) through SRI activities for smallholder market development (partnership with market stakeholders).

Group 2: Integration of SRI practices with conservation agriculture principles and pilot testing in LMB regions and beyond, leading to development of climate-smart production systems and practices.

Group 3: Selected option 5 (Activities 1, 2, and 3).

After group discussions among participants, the report included the following ideas:

**Group 1: Development of farmer’s network (formalization of network) through SRI activities for smallholder market development (partnership with market stakeholders)**

Group 1 was represented by Ms. Supisra (Farmer representative from Thailand). She informed that farmers work in groups and formalization of networks happens when they see benefit out of it. Linking farmers to markets is very important in this context. As far as marketing approach is concerned, it can be online or offline platform. For online platform in many countries including Thailand, there are start-up companies mostly run by youth through mobile applications. They can connect producers and consumers. With this application we can work with them, not only connecting with consumers and producers, but we can also share new knowledge and information with producers because SRI can enhance the health of rice plants and also of ecosystems; therefore new knowledge and techniques should be made available to farmers. Similarly, consumers should be aware of the fact that SRI rice is safer for them, safer for producers, and safer for environment.
For offline marketing, we can categorize this into two domains: the international market and the domestic market. For the international market, one of the biggest challenges for farmers is to get certification. Many of us are thinking about how to create a general standard for SRI – how to have certification for SRI. It can be tricky because of the many adaptations of practices; but in order to do the most effective marketing, we need to open the channel for certification. We have to work on that. The challenge is the cost for certification, but also its ease and simplicity, as well as its being authentic and realistic.

Another thing to consider is partnerships. For getting certificate for SRI, it might have high costs and many requirements. But if we focus on the domestic market, things may worked out more easily for farmers. For example, the institutions, the government departments, AIT, and international organizations based in Thailand who are the part of the SRI-LMB platform could create some channel to buy rice from SRI farmers rather buying from outside. This is the simplest way to support farmers and SRI. Another option can be to support the campaign, the Participatory Guarantee System (PGS) campaign. A local group of consumers can visit SRI farms periodically and certify the quality of the rice and the correctness of the practices. Right now we focus on organic production only, but there could be opportunities for having local groups assist for SRI production.

After her presentation, Dr. Wijayaratana expressed his concern that the presentation only addressed output marketing. What about input supply for farmers? Ms. Supisra clarified that with SRI, farmers produce their own seeds, and most of the farmers produce their own fertilizers. Within our networks, we can exchange seeds. And farmers in rainfed areas don’t buy irrigation water. In irrigated areas, the government supports the farmers. In the past, many farmers found difficulties in selling their rice as seed because of the impurities issues. But with SRI practices, farmers are able to produce good seeds and with reduced costs. So that is a benefit. However, market support is needed for the sustainability of the practices learned, making them well remunerated.

Mr. Pierre Ferrand [Regional Coordinator, Agroecology Learning Alliance] added that the PGS system is very good for building evidence among consumers and farmers. SRI goes well together with organic farming, so he suggested looking into PGS for the domestic market to get certification for farmers together with consumers because it is a very good way to build trust with consumers in the domestic market, and it is a stepping stone to build a strong internal control system for later-on export. It is a low-cost quality control approach and a good way to strengthen our network as well.

**Group 2: Integration of SRI practices with conservation agriculture principles and pilot testing in LMB regions and beyond, leading to development of climate-smart production systems and practices**

Group 2 was represented by Mrs. Rampoeng Sorathaworn [Champion farmer, Surin]. She informed that the group discussed processes and approaches for integrating SRI practices with conservation agriculture. She suggested the following points:

1. Conduct pilot activities on SRI + CA at different locations
2. Local conditions and landscapes need to be taken into consideration while designing the activities
3. Integrated farming should be promoted such as rice + fish, rice + vegetables, rice + agroforestry, etc.
4. SRI practitioners should make their own fertilizers, incorporate straw into the soil, and plant big tree along the farm plots, e.g., fruit trees
5. If we do successful experiments, we can invite the policy makers to come and see the successful integration.

http://www.sri-lmb.aist.asia
Group 3: Selected option 5 (Activities 1, 2, and 3).

This group was represented by Dr. Viswanathan [Professor (Economics & Sustainability) Amrita Vishwa Vidyapeetham, Kochi, India]. He informed everyone that this group discussed all three points.

For Activity 1, he mentioned that networking is very important for farmers, but in order to have smooth networking, there should be proper empowerment among the farmers to make use of this network. This can be made through capacity-building intervention including identifying and creating champions. Networks can be considered at three levels, with different layers of networking at different organizational levels. We should also be thinking a model of networking that includes the role of social media. Then we should also think about ownership. This can happen at various levels, the regional, national and provincial levels. The group also discussed about establishing a ‘community of practice’. Further, he said that setting up of institutions is very important as this can facilitate marketing of the produce. Additionally, creating marketing infrastructure, including e-marketing platforms, is equally important. This marketing infrastructure should not just deal with output but also with output marketing, storage, packaging, transportation, etc.

As mentioned by previous group, the PGS approach is very important. Using this we can consider educating the consumers about responsible consumption. The group also discussed product standardization certification as a part of the PGS. Sensitizing the state authorities about farmers’ proactive roles in achieving sustainability is very important.

For Activity 2: the group strongly support SRI and SCI integration with CA. we should also take into consideration the existing practices that has been shared in the workshop, for example presentation made on soil cover using mulch, etc. The diversification of integration is equally important in terms of more crops, fisheries and livestock.

There should be change in the mindset at two levels. Farmers should believe the system will change through proper motivation, and the state government should also believe the system will change. There should be proper creation of institutional architecture. In the regional context, we have several governments. All these governments should come forward and should have institutional architecture to promote good agricultural practices such as SRI. Finally, piloting the comprehensive system is very important.

All three groups were thanked for their valuable inputs. It was agreed that the discussion will continue after the workshop to shape up the strategies, priorities, and action areas for a phase II of the SRI-LMB.
5. CLOSING REMARKS

Ms. Gilli Francesca [Attaché Cooperation, Delegation of the European Union to Thailand] from the EU delivered the closing remarks. She said that she has been working with EU Delegation Office Thailand since the last six months. Prior to that, she was working with NGOs and mainly with rural development programmes. That’s why this project is very close to her heart. She said that she will write to EU Headquarters Brussels to see if there is any funding opportunities through global calls for proposal in the food security and malnutrition areas. The EU always goes through a competitive procedure. At the country level, Thailand is a graduate country, and therefore less funding is available for development work. But there is indeed opportunity for Cambodia, Laos and Vietnam to take up this kind of work further at country level.

At the regional level, there might be possibilities through ASEAN support of farmers’ networks. SRI terminology may need repackaging depending on the institution/organization we are approaching. We may call it ‘climate-smart practices’ or ‘climate-smart practices and farmer organization.’ Though development funds are decreasing in Asia, there are opportunities for research and academic activities. SRI-LMB has involved not only development partners and government ministries, but also academic institutions, which can approach for such funding in their respective countries. She also suggested to prepare policy briefs that are attractive for institutions. Repackaging in this context is very important. Finally she thanked SRI-LMB partners for their significant contribution and achievements.

Dr. Abha Mishra from AIT reemphasized AIT’S mission and the emerging needs of Asia. She mentioned that AIT, through its agriculture-related field of studies (FoS), has been working on a much-needed ‘system perspective’ for its educational, research and outreach activities in the Asian region, and it has gained considerable insights and experiences in this area. Climate-smart and sustainable agriculture are subjects that are evolving. Therefore, it is important to get the ‘feel’ on the client’s demand. Accordingly, based on the need, the Institute revises and re-designs its academic curricula and training programmes to serve the region. For example, AIT research strategies for the year 2012-2016 were to work on sustainable land and water resource management and on business and innovation models for a green economy. SRI-LMB was an initiative in this area in the field of agriculture. Keeping the felt need, AIT has also designed a special course on Climate Change, Agriculture and Food Security. This kind of academic courses and formal training programmes could be useful for government staffs, policy makers and other development professionals who take lead in implementing the development programmes in these areas.

She mentioned that SRI-LMB was successful because of the collective action of all the partners. Challenges were many, but still the project was able to achieve the objectives. This was due to tremendous support from all the partners and implementers working at the local, national and regional levels. How can we sustain and accelerate this momentum to bring the benefits of experience and learning to millions? Phase II is one of the options, but establishing an Asia network could be additional and useful thing that can be discussed and formalized involving you all. The network can be established only when you feel that it is needed and useful for you. The network can manage the database of SRI learnings, equipment, and resource persons, so that information can be easily available to those who need it. The network can work with country networks and also with other regional SRI networks such as the Africa SRI network. Taking this idea, a workshop was organized in Malaysia last month. Various structures of the network were discussed but they need your inputs before being finalized. We will take this discussion forward in the coming months. Finally, she thanked all the partners, donors, and colleagues for their support and wonderful contributions and congratulated them for their achievements.

http://www.sri-lmb.aiia.asia
ANNEX 1

Workshop Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Person-in-Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>31st October, 2018: Check-in into Hotel, Novotel Sukhumvit 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 1 (Date: 01 November 2018)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08.30-09.00</td>
<td>Registration</td>
<td></td>
</tr>
<tr>
<td>09.00-10.00</td>
<td>Welcome Address &amp; Opening Remarks</td>
<td>1. <strong>Dr. Eden Y. Woon</strong> President, Asian Institute of Technology (AIT) Pathumthani, Thailand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. <strong>Mr. Jerome Pons</strong> Head of Cooperation, Delegation of the European Union to Thailand</td>
</tr>
<tr>
<td></td>
<td>Workshop Schedule and Expectations</td>
<td><strong>Dr. Abha Mishra</strong> Director, ACISAI Team Leader, SRI-LMB ACISAI, AIT, Thailand</td>
</tr>
<tr>
<td></td>
<td>Keynote: System of Rice Intensification and Conservation Agriculture for Climate-Smart Practices</td>
<td><strong>Dr. Amir Kassam</strong> Visiting Professor School of Agriculture, Policy and Development University of Reading, UK Moderator of the FAO-hosted Global Platform for Conservation Agriculture Community of Practice (CA-CoP)</td>
</tr>
<tr>
<td>10.00-10.30</td>
<td>Group photo, Tea break &amp; Media briefing</td>
<td></td>
</tr>
</tbody>
</table>

**Session 1: Sustainable Agriculture Intensification for Food Security and Climate-Smart Agriculture:**
*Sharing key results from the SRI-LMB*

**Session Chair:** Dr. Max Whitten  
**Rapporteurs:** Dr. P.K. Viswanathan & Dr. Shweta Sinha

**Presentations**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Person-in-Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.30-11.10</td>
<td>Key Learning with the SRI-LMB for Food Security and Climate-Smart Agriculture</td>
<td><strong>Dr. Abha Mishra</strong></td>
</tr>
</tbody>
</table>

http://www.sri-lmb.ait.asia
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.15-11.55</td>
<td>Strategies to Maintain Momentum: SRI-LMB Achievements and the Way Forward</td>
<td>Dr. C. M. Wijayaratna&lt;br&gt;Independent Consultant, Agriculture Strategy Specialist, New Zealand</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>1300-1330</td>
<td>Why Does it Pay to Invest in Smallholder Agriculture, Women Farmer and Landless When It Comes to Food &amp; Nutrition Security: Key Policy Options for the SRI-LMB Countries</td>
<td>Ms. Sopheavy Ty&lt;br&gt;Head of Portfolio Management Unit-Asia&lt;br&gt;Oxfam America, Phnom Penh, Cambodia</td>
</tr>
<tr>
<td>1330-1400</td>
<td>Key Findings of the Evaluation of the SRI-LMB Project</td>
<td>Dr. Anizan Isahak&lt;br&gt;President, SRI-Mas&lt;br&gt;Malaysian Agroecology for Sustainable Resource Intensification, Malaysia</td>
</tr>
<tr>
<td>1400-1420</td>
<td>Tea Break and Poster Session</td>
<td></td>
</tr>
<tr>
<td>1420-1450</td>
<td>SRI-LMB Learning from Cambodia: Key Findings and Recommendations</td>
<td>Mr. Kong Kea&lt;br&gt;Country Coordinator, SRI-LMB Project&lt;br&gt;Deputy Director, Department of Rice Crop GDA, MAFF, Cambodia</td>
</tr>
<tr>
<td>1450-1520</td>
<td>SRI-LMB Learning from Laos: Key Findings and Recommendations</td>
<td>Mr. Thongsavanh PHATHALAVONG&lt;br&gt;Deputy Director General&lt;br&gt;Department of Technical Extension and Agro-Processing (DTEAP)&lt;br&gt;Ministry of Agriculture and Forestry (MAF)&lt;br&gt;Lao PDR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Viengxay PHOTAKOUN&lt;br&gt;Country Coordinator, SRI-LMB Project&lt;br&gt;Deputy Director, DTEAP&lt;br&gt;MAF, Lao PDR</td>
</tr>
<tr>
<td>1520-1550</td>
<td>SRI-LMB Learning from Vietnam: Key Findings and Recommendations</td>
<td>Dr. Nguyen Quy Duong&lt;br&gt;Vice Director General, Plant Protection Department (PPD)&lt;br&gt;Ministry of Agriculture and Rural Development (MARD), Vietnam</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Do Hong Khanh&lt;br&gt;National IPM Coordinator,</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
<td>Presenter(s)</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1550-1610</td>
<td>SRI-LMB Learning from Thailand: Country Presentation</td>
<td>Abha Mishra</td>
</tr>
</tbody>
</table>
| 1610-1640 | SRI-LMB Learning from Thailand: Key Findings from Project Provinces and Recommendations | Ms. Wirawan Thancharoen  
Smart and SRI-LMB Project Farmer  
SRI-LMB Project Farmer Coordinator  
VTDC Center, Uttaradit, Thailand  
Mr. Phayat Seetha  
Smart and SRI-LMB Project Farmer  
Key farmer on organic and integrated farming  
VTDC Center, Uttaradit, Thailand  
Mrs. Rungnapa Choocherd  
NFE Volunteer Teacher  
Provincial Office of the Non-Formal and Informal Education, Surin, Thailand  
Mrs. Rumphoeng Sorathaworn  
graduate of Charles Sturt University, N.S.W., Australia,  
Smart & SRI farmer  
Member of Moon River Agricultural Net working group  
Ms. Yaowalux Kulto  
Subject Matter Specialist, Head of Seed Development Group, Sisaket Seed Center, Rice Department, Ministry of Agriculture and Cooperatives  
Mrs. Yuphaphin Siyongyod  
President- Big plot farming group, Organic rice cultivation group, Learning center on agricultural value addition and Village Head, Uthumporn Phisai district, Sisaket  
Mr. Yuttakarn Kaewkamthong  
Rice Department  
Ministry of Agriculture and Cooperatives Thailand |
| 1640-1700 | Wrapping Up – Day One                                                   | Dr. Amir Kassam                                                              |
| 18.00   | Welcome Dinner                                                          |                                                                              |

http://www.sri-lmb.aiit asia
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Person-in-Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 2 (02 November 2018)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09.00-9.30</td>
<td>Reflections on Key Points from Day 1</td>
<td><strong>Dr. P. K. Viswanathan</strong> Professor (Economics &amp; Sustainability) Amrita Vishwa Vidyapeetham, Kochi Campus Kerala, India</td>
</tr>
<tr>
<td>09.30-09.50</td>
<td>FAO’s Initiatives on Sustainable Agriculture Intensification: Updates, Results to Date, and Future Planned Work</td>
<td><strong>Mr. Johannes W. Ketelaar</strong> Chief Technical Advisor for FAO’s Inter-Country IPM/Pesticide Risk Reduction Programme FAO Regional Office for Asia and the Pacific, Bangkok, Thailand</td>
</tr>
<tr>
<td>9.50-10.10</td>
<td>Sustainable Intensification through SRI: Learning and Updates from Africa</td>
<td><strong>Prof. Bancy M. Mati</strong> Director, WARREC and Coordinator, SRI Project Jomo Kenyatta University of Agriculture and Technology (JKUAT), Nairobi, Kenya</td>
</tr>
<tr>
<td>10.10-10.30</td>
<td>SRI with Plastic Mulch: Experience in Sichuan, China</td>
<td><strong>Mr. Hillario Padilla</strong> Senior Agro-ecosystem Officer, Kadoorie Conservation, China Dept. Kadoorie Farm &amp; Botanic Garden Lam Kam Road, Tai Po, Hong Kong</td>
</tr>
<tr>
<td>1030-1100</td>
<td>Tea Break</td>
<td></td>
</tr>
<tr>
<td>1100-1120</td>
<td>Sustainable Intensification through SRI: Learning and Updates from Bangladesh</td>
<td><strong>Dr. A. M. Muazzam Husain</strong> Coordinator, National SRI Network Chairman, Bangladesh Rice Foundation, Dhaka, Bangladesh</td>
</tr>
<tr>
<td>1120-1140</td>
<td>Sustainable Intensification through SRI: Learning and Updates from India</td>
<td><strong>Dr. B. C. Barah</strong> Former Chair Professor (NABARD) Indian Agricultural Research Institute, Pusa, Delhi, India</td>
</tr>
<tr>
<td>1140-1200</td>
<td>Block Chain for Livelihoods from Organic Cambodian Rice – BLOCRIICE”</td>
<td><strong>Phay Cheth</strong> Programme Coordinator, Resilience Oxfam, Cambodia India</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Lunch</td>
<td></td>
</tr>
</tbody>
</table>

**Session 2: Sustainable Agriculture Intensification in Asia and Beyond**

Exchange lessons learned from similar efforts regionally and/or internationally on food security, climate change adaptation, mitigation; climate-smart practices, sustainable rice production

**Session chair:** Dr. C. M. Wijayaratana  
**Rapporteurs:** Dr. P.K. Viswanathan & Dr. Shweta Sinha

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Person-in-Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.30-09.50</td>
<td>FAO’s Initiatives on Sustainable Agriculture Intensification: Updates, Results to Date, and Future Planned Work</td>
<td><strong>Mr. Johannes W. Ketelaar</strong> Chief Technical Advisor for FAO’s Inter-Country IPM/Pesticide Risk Reduction Programme FAO Regional Office for Asia and the Pacific, Bangkok, Thailand</td>
</tr>
<tr>
<td>9.50-10.10</td>
<td>Sustainable Intensification through SRI: Learning and Updates from Africa</td>
<td><strong>Prof. Bancy M. Mati</strong> Director, WARREC and Coordinator, SRI Project Jomo Kenyatta University of Agriculture and Technology (JKUAT), Nairobi, Kenya</td>
</tr>
<tr>
<td>10.10-10.30</td>
<td>SRI with Plastic Mulch: Experience in Sichuan, China</td>
<td><strong>Mr. Hillario Padilla</strong> Senior Agro-ecosystem Officer, Kadoorie Conservation, China Dept. Kadoorie Farm &amp; Botanic Garden Lam Kam Road, Tai Po, Hong Kong</td>
</tr>
<tr>
<td>1030-1100</td>
<td>Tea Break</td>
<td></td>
</tr>
<tr>
<td>1100-1120</td>
<td>Sustainable Intensification through SRI: Learning and Updates from Bangladesh</td>
<td><strong>Dr. A. M. Muazzam Husain</strong> Coordinator, National SRI Network Chairman, Bangladesh Rice Foundation, Dhaka, Bangladesh</td>
</tr>
<tr>
<td>1120-1140</td>
<td>Sustainable Intensification through SRI: Learning and Updates from India</td>
<td><strong>Dr. B. C. Barah</strong> Former Chair Professor (NABARD) Indian Agricultural Research Institute, Pusa, Delhi, India</td>
</tr>
<tr>
<td>1140-1200</td>
<td>Block Chain for Livelihoods from Organic Cambodian Rice – BLOCRIICE”</td>
<td><strong>Phay Cheth</strong> Programme Coordinator, Resilience Oxfam, Cambodia India</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Lunch</td>
<td></td>
</tr>
</tbody>
</table>

**Session 2 (contd.)**

**Session chair:** Ms. Sopheaby Ty  
**Rapporteurs:** Dr. P.K. Viswanathan & Dr. Shweta Sinha

---

[http://www.sri-lmb.ai.asia](http://www.sri-lmb.ai.asia)
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter/Institute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1300-1330</td>
<td>International, Regional and National Network for Sustaining the SRI Learning Momentum</td>
<td>Ms. Lucy Fisher&lt;br&gt;Director of Communication&lt;br&gt;SRI-Rice, Cornell University, USA</td>
</tr>
<tr>
<td>1330-1400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400-1430</td>
<td>Monitoring, Evaluation and Learning (MEL) Study for Understanding the Patterns of Change Resulting from SRI Capacity Building Interventions in Laos PDR.</td>
<td>Mr. Hemantha Kumar Pamarthy&lt;br&gt;Independent Consultant, Chennai, India</td>
</tr>
<tr>
<td>1430-1500</td>
<td>Tea Break</td>
<td></td>
</tr>
<tr>
<td>1500-1530</td>
<td>MEL Study for Understanding the Patterns of Change Resulting from SRI Capacity Building Interventions in Four LMB Countries</td>
<td>Dr. Abha Mishra&lt;br&gt;AIT</td>
</tr>
</tbody>
</table>

**Session 3: Accelerating and Sustaining the Learning Momentum through SRI**

*Accelerating momentum for social, economic and environmental improvements in the region*

**Moderators:** Amir Kassam & Dr. Abha Mishra

**Rapporteur:** Dr. P.K. Viswanathan & Dr. Shweta Sinha

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter/Institute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1530-1600</td>
<td>Setting Strategic Directions for Future Project Activities and for Complementing with Other Regional Initiatives</td>
<td>Presentation by Dr. Amir Kassam on the relevance of intergration of Conservation Agriculture with SRI Group presentation and discussions based on the feedback received from partners, implementing ministries, international SRI leaders, farmers and other workshop participants</td>
</tr>
<tr>
<td>1600-1615</td>
<td>Session continued with open discussions with all participants</td>
<td>All participants</td>
</tr>
<tr>
<td>1615-1630</td>
<td>Summary: Roadmap with Recommendations and Suggestions for Broader Follow-Up</td>
<td>AIT</td>
</tr>
<tr>
<td>1630-1700</td>
<td>Concluding Remarks</td>
<td>EU and AIT</td>
</tr>
</tbody>
</table>
ANNEX II

List of participants

1. Dr. Eden Woon
   President
   Asian Institute of Technology, Thailand

2. Mr. Jerome Pons
   Head of Cooperation
   Delegation of the European Union to Thailand
   Bangkok, Thailand

3. Gilli Francesca
   Attaché Cooperation
   Delegation of the European Union to Thailand

4. Dr. C. M. Wijayaratna
   Agriculture Strategy Specialist
   Auckland, New Zealand
   Email: c.m.wijayaratna@gmail.com

5. Mr. Johannes Willem Ketelaar,
   Chief Technical Advisor, FAO Asia IPM Programme,
   FAO-RAP Bangkok, Thailand
   Email: Johannes.Ketelaar@fao.org

6. Ms. Sopheavy Ty
   Head of Portfolio Management Unit-Asia
   Oxfam America, Phnom Penh, Cambodia
   Email: Sopheavy.Ty@Oxfam.org

7. Mr. Hemantha Kumar Pamarthy
   Development Consultant
   First Floor, H – 9 D, Krupa Colony, 44\textsuperscript{th} off Jawaharlal Nehru Road (100 Feet Road)
   First Avenue, Ashok Nagar,
   Chennai 600 083, Tamil Nadu, India
   Email: hpamarthy@gmail.com

8. Ms. Lucy H. Fisher
   Director of Communications
   SRI-Rice, Cornell University
   USA
   Email: lhf2@cornell.edu

9. Dr. Anizan Isahak
   Secretary General, SRI-Mas
   Faculty of Science and Technology
   Universiti Kebangsaan Malaysia
   43600 Bangi, Selangor, Malaysia
   Email: srimas2011@gmail.com

http://www.sri-lmb.aia.asia
10. Mr. Pierre Ferrand  
Regional Coordinator-Agroecology Learning  
ALiSEA/ACTAE  
Vientiane, Lao PDR.  
Email: ferrand@gret.org

11. Prof. Amir Kassam, OBE, FRSB  
Visiting Professor, School of Agriculture, Policy and Development  
University of Reading; UK  
Email: amirkassam786@googlemail.com

12. Dr. Maxwell Whitten  
University of Queensland  
Australia  
Email: maxwhi@aapt.net.au

13. Dr. Bancy Matti  
Director, WARREC and  
Coordinator- SRI Project  
Jomo Kenyatta University of Agriculture and Technology  
Nairobi, Kenya.  
Email: bancym@gmail.com

14. Dr. A. M. Muazzam Husain  
Coordinator-National SRI Network and  
Chairman, Bangladesh Rice Foundation  
Dhaka, Bangladesh.  
Email: muazzamhusain1937@gmail.com

15. Dr. P. K. Viswanathan  
Professor (Economics & Sustainability)  
Amrita Vishwa Vidyapeetham, Kochi Campus  
Kochi-682 041, Kerala, India  
E-mail: pkviswam@gmail.com

16. Ms. Ananya Muangkong  
Peterson Projects & Solutions (Thailand) Co., Ltd  
Bangkok 10260, Thailand  
Email: amuangkong@onepeterson.com

17. Mr. Atip Phuengsomboon  
Peterson Projects & Solutions (Thailand) Co., Ltd  
Bangkok 10260, Thailand  
Email: aphuengsomboon@onepeterson.com

18. Mr. Cheth Phay  
Project Manager- Blockrice  
Oxfam America, Phnom Penh  
Cambodia  
Email: Cheth.Phay@Oxfam.org
18. Mr. Hillario Padilla  
Senior Agro-ecosystem Officer  
Kadoorie Conservation China Dept.  
Tai Po, Hong Kong.  
Email: hilpaddy@kfbg.org

19. Dr. Shweta Sinha  
Lecturer  
Thammasart University  
Thailand  
Email: shweta.s@pbic.tu.ac.th

20. Dr. B. C. Barah  
Former Chair Professor (NABARD)  
Indian Agricultural Research Institute, Pusa  
New Delhi, India  
Email: barah48@yahoo.com

21. Mr. Cheth Phay  
Project Manager- Blockrice  
Oxfam America, Phnom Penh  
Cambodia  
Email: Cheth.Phay@Oxfam.org

22. Mr. Hilario Padilla  
Senior Agro-ecosystem Officer  
Kadoorie Conservation, China Dept.  
Tai Po, Hong Kong.  
Email: hilpaddy@kfbg.org

23. Mr. Paul Nicholson  
Vice President- Research and Risk Management  
Olam International Ltd., Singapore  
Email: paul.nicholson@olamnet.com

Cambodia

24. Mr. Kong Kea  
Country Coordinator, SRI-LMB Project  
Deputy Director, Department of Rice Crop  
GDA, MAFF, Phnom Penh, Cambodia  
Email: kea_ipm@hotmail.com

25. Mr. Chhit Mak  
National Training Expert, SRI-LMB Project  
SRI Secretariat, Department of Rice Crop  
GDA, MAFF, Phnom Penh, Cambodia  
Email: Mak.Chhit@fao.org

26. Prof. Chuong Sophal  
Lecturer& Researcher  
Royal University of Agriculture
27. Mrs. Mel Channteuy  
LMU Coordinator, SRI-LMB Project  
Takeo Province  
Cambodia

28. Mrs. Ly Thyvy  
LMU Coordinator, SRI-LMB Project  
Kampong Speu Province  
Cambodia

29. Mr. Men Narith  
LMU Coordinator, SRI-LMB Project  
Kampot Province  
Cambodia

30. Mr. Tep Khen  
Champion Farmer, SRI-LMB Project  
Cambodia

31. Ms. Chea Lira  
FAO  
Phnom Penh, Cambodia  
Email: sophal1954@hotmail.com

32. Mr. Thongsavanh PHANTHALAVONG  
Deputy Director-General  
Department of Technical Extension and Agro-Processing (DTEAP)  
Ministry of Agriculture and Forestry (MAF)  
Vientiane, Lao PDR

33. Mr. Viengxay PHOTAKOUN  
Country Coordinator, SRI-LMB Project  
Deputy Director- DTEAP  
Ministry of Agriculture and Forestry (MAF)  
Vientiane, Lao PDR  
Email: ptkoun@yahoo.com

34. Mr. Kongsy XAYAVONG  
National Training Expert, SRI-LMB Project  
DTEAP, Ministry of Agriculture and Forestry (MAF)  
Vientiane, Lao PDR  
Email: kongsy47@yahoo.com

35. Ms. Khampheuth VONGLATTANA  
LMU Coordinator  
SRI-LMB Project  
Khammuane Province  
Lao PDR

http://www.sri-lmb.aist.asia
36. Mr. Chanlakhone XAYALATH  
LMU Coordinator  
SRI-LMB Project  
Savannakhet Province, Lao PDR

37. Mrs. Keo Oudone SISOMXEUN  
LMU Coordinator  
SRI-LMB Project  
Vientiane Province, Lao PDR

38. Mr. Saly MOUNTATHILATH  
Champion Farmer  
SRI-LMB Project  
Mouangkai Village, Songkhone District  
Savannaketh Province, Lao PDR

Thailand

39. Ms. Wirawan Tancharoen  
Champion Farmer  
VTDC Center, Uttaradit-53140, Thailand  
Tel: 0817866976

40. Mr. Phayat Seeta  
Champion Farmer  
VTDC Center, Uttaradit-53140, Thailand

41. Mrs. Prakay Marya  
Champion Farmer  
VTDC Center, Uttaradit-53140, Thailand

42. Mr. Chainarong Pongbanrua  
Director  
Provincial Office of the Non-Formal and Informal Education  
Surin-32000, Thailand  
Email: srn_nfedc@nfe.go.th

43. Mr. Sampoch Yasungnoen  
LMU Coordinator  
SRI-LMB Project  
Provincial Office of the Non-Formal and Informal Education  
Surin-32000, Thailand  
Email: poch_a3038@hotmail.com

44. Ms. Rungnapa Choocherd  
Teacher  
Provincial Office of the Non-Formal and Informal Education  
Surin-32000, Thailand

45. Mrs. Rampoeng Sorathaworn  
Champion Farmer
Surin, Thailand

46. Mrs. Chom Thepbuddee
Champion Farmer
Surin, Thailand

47. Ms. Yaowalux Kulto
Agricultural Extensionist
Sisaket Rice Seed Center
Si Sa Ket District, Si Sa Ket-33000
Thailand
Email: ssk_rsc@rice.mail.go.th
Tel : 095-1867860

48. Ms. Janjira Ketsakool
Project Assistant and Coordinator
Sisaket Rice Seed Center
Sisaket.
Tel : 082-3201720

49. Mrs. Yuphaphin Siyongyod
Champion Farmer
Sisaket Rice Seed Center
Sisaket
Tel : 084-9625351

50. Mr. Sai Booddawong
Champion Farmer
Sisaket Rice Seed Center, Sisaket
Tel : 086-2575792

Vietnam

51. Dr. Nguyen Quy Duong
Vice Director General, Plant Protection Department (PPD)
Ministry of Agriculture and Rural Development (MARD)
Vietnam, Email: duongngq.bvtv@mard.gov.vn

52. Mr. Ngo Tien Dung
Former National IPM Programme Coordinator
Ex-Deputy Director, PPD, MARD, Vietnam
Email: ipmppd@fpv.vn

53. Mr. Do Hong Khanh
National IPM Coordinator,
PPD, MARD, Vietnam, Email: khanhdh@bvtv@mard.gov.vn

54. Mr. Nguyen Tuan Loc
National Expert, SRI-LMB Vietnam
Director of the Center for Plant Protection of North Central Ngha An
Ministry of Agriculture and Rural Development (MARD)
Vietnam
Email: loctuannguyen1964@gmail.com
55. Ms. Do Thi Luyen  
LMU Coordinator, SRI-LMB Project  
Bac Giang Plant Protection Sub-Department  
Email: dtluyenbvtvbg@yahoo.com.vn

56. Mr. Nguyen Tong Phong  
LMU Coordinator, SRI-LMB Project  
Ha Tinh Plant Protection Sub-Department  
Email: Nguyentongphong@gmail.com

57. Ms. Nguyen Thi Nhi  
Champion Farmer, SRI-LMB Project  
Dong Phu Commune, Luc Nam district  
Bac Giang Province.

58. Dr. Nguyen Thi Bich Yen  
MEL Researcher, SRI-LMB Project  
Researcher, CARES  
Hanoi University of Agriculture, Vietnam  
Email: yenntb@yahoo.com

---

**Asian Institute of Technology**

59. Dr. Abha Mishra  
Team Leader, SRI-LMB Project  
Director, ACISAI  
Email: abhamishra@ait.asia

60. Dr. Shubham Pathak  
Admin and Finance Officer, SRI-LMB Project  
ACISAI  
Email: shubhampathak@ait.asia

61. Ms. Raaga Harsha Sayoji Doddaka  
Assistant Program Management Officer  
ACISAI  
Email: raaga@ait.asia

62. Mr. Ashwin Mysore  
Action Research Coordinator, SRI-LMB Project  
ACISAI  
Email: ashwin@ait.asia

63. Ms. Tattanakorn Moekchantuk  
Consultant- Translation and Facilitation  
Nakhon Ratchasima, Thailand.  
Email: tattanakorn@gmail.com

64. Ms. Angsana Chaksan  
Student Assistant  
SRI-LMB Project  
ACISAI, Email: St119572@ait.asia
65. Mr. Supanut Chutchatkaew  
Student Assistant  
SRI-LMB Project  
ACISAI, Email: St119714@ait.asia

66. Mr. Rahul Uppu  
Student Assistant  
SRI-LMB Project  
ACISAI, Email: st119169@ait.asia

66. Mr. Pham Van Tho  
Student Assistant  
SRI-LMB Project  
ACISAI, Email: st119563@ait.asia

67. Mr. Anshuman Yashodhar Rangaraj  
Student Assistant  
SRI-LMB Project  
ACISAI, Email: St119166@ait.asia
ANNEX III

Workshop Presentations and Other Online Resources

Press Release


Workshop Presentation

https://drive.google.com/drive/folders/1Z61Uthb9B4Jw53sBTTVRjJBzHssLCdsw

Workshop Pictures

https://photos.google.com/share/AF1QipMnqHhoBWIuQkv29ENmA4LU8NeEd40BqLeLzAVSMywHjDwltPi-LnyrafRY7VJQVA?key=OGNhC93ZHi4UjU0ZU52QnJfYXJtTTJiMll6SFhB

Project Videos

https://www.youtube.com/watch?v=xBZf42TyOyo&feature=youtu.be

https://www.youtube.com/watch?v=KzkkGgTREnQ