

# Orissa State Dialogue On System of Rice Intensification (SRI)

*23rd June, 2007  
IMAGE Conference Hall  
Bhubaneswar  
Orissa*

## Workshop Partners



Department of  
Agriculture  
Govt. of  
Orissa



Xavier Institute  
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Centre for World  
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OXFAM GB  
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WWF-Dialogue  
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Water, Food  
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Mr. Bibhukalyan Mohanty

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## Introduction

A one day dialogue workshop on the *System of Rice Intensification* (SRI) in Orissa was organised by the Centre for World Solidarity (CWS), Orissa Resource Centre, Bhubaneswar with the support of the Xavier Institute of Management, Bhubaneswar (XIMB), the Department of Agriculture, Orissa, Oxfam India Eastern Region and the World Wide Fund for Nature (WWF), Hyderabad. The workshop was held at IMAGE auditorium,



Bhubaneswar on the 23<sup>rd</sup> June and was attended by 80 participants. Participants in the workshop included representatives from the State Agricultural Department and other Government agencies, Research Organisations like Central Rice Research Institute (CRRI), Orissa University for Agricultural Technology (OUAT), SRI practitioners from around ten districts including civil society groups such as Sambhav and PRADAN. Important dignitaries who contributed significantly for the success of this workshop include Dr. Arvind Padhee, Director - Orissa State Agricultural Department, Prof. Radha Mohan – Orissa State Information Commissioner, Mr. Vinod Goud – WWF, Hyderabad, Andhra Pradesh, Mr. Baharul Islam Majumdar, Senior Agronomist – State Agricultural Research Station, Agartala, Tripura and Mr. Kishan Rao – Consultant, WASSAN, Andhra Pradesh.

This is a report of the proceedings of the workshop. The workshop was divided into four sessions:

One – Sharing Session – Chaired by Dr. Arvind Padhee

Two – SRI in Orissa – Chaired by Prof. Radha Mohan

Three – Technical Session – Chaired by Mr. Bibhukalyan Mohanty

Four – Way Forward and Planning for Future – Chaired by Dr. C. Shambu Prasad.

The fourth session could not be taken up due to shortage of time.

## Background



For the past couple of years, Civil Society Organisations (CSO) such as Sambhav and PRADAN (Professional Assistance for Development Action) with the encouragement of farmers in the neighbouring states of Andhra Pradesh and West Bengal started practicing 'System of Rice Intensification,' popularly known as SRI. These experiences have indicated the

potential of yield increase, water saving and enhanced food security for small and marginal farmers through SRI. Given the low cropping intensity of farming, poor average rice yields and large extent of small landholdings and prevalence of rainfed farming in Orissa; SRI presents an important alternative to conventional methods for improving the productivity of rice and enhancing food security of farmers. Despite lack of any formal support the work of organisations such as Sambhav, PRADAN and SVA (Saha Vikas Abhiyan) and several enterprising farmers have ensure the spread of SRI to ten districts in the state. Research organisations such as OUAT and Central Rice Research Institute (CRRI) have also been involved in SRI trials. The state level workshop was to bring to the fore some of the existing efforts and promote greater synergy in future work on SRI In the state.

## Objectives

'Orissa State Dialogue on System of Rice Intensification' aptly coined by the organisers has set the following agenda to initiate a dialogue between various partners of the State.

1. Building SRI innovation capacity: To build SRI capacity in the state by pooling together experiences from both civil society and the state agriculture department.
2. Learning platform for agriculture officials: To enable agricultural officers to learn on the best practices in SRI from within and outside Orissa. The State Government has as part of its work plan for Kharif has decided to take up SRI in different agro-ecological regions.

3. Capacity building for policy and institutional uptake: To provide a platform to build capacities of extension and research staff, farmers, NGOs and other government officials on SRI cultivation for its enhanced spread.
4. Creating a new culture of innovation: To create a new culture of innovation by sharing of information on best practices and learning techniques from experts within and outside the State.
5. Establishing procedures for zonal workshops and Training of Trainers (ToT): To facilitate state level workshops and training of trainers for increased SRI uptake in Kharif 2007.

#### **Expected Outcome**

- ❖ Knowledge and understanding of the participants on SRI will be enhanced
- ❖ Better learning through sharing of experiences by actors from within and outside the state in a common forum ensured
- ❖ Increased partnership between civil society organisations and state agencies for effective promotion of SRI in the state
- ❖ Lobby and advocacy on promotion of SRI in the state will be initiated

The workshop objectives were shared through a concept note to all the participants who were also provided resource material that included the Oriya booklet brought out by SVA in collaboration with WASSAN (Watershed Support Services and Activities Network). The summary and highlights of the presentations made by the speakers in the various sessions is described here.

## ***Introduction and Workshop Objectives***

*Dr. C. Shambu Prasad, Faculty, Xavier Institute of Management, Bhubaneswar, Orissa*

After brief self introductions by all the participants, Dr. Shambu Prasad invited every one to the workshop which according to him was first of its kind on SRI in Orissa. He thanked the Director, Agriculture Department, Government of Orissa (GoO) for being extremely co-operative in this initiative. He expressed happiness on being invited by the Director to present a paper on SRI cultivation during the Department's Kharif Plan Meet. He also thanked WWF, OXFAM (Eastern Region) for supporting this initiative in spite of being informed at very short notice.

Explaining the necessity for such a dialogue he highlighted the low productivity of rice farming in Orissa. This is despite having a wide diversity in rice and the rice crop accounting for 64% of net sown area. The state is in dire need of some intervention that enhances the productivity and that is easily adaptable to the existing agricultural scenario. Under SRI cultivation the consumption of water and other inputs is less than with other practices, and hence is extremely suitable for small and marginal land holdings. Hence SRI needs to be propagated extensively, he opined. This workshop is an effort made to initiate a dialogue on SRI philosophy and technology and to exchange hands on experiences, mistakes committed, problems faced and solutions found in SRI.



Introducing the agenda of the workshop he felt the need to have a '*Learning Alliance*' between various key players as SRI is knowledge and technology intensive. He also hoped that this alliance would help in bringing together the efforts of various players on SRI and avoid experiences in other states where there are parallel systems and even names for SRI done by the state and civil society. Apart from the objectives mentioned earlier he hoped that the work on SRI in Kharif would lead to a change in policy at State and National level by strategising and implementing an effective advocacy campaign for SRI adoption. He informed the audience that while charting out the objectives for the workshop the organisers realised the importance of having a learning alliance that would create space and opportunity to have a dialogue on SRI. This led them to change the title to *A Dialogue Workshop on SRI*.

He concluded by reading out the messages sent by some experts on SRI across India and outside India that included Prof Norman Uphoff, Drs B C Barah, Biksham Gujja, Alapati Satyanarayana and T M Thiagarajan who all expressed

their keen interest in the workshop. Dr Shambu Prasad hoped that they would be able to join the Orissa SRI learning alliance at a later date.

### **Sharing Session: Chair- Dr. Arvind Padhee**

*Kharif Plan for SRI- Department of Agriculture, Govt. of Orissa (GoO)*

*Dr. Arvind Padhee, Director, Agriculture and Food Production, GoO*

Dr. Padhee said that he first heard of SRI cultivation from a friend from PRADAN and later from Prof Radha Mohan. Picking on the thread of policy support in Tripura of Dr Shambu Prasad's talk and the speech of the Chief Minister of Tripura on SRI at the National Development Committee (NDC), Dr Padhee informed the participants that he too had participated in the meeting which had an exclusive focus on agriculture. The shift among policy makers to focus on agriculture



through the recently launched National Food Security Mission was to him recognition of the fact that in a country like India, development is not possible without agriculture. He mentioned about the plans of the Government of India to produce additional 20 Million Tons (MT) in the next four to five years that includes an increase of 10 MT of Rice. SRI thus assumes added importance.

He requested the scientists, researchers and activists to share information on their experiences, and to train farmers on SRI methodology. He announced that the State Agricultural Department earmarked funds for SRI demonstration and ToT (Training of Trainers) for 18 members divided into three groups. He also requested the master trainers present in the workshop to allot some time and extend their services in ToT. He also expressed the intention of the department of agriculture to be part of the learning alliance and was happy to partner with XIMB and OXFAM in this endeavour. He welcomed outside participants to Orissa and observed that the scientific name for rice *Oryza sativa* seemed to reflect Orissa as a home for rice and biodiversity.

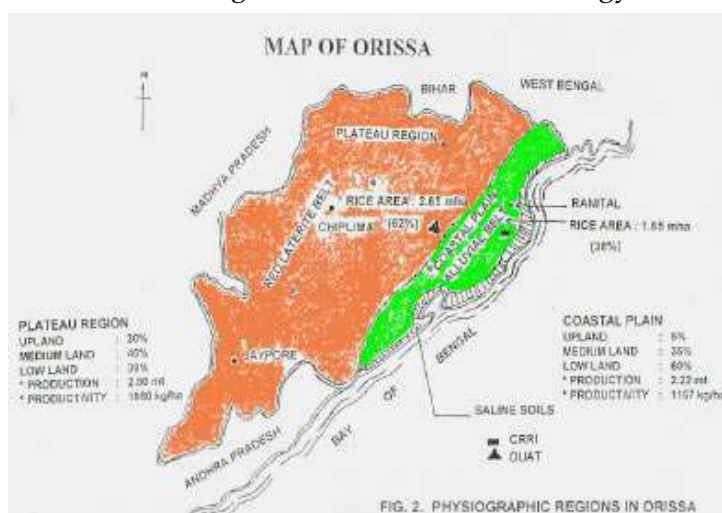
### ***Research results of SRI trial of OUAT***

*Pravat Ku. Roul, Associate Professor, College of Agriculture, OUAT*

Dr Pravat Roul informed the audience that his experiences in OUAT made him realise that the natural resource base is depleting while the population is increasing at an alarming rate. He felt that in this kind of a situation SRI, which is a way of farming developed in Madagascar long back but came to India very recently, came as a ray of hope. He then shared the research results of OUAT of SRI. Dr Roul

drew a comparison between SRI and Traditional Rice Cultivation (TRC) of rice in his presentation:

1. The state economy is directly linked with the increase in productivity of Rice as it is the staple food in the state.
2. The national average production of rice per hectare is 2 tons where as it is only 1.5 tons in Orissa.
3. Two approaches exist to increase rice productivity. One is crop improvement wherein the different varieties of seeds evolved like High Yielding variety, Hybrid variety, BT rice, Super rice etc. Two is Agronomic measures which involves quality of seed, planting geometry and fertiliser management. SRI is a methodology that takes into account all the agronomic measures.
4. The advantages of SRI were explained and he explained how the altered soil environment activates root oxygenation appreciably during different stages of growth. During later stages of growth this is considered to be an important physiological characteristic in SRI Rice plants.



5. Their SRI trials were based on the literature available on SRI. He highlighted three factors that were observed during their experimentation; namely seed bed close to the main field, regular weeding with the rotary weeder, and a good knowledge on water management (when the field has to be allowed for drying, how much water or moisture is required at what times etc.).
6. Explaining the potential of SRI in Orissa through a physiographic map of the regions (see figure above) Dr Roul observed that SRI has greater potential in the plateau as compared to coastal plains.

### ***System of Rice Intensification – Myth or reality for future rice production***

*Dr. Amol Ghosh, Sr. Scientist, Division of Agronomy, Central Rice Research Institute (CRRI), Cuttack, Orissa*

Dr. Ghosh presented the global rice production scenario and compared it with the national and state levels. He pointed out that though every one wants an increase in the production, the land under Rice cultivation has remained largely constant. Methodologies such as SRI are thus essential to increase the productivity. The data given in the slide is given below:

<b>Demand for rice in</b>	<b>2006</b>	<b>2025</b>
<b>World</b>	<b>600 million tons</b>	<b>845 million tons</b>
<b>India</b>	<b>87.5 million tons</b>	<b>130 million tons</b>

**Productivity target - 60% more than present status**

Speaking on the misconception on rice cultivation he said that there is a general notion that the productivity is less due to lack of water, as rice plant is considered an aquatic plant. But SRI proved this wrong by stressing on nurturing the soil well before transplanting as it will take care of the plant in its growth in the later stages. Also he added that the other costs like inputs like fertilizer and pesticide costs becomes almost negligible and labour cost also gets reduced over the period of time.

This statement led to discussion and few among the participants questioned the speaker on reduced labour costs which according to them is not true.

*Prof. Radha Mohan* answered them by saying that in the initial years farmers find it difficult to adapt to new methods like single seedling transplantation, levelling of fields, management of water etc. in spite of good training. However with practice they slowly get accustomed to new ways of farming. Hence, the first couple of years there will be definitely an increase in the labour cost but it decreases with better learning of the skills involved.

*Dr. Aroind Padhee* added that given this it is perhaps preferable to persist with a set of farmers and also it would be desirable to select and train such farmers who have a scientific bent of mind and are willing to adapt easily and innovate on new techniques.

Mr. Ghosh ended his presentation by highlighting some of the benefits of SRI cultivation. Following are the benefits he mentioned:

<b>Seed requirement</b>	<b>65-75 % reduction</b>
<b>Water requirement</b>	<b>35-45 % reduction</b>
<b>Fertilizer requirement</b>	<b>No or initially 50% less</b>
<b>Head rice recovery</b>	<b>20-25% increased</b>
<b>Maturity period</b>	<b>Uniform</b>
<b>Duration</b>	<b>10-20 days less</b>
<b>Yield</b>	<b>25-30% increased</b>
<b>Strong root anchorage</b>	<b>Withstand cyclonic gales</b>
<b>Pest &amp; disease management</b>	<b>Less</b>
<b>Soil health</b>	<b>Sustained improvement</b>

Dr Ghosh also mentioned a bit about the Food Security Mission of the government of India that is likely to set a target of 5 mill hectares under SRI with one demonstration plot for every 100 ha. The target states are eastern UP, Bihar etc.

### *SRI in Tripura*

*Dr. Baharul Islam Majumdar* Senior Agronomist – State Agricultural Research Station, Agartala, Tripura

Mr. Baharul was happy to inform the participants that he is a product of OUAT and now working in Tripura Agricultural Department. He recounted the SRI trials in Tripura since 1999 and how he started SRI trials in government farms. He informed that the farmers in Tripura have not taken on hybrid varieties yet though SRI is being practiced.

Speaking on traditional knowledge and training being received in agricultural universities he said one cannot practice or experiment in SRI as in all the text books rice is classified as an aquatic plant where as in reality it is not so. He urged the participants to think like the people and look upon themselves as production technologists of people and for he highlighted that agriculture staff have to be with the farmers. He recalled how Dr Swaminathan would remark how it was not good to treat farmers as beneficiaries but as thinking practitioners. Some of the important points of Dr Mazumdar's presentation include:

1. Nursery Management and transplantation of seedling: It was found that a mixture of soil (75%), cow dung (20%) and rice hull (5%) has to be prepared and a 2.5 cm width layer has to be spread on top of the raised nursery bed, in order for SRI to work best. Nursery management is very important in SRI and hence uprooting of seedlings has to be done carefully without disturbing the bed. Below are the precautions to be taken while uprooting/transplanting the seedling:

- ◆ Transplanting 8-12 days old seedling
- ◆ Transplant the seedling within 30 minutes after uprooting from nursery bed with out giving any transplanting shock to seedling
- ◆ Root of the seedling shall not be bend upward like J, it shall be like L
- ◆ One Seedling per hill

He said initially the farmers used ask on how to handle a problem but, if left unanswered, they started coming up with solutions of their own. Questions like transferring seedlings within 30 minutes of uprooting, spacing between seedlings, etc. which involved techniques and devices, he said he always used to communicate to them what he wanted rather than suggesting what the farmers have to follow. This he said led a tribal woman to come up with an idea i.e., uprooting the seedling along with some soil mass to buy some more time for transplanting the same.

He informed that a boy for the past seven years is managing SRI with only cow dung.

He also informed that no inorganic fertilizer is used in cultivation in Tripura and hence there is lot of demand for bio-fertilisers. But as Tripura shares international borders there is shortage of cattle and hence it is difficult to find cow dung.

2. Levelling of Main field: Proper levelling of fields helps in removing water from the field. During the rainy season levelling helps in preventing water logging in the main field. This will enhance the oxygen and microbial activity in the soil.

3. Spacing: Exact distance or equal spacing has to be maintained between seedlings i.e., 25 x 25 cm row to row and 25 x 25 cm plant to plant. He said fields, money, time and effort are all the farmers and hence the production is also in their hands. Hence convincing them on the benefits of SRI and giving them time to adjust and adapt to this new methodology which is very contradictory to TRC, is essential to achieve the set targets.



Spacing through low cost device developed by farmers

4. Draining Channels: Stagnation of water on the transplantation bed is not at all advisable and hence it is recommended to create drains manually.

After every sixth bed a drain has to be created which helps in two ways. One is to drain the water from the beds and two to help thirsty roots to suck water from the drains. A 25 cm drain with 12.5 cm each from both the neighbouring beds is advisable for easy weeding on the beds. Moreover, in the drains weeds do not grow.

5. Weed Management: Weed management minimises the weed and thus the crop competition and maximises aerobic condition in the field. The first weeding has to start before the transplantation, followed by second and third weeding at an interval of 10 – 12 days each. When the farmers were asked to do weeding before transplantation they were surprised, as no weed can be seen at that stage. But the purpose of the first weeding is to let the soil mix up well and be ready for transplantation and also to ensure that not even a baby weed is present while seedlings



are transferred.

Speaking on the yield he said that under Tripura conditions on an average the farmers practicing SRI are getting an additional 2 tonnes /ha compared to farmers practicing TRC. According to him the following are the yield contributors:

- ◆ Number of tillers per plant
- ◆ Number of panicle per plant
- ◆ Number of grains/panicle
- ◆ Length of panicle
- ◆ Number of filled grains per panicle

Sharing the problems involved with SRI he mentioned four types of problems, which are as follows:

- ◆ Weeding: Yield gets affected if weeding is not done properly and carefully
- ◆ Water control: Managing water is also a very important factor. Water has to be drained out continuously for which proper levelling has to be done.
- ◆ Labour intensity: The first few years labour costs increase as levelling of fields , making nursery beds, transplanting seedlings within 30 minutes of uprooting, creating drains manually and weeding thrice at regular intervals involves labour.
- ◆ Sustainable Soil Fertility Management:



- In SRI cultivation treatment of soil before transplantation going below three feet is very important as usage of chemical fertilizers and pesticides is not advisable. Also the SRI concept believes in biological empowerment and hence treatment of soil in the main field and nursery beds with cow dung is encouraged. A farmer however tends to spray pesticides at the sight of pest and even with out informing uses chemical inputs. Hence soil management in a biological way is difficult. We encourage use of bio pesticides.

He ended the presentation by requesting every one to treat SRI as a child and nurture it giving it a chance to grow.

### ***SRI in Andhra Pradesh – Experiences of WWF***

*Dr. V. Vinod Goud, Project Coordinator, World Water Fund for Nature (WWF), Dialogue Project, ICRISAT, Patancheru, Hyderabad, Andhra Pradesh (AP)*

Dr. Goud introduced WWF and its international project called 'A Dialogue on Water, Environment and Food', the main motto of which is the conservation of water - essential for both agriculture and environment. As an environmental organization he said their priorities were very clear in not letting high usage of

water by agriculture. Thus they initiated a dialogue among various players who are involved in taking decisions on water like researchers and scientists in agriculture, farmers, and the agricultural department of Andhra Pradesh etc.

Following is the story of the experiences of WWF in promoting SRI cultivation as a solution to water conservation in AP. Vinod Goud contextualised the work on SRI with the increased demands for irrigation water that has necessitated large investments by the state. In AP a programme titled 'Jalayagnam' has been started by the State Government wherein 28 fast track projects have been identified with a budget of Rs. 46,000 crores covering 64,00,000 acres under irrigation. But many of the projects have led to water conflicts such as in the Polavaram Project. All these efforts by the Government were to increase the productivity of Rice which WWF felt as Water Guzzling Crop.

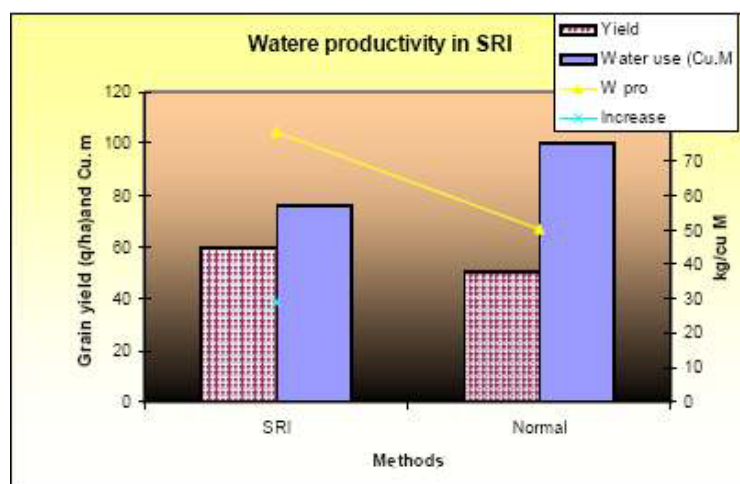
WWF - understanding the potentiality of SRI cultivation - started promoting SRI through demonstration fields and networking with various partners like ICRISAT (International Crop Research Institute for Semi Arid Tropics), ANGRAU (Acharya NG Ranga Agricultural University), independent farmers etc. Scientists were surprised by the fact that despite fewer inputs the productivity is higher in SRI cultivation compared to TRC.

Dr. Rupela, soil microbiologist in ICRISAT, conducted studies comparing SRI with TRC and found out that due to high soil and microbial activity in SRI the yield is high, in spite of less input. His research is still continuing, aiming to know and understand SRI methodology.

In 11 districts of AP around 1000 farmers are practicing SRI through the WWF initiative. Research stations like ANGRAU, DRR and ICRISAT, NGOs like WASSAN and CSA (Centre for Sustainable Agriculture) also evaluated the productivity between SRI and TRC where in same variety of seed and same nutrient inputs were used. Following are the findings drawn:

### Mean Yields for SRI and Conventional Rice Compared by District

DISTRICT	No OF FARMERS	YIELD (Kg/ha)		% INCREASE
		Convention	SRI	
Adilabad	13	4623	5121	10.8
Anantapur	14	6990	7887	12.8
Chittoor	16	5588	7015	25.5
East Godavari	19	7351	8610	17.1
Karimnagar	20	5680	6757	19
Mahboobnagar	15	4778	5981	25.2
Medak	20	6194	7805	26
Nalgonda	17	5706	7118	24.7
Rangareddy	15	5521	8233	49.1
Warangal	22	4244	4877	14.9
West Godavari	13	8408	9476	12.7
<b>Mean</b>	184	5862	7113	21.3
<b>SE</b>	290.2			
<b>CV</b>	11.1			
<b>LSD 5%</b>	497.3			



The trials on SRI showed lesser usage of water and inputs and also found out that the chlorophyll content is high in SRI leaves. WWF's experiences indicate SRI as an evolving technique and many times farmers are coming up with newer practices and models to resolve the hindrances.

He suggests that it is always better to give the farmer freedom to decide on the ways they would like to adopt SRI to achieve the set target.

Experiences in weeding made WWF realize this and look it as an opportunity rather than a problem as weeds are transferred back to the soil. Speaking on the constraints in adoption and scaling up SRI, the following have been mentioned:

1. Seed/Input based agricultural research and extension: Present scenario in agriculture speaks on high seed and input based cultivation. The concept of SRI which is seed and input independent is totally new and hence difficult to accept.

2. Skilful operations: Practicing SRI requires skilful operations like transferring seedlings from nursery bed to main field in 30 minutes, levelling the field, creating drains, single seedling transplantation etc. Unless farmers are given proper training adoption and adaptation of SRI is difficult.

3. Psychology and Attitude: Farmers minds are tuned to pumping in chemical fertilizers and pesticides. As no external inputs are required in SRI, it is difficult for a farmer to comprehend the reason behind it. Hence they feel insecure at the beginning.

4. Social Acceptance – Roles reversed: Tasks like weeding, transplantation etc. in TRC are normally done by women. But in SRI activities like weeding are being done by men. Hence accepting SRI by women is becoming a bit difficult.



5. Lack of Support Systems: unlike TRC where Government's support is present, there are no supporting systems for farmers who are practicing SRI.

6. Water Management: Water management in SRI is difficult in the first few years as the practice has been to flood the field with water. Following are the constraints in managing water in SRI:

- ◆ Maintenance of thin film of water: Very difficult to practice unless trained properly.
- ◆ Accuracy in land levelling: In Delta areas where the farmers are mostly tenants land levelling; creating drain channels etc. are difficult as they are not the decision makers.
- ◆ Uncertainty of power supply: Power situation in AP is very bad. That adds to the problem.
- ◆ There are also limitations in the Method itself. This includes difficulty in practicing SRI in saline soils, proper drainage and water management in canal irrigated systems, growth hindrances during cold weather in some parts of AP and difficulties in low lands with SRI.

The strategies he suggested for adoption & scaling up of SRI:

- ◆ Awareness and training to farmers: Proper hand holding support is to be given to farmers for easy adoption.
- ◆ Training and incentives to agriculture extension staff: Training is a must to agriculture extension staff as they are resource persons for farmers on field. Also these staff members have to be given some incentives for promoting SRI on a large scale
- ◆ Experienced SRI Rice farmers with extension kits: To support those farmers who are practicing SRI and has knowledge and experience to share and train other farmers, by providing extension kits to them.
- ◆ Farmers field visit exchanges: To arrange field visits to view, understand and learn the techniques of SRI directly.
- ◆ Establish a separate Extension Service Centres at the district level to guide and promote SRI method



Speaking on the importance of advocacy in SRI promotion, Dr Goud said that in AP the chief Minister was invited to visit a SRI field. On his visit Honourable Chief Minister interacted with the farmers and on going back announced an aid of four crores for establishing demonstration fields in each revenue village in one acre plot. Adding to that he said they had organized a National Symposium on SRI where the negative aspects and the best practices of SRI were discussed. Dr. Goud then informed every one that the next National Symposium on SRI is going to be organized in Tripura in October from 3-5. He also mentioned that WWF is focusing on international lobbying and started a dialogue by participating in the 'Rice and Water' workshop in March 2006 at IRRI, Philippines.

Following questions were asked at the end of the presentation:

**Q.** Has any local variety been used in SRI?

**A.** Almost all the local varieties have been tried. And also SRI is a system of farming and hence not a variety specific.

**Q.** What about the GE and other seed varieties? Can they also be used in SRI?

**A.** Technically yes. But GE and other varieties are susceptible to pests and hence there is a request to concentrate on indigenous variety in SRI cultivation.

Dr. Arvind Padhee: Practically speaking adopting SRI in the entire rice cultivation areas in Orissa is not possible as it can not be practiced in saline lands, low lands, during Rabi season etc.

## **SRI in Orissa: Chair-Prof. Radhamohan**

*Presentation on field trial conducted in the campus and also in farmer's field*

*Ms. Sabarmatee, SAMBHAV*

Greeting her co-travellers, Ms. Sabarmatee said she is grateful to three kinds of people – one – the organizers who have given the opportunity to share Sambhav's experiences on SRI, two – teachers and people who inspired them, and three – the farmers and NGOs who



took part in their experimentation. She informed the audience that she neither underwent a formal training in agriculture nor was born in a farmer's family. But she started practicing SRI in the farms in SAMBHAV and is also encouraging neighbouring farmers to follow SRI in rice cultivation.

Following are the points she stressed upon in her talk:

### *Experiences as a practitioner and extension worker*

She said that their group SAMBHAV heard of SRI method in 2004 through Prof. Radha Mohan. After this, CWS conducted a work shop on SRI at Berhampur that two people from their organization attended. Prof. Shambu Prasad shared a CD on SRI. In 2005, CWS Orissa organized a training programme at Sambhav in which SRI was a component. Shri Nagaratnam Naidu a successful SRI farmer from AP was the facilitator for that workshop. That is when according to her they gained confidence on SRI cultivation by watching the demonstration.

Explaining the nature of the land they had experimented on she said annual average rainfall is 750 mm and temperature ranges from eight degree centigrade to 48 degrees. Land is slopy but terraced, highly alkaline in nature and is marginal. She said people were discouraged in rice cultivation. They followed SRI in two acre plots during last Kharif i.e., 2006. In March they did the transplantation and they were surprised to see the field green in the month of May. She said that to their surprise the crop survived the standing cyclonic storm they had in the month of June. She informed that they could harvest from only one acre as the remaining was damaged by monkeys and parakeets.

Following are the experiences during the first trial:

- ◆ In June *Sambhav* conducted a training programme on sanitation. The government officials who were present learned about SRI by comparing SRI fields with adjacent fields.
- ◆ They ended up selling scented rice at Rs 30 per Kg
- ◆ They observed that SRI crop could withstand both dry conditions of May as well as cyclonic storms of June.
- ◆ They developed their own equipment for weeding, levelling, and channelling.
- ◆ They also learned on training methodology

Following are the experiences during second trial:

- ◆ Land levelling became difficult as the earthworm population increased and also the roots of previous crops were very strong.
- ◆ They observed that channelling becomes labour intensive in sticky soils compared to loose and a bit dry soils.
- ◆ It is a must to train the farmers in using weeders. Otherwise weeding becomes a tough task.
- ◆ The key thing in SRI method is the nurturing of soil by practicing traditional techniques like Ox ploughing, using natural and bio fertilizers like oil cakes, vermicompost etc.
- ◆ Two kilo grams of seed are normally suggested for a small grain variety for one acre, but in SRI one and half kilo gram is enough.
- ◆ In SRI late transplantation of seedling is not possible.
- ◆ Intensive training to farmers is always effective rather than having more number of farmers to work in the farms.
- ◆ When pests attack, instead of getting worried one should think in two ways – one is how pests have come in the first place and secondly how to handle the problem.
- ◆ Plants on the border grew up to 5.6 feet tall.

#### Observations

- ◆ They realised that the success rate in alkaline soils is less and this helped them to learn not just what one needs to do but also on what one is not supposed to do.
- ◆ Also in organic farming one should not concentrate only on yield but also on the field as the soil is being nurtured simultaneously.

#### Fears or Myths on SRI that farmers often have

- ◆ Management of water is difficult as it is not under ones control
- ◆ Digging up so many channels leaves little space for crop
- ◆ Fear of family and friends not accepting their practice

### Request

- ◆ Not to have any kind of fear as they are all imaginative and no proof is there to support these fears.
- ◆ Not to generalize on practices or methods as agriculture is a very vast topic and always differs depending on local conditions.
- ◆ Not to think about SRI as a technology but as an attitude and effort to understand the nature of plant and soil.
- ◆ Not to study SRI by slitting it into various components but to conduct research in totality.

### *Sharing of field Experience on SRI*

Mr. Surijit Behera, PRADAN

Mr. Surijit informed the audience that their organisation PRADAN works in 27 Districts in Bihar, Chhattisgarh, Jharkhand, M. P., Orissa, Rajasthan, and West Bengal. In Orissa he said they are practicing SRI cultivation in Keonjhar and Mayurbhanj Districts since 2003. Following are the experiences he shared on SRI:

1. Shared details on various comparisons drawn between traditional, improved method and SRI for the past four years. Giving details of cost – benefit ratio between the three practices of rice cultivation he said the margins are high in SRI practice.

Particulars	Traditional	Improved	SRI
Investment	Rs 2000	Rs 2500	Rs 2500
Output	Rs. 16000	Rs. 29000	Rs. 41000
Profit	Rs. 13000	Rs. 27000	Rs. 38000

2. Speaking on the outreach of PRADAN he shared the following data on SRI in Orissa:

Year	No. of districts	Families	Area (ha)
2003	2	8	0.4
2004	2	280	40
2005	7	1750	210
2006	11	6200	632

3. Following are the PRADHAN's observations on SRI since 2003:

- ◆ Tillering up to 80/ hill
- ◆ Conversion to effective tillers 40%- 70%
- ◆ As tillering goes up, percentage of effective tiller comes down

- ◆ Application of chemical fertilizer increased effective tillers
- ◆ Number of bold grains / panicle 150 – 220  
(Conventional 100-140)
- ◆ Plants under SRI are healthier compared to plants grown under conventional method
- ◆ Withstand longer dry spells
- ◆ Adopters are becoming proponents

4. Talking on their approach of extension work he mentioned the following points:

- ◆ Demonstration
- ◆ Sensitisation of women SHG members through guided exposures
- ◆ Grooming of local resource persons
- ◆ Development of POP (Package of Practices), collection of money in advance
- ◆ Hands on training and support to SHG families
- ◆ Timely field supervision, data collection and interpretation
- ◆ Introduction of weeder and power tillers to increase mechanization

5. Following concerns and challenges were shared:

Concerns:

- ◆ Dependent on monsoon – little control over water
- ◆ Poor draft power affects farming practices
- ◆ Intercultural operation at early stage is restricted (in case of transplanted paddy) in certain tribal pockets of this area as there is a custom to start operation after their Nuakhai festival. ( First harvesting of upland paddy )

Challenges

- a. To increase the yield potential
  - ◆ Promoting large scale in-situ water conservation measures
  - ◆ Mechanisation
  - ◆ Resources for training and follow-up
- b. Scaling up
  - ◆ Guided exposure with Audio Visuals
  - ◆ Mobilizing resources for extension

***Sharing of Experiences from farmer's field in Western Orissa on SRI***

*Mr. Parija - Sahabhagi Vikash Abhiyan*

Mr. Parija opined that organic farming is different in different areas. In 15 areas in Koraput and Barhgarh SRI is being practiced by their organization. During this Kharif season he said they are planning to follow SRI in nearly 1000 acres of land. He informed that they are planning to dig up deep channels in low lying areas to implement SRI during this Kharif season. He said that looking at their organisation's trials farmers are coming forward to practice SRI methodology.

Talking on their best practices he informed that cow urine and dung are mixed in the water in channels.

### ***Sharing of field Experience on SRI***

*Dr Luna Panda, Pragati*

Mr. Prabhakar shared that their organization works in 230 villages of 16 GPs in Nandapur and Koraput Block areas of Koraput District. According to him they got introduced to SRI cultivation in 2003 when CWS supported one of their agricultural programmes. Initially 25 farmers were trained of which 11 practiced SRI in their farms of about 2.5 acres of land. He said these farmers were called crazy at the beginning. He shared an incident happened in one particular village where during transplantation an entire village gathered near the field to watch the drama of transplantation. All the 11 farmers have harvested two to four times higher yields as compared to traditional methods of paddy cultivation by using organic manures only.

Following are the experiences and observations shared by Mr. Prabhakar on SRI:

1. SRI is more suitable for small and marginal lands and hence can address food scarcity problem of those farmers.
2. Lack of understanding and adaptability of farmers: As SRI is knowledge and technology intensive and also as it is very different from TRC farmers tend to take a lot of time in understanding and adapting the techniques.
3. Lack of water management and proper drainage: Water management in these areas is difficult as they are monsoon dependent which is unpredictable. Similarly if the drainage channels are not properly created then maintenance of water becomes difficult.
4. Reduce the increasing trend to use of chemical fertilizers: Intensive SRI cultivation discourages usage of inorganic inputs.
5. After observing the results in 15 demonstration fields during Rabi season SRI methodology is being replicated by other farmers in other areas also.

### ***Experiences of Farmers in Orissa***

*D. Narayan, Makarjhol, Kanchuru-PO, Ganjam District, Contact No. – 9861328455*

Mr. Narayan informed that he has been practicing SRI for the past three years. And last year he followed SRI in eight acres of land. Following are the results he shared:

- ◆ Yield was 6.5 t/ha with local variety.
- ◆ Was harvested 12 days earlier.
- ◆ No pest was found in the field.
- ◆ A maximum of 90 tillers and 84 panicles per hill were found. A man couldn't uproot a hill with normal force. Its roots were 12 inches long.
- ◆ A selected panicle has 340 grains.
- ◆ Manual weeding was done. He bought a cono weeder, but that did not work well.

The increase in yield he said he achieved by using only organic and green manure. He is also planning to cultivate ragi and sugarcane following SRI method. He shared that in SRI Fields ploughing becomes difficult as the roots become dense which work like a net.

A Government officer adding to what Mr. Narayan said informed the audience that the Farmers Field School (FFS) programme was conducted in his village and many farmers and agriculture department staff visited his SRI Fields. Responding to a question on whether neighbouring farmers are following it or not, he said other farmers also are now motivated to adopt SRI. He said other crops like black gram, green gram, and dhaincha should be taken up to supply green manure to the fields.

***Pravash Chandra Satpathy, Ananda Brundabanpur, Belam-PO, Mayurbhanj***

Mr. Pravash Chandra Satpathy, an experienced progressive farmer from Mayurbhanj also shared his experiences on SRI, and informed that he is practicing SRI for the last four years, but recently reduced his area for SRI cultivation. Concentrating on direct seeding using drum seeder he said he modified the drum seeder to have single plant. Both organic and inorganic manures are being used. He documented and shared experiments carried on in his farm.

***Mr. Natabar Sarangi, SPARD***



Mr. Natabar Sarangi said that for the past 13 years he is involved in conserving, multiplying and supplying of traditional seed and their organisation has nearly 2000 odd varieties of seed. He has been working on SRI since two years. According to him the main criteria for the propagation of SRI in Orissa is its lesser intake of seed compared to TRC. In SRI two kg of seed is sufficient where as the

government is recommending to use 30 kg of seed in one acre under traditional cultivation.

Talking on the process he said that soil and compost are mixed in a 1:1 ratio and to soak the seeds in that mixture spread on a banana leaf for 24 hrs. After 12 hrs it is allowed to dry to avoid sprouting. As root is important in SRI, the seed is covered with half a centimetre of soil. After 3 to 4 days seedlings are transplanted onto a bed of 30"x30". A small layer of water is maintained for two days and on the third day it is drained out. On the seventh day sprouting is seen.

By following SRI they managed to get 70 bags, 75 kg per bag, of aromatic rice while the local average yield is only 12 bags.

***Mr. Pradeep Sahoo, farmer, Badamba, Cuttack District***

Mr. Pradeep said he was introduced to SRI method by a CARR (NGO) staff member. Sharing his experience with SRI he said he tried SRI on 13 decimals of land by using half a kg of seed on a hill slope. Unfortunately that season there were no rains and also there was enormous spread of weeds that could not be controlled. In spite of all this to his surprise he managed to get one bag extra rice in comparison with traditional farming.

***Mr. Balabhadra Gadaba, Koraput District***

Mr. Balabhadra expressed his pleasure being a SRI farmer. A local NGO called Pragati has introduced SRI in their areas. Ms. Luna (the project coordinator of Pragati) told him about the practices and accordingly he proceeded. His field was the best among 12 others who

had adopted SRI. Initially when he sowed, he could not believe that just half kg of seed can return such a high yield. Now he said he will do it in one acre of land.



***Prof. Radha Mohan***

Prof. Radha Mohan opined that whatever has been learned till now on rice cultivation has to be unlearned in order to learn, appreciate and understand new aspects, experiences and techniques in SRI methodology. Declaring SRI as an answer to the problem of food security he said there is need for a mental metamorphosis to happen among the farmers, researchers, agricultural department's staff, scientists, NGOs and funding agencies. He hoped to find out solutions for the existing problems being faced by SRI practitioners and chart out ways of spreading SRI across the State to address the issue of food security.

## **Technical Session: Chair- Bibhukalyan Mohanty**

*Mr. Bibhukalyan Mohanty*

He expressed happiness on listening to various speakers on SRI and requested every one to share and explain their queries, fears, doubts etc. after the technical session that helps in building a consensus on SRI. He made special request to the Government officials to actively participate in the discussions as they can play a very important role in promoting SRI across the State.

**Dr. Shambu Prasad** suggested on sharing of any kind of doubts/fears/queries before the technical session starts as these can also be answered during the session.

**Q.** SRI as a method itself has some constraints. Hence the concern is whether SRI can be implemented in coastal areas, what kind of farmers – small, marginal, upland farmers in coastal areas can follow SRI, which traditional variety has to be used, under what conditions SRI can be followed – rain fed other sources of water etc? As majority of Orissa farmers are poor, decisions have to be taken carefully.

**Q.** What kind of organic manure can be used and which is suitable to Orissa?

**Q.** Is SRI effective in organic farming or inorganic farming?

**Q.** In SRI method of cultivation how many years will it take for soil nutrition depletion to happen?

**Q.** In Kandhamal soil is acidic in nature and is deficient in Zinc, Boron and Molybdenum. Can SRI be practiced in such conditions?

**Q.** Mr. Parija was benefited by practicing SRI in rain fed conditions whereas failure or not so much of success is seen by others who practiced SRI under similar conditions. How is that possible?

*Mr. Kishan Rao, Consultant, WASSAN, Andhra Pradesh*



Before starting the presentation Mr. Kishan Rao explained why a young seedling has to be transplanted in SRI methodology which is not so in traditional farming. According to him a seed can survive without any nutrient

support till 15 days if the right amount of moisture is maintained. He suggested experimenting this by soaking seed for some time in water and then replacing it into a sand box. By moistening it regularly it can survive for 15 days.

Two leaves are seen after the fifth day of soaking indicating the time to start preparing for transplantation. According to him the birth of third leaf is a sign of emergency. On the 15th day the first tiller i.e., fourth leaf (which is like the first daughter of the plant) is seen. The first tiller loses its strength if not protected. The tillers are called daughters by him as the daughters only can produce a daughter again. And hence the survival of the plant becomes difficult if the first tiller is not protected by transplanting it at right time.

He said normally human beings are cruel but when it comes to a tender rice plant they lose their original quality and start feeling sorry for removing or transplanting the young seedling. But he said one has to understand that the plant grows not only upwards but also downwards below the soil. Hence the plant when it is tender and has 2 leaves has to be transplanted.

Following are the important points he made during the presentation:

Ideal Conditions for SRI:

1. The farmer: The first and foremost requisite of SRI is the farmer who must be positive and enthusiastic about farming and the methodology he is following. In addition to that the following conditions are also required: A farmer who

- ◆ Is in dire need of food for his/her family: If a farmer is in poverty and has no other means of supporting his family then the scope for SRI is enormous as he gives his entire attention to farming.
- ◆ Is a small and marginal farmer: It is preferable as SRI is technology and labour intensive in the initial years.
- ◆ Owner, not a share cropper, of the land: Is preferable as the land has to be levelled and drain channels have to be dug in SRI cultivation.
- ◆ More than one is available for labour: One more person from the family other than the farmer has to work on the field which shows interest of the family members and also the labour cost is reduced.
- ◆ Not suffering from excess water: Preferable to have fewer water supplies as SRI is not applicable in the fields where there is excess of water.
- ◆ Has respect for rice cultivation: Love and respect for rice cultivation is a must as agriculture in general and rice cultivation in particular is an art.



- ◆ Open-minded and inquisitive: As SRI is technology and knowledge intensive and is also very different from TRC the farmer has to be open minded and also curious and inquisitive about the techniques.

2. The Land: Following conditions of land are ideal for SRI cultivation:

The land which

- ◆ Is full of decomposed bio compost called 'Humus' on which both plant and animal kingdom survive.
- ◆ Has good physical, chemical and biological characteristics
- ◆ Can access water when needed
- ◆ Can drain water when needed



3. Essentials: Following are the essential things which have to be kept in mind for practicing SRI:

- ◆ The land to be ploughed preferably in summer
- ◆ The working depth is not more than four inches or ten centimetres (4" or 10cm) unlike in traditional ploughing where the land is ploughed deep into the soil making the top layer very loose.
- ◆ The available compost is kept for future use
- ◆ The seed is chosen based on local preferences, conditions and adaptability like short and long duration etc.

4. The Right time to Start:

- ◆ Rice is a season-sensitive and heat seeking crop
- ◆ Hence sowing is done early in the season
- ◆ Late sowing affects productivity, increases disease vulnerability and thus increases costs
- ◆ The sowing time is so adjusted to avoid rains at flowering time

5. The Seed-bed Preparation

- ◆ *The farmer should stick to seed bed size (50g/sq.m)*: Many farmers do not stick to this factor. Hence they are requested to understand and spread the two kg seed in one acre by sowing 50 grams per square meter.



- ◆ *The compost used must be fully decomposed:* Many times farmers use half decomposed manure on the field presuming that the manure is fully decomposed. This results in heat

generation leading to the death of young plants.

- ◆ *No chemical fertilisers are needed nor applied:* In SRI no chemical fertilizer is required as the soil is treated well before sowing.

#### 6. The Land Preparation

- ◆ The land preparation starts on seed sowing day itself
- ◆ *Bullocks are preferred to machines:* Tractors are not advisable since the working depth shouldn't be more than four inch.
- ◆ No peddler in heavy black soils

Q. Can power tillers be used for ploughing?

A. The problem with power tillers is that their speed is less compared to a bullock drawn tiller. Also bullock drawn tiller helps in saving money and also as the required depth is only four inch ploughing is very well done.



#### 7. The Marking

- ◆ *Marking is done on the previous day:* Is advisable to do marking the previous day to save time and effort.
- ◆ *The Marker can be made locally:* Is easy to get the markers made locally.
- ◆ Marking to be done when the soil condition is just right
- ◆ A thin film of water may be maintained

#### 8. The Finer Points on care to be taken

- ◆ While transplanting care has to be taken to ensure that the root, the soil around it and the seed are intact
- ◆ A thin layer of fully composted field yield manure (FYM) may be applied after transplantation
- ◆ Water can be given the next day

- ◆ *Standing water is not a problem till 15th day:* Water can remain on the field till the fourth leaf is born. Afterwards the water has to be drained and has to be maintained like that till 60 days.
- ◆ No standing water while the tailoring is on
- ◆ Weeding has to start after the ninth day of transplantation.

#### 9. The Challenges

- ◆ Diverse and difficult soil conditions
- ◆ Monsoon dependent agriculture
- ◆ *Low morale:* Farmers' morale has to be boosted up. This is a general problem and has nothing to do with SRI alone.
- ◆ Low(est.) productivity
- ◆ Indigenous, local varieties on way out
- ◆ Unsustainable practices (dependence on external inputs such as Hives, Chemical fertilisers and Chemical pesticides) on the rise

#### 10. The Opportunities

- ◆ Small land holdings: It is a boon to have small land holdings in SRI as it becomes easier to follow the methodology.
- ◆ Urgent need to raise productivity to meet family's food needs: This makes the farmer look for opportunities and pushes them to search for, accept and adapt to newer practices easily.
- ◆ Availability of time-tested varieties to suit different agro-climatic conditions and soils
- ◆ Scope for re-establishing soil-cattle-farmer equilibrium
- ◆ The Farmers' innocence: Makes them to listen, understand and appreciate new ways of farming.

Mr. Kishan Rao concluded the presentation by informing the audience that for the past three years they have been practicing SRI. While sensitizing on SRI many questions were raised by farmers. These they decided to answer by experimenting themselves.

#### **Dr. Shambu Prasad**

Dr. Prasad requested every one to understand SRI not just as a technology but also as a philosophy behind the technology. It is called "System of Rice Intensification" as it is a series of practices which can always be developed and modified. He opined that in Orissa the farmers can avoid repeating the mistakes made by AP farmers in SRI cultivation if the philosophy behind it is understood properly.

#### **Mr. Kishan Rao**

Mr. Kishan Rao expressed the necessity to understand the concept of SRI which will help in not having unreasonable expectations. He questioned on what one will do if a surplus of 50 million tons of rice is produced.

**Mr. Baharul Majumdar**

Answering the questions posed by participants before the technical session started Mr. Baharul explained on why one individual fails when the other succeeds under similar conditions. According to him some people like him are good at only advising and guiding others where as the others who are successful are very strong in implementation also.

According to him Leaf Folder and Case Worm attacks on SRI paddy are due to the colour of the leaf. The green colour of SRI plant leaf is very attractive and the absence of standing water on the field might also be adding to the problem.

He advised the Orissa network to invite Dr. Rupela, a soil microbiologist from ICRISAT to share and speak on all these issues and also on organic farming.

Speaking on the Tripura experience he said they targeted for two metric tons of rice per hectare but could achieve only 34 % of it. On analysis they found two important reasons behind it – one was due to lack of supply of Bio-fertilisers and two was due to late transplantation of seedlings. He said that later he got to know from farmers that they transplanted seedlings on the 16<sup>th</sup> day or may be even later than that. That is when he understood the necessity to give more time to them to unlearn hundreds of years' history of agriculture.

He saw once 108 tillers in the farm but normally on a full length pinnacle 43 - 63 tillers are seen. According to him tillers can be easily understood if one understands phyllochrons.

He informed that in 2001 he started practicing SRI on demonstration fields and in one village the women were very upset with him. But after two months looking at the fields realized the effect of SRI and accepted the new practice. In 2002 the Director, ANGRAU got enthused and visited the demo fields and gave permission to extend the trials to 44 fields. In 2005 the Chief Minister of the State interacted with the farmers practicing SRI and PRI members of those villages where the trials are being done. In 2006 with Chief Minister's support went into SRI cultivation in around 15000 hectares. At present they are practicing SRI in nearly 30000 hectares.

Speaking on training being given he said capacity building on SRI is being done and till now around 400 Government officers (all levels); Field Staff, Farmers and

PRI Representatives have been trained. Talking on the policy support he said since April 2007 farmers are receiving Rs. 5000 per hectare for practicing SRI cultivation.

### **Way Forward**

As the sessions extended till late in the evening, the session on the way forward was shortened and Dr. Shambu Prasad in his concluding remarks opined that the steps and ways to take this dialogue forward have been decided though in an indirect way. He hoped to have many more interactions on SRI in future.

### ***Vote of Thanks – Ms. Ronali Pradhan, Orissa Resource Centre – CWS, Orissa Chapter***

Ms. Ronali Pradhan expressed happiness on the way the proceedings took place and thanked each and every one for participating actively in the workshop by sharing their knowledge, experiences and fears and doubts on SRI. She thanked the resource persons who have come from other states to share their stories with Orissa practitioners. Certificates of participation signed by the Director, Department of Agriculture were distributed to the participants by Kishan Rao.



### List of Participants

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