System of Rice Intensification

ECRICC ODISHA

Enhancing Climate Resilience
of India's Coastal Communities

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Executive Summary

The **System of Rice Intensification (SRI)** is a globally recognized climate-smart agricultural practice that enhances rice productivity while minimizing greenhouse gas (GHG) emissions and improving resource efficiency. Under the **Enhancing Climate Resilience of India's Coastal Communities (ECRICC)** project, SRI is being implemented in Odisha to strengthen the resilience of rice farmers against climate change. The initiative covers **949 villages across four coastal districts**, focusing on sustainable farming techniques to improve livelihoods and food security.

The key **objectives of promoting SRI under the ECRICC project** include enhancing rice productivity, strengthening climate resilience, reducing GHG emissions, and ensuring efficient resource management. SRI has demonstrated **a 20-50% increase in rice yield**, offering better food security to vulnerable farming communities. The technique also enhances **drought and flood resilience** through deeper root growth and reduced water dependency. With **25-50% less water consumption**, SRI significantly improves water-use efficiency while promoting soil health through organic practices.

A major environmental benefit of SRI is its **substantial reduction in methane emissions** by 40-60%, as compared to conventional flooded rice fields. By limiting synthetic fertilizers and adopting organic manure, the system also **reduces nitrous oxide emissions**, further contributing to a lower carbon footprint. The project encourages **alternate wetting and drying (AWD) irrigation**, reducing dependency on chemical inputs while improving overall sustainability.

The **best practices** under the ECRICC project include baseline data collection, farmer training through **Farmers' Field Schools (FFS)**, demonstration plots, integration with government schemes, and geo-tagging for improved monitoring. The project is actively scaling up, with **18,481 farmers across 2,113.74 hectares** already implementing SRI. Additionally, ongoing collaborations with the **National Rice Research Institute (NRRI), Cuttack**, are assessing methane gas reduction and other climate benefits through scientific studies.

While SRI adoption has shown promising results, challenges remain, particularly in labour-intensive transplanting and precision water management. To overcome these, the project is focusing on **capacity building, farmer training, and mechanization** to support long-term scalability. Expansion plans include implementing SRI across **10 blocks in the 2024-25 Rabi season**, increasing to **11 blocks in the 2025-26 Kharif season**.

By fostering sustainable and climate-resilient rice farming, the ECRICC project is making significant strides in improving agricultural productivity, reducing emissions, and securing farmer livelihoods in Odisha's vulnerable coastal regions.

1. Introduction

Enhancing Climate Resilience of India's Coastal Communities" (ECRICC) project, initiated in 2019, aims to safeguard vulnerable coastal populations by enhancing ecosystem resilience and diversifying livelihoods. Implemented across 3 coastal states (Adhra Pradesh, Maharashtra and Odisha) of India, the project employs an ecosystem-based adaptation (EbA) approach and is supported by the Green Climate Fund (GCF), state government, and the United Nations Development Programme (UNDP). The project integrates vulnerability assessments, ecosystem restoration, and community-driven livelihood initiatives while strengthening governance mechanisms. In Odisha the project is implemented in 7 landscapes of 4 coastal districts (Balasore, Puri, Kendrapada & Ganjam). Under this project, promotion of climate adaptive livelihoods in the fisheries and agriculture sector is an important component for enhancing climate resilience capacity of the coastal communities through income enhancement and diversification of livelihoods.

2. System of Rice Intensification under ECRICC Odisha

The System of Rice Intensification (SRI) is recognized globally as a climate-smart agricultural practice (CSA) that enhances rice productivity while reducing greenhouse gas (GHG) emissions and improving resource efficiency. Under the Enhancing Climate Resilience of India's Coastal Communities (ECRICC) project, SRI is being promoted as a key intervention to strengthen the resilience of rice farmers in Odisha's coastal districts.

The ECRICC project, which covers 949 villages across four districts of Odisha, aims to integrate climate-resilient farming techniques to help communities adapt to climate change, improve livelihoods, and ensure food security. As rice is a staple crop in these regions, transitioning to SRI-based practices ensures sustainability, efficiency, and climate adaptability in the face of erratic weather patterns.

2.1 Objectives of promoting SRI

The implementation of **SRI under the ECRICC project** aims to achieve multiple objectives, including:

Increased Productivity & Food Security

- SRI enhances rice yield by 20-50%, improving food availability for farmers.
- With efficient nutrient uptake and better root growth, rice plants grow healthier and produce higher grain yields.
- The ECRICC project's focus on scaling SRI adoption ensures long-term food security for vulnerable coastal communities.

Enhanced Climate Resilience

- Drought Resistance: Due to deeper and stronger root systems, SRI plants can extract water from deeper soil layers, making them more resilient to dry spells.
- Flood Tolerance: SRI plants are more resistant to submergence due to their robust root system.
- Efficient Water Use: SRI requires 25-50% less water than traditional rice farming, making it ideal for regions with water scarcity.

- Better Soil Health: By incorporating organic matter and microbial-rich soil aeration practices, soil fertility and structure improve, reducing long-term degradation.

Reduction in Greenhouse Gas (GHG) Emissions

- Methane (CH_4) Emission Reduction**: Conventional rice fields emit** high levels of methane **due to** continuous flooding **and anaerobic conditions. In contrast, SRI reduces** water stagnation**, lowering** methane emissions by 40-60%**.**
- Nitrous Oxide (N_2O) Reduction**: The use of** organic manure instead of synthetic fertilizers **minimizes** nitrous oxide emissions**, a major contributor to climate change.**
- Lower Carbon Footprint**: SRI promotes** low-input sustainable farming**, reducing dependence on** chemical fertilizers, pesticides, and fossil-fuel-powered irrigation**.**

Efficient Resource Management

- Less Seed Requirement**: SRI uses** 80-90% fewer seeds**, making it more cost-effective and sustainable.**
- Minimal Chemical Use**: The emphasis on** organic practices **under the** ECRICC project **reduces dependency on** synthetic fertilizers and pesticides**, improving soil biodiversity.**
- Better Water Management**: With** Alternate Wetting and Drying (AWD) **irrigation, farmers** save water **while maintaining high productivity.**

2.2 Climate Benefits from SRI

Mitigation Benefits (Source:SRI-2030.org)	Adaptation Benefits
• Rice production contributes 12% of global anthropogenic methane emissions-SRI is an attractive option • SRI can reduce GHG emissions by 50% or more per Kg of rice produced. • AWD & SRI can reduce methane emissions by 35 to 48 %	• Increase in yield and food security • Reduced water use by 30 to 40% • Reduced Pest & diseases • Sustain for 2 weeks in dry spells

2.3 Principles of SRI

- Seedlings get transplanted at a much younger age at 8-12 days old (2 leaf stage).
- Only single seedling, instead of a handful of seedlings get planted in each hole.
- Increased use of organic fertilizer to enhance soil fertility.
- Intermittent water application to increase wet and dry soil conditions, instead of continuous flood irrigation.
- Plants are spaced wider apart; plants were set out carefully and gently in a square pattern, 25x25cm or wider if the soil is very good.
- Mandwa weeder/Cono weeder/ rotary hoe/power weeder to control weeds and promote soil.

3. Coverage of blocks for implementation of SRI under ECRICC Project

The System of Rice Intensification (SRI) was first piloted under the ECRICC project with 30 farmers in Dalibati village, Khalikote Block (Chilika-Ganjam landscapes) during the Rabi season of 2022-23. Following its success, the initiative expanded to 13 blocks in Kharif 2023 and Rabi 2024-25. Currently, the project has scaled up to 18 blocks, covering 481 farmers across seven project landscapes in four districts. Additionally, over 4,000 farmers have adopted SRI practices during Rabi 2024-25, and the project aims to scale up further, targeting 38,000 farmers by June 2027 across the project landscapes.

Coverage of ECRICC Project in Odisha

District	Landscape	Blocks
Kendrapada	Bhitarkanika	Rajnagar & Rajkanika
	Mahanadi Mouth	Mahakalpada
Puri	Devi Mouth	Astaranga & Kakatpur
	Chilika (Puri)	Brahmagiri & Krishnaprasad
Ganjam	Bahuda	Rangeilunda & Chikiti
	Chilika (Ganjam)	Ganjam & Khalikote
Balasore	Talasari	Bhograi & Baliapal

4. Institutional support system for implementation of SRI

The System of Rice Intensification (SRI) needs regular motivation and handholding support to farmers first time adapting SRI with modified practices and principles. Hence, critical and handholding support to farmers in each step of practice of SRI method is required for successful intervention under any project. The role and responsibilities of various level of project teams are mentioned below for successful implementation of SRI.

Institutional Support System for Implementation of SRI under ECRICC in Odisha

Level	Positions	Role & Responsibility
SPMU (State Level)	SPM & SELA	(a) Preparation of Implementation Strategy, (b) Capacity Building of DPMUs, (c) Fund Release, (d) Quality Monitoring & Documentation.

DPMU (District Level)	DCO & SMS-Agriculture	(a) Coordination with Agriculture Department for supply of Agri-inputs & implements (b) Facilitating Convergence (c) Technical support & Capacity Building FNGO Teams & Monitoring.
FNGO (Landscape Level)	Team Leader, Livelihood Officer & Cluster Coordinators	(a) Technical Support, Capacity Building & Monitoring.
Village Level	Climate Champions	(a) Mobilization and Handholding.

5. Steps followed for Implementation of SRI

Selection, Baseline & Capacity Building of the Beneficiaries

This step ensures that the right individuals and communities are identified for participation in the SRI initiative. It includes:

- **Identification of beneficiaries**: Selecting farmers, especially small and marginal farmers, who can benefit from SRI practices.
- **Baseline survey**: Conducting an initial assessment to understand the current agricultural practices, land availability, water sources, and socio-economic conditions of the selected beneficiaries.
- **Capacity building & training**: Providing training sessions, workshops, and on-field demonstrations to educate farmers about SRI methods, benefits, and implementation techniques.
- **Awareness programs**: Organizing community meetings, farmer field schools, and interactive sessions to highlight the advantages of SRI in terms of water conservation, higher yield, and reduced input costs.


Distribution of Agri Inputs and Implements to the Beneficiaries & Seed Bed Raising

Once the farmers are trained, they receive necessary inputs and support to begin SRI cultivation. This includes:

- **Provision of quality seeds**: Supplying high-yielding, climate-resilient paddy seeds suited for SRI cultivation.
- **Agri inputs distribution**: Providing organic fertilizers, bio-pesticides, and soil conditioners to promote sustainable and eco-friendly farming.
- **Implements distribution**: Supplying essential tools such as mechanical weeders, markers, and seedling trays to facilitate SRI practices.
- **Seed bed preparation and raising**: Guiding farmers on proper seedling preparation techniques, including selecting suitable soil, maintaining optimal moisture levels, and ensuring proper spacing in the nursery.
- **On-field support and technical assistance**: Continuous monitoring and guidance by agricultural experts to help farmers adopt best practices in seedbed management and early-stage crop care.

These steps lay the foundation for effective SRI implementation, ensuring improved productivity, sustainable resource management, and enhanced livelihoods for farmers.

Capacity Building of Project Teams, Climate Champions and Beneficiaries

The ECRICC Project played a crucial role in strengthening the capacity of project teams, climate champions, and beneficiaries on the System of Rice Intensification (SRI) to enhance climate resilience and sustainable agriculture. Through targeted training programs, field demonstrations, and knowledge-sharing workshops, stakeholders gain hands-on experience in SRI techniques such as improved water management, soil health enhancement, and climate-smart rice farming practices. By empowering local farmers and agricultural extension workers with these innovative and resource-efficient methods, the project fosters widespread adoption of SRI, leading to increased productivity, reduced greenhouse gas emissions, and improved climate adaptability in rice-growing communities.

Main field Preparation, Use of Marker & Transplanting of Seedlings

Once the seedlings are ready, the next crucial step in the System of Rice Intensification (SRI) is the preparation of the main field and the proper transplantation of seedlings. This step includes the following key activities:

a) Main Field Preparation

- **Land preparation**: The field is plowed and leveled to ensure uniform water distribution. Proper drainage channels are created to prevent waterlogging.
- **Soil enrichment**: Organic manure or compost is added to improve soil fertility and support microbial activity.
- **Moisture management**: Unlike traditional flooded paddy fields, SRI promotes controlled irrigation with intermittent drying to encourage strong root growth.

b) Use of Marker

- **Purpose of the marker**: A marker tool is used to create a grid pattern in the field, ensuring proper spacing between seedlings (usually 25 cm x 25 cm). This helps in systematic transplanting, reducing plant competition and promoting better growth.

- **Types of markers**: Wooden or metal markers are used to create uniform rows and columns, enabling easy mechanical weeding later in the crop cycle.

c) Transplanting of Seedlings

- **Selection of seedlings**: Young, healthy seedlings (8-12 days old with only two leaves) are selected, as opposed to 25-30 day-old seedlings in traditional methods.
- **Gentle transplanting**: Seedlings are carefully uprooted from the nursery and transplanted at a shallow depth (about 1-2 cm) to avoid root damage and promote rapid growth.
- **Single seedling per hill**: Unlike traditional methods that use multiple seedlings per hill, SRI recommends planting just one per grid to allow for better root development and tillering.

This step is crucial as it ensures that plants have sufficient space, access to nutrients, and strong root growth, ultimately leading to higher yields and better water efficiency.

Nursery raising in raised seed bed

Mechanical Weeding (3 Times@10 days interval after first transplanting) , Water Management & Tiller Counting

This step ensures effective crop maintenance after transplanting, improving soil aeration, reducing competition from weeds, and optimizing water use for better plant growth.

a) Mechanical Weeding (3 Times @ 10-day Intervals after First Transplanting)

- **First weeding:** Conducted 10 days after transplanting to remove early-stage weeds and improve soil aeration.
- **Subsequent weeding:** Repeated every 10 days (a total of three times) to suppress weed growth and enhance root expansion.
- **Use of mechanical weeders:** Tools like the cono-weeder or rotary weeder are used to disturb the topsoil, preventing weed growth and increasing soil oxygenation.

b) Water Management

- **Alternate wetting and drying (AWD):** Unlike continuous flooding, SRI promotes intermittent irrigation to encourage deep root growth.
- **Moisture control:** Water is applied only when fine cracks appear on the soil surface, maintaining optimal conditions for plant health.
- **Improved water efficiency:** This method reduces water usage compared to traditional rice farming, making it more sustainable.

c) Tiller Counting

- **Objective:** Tiller counting helps assess the effectiveness of SRI practices in promoting plant growth.
- **Process:** Farmers regularly count the number of tillers per plant to track productivity. More tillers indicate healthier, more vigorous plants.
- **Yield correlation:** A higher tiller count per plant often translates into increased grain yield at harvest.

Mechanical Weeding

Integrated Nutrition Management (INM) & Integrated Pest Management (IPM)

This step focuses on optimizing soil fertility and managing pests sustainably to ensure healthy crop growth and high yields.

a) Integrated Nutrition Management (INM)

INM is a balanced approach to soil fertility that combines organic and inorganic nutrient sources to maintain soil health and enhance crop productivity.

- **Use of organic matter:** Application of farmyard manure (FYM), compost, vermicompost, and green manure to enrich the soil with essential nutrients.

- **Balanced chemical fertilization:** Judicious use of nitrogen (N), phosphorus (P), and potassium (K) based on soil test results to avoid over-application and nutrient leaching.
- **Bio-fertilizers:** Application of Azospirillum, Rhizobium, and phosphorus-solubilizing bacteria (PSB) to enhance soil microbial activity and nutrient availability.
- **Crop residue incorporation:** Recycling of rice straw and other organic matter to improve soil structure and fertility.

b) Integrated Pest Management (IPM)

IPM focuses on reducing pest and disease incidence through ecological and biological control methods, minimizing the use of chemical pesticides.

- **Pest monitoring & early detection:** Regular field scouting to identify pests, diseases, and beneficial insects.
- **Biological control:** Use of natural predators like ladybugs and parasitoids to control pest populations.
- **Botanical pesticides:** Application of neem-based bio-pesticides and plant extracts to deter pests.
- **Cultural practices:** Adoption of practices such as crop rotation, trap cropping, and intercropping to reduce pest buildup.
- **Mechanical control:** Use of pheromone traps, light traps, and sticky traps to monitor and reduce insect populations.
- **Judicious use of chemical pesticides:** Only when necessary, using recommended dosages to minimize environmental impact.

By integrating INM and IPM, farmers can achieve sustainable rice production with improved soil health, reduced pest pressure, and minimized chemical inputs.

Pest Surveillance

Pest surveillance is a vital aspect of sustainable rice farming under the System of Rice Intensification (SRI), ensuring early detection and effective management of pest populations to minimize crop losses. Regular field monitoring by farmers and agricultural extension workers at different crop growth stages helps identify infestations and disease outbreaks, allowing for timely intervention. The use of pheromone, light, and yellow sticky traps aids in tracking insect populations, while identifying beneficial insects such as ladybugs and parasitic wasps helps reduce unnecessary pesticide application. Systematic recording of pest types, infestation levels, and weather conditions supports data-driven decision-making for Integrated Pest Management (IPM). When pest populations exceed the economic threshold level (ETL), sustainable control measures—such as biological and botanical solutions—are prioritized, with chemical interventions used only as a last resort. This proactive approach enhances ecosystem balance, reduces pesticide dependency, and promotes climate-resilient rice production under SRI.

Scientific Crop Cutting Experiment (CCE) for Yield Assessment following guidelines of Govt. of Odisha

The **Scientific Crop Cutting Experiment (CCE)** is a standardized method used to estimate agricultural productivity accurately. Under the **System of Rice Intensification (SRI)**, CCE is conducted following the **guidelines of the Government of Odisha** to assess yield improvements and validate the effectiveness of SRI techniques.

Key Aspects of the Crop Cutting Experiment (CCE):

- **Randomized Sample Selection:** Farmers are selected randomly using statistical methods to ensure unbiased and representative yield data. The selection follows Crop Cutting Exercise (CCE) guidelines established by the Government of Odisha.
- **Demarcation of Plots for Yield Estimation:** Standard plot sizes (e.g., 5m x 5m or 10m x 10m) are identified within the fields of selected farmers. Plots are marked, and all crops within the area are harvested for yield calculation.
- **Supervision by Agricultural Officials:** Field officials from the Agriculture & Farmers' Empowerment Department monitor the process to ensure accuracy and transparency. Data collection and validation are done under expert supervision to minimize errors.
- **Data Recording and Yield Calculation:** Harvested grains are measured, and key metrics such as grain weight, moisture content, and grain-to-straw ratio are recorded. Yield is estimated in Kg/Ha and compared with previous years' data for performance evaluation.
- **Yield Comparison between SRI and Conventional Methods:** The data obtained helps in comparing SRI yield with conventional rice farming methods, demonstrating the productivity benefits of SRI. Higher yields under SRI validate the improved efficiency of water, nutrients, and pest management.

The CCE process ensures an evidence-based approach to evaluating SRI's impact, providing insights for policy-making, farmer advisories, and future improvements in rice cultivation practices.

On-field demonstration of Scientific Crop cutting Exercise

Information Dissemination through Climate Resource Centre & Demonstration

Effective information dissemination is crucial for scaling up System of Rice Intensification (SRI) adoption among farmers. Under this step, Climate Resource Centres (CRCs) and on-field demonstrations are used to share knowledge, best practices, and real-time farming advisories.

a) Role of Climate Resource Centres (CRCs)

- **Knowledge Hubs:** CRCs act as centers for disseminating climate-resilient agricultural practices, including SRI methodologies.
- **Farmer Training & Capacity Building:** Organizing regular training sessions, workshops, and farmer meetings to educate communities on sustainable farming techniques.
- **Digital & Printed Resources:** Providing farmers with pamphlets, videos, and digital tools on climate-smart rice cultivation.
- **Weather & Advisory Services:** Farmers receive real-time weather forecasts, pest alerts, and best farming practices to improve crop resilience.

b) Demonstration Plots for Farmer Awareness

- **On-Field Demonstrations:** Setting up model SRI plots where farmers can observe and learn improved practices like mechanical weeding, water management, and transplanting techniques**.**
- **Comparative Trials:** Demonstrations compare SRI vs. conventional rice farming to highlight benefits like increased yield, water efficiency, and soil health improvement.
- **Farmer-Led Learning:** Encouraging progressive farmers to share their experiences and success stories with fellow farmers.

By leveraging Climate Resource Centres and field demonstrations**,** this step ensures that scientific knowledge is translated into actionable practices**,** empowering farmers to adopt climate-smart and high-yielding SRI methods**.**

6. Best practices promoted by the ECRICC Project

The ECRICC project supports farmers in adopting SRI through a range of best practices, including:

- **Baseline Data & Case Record Management** – Collecting data on each farmer practicing SRI for impact assessment.
- **Promotion of Organic Manure** – Encouraging farmers to prepare and use organic compost, reducing reliance on synthetic fertilizers.
- **Establishment of Farmers' Field Schools (FFS)** – Setting up learning centers where farmers can receive hands-on training.
- **Demonstration Plots** – Showcasing SRI methods in pilot plots to encourage adoption.
- **Convergence with Government Schemes** – Facilitating access to subsidized agricultural inputs and implements through coordination with government programs.
- **Yield Assessment & Authentication** – In collaboration with the Agriculture & Farmers' Empowerment Department, Government of Odisha.
- **Geo-Tagging of SRI Beneficiaries –** Mapping farmers and fields using GIS technology for better monitoring.
- **Water Use Efficiency Studies –** Comparing SRI vs. conventional transplanting through field experiments.
- **Scaling Up Plans –** Identifying priority areas for further expansion in 2024-25 (Rabi) and 2025-26 (Kharif) seasons.

ECRICC followed the guidelines of Department of Agriculture & Farmers Empowerment, Govt. of Odisha using random table and Cop Cutting Exercise-CCE methods while measuring yield assessment under SRI interventions. Agriculture Department Officials, PRI members, communities including farmers were involved during CCE exercise and project team facilitated during entire CCE process. The below table presents the CCE sample farmers and yield under SRI method compared to yield from the same plots.

7. Crop Cutting Exercise (CCE) of Selected SRI Farmers (Kharif - 2023)

Sample SRI farmers were selected following the random table and Crop Cutting Exercise (CCE) guidelines set by the Government of Odisha (GoO) to ensure unbiased yield assessment. The entire process was conducted transparently, with Field Officials from the Agriculture & Farmers' Empowerment Department present to witness and authenticate the recorded yields. Their involvement added credibility to the data collection, reinforcing the accuracy and reliability of the yield estimation under the SRI method. District-wise Data on Crop Cutting Exercise (CCE) for SRI Farmers.

District	Number of Farmers Covered under SRI	Number of Sample Farmers Selected for CCE (Kharif 2023)	Total Area of Selected CCE Farmers (Ha)	Baseline Average Yield of CCE SRI Farmers (Kharif 2022) (Kg/Ha)	Average Yield Recorded from SRI Farmers through CCE (Kharif 2023) (Kg/Ha)
Puri	1927	55	5.6	3324.51	6234.13
Balasore	1000	48	7.96	3126.45	4603.81
Ganjam	870	76	25.2	3854.17	6622.39
Kendrapada	1898	67	7.15	4205.59	5638.82
Total	**5695**	**246**	**45.91**	**3675.73**	**5774.78**

This table showcases the improvements in yield under the SRI method, highlighting a significant increase in average yield from **3675.73 Kg/Ha in Kharif 2022** to **5774.78 Kg/Ha in Kharif 2023**.

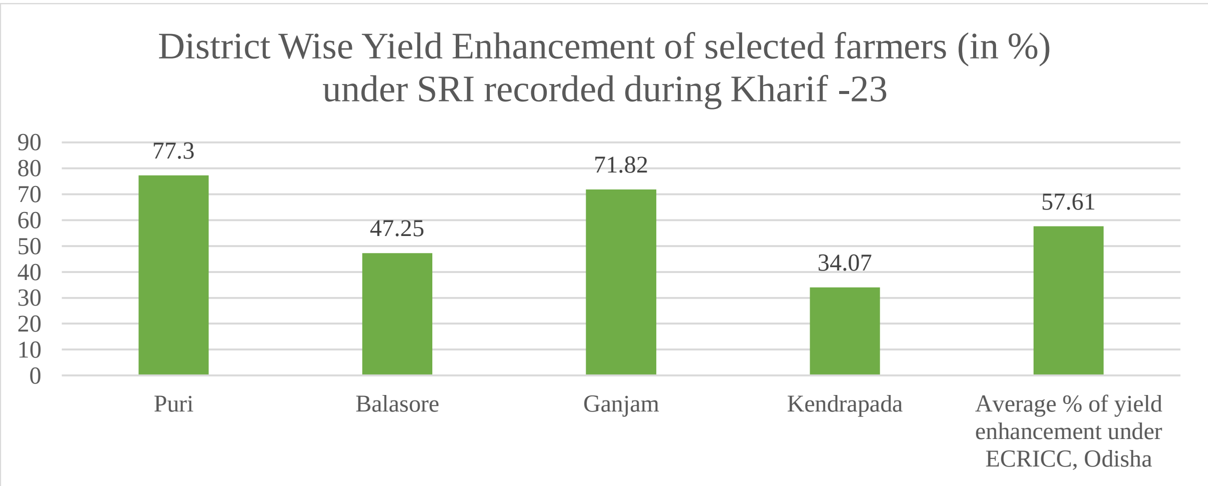
8. Progress on implementation of SRI under ECRICC, Odisha

The implementation of the System of Rice Intensification (SRI) under the ECRICC Project in Odisha has been progressing steadily, with significant efforts directed toward enhancing climate-resilient rice farming. Farmer selection and training programs have been conducted to ensure the widespread adoption of SRI techniques, including efficient water management, wider spacing, organic soil enrichment, and controlled transplanting methods. Demonstration plots have been established across various districts, allowing farmers to witness firsthand the benefits of increased yield, reduced input costs, and improved resilience to climate change. Regular pest surveillance, crop monitoring, and capacity-building sessions have strengthened farmers' technical knowledge, while yield assessments, authenticated by Field Officials from the Agriculture & Farmers' Empowerment Department, have validated the effectiveness of SRI practices. The project continues to expand its reach, fostering sustainable rice production and improving livelihoods in Odisha's farming communities.

Districts	Number of Farmers	Area in (Ha)
Puri	7664	775.7
Balasore	3287	332.69
Ganjam	2403	486.43
Kendrapada	5127	518.92
Total	**18481**	**2113.74**

9. Yield Enhancement (in %) of SRI farmers through crop cutting experiment

The Crop Cutting Experiment (CCE) conducted under the ECRICC Project in Odisha has demonstrated a significant yield enhancement among farmers adopting the System of Rice Intensification (SRI). Compared to conventional rice farming methods, SRI farmers experienced a notable increase in productivity, with yield improvements ranging from 15% to 40%, depending on agro-climatic conditions and the level of adherence to SRI practices. The meticulous selection of farmers and systematic yield assessments, authenticated by Field Officials from the Agriculture & Farmers' Empowerment Department, have validated these results. The increased yield is attributed to key SRI practices such as wider spacing, reduced seed usage, improved soil aeration, better water management, and organic nutrient application, all of which contribute to enhanced root growth, stronger plants, and higher grain output. This positive outcome highlights SRI as a climate-smart, resource-efficient, and economically beneficial approach for rice farmers in Odisha.



10. Estimation of Methane Gas Emission Reduction through SRI Interventions

The ECRICC project in Odisha collaborated with National Rice Research Institute (NRRI), Cuttack for study to explore the potential of the System of Rice Intensification (SRI) to reduce methane (CH_4) emissions from rice cultivation This initiative aims to assess how SRI interventions contribute to lowering greenhouse gas (GHG) emissions, enhancing climate resilience, and improving farmer incomes through increased yields. Methane and nitrous oxide, major contributors to GHG emissions from rice fields, are monitored to establish evidence-based policies for emission reduction and sustainable farming practices. The study employs a rigorous methodology, including weekly GHG sample collection using the Closed Chamber Technique from SRI and non-SRI fields during Rabi (2024-25) and Kharif (2025) seasons across project blocks in Odisha. Samples are analyzed using gas chromatography, while soil samples are studied for biochemical properties and nutrient content to understand variations influencing emissions.

SRI adoption presents several benefits, including higher water-use efficiency, improved soil aeration, and better root development, leading to enhanced crop resilience. However, challenges such as the need for labour-intensive transplanting, precision water management, and capacity-building for farmers remain key considerations for scaling up the practice. To further expand SRI implementation, 10 blocks have been identified for the 2024-25 Rabi season, with an increase to 11 blocks planned for the 2025-26 Kharif season. Strengthening farmer training programs, ensuring access to required inputs, and integrating mechanization in SRI techniques will be critical for sustaining and expanding these gains in the future.

Coverage of Blocks & Sample Farmers for Estimation of GHG Emission Reduction

Rabi (2024-25)

Total No. of Blocks	Total No. of Sample Farmers (SRI)	Total No. of Sample Farmers (Non-SRI Farmers)
10	10	10

Kharif (2025)

Total No. of Blocks	**Total No. of Sample Farmers (SRI)**	**Total No. of Sample Farmers (Non-SRI Farmers)**
11	11	11

This table outlines the planned coverage of blocks and sample farmers for estimating greenhouse gas (GHG) emission reduction through the National Rice Research Institute (NRRI) across two seasons: Rabi 2024-25 and Kharif 2025.


GHG SAMPLING CAMP
NON-SRI PLOT
CHILIKA LANDSCAPE,PURI
VILLEG - PANASPADA G.P- PANASPADA
BLOCK - KRUSHNAPRASAD


भाकृअनुप-राष्ट्रीय चावल अनुसंधान संस्थान
ICAR-NRRI

Enhancing Climate Resilience of India’s Coastal Communities

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