SYSTEM OF RICE INTENSIFICATION (SRI)

A SLEM BEST PRACTICE

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Indian Council of Forestry Research and Education has documented System of Rice Intensification (SRI) as one of the best practices for sustainable land and ecosystem management (SLEM) under the World Bank funded SLEM Project.

Rice is one of the high-water demanding crops in India. One kilogram of rice production needs about 3000-5000 litres of water. System of Rice Intensification (SRI) is a method of rice cultivation for increasing rice yield with reduced seed and water demand. SRI involves cultivating rice with as much organic manure as possible, starting with young seedlings planted singly at wider spacing in a square pattern; and with intermittent irrigation that keeps the soil moist but not inundated, and frequent inter-cultivation with a weeder that actively aerates the soil. Traditional paddy growers can adopt SRI practice where water is scarcely available and as such has an immense potential in the paddy growing areas of Chhattisgarh and Madhya Pradesh.

Concept of SRI is gaining popularity in India. About 100,000 farmers in the states of Assam, Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Karnataka, Maharashtra, Manipur, Odisha, Uttar Pradesh and Uttarakhand have already adopted this practice.

Areas and soil suitability for SRI

In India rice growing areas receiving about 1000 mm annual rainfall with irrigation facility are suitable for SRI. Well drained loamy to clayey fertile soils having pH within a range of 5.5 to 7 are ideal for SRI. Additionally, land should be levelled, convenient to irrigate & drain, and should not be affected by salinity or alkalinity.

Agronomy for SRI

Pre-treatment of seeds for germination

Healthy seeds of improved rice variety are soaked in water for 12-24 hours. Soaked seeds are covered with moist gunny bags for 24-48 hours and regularly sprinkle water to facilitate sprouting. Nearest Krishi Vigyan Kendra or Agriculture Department or Kisan Sewa Kendra can be contacted for appropriate improved variety of rice suitable for the region. The seeds selected are pre-treated with biopesticides or carbondezim (1 gram) plus menkojab (2 grams) and thiomethoxam (2 grams) per kg of seed before sowing in the nursery.

Nursery preparation and management

Normal garden nursery is ideal for SRI. Under this method 5 kg seeds per ha are required. 100 square meter nursery is needed for 5 kg seeds. Surface soil (0-15 cm deep) is well pulverised and mixed with well decomposed organic manure. 50 kg compost/ farm yard manure or 25 kg vermi-compost is needed for 100 square meter of nursery bed.

Raised beds of about 6-12 inches are prepared as the roots of 8-12 days old seedlings would grow up to 3 inches. The beds should be 4 feet wide and of convenient length which can be adjusted. Depending upon the convenience, single bed or several smaller beds can be prepared for one hectare of planting. The soil of the beds is mixed with sufficient amount of farmyard manure and irrigated. The seeds are sown either in 10 cm rows or through broadcasting. The seeds are covered with a mixture of fine soil and farmyard manure in equal proportions with height of 2 cm, watered and covered with a layer of rice husk for three days for protection. A water drainage channel is prepared around the nursery bed. Stability of the raised bed can be ensured through wooden planks, bamboos or other locally available materials.

Field preparation

In a well-drained loamy to clayey soil 15 cartloads or 3 tractors trolley loads of farm yard manure or compost should be applied per acre followed by 1-2 ploughings and 2-3 harrowings. SRI requires perfect levelling and raking for uniform distribution of water. 30 cm wide channels at two meters interval across the field are prepared to facilitate drainage.

Seedling transplanting

SRI demands minimum disturbance and shock during transplanting of seedlings. Seedlings at two leaf stage (8-12 days old) are generally removed from the nursery and transported keeping the seed and soil intact. A metal sheet is inserted 4-5 inch below the seed bed and seedlings along with soil are lifted with minimum disturbance to roots. Single seedling is planted gently at 1-2 cm depth using thumb and index finger at the intersections of 25x25cm.These intersections are already marked for quick and uniform establishment.

Irrigation and water management

SRI demands no inundation. Purpose of irrigation is to wet and saturate the soil with moisture. Subsequent irrigation is again required to keep the soil moist when it starts developing cracks. After panicle initiation, irrigation is given to a depth of 2.5 cm a day after the previously ponded water disappears. Watering is necessary at the timing of panicle initiation, booting, heading and flowering.

Weed control

Absence of standing water can lead to more weed growth in SRI. First weeding after 10 days of transplant is very crucial. Benefits of SRI can be obtained by use of weeder. Weeding can be done either through conoweeder/ ambikaweeder or by hand and is operated in criss-cross way for weed control. Weed can also be manually removed and buried in soil to improve the soil fertility. Chemical herbicides are not used in SRI.

Harvesting

Harvesting is advised when stem is green and panicles have ripened to prevent shattering. SRI reduces the duration of rice crop by 10 days. Thus, it allows more time for farmers to prepare for the Rabi crop.

Minimum and maximum area under SRI

The area for SRI varies from 0.4 to 1.0 ha. This practice when adopted in large area will reduce the percolation losses of water.

Increased savings through SRI

- Cost of cultivation is reduced by 23%
- Reduce the duration of crop
- Saving of 40% of irrigation water and increased land productivity by 45%
- The nursery costs in the SRI technique are reduced considerably, which is another benefit

Increased rice production through

- More panicles per plant
- Increased length of panicles
- Increased number of grain bearing panicles
- More grains per panicle
- Increased grain weight

A proper training of stakeholders (beneficiary/ farmers) in nursery preparation, handling and transplanting of seedlings, water management and weed control is necessary for proper adoption of this SLEM best practice. More information on SRI can be obtained from nearby Krishi Vigyan Kendra.

Indian Council of Forestry Research and Education (ICFRE), Dehradun as Ecosystem Services Improvement Project Implementing Unit (ESIP-PIU) is building the capacity of the local communities of ESIP project areas of Chhattisgarh and Madhya Pradesh for upscaling of System of Rice Intensification (SRI): A SLEM Best Practice.

Brief About ESIP

The World Bank funded Ecosystem Services Improvement Project (ESIP) supports the goals of the Green India Mission by demonstrating models for adaptation-based mitigation through sustainable land and ecosystem management and livelihood benefits. ESIP will introduce new tools and technologies for better management of natural resources, including biodiversity and carbon stocks. Main components of the project are: strengthening capacity of government institutions in forestry and land management programs, improving forest quality, and scaling up of sustainable land and ecosystem management (SLEM) best practices. ESIP is being implemented in the states of Madhya Pradesh and Chhattisgarh by Indian Council of Forestry Research and Education, Chhattisgarh State Forest Department and Madhya Pradesh State Forest Department under the overall direction of Ministry of Environment, Forest and Climate Change, Government of India.

Brief About ICFRE

Indian Council of Forestry Research and Education (ICFRE) is an autonomous body of the Ministry of Environment, Forest and Climate Change, Government of India. It is an apex body in the national forestry research system that promotes and undertakes need based research, education and extension in the forestry sector. It has a pan India presence with its 9 research institutes (Arid Forest Research Institute, Jodhpur; Forest Research Institute, Dehradun; Himalayan Forest Research Institute, Shimla; Institute of Forest Biodiversity, Hyderabad; Institute of Forest Productivity, Ranchi; Institute of Forest Genetics and Tree Breeding, Coimbatore; Institute of Wood Science and Technology, Bengaluru; Rain Forest Research Institute, Jorhat and Tropical Forest Research Institute, Jabalpur) and 5 centers located at Agartala, Aizawl, Prayagraj, Chhindwara and Visakhapatnam. Each institute are directs and manages research, extension and education in forestry sector in the states under their jurisdiction.

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