Socio-economic attributes of farmers adopting System of Rice Intensification (SRI) method-An Overview

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ABSTRACT

Rice is the staple food of India more than 43.86 M Ha area covered in the agriculture and 50% less seed and agri input 50% less water saving techniques were reported in SRI Methods..This techniques suggests that the system has been designed to satisfy the need of rice itself. A process transformation is always necessary to transform from tradition of farming to SRI Methods by imparting the training the farmers. This article identifies a number of areas for research that can be probably improving the factor productivity further.

Keywords: Adoption, constraint, rice, SRI.

INTRODUCTION

Rice is the staple food of India with regard to than 43.86 m.Ha area covering the agriculture land by paddy as the main food crop. System of Rice Intensification (SRI) was first introduced in Madagascar in 1983 by Father Henri de Laulanie. It was discovered by him when late rains forced him and his students to prematurely transplant 15-day old seedlings that subsequently tillered and performed well (Bouman, 2012). This method of cultivation has two main attributes, one, planting of 8-12-day old seedling at 25x25 cm (however, the distance between the seedlings depends on the temperature of the region also) and second, using less water. Kevane and Wydick (2001) suggested that, a crucial complicating factor is that the social context within which a farmer makes his adoption choice may have behavioral effects beyond those associated with learning about the technology. Particularly, concerns over rank and no pecuniary penalties related to deviation from community norms may affect individuals' decisions the maximum amount as or quite profit motives.

Minten and Zeller (2000) reported that Seasonal family labour and liquidity constraints prevent the poorer farmers from taking advantage of SRI. Similar findings concerning the distributional regressive nature of rice intensification strategies in Madagascar suggest that promoting alternative sources of income among the poorer farmers should be a crucial part of

rural development programs in this country. Sunding and Zilberman (2001) said that cross-sectional variation within the extent and rate of latest technology adoption is usually due to characteristics of the farmer or the farm, especially to differences in education, access to extension or financial services, risk preferences, plot biophysical conditions and farm size.

Moser and Baret (2002) reported that SRI is difficult for many farmers to practice because it requires additional labour and medical aid during the crop production. SRI permits resource limited farmers to appreciate higher yields upto 15 t ha-1 of paddy in less fertile soil with reduced rates of irrigation and inputs (Stoop *et al.,* 2002).

Rice is one amongst the most important traded commodities within the world with a complete quantity traded touching 16.4 million tonnes. The southeast countries account for about 40 per cent of the rice change the planet (Rai, 2004). Prabodh and Yanagida (2004) estimated the technical efficiency of small holding paddy farms in Sri Lanka by using stochastic frontier production methodology.

Prasad (2007) said that the growing out of the inductive creation of coalitions of diverse partners who work on and for SRI has been the emergence of what can be called learning alliances**.** The emerging organizational framework in Odisha state is the first of its kind in India. It may become a model for others as civil society, writ large, seeks to engage more functionally with state institutions and to step up the pace of SRI expansion.

Sinha and Talati (2007) evaluated the impact of SRI practices on rice yields, the economics of paddy cultivation and labour inputs based on field research conducted in West Bengal, India. Paddy yields with SRI were 32% higher than those under conventional paddy cultivation and net returns were 67% higher.

Palanisami *et al.,* (2008) said that labour input in SRI was reduced by 8%. An economic appraisal of SRI in Tamil Nadu showed that farmers using SRI methods are comparatively more efficient than those employing conventional methods under researcher-managed fields. The average levels of technical, allocate and economic efficiencies are 92, 76 and 70% respectively for SRI farms compared to 73, 35 and 25% for conventional rice farms. Higher allocate efficiency under SRI reflects the ability to choose optimal input levels.

In 2006, while India's agriculture sector contributed only 16% to national GDP, about 70% of India's poor, who mostly live in rural areas, depended on agriculture for their livelihoods (World Bank report, 2008).

Knowledge level of farmers about SRI method

SRI is usually considered as a practice that gives substantial yield without the use of inorganic fertilizer (Barison, 2002). *Thavaprakash et al.*, (2008) revealed that transplanting methods and application of organic manures significantly influence the growth and yield attributes. They also reported that organic rice production minimizes environment pollution, maintains or soil fertility ver a period of time, prevents entry of toxicants into food chain and ultimately the quality of rice fetches high premium in global market.

Nath and Das (2018) conducted a study in two district of Tripura, viz., West Tripura and South Tripura. Tripura may be a landlocked State. System of Rice Intensification (SRI) method of paddy cultivation is very important because it needs less seed, less water, less fertilizer and fewer attacks of pest and disease but per hectare yield gain is over traditional method of paddy cultivation. Rice is that the major food crop in Tripura with 75 per cent of its cropped area dedicated to the assembly of rice. In Tripura state as a full an outsized section of the SRI farmers possessed knowledge high to medium level (39.5 % to 35.0 %) on SRI technology.

A study in Vasudevanallur block of Tirunelveli district in province. a complete of 120 respondents were selected, and interviewed employing a well structured, pretested interview schedule. System of Rice Intensification cultivation practices around one-half of the SRI farmers had medium level of information and particularly cent per cent of the respondents possessed knowledge about the age of seedlings for transplanting, the spacing recommended for transplanting, number seedlings planted in an exceedingly hill and name of the mechanical weeder. 50.00 per cent of the respondents had medium level of information followed by 38.30 per cent and 10.00 per cent who had high and low levels of information in SRI cultivation method respectively (Thatchinamoorthy and Selvin, 2014).

Adoption of SRI Method

Evenson and Gollin (2002) suggested that SRI method has worked extremely well in developing improved seed, fertilizer and machinery, the staples of historically unprecedented agricultural output growth over most of the 20th century. The positive results from SRI methods have been reported from the Philippines, Cambodia, Myanmar, Lao PDR, Sri Lanka, Bangladesh, Gambia, Sierra Leone, and Cuba. Yield increases of 50% to 100% are common, with sometimes even a tripling of yield [Kabir (2002), Yamah (2002), Ceesay (2002)].

Laguna (2002) stated that SRI was proved to be an effective water saving technique which incurred (50%) less seed costs and costs on other inputs. Weeding was easier since the seedlings were distanced further apart. Thiyagarajan *et al.,* (2002), said that about 50 percent water savings are also reported with little or no reduction in yield. Thiyagarajan (2002) reported that the results indicated considerable water saving through modified SRI and a reduction of seed costs, but no significant increase in yields.

Bose and Hussain (2003) said that an alternative and more recent increase in focus is the use of bio technology in evolving a new rice with higher yield by effectively overcoming the complex problems of disease and pest incidence, tolerance to biotic and abiotic stresses such as drought, submergence, heat and cold, etc.; and also for improving the quality of rice to solve the problems of malnutrition and health. Kumar and Shivoy (2004) reported that SRI has it's own methodology of planting young and single seedling hill-1 at a wider spacing in a square pattern to facilitate mechanical weeding, permitting greater root growth, more tillering and yield. Tech (2004) said that an evaluation of 120 farmers in Cambodia who had used SRI methods for 3 years, with a doubling of yield, documented that farmers reduced their fertilizer use by 43%, and their use of agrochemicals by 80%.

Zheng *et al.,* (2004) denoted that the assure food security within the rice-consuming countries of the globe, rice production would must be increased by 50 per cent in these countries by 2025 and, this extra yield must be produced on less land with less usage of water, labour and chemicals.

Barah and Pandey (2005) said that "International Year of Rice", which has tremendous significance to food security. It very eloquently upheld the requirement to heighten awareness for the role of rice in alleviating poverty and malnutrition. The beneficial practices get recommended to be used with SRI, like selection of best suited varieties, doing good seed selection, possibly doing also seed priming and seedbed solarization (Culman et al., 2005), or using raised beds.

Kabir and Uppoff (2007) said that average rainfed yield within the area is 2 t/ha. On farmer field school demonstration plots, where SRI methods were used of course, average yields were over 6 t/ha. However, on farmers' field even without full use of the methods, yields averaged over 4 t/ha and are increasing year to year. Uphoff, (2007) said that normally, one can say that use of SRI methods reduces the agronomic and economic risks that farmers face.

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Thakur *et al.,* (2010a) Suggested that SRI experiences and analyses have, in fact, demonstrated that modifying conventional management of plants, soil, water and nutrients can lead to larger, deeper, longer lived root systems and more abundant, diverse and active soil biota. In turn, more profuse root systems and soil biota can have strong positive impacts on plants productivity and vigour.

The on-farm evaluations in farmers' fields have been conducted by research institutions, extension departments and civil society organisations in Tamil Nadu, Andhra Pradesh, Tripura, Odisha**,** Jharkhand, Himachal Pradesh, Uttrakhand, and Punjab. The farmers also reported lodging resistance and an absence of rat damage in SRI crops (Water Technology Centre, 2009).

The farmers who cultivated paddy in SRI method got more grain yield than with traditional methods as all yield contributing parameters of the plants were influentially better give SRI methods in comparison to non-SRI methods, and the requirements of irrigation water, plant-protection chemicals, and chemical fertilizer were all much less with SRI methods in comparison to non-SRI methods (Ghosal and Basu, 2018).

Constraints impending the adoption of SRI method

The labor-intensive nature of SRI and many other low-external input technologies have long been viewed as a positive characteristic in areas where labor is the main resource of the household yet the labor requirement is precisely the obstacle to adoption for many poor households with highly seasonal labor and income patterns (Lee and Reuben, 2000).

Stoop *et al.,* (2002) said that SRI method will not be applicable invariably everywhere. Each situation will require research and validation of the various SRI components. Therefore, on-farm participatory research will be required to introduce site-specific adaptations and to expose farmers and extension agents to the SRI perspectives.

Surridge (2004) noticed that SRI doesn't present the type of barriers to adoption that have kept revolution technologies from benefiting many of the world's poor households. Presently, probably over 400 million people in rice-producing areas of Asia, Africa and geographic region are afflicted with chronic hunger.

Bouman, (2007) denoted that rice cultivation could be a very water-intensive activity. to provide one Kilo of rice requires 3,000-5,000 litres of water. About two or thrice more water is required for rice cultivation than other irrigated crops. it's estimated that irrigated rice receives 34-43% of the world's irrigation water. It's also estimated that by 2025, 15-20 million ha of irrigated rice will suffer some extent of water scarcity. It's been estimated that for each 1ºC rise in mean temperature, there's a corresponding 7% decline in rice yield because of changes in climate will affect rice production and thus have an impression on food security and 24-30% of the world's accessible freshwater resources (rivers, lakes and aquifers) are accustomed irrigate rice (IWMI, 2007).

SRI dissemination methods has listed because the three main ones: (1) drawing on visual impacts of SRI (such as seen within the pictures here), (2) isolated and scattered efforts to popularize SRI, and (3) traditional SRI training programs (Meera, 2007).

SRI is not a technology and doesn't depend on saleable inputs has made it difficult for many existing extension organizations to understand and promote the innovation (Ravindran, 2007). The 2008 World Development Report (UNDP, 2008) shows that India's agriculture sector faces major constraints because of low investment and dilapidated irrigation infrastructure.

The major constraints in SRI production were lack of awareness, scarcity of skilled labour, nursery management, and drudgery in cono-weeder uses. The major perception regarding SRI method of paddy cultivation were low demand of water, higher yield, remuneration from government, low seed requirement, low costs of input uses (Agarwal and Kumar, 2016).

CONCLUSION

The impact of SRI adoption revealed from the results indicate that the SRI adoption can improve the household income provided the government intervenes in reducing the cost involved in the adoption of some of practices/components of SRI.

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