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SCIENTIFIC RICE PRODUCTION TECHNOLOGY ADOPTION BY TRIBAL FARMERS IN ALLURI SITHARAMARAJU DISTRICT OF ANDHRA PRADESH INDIA

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ABSTRACT

Alluri Seetharama Raju (ASR) district is an exclusive tribal agency district of Andhra Pradesh state where in rice is the prime staple food crop being cultivated by the tribal farmers in high altitude and hilly terrains in an area of 56,605 ha. A study was conducted during the year 2021-2022 to assess the adoption levels of recommended scientific rice production technologies by tribal farmers and also constraints faced by them in cultivation. A survey was conducted in two major rice growing areas of ASR district *i.e.*, Chinthapalli and G.K. Veedi mandals. A total of 60 respondents were interviewed with a set of 15 questions prepared based on critical scientific rice production technologies / practices. The results witnessed that among the scientific recommended practice being adopted by tribal farmers, FYM application (100%), time of sowing (88.33%), time of harvesting (85.00%), age of transplanting seedlings (73.33%) and weed management (70.00%) are the major followed practices. Scientific practice for pest and disease management (43.33%), selection of suitable recommended varieties (40.00%), line transplanting and spacing (26.00%) were adopted with less majority. Other scientific practices/methods like, recommended fertilizer dose (20.00%), seed treatment (20.00%) and water management (16.67%) are very less practiced by the farmers. The practices which were adopted less than 10 per cent by the tribal farmers include incorporation of green manure crops (10.00%), alley ways formation (6.67%) and soil test based fertilizer application (5.00%). Critical practice of correction of micro nutrient deficiencies was not followed by any tribal farmer. The major production constraints in rice cultivation include no control on water flow from field to field (rank 1), high incidence of blast disease (rank II), non-availability of seeds in time (rank III), more pest and disease attack during nursery stage (rank IV), less market rate (rank V) and heavy rains during flowering stage (rank VI). The information in the present study may aid in developing strategies that may benefit the farmers in rice cultivation in tribal areas reaping better net returns.

Keywords **:** Rice, Adoption level, Production technology, Constraints, Tribal farmers

Introduction

Rice is one of the most important food crops in India in terms of area, production and as a staple food for half of the Indian population after wheat (Singh and Yadav, 2014). India is the world's second largest producer of rice, with the cultivation area around 477.30 L Ha with a production 1364.37 LT, while in state of Andhra Pradesh the area extended around 20.97 L Ha with the production of 80.18 LT (Indiastat.com, 2024-25). In Andhra Pradesh, Alluri Seetharama Raju (ASR) district is located in a high-altitude region accounts for 56,605 acres under rice cultivation, contributing 3.7% of Andhra Pradesh total rice cultivation (Mohan, 2023, desagri.gov, 2024 and Sanyasi Rao,2024). Traditionally, tribal farmers' mainstay in indigenous agricultural practices (Taba *et al.,* 2014). However, over the years, they have gradually begun to adopt the recommended practices of improved rice production technology to enhance the production, productivity and sustainability thus it increases the farmers income. Several factors influence the adoption of recommended practices in improved

rice production technology, includes socio-economic conditions, institutional support and psychological factor (Asmelash, 2014 and Hagos *et al*., 2018).

However, in reality the awareness and knowledge of specific recommended practices among tribal farmers remain limited due to low exposure to extension services, lack of education and a strong reliance on traditional beliefs. Hence this research examined the extent of adoption the recommended practices in scientific production technology in rice by tribal farmers. Also, attention was paid to determine the constraints faced by the farmers in rice cultivation.

Material and Methods

The study was conducted during the year 2022 in Alluri Seetharamaraju (ASR) district of Andhra Pradesh. Exploratory research design was adopted. In the ASR district, two mandals *viz*., Chinthapalli and Gudem Kotha Veedi mandals were selected for the study, as rice is cultivated in the larger extent. From each selected mandal, three villages were selected randomly. From each selected village, 10 farmers were selected randomly who are cultivating rice since many years and the total sample size for the study is 60 tribal rice cultivating farmers. A set of recommended rice cultivation practices for this hilly and tribal area given by Acharya N.G. Ranga Agricultural University were taken (ANGRAU, 2022). A set of 15 critical recommended practices from seed to seed were selected. A semi-structured interview schedule was prepared for recording of the farmers responses. Constrains as perceived during rice cultivation was recorded and ranked accordingly. Descriptive statistics were used for explaining the results obtained.

Results and Discussion

Adoption of recommended practices by tribal farmers

The data in Table 1 provided a summary statistic of respondent according to the adoption and non-adoption of recommended practices in rice cultivation from seed selection to harvest. The data indicates that selection of suitable recommended varieties only adopted (40.00%) which is significantly less than the non-adopters (60.00%). Non- adoption of improved varieties may have been due to a lack of technical guidance, limited participation in extension training programs, high input requirement, lack of demonstration on hybrid rice varieties and the unavailability of timely information and improved variety seeds at proper time as reported by Singh and Yadav,2014; Emran *et al.,* 2020; Upadhyay *et al.,* 2020; and Sahoo *et al.,* 2020.

Following this, only a small percentage (20.00%) of tribal farmers adopted seed treatment practices, while the remaining (80.00%) of tribal farmers were not adopted the seed treatment practice. This may be, tribal farmers relied on old traditional cultivation methods and avoided the use of agro-chemicals coupled with low awareness about the benefits of seed treatment in controlling the seed borne diseases (Borthakur *et al.,* 2015).

A majority (88.33%) of tribal farmers being followed the recommended practices of timely sowing between the third week of June to mid-July to maximize crop survival, yield and ensure the timely harvest. However, a few tribal farmers (11.67%) were not followed the timely sowing due to lack of timely access of seed and faced the labor shortage during peak sowing period.

Nearly half of the tribal farmers (73.33%) adopted the recommended practices of transplanting the seedling at right age, as it helped to control the ear-head bug as reported by Venkatesan *et al.* (2016).

Perhaps, a large majority (95.00%) of tribal farmers have not adopted the soil test-based fertilizer application as it due to low mass media exposure, medium level of utilization of information sources, low literacy level, lack of technical guidance from extension agencies and remote location of soil testing laboratories in hilly areas. (Upadhyay *et al.*, 2020; Kapur *et al*., 2022)

Similarly, the recommended practices of line sowing and spacing of 20 × 15 cm were not fully adopted (73.33%) by tribal farmers due to lack of knowledge, skills and requirement of labor and time as most of the farmer engage their family members due to it is labor intensive work reported by Singh and Barman, 2011.

A significant majority (93.33%) of tribal farmers were not adopted the practice of forming alleyways, mainly due to lack of technical knowledge and fragmented land holdings but only small significant portion (6.67%) of tribal farmers were adopted it, as it helps to control the pest like the brown planthopper and stem borer.

Regarding the use of green manure crops, a majority (90.00%) of tribal farmers had not adopted, only few tribal farmers (10.00%) have adopted it. In contrast, cent percent of tribal farmers applied FYM, likely because it was easily available, cost effective and aligned with their indigenous agricultural practices.

A significant portion (80.00%) of tribal farmers did not adopt the prophylactic recommended dose of fertilizer (32:24:20). Borthakur *et al.* (2015) noted that due to lack of adequate knowledge about the correct dosage and the cost involvement were key reason for this non- adoption.

Moreover, cent percent of tribal farmers did not adopt the correction of micro-nutrient deficiencies, this is due to lack of knowledge and lack of observability directly in the field level (Sahoo *et al.,* 2020).

Weed management was adopted by 70.00% of tribal farmers, while the remaining 30.00% of tribal farmers did not follow the practice, possibly due to their poor economic condition, the use of broadcast seeding which makes weeding difficult, labor shortages and lack of knowledge about the timely weeding, as reported by Singh and Barman (2011).

Water management practices were followed by only small population of tribal farmers (16.67%), while majority (83.33%) of tribal farmers were not adopted may be due to inadequate irrigation infrastructure. Similarly, the practices of pest and disease management followed only 43.33% of tribal farmers, but half of the tribal farmers (56.67%) were not adopted this important practice. The reason behind may be tribal farmers relied on indigenous technical practices and lack of knowledge on chemical spray mixture, time and quantity of application, as reported by Singh and Barman, (2011); Borthakur *et al.* (2015).

Finally, majority (85.00%) of tribal farmers adopted the practice of timely harvesting of rice crop. This helped to prevent the grain shattering and allowed timely land preparation for the next crop. According to Nirmala *et al.* (2016) labour shortage during the harvest found more difficult but farmers do not postpone due to fear of rainfall and yield loss.

Table 1 : Adoption of recommended practices by farmers: (n=60)

S.No.	Recommended Practices	Adopted (f)	Adopted (%)	Not Adopted (f)	Not Adopted (%)
1	Selection of suitable recommended varieties	24	40.00	36.00	60.00
2	Seed treatment	12	20.00	48.00	80.00
3	Time of sowing	53	88.33	7.00	11.67
4	Age of transplanting seedlings	44	73.33	16.00	26.67
5	Soil test-based fertilizer application	3	5.00	57.00	95.00
6	Line transplanting and spacing of 20 x 15 cm	16	26.67	44.00	73.33
7	Allay ways formation	4	6.67	56.00	93.33
8	Green manure crops	6	10.00	54.00	90.00
9	FYM application	60	100.00	0.00	0.00
10	RDF (32:24:20)	12	20.00	48.00	80.00
11	Correction of micro nutrient deficiencies	0	0.00	60.00	100.00
12	Weed management	42	70.00	18.00	30.00
13	Water management	10	16.67	50.00	83.33
14	Pest and disease management	26	43.33	34.00	56.67
15	Time of harvesting	51	85.00	9.00	15.00

Constraints faced by tribal farmers in Rice cultivation

It is evident from the Table.2 indicates the data of constraints faced by the farmers in rice cultivation. Out of six constraints identified, respondents reported that 'no control on water flow from field to field' was ranked first, as reported by 85.00% of the farmers. This was followed by the 'incidence of blast disease' which was ranked as the second important constraints by 68.33 percent of the farmers. The 'non availability of seeds in time' was identified as the third major constraints by 53.33% of the farmers. The fourth rank was given to 'more pest and disease during nursery stage' as the constraints reported by 33.33% of farmers. 'Less market rate' was given fifth rank as constraints by 31.67% of farmers. Lastly, about 30.00 % of the farmers cited that 'heavy rains during flowering stage' as the sixth major constraints faced by the farmers.

Table 2 : Constraints faced by farmers in rice cultivation: (n=60)

S.No.	Constraint	F	%	Rank
1	No control on water flow from field to field	51	85.00	I
2	High incidence of blast disease	41	68.33	II

3	Non availability of seeds in time	32	53.33	III
4	More pest and diseases during nursery stage	20	33.33	IV
5	Less market rate	19	31.67	V
6	Heavy rains during flowering stage	18	30.00	VI

It was determined through the data, due to lack of proper irrigation infrastructure, improper field leveling, humid condition and lack of crop rotation practices were favorable condition for the spread of disease. Further, the lack of awareness and information about the improved variety and lack of proper distribution channels were major reason for the constraints in availability of seeds in-time. Dense sowing and improper nursery management practices will cause the occurrence of pest and disease in nursery condition. From the above analysis, a similar study found with the agreement of those of Khan *et al.* (2021), Shigwan *et al.* (2019), Phenica *et al.* (2018), and Nirmala *et al.* (2016).

Conclusion

The study revealed that the majority of tribal farmers were not adopted important recommended practices such as correction of micro-nutrient deficiency, soil-test based fertilizer application, green manure crops, seed treatment and water management, alleyways formation. Regarding constraints, lack of control of water over water flow, pest and disease attack, low market rate and heavy rainfall during flowering stage were identified as the major constraints faced by the tribal farmers in rice cultivation. These issues are primarily due to limited awareness and inadequate knowledge about improved recommended practices. Therefore, it is essential to strengthen extension services, improve the accessibility of agricultural inputs and timely information and conduct the training programs to motivate the tribal farmers to successfully adopt the scientific production technology, thereby enhancing their productivity and living standards.

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