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Adoption intention of farmers towards improved tools in paddy cultivation practices

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Abstract

A sizeable portion of farmers in India are dependent on agriculture. Farm land in India is more of fragmented which means small and marginal. As the land holdings are small, farmers are doing the farming practices manually with lot of risk and drudgery. Farmers are not in a position to afford the mechanised equipment rather they can use the improved tools available for the same. Current study was conducted on paddy cultivation practices in Andhra Pradesh. Two districts were selected namely east and west Godavari in which two blocks were taken from each district. From each block 30 samples were taken randomly so that total sample size was constituted to 120. Adoption intention was assessed against five improved farm tools available for paddy cultivation practices. A five-point scale was used to know the degree of very interested to not at all interested. Mean scores were assigned appropriately. Mann Whitney U test was applied to know the significance of the adoption intention. Results showed that Drum seeder have the highest mean score followed by cono weeder, SRI planter, power prayer and power operated thresher. Mann Whitney U test results showed that all the five improved tools found to be significant for the adoption intention. The present study may help the farming community to adopt the improved tools which are easily available, affordable for them.

Keywords: farmers, adoption, improved tools

1. Introduction

Majority of the farmers in India are dependent on agriculture for their livelihood security. Farmers are doing all the cultivation practices manually as they are not in a position to afford the mechanised equipment for farming purposes. Paddy cultivation involves many activities that requires great physical effort. Practices includes ploughing the field, uprooting the seedlings from nursery, planting the saplings in main field, fertilizer application, harvesting, threshing, and winnowing are common in paddy. Doing all the practices in paddy manually, they are adopting awkward postures as well as highly repetitive movements which resulting in the physical strain. As a results, productivity of the work and efficiency of the worker are greatly reducing. By working in awkward postures during a particular agricultural activity rice farmers suffering from pain in different parts of their body, especially in the lower back, knee, ankle, feet, and shoulder regions (Das and Gangopadhyay, 2011) [4]. Gangopadhyay *et al*., 2010 [5] also suggested that working in a squatting and awkward posture for prolonged period of time may lead to musculoskeletal disorder especially low back pain among the different group of workers. In rice cultivation, Manual rice transplanting is high labour demanding operation and directly associated with human drudgery. High labour demand during peak transplanting period adversely affects the timeliness of this operation, thereby reducing crop yield. Ojha and kwatra, (2012) [8] carried out an experiment to assess the level of human drudgery and musculoskeletal disorders of farm workers involved in mechanical and manual rice transplanting and concluded that bending and sitting posture during manual uprooting and transplanting majority of the farmers were suffering from pain in neck, both shoulders, upper back, lower back and thighs and recommended the mechanical rice transplanting as the most promising option to solving the problem of high physiological workload, human drudgery and musculoskeletal disorders. A study by Crawford (2007) [3] revealed that musculoskeletal problems are one of the most prevailing occupational ailments and one of the leading causes of absenteeism and productivity loss. Various methods of assessment applied to know the risk factors as a result of incorrect postures. Food security is ensured by agriculture industry in most of the developing countries. Major portion of the steps including cutting, planting, and harvesting is done manually in the sugarcane production. One of the major drawbacks that farmers face is a lack of awareness about how to keep their bodies in normal and proper working conditions. Singh *et.al.,* (2016) stated that the majority of the farm women were performing digging, sowing, manuring, and drying of grain and various livestock activities. Women as farmers or farm workers, participate in several activities such as seeding, transplanting, weeding, fertilizer & manure application, plant protection, thinning, harvesting, processing, selling, winnowing, storing, etc. Buranatrevedh and Sweatsriskul (2005) [1] conducted a study in Pathum Thani province,

Thailand. The evaluation of farmers' knowledge, attitudes, and practices relating to occupational agricultural health and safety in the Klong revealed that farmers had a high level of knowledge both before and after model implementation. However, their knowledge did not match their behaviour. Their actions remained high-risk both before and after the adoption. Furthermore, rice farmers are more vulnerable to accidents and injuries in paddy fields with holes, ponds, flooded areas, and muck. Furthermore, working long hours in the sun can lead to health issues such as fatigue and stress.

Santaweesuk *et al.,* (2013) [10] opined that it was possible that people who had been rice farmers for a long time knew the nature of their work and neglected the risks associated. Those who had shorter length of current occupation might have been well aware but they lacked experience. As a result, they worked more carefully and cautiously to the point that their risk perception was higher. Rice farmers with longer lengths of current occupation did not care about personal health resulting in a lack of safety perception opportunities. Furthermore, farm size was found to be one of the factors that negatively affect health risk perception. Because they had to work longer hours per day due to a large number of farms, work overload occurred whenever they had limited time for too much work and had no time to be aware of their health.

So, there is a need that farmers should be made aware of the adverse effects of the manual practices, and they should be encouraged to go for the improved tools available to save their physical and mental health. In order to address the above issues, present study was planned.

2. Materials and Methods

2.1 sampling plan

The present study was carried out in Andhra Pradesh state where the paddy cultivation is prevalent. Two districts namely east and west Godavari were taken purposively as these two districts are producing almost 50 percent of total rice that is producing in Andhra Pradesh. Two blocks were taken randomly from each district and 30 farmers were taken as sample randomly from each block. So, the entire sample size constituted 120 from four blocks of two districts.

2.2 Methodology

A structured interview was conducted, to know their perception about the technology and readiness to adopt it. A five-point scale was used to assess the adoption of the farmers towards the improved tools available in paddy. Mann-Whitney U test was used to know the significance of adoption intention. To assess the adoption intention of the five improved tools available for the paddy cultivation practices were assessed mean scores and ranks were assigned properly. The improved tools were Drum seeder, SRI planter, Cono weeder, Power sprayer, and Pedal operated thresher. A five-point scale was used to assess the adoption intention.

Table 1: Categories and scores of the improved tools for adoption intention

Category	Score
Very interested	5
Interested	4
Neutral	3
Less interested	2
Not at all interested	1

Mann Whitney U test

It was used to know the significance of adoption intention towards the improved tools in paddy cultivation practices. The Mann-Whitney U test is the non-parametric counterpart to the t-test for independent samples; it is subject to less stringent assumptions than the t-test. Therefore, the Mann-Whitney U test is always used when the requirement of normal distribution for the t-test is not met.

3. Results

Table 2: Showing Mann-Whitney U test values

S.no	Tool	Mann-Whitney U	Z values	Level of significance
1	Drum seeder	74.000	-6.625	0.005*
2	SRI planter	532.000	-1.935	0.045*
3	Cono weeder	440.000	-2.881	0.004*
4	Power sprayer	683.000	-0.78	0.000*
5	Pedal operated thresher	74.000	-6.625	0.005*

*Significance at 0.05 Level

Mann-Whitney U test yields the results in which adoption intention towards all the improved tools found to be significant at 5 percent level as given above in the table 2.

1. Drum seeder

The low p-value (0.005) indicates that results is statistically significant at a common significance level (0.05). this indicates that there is significant difference in the distribution if measured variable for the drum seeder compared to the reference group. The large negative Z value indicates a large difference, likely favouring the reference group.

2. SRI planter

The p- value (0.045) which is just below the normal significance value (0.05), reported statistical significance. Results indicating that significance difference in the measured variable for the SRI planter compared to the reference group. The Z value is negative, it is not that extreme, which shows moderate effect.

3. Cono weeder

The p-value (0.004), the result indicating statistically significant. This suggested that cono weeder shows a significant difference in the measure compared to the

reference group. The negative Z value indicated that difference if clearly identifiable and possibly skewed in favour of the reference group.

4. Power Sprayer

The p- value (0.000) showing very strong statistical significance. There is a significant difference in the measured variable for the power sprayer compared to the reference group. The Z value is relatively close to zero, indicating that while the difference is statistically significant, it may not be large.

5. Pedal operated thresher

The p- value (0.005) which is statistically significant. And the large negative Z value suggest a notable difference, favouring the reference group.

Table 3: Tools and their mean ranks for the adoption intention. (N=120)

S. no	Tools	Mean rank	Priority
1	Drum seeder	51.60	I
2	SRI planter	46.04	III
3	Cono weeder	49.58	II
4	Power sprayer	40.23	IV
5	Pedal operated thresher	39.89	V

It was observed from the above table 3 that Drum seeder has the highest mean rank (51.60) and it is the top priority among the listed tools. It is considered that most important or valuable based on the criteria used for the ranking. Cono weeder (49.58) which ranked second is slightly less prioritised than the drum seeder but still holds the significant value. SRI planter (46.04) is third in the mean rank and priority which indicated that it is somewhat less prioritised compared to the drum seeder and conoweeder but still important. Power sprayer has the lower mean rank (40.23) and is fourth in the priority list. It is valued less than the top three tools but still has some level of importance. With the lowest mean rank (39.89) and priority, Pedal Operated Thresher is the least prioritized among those listed, suggesting it is the least critical or valued based on the provided criteria.

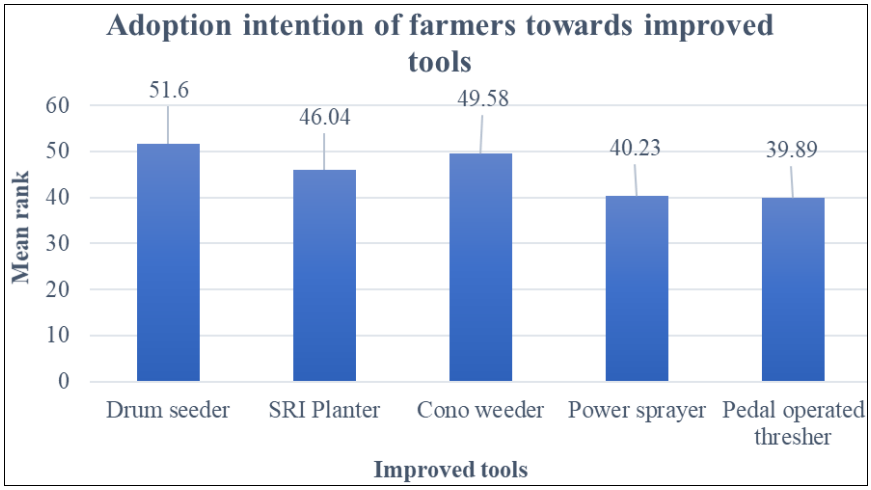

Fig 1: Histogram showing the mean ranks of different improved tools for adoption intention among farmers

4. Conclusion

It was noted that famers are doing cultivation practices manually which indicated that they are facing a lot of strain which results in the drudgery and reduced efficiency, productivity. So, the above study was conducted to assess the adoption intention among the farmers to make the farmers aware of the improved tools available in the paddy cultivation practices. There is a need from the government side to make the farmers aware of the adverse effects of the manual cultivation practices which are risky.

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