The Pharma Innovation Journal 2023; 12(11): 742-746

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(11): 742-746

www.thepharmajournal.com
Received: 07-08-2023
Accepted: 18-10-2023

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Assessment of conservation agriculture practices with happy seeder technology in rice-wheat and green gram cropping system

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Abstract
Rice-wheat is the major cropping system in the Indo-Gangetic plains and is also practiced on considerable area in district Betul Madhya Pradesh. Rice-wheat production system under conventional practices includes monotonous and tedious techniques for field planning and weeds the board; expands cost of creation, decay soil richness, and don't offer wanted benefits for increasing the grain yields. In conventional agriculture, burning of crop leftover residue and consuming of harvest extra buildup has become a significant test that prompts loss of valuable plant supplements and decayed natural quality. To alleviate these issues, in fact attainable, monetarily feasible and environmentally reasonable innovations should be basically embraced. An innovation is needed to work with ideal planting in standing stubbles, limit weed invasion, lower cost of creation, further develop compost/water-use proficiency and further develop soil wellbeing. To reap the benefits of conservation agriculture (CA), studies were conducted at farmers' fields in rice-wheat-greengram cropping system in black-cotton soils in district Betul Madhya Pradesh for consecutive four years. Sowing was done with Happy Seeder. Rise of weeds from upper soil surface was viably constrained by herbicides. Results showed that the advantages of CA can well be tackled in dark cotton soils with rice-wheat-green gram editing framework. Maintenance of yield buildups on soil surface gave a successful mulch cover to supplement and dampness preservation, temperature balance and weed control.

Keywords: Conservation agriculture, greengram, INM Integrated Nutrient Management, wheat, happy seeder

Introduction
Wheat is major rabi cereal crop and cultivated in 1.5 lakh ha availability of irrigation water is major constraints, in wheat cultivation paddy grown in 0.50 lakh ha, and the residue of paddy also limiting factor in rabi. In view of moisture and residue management during rabi season, the present study has been conducted. The technologies assessed is conserving the moisture in rabi as well as decomposing the paddy residue, which increases the organic carbon. Paddy-Wheat editing framework is major trimming arrangement of Betul District Madhya Pradesh. Escalated editing framework and utilization of high return assortments has brought about creation of colossal amounts of yield buildup. With the presentation of consolidates, more than 80% of paddy-wheat region is collected by the join reapers in this manner create 20 million tons of paddy straw. This utilization of join collectors for enormous scope was observed to be a significant determinant factor of ranchers' choice to consume on field rice deposits (Gupta, 2010) [1]. Further long span assortments having hefty straw burden, involving critical region in the state presents significant test for the ranchers to arrange off left over straw. In-situ fuse of a huge amount of deposits is energy serious, costlier and tedious undertaking (Singh *et al*. 2013) [2]. Because of more limited time interval (10-15 days) between reaping of paddy and planting of next wheat crop, high information cost for joining, non accessibility of effective buildup the board hardware with the ranchers, absence of appropriate implementation of law to check consuming, the ranchers of the state resort to consume the yield buildup for early leeway of fields. Such buildup consuming causes considerable natural contamination, consuming of side of the road vegetation, street mishaps and so forth Contaminated air likewise presents inconvenient impacts to human and creatures wellbeing; particularly to youngsters and advanced age individuals. This act of consuming additionally contributes towards green house gases outflow (Gujral *et al*. 2010) [3]. Other than these natural and human medical problems this training likewise brings about crumbling of soil wellbeing,

loss of plant supplements, natural carbon of the dirt and so forth According to gauges one ton of straw contain roughly 400 kg of natural carbon, 5.5 kg of Nitrogen, 2.3 kg of P_2O_5, 25 kg of K_2O, 1.2 kg of S and 50-70 percent of miniature supplements are lost through straw consuming along these lines costs more than Rs. 200 crores (Siddhu *et al*. 2007) [4]. To handle the issue of stubble consuming an innovation was needed for in-situ buildup the executives and ideal planting of the following wheat crop. Among different in-situ buildup the board advances, Happy Seeder innovation had a significant forward leap because of its fast extension in the previous two years. This machine joins both the capacity of stubble mulching and seed boring. It comprises of a rotor mounted with the gamma type cutting edges for dealing with the paddy buildups and a zero till drill for planting of wheat. (Pratibha G 2017) [5].

Materials and Methods

The monetary investigation included a halfway planning approach in which the extra and inescapable yearly expenses and advantages related with the Happy Seeder (HS) were contrasted with gauge the net additions from reception of the new innovation. The investigation was done basically according to a monetary viewpoint; some financial, social and natural advantages were additionally distinguished without evaluating the worth of these advantages. The investigation was completed essentially according to a monetary viewpoint; some financial, social and ecological advantages were likewise distinguished without evaluating the worth of these advantages. In endeavor a monetary assessment, it is proper to utilize monetary qualities for every pertinent information and yields. Monetary qualities' allude to the costs/benefits really got by ranchers for yields, and genuine expenses paid by them for inputs utilized or misfortunes endured. In a monetary examination (rather than the monetary investigation introduced here) sources of info and yields would be estimated at the worth put on them by society. A financial investigation is past the extent of this examination. The measure utilized in evaluating the monetary value of reception of the HS was the Net Present Value (NPV) of the speculation. NPV is the difference between the present 7 value of benefits of the technology and the present Net value of costs of the technology. The proposition is considered to have a positive effect if its NPV surpasses zero.

Table 1: Conservation technologies address sustainable farming issues compared to conventional techniques:

Problem Area	Conventional Farming	Conservation Technologies
Nutrient deficiency	Application of inorganic fertilizer	INM through biological regeneration with integration of livestock production for nutrient recycling
Pest Management	Need based spraying of pesticides	Eco-friendly pest management with IPM module
Crop residue Management	Burning of crop residue for early/easy field preparation of next crop	Crop residue and moisture conservation through happy seeder technology
Water deficiency	Conventional irrigation practices	Management of soil organic matter for increasing water holding capacity and irrigation by BBF and FIRB technology
Seed Conservation	High seed rate, improper seed treatment methods	Seed saving by hand dibbling on ridges, R&F and raised bed technologies
Environmental degradation	Intensive tillage and associated managements practices which provide limited protection against degradation	Deep ploughing reduces soil erosion and water conservation.

Results and Discussions

Crop residue management by happy seeder in Wheat-Summer green gram cropping system

Salient features: Burning of crop residue is one of the major problems practiced by farmers for removing stubbles from the fields after Rabi season. Therefore, new technology of sowing is introduced for sowing of crops in standing residue named as happy seeded. This technology of sowing of summer green gram by using happy seeded has shown best results on soil health and improved its yield.

Fig 1: Sowing in happy seeder in wheat- summer green gram (Worker)

Impact and benefits- KVK intervention

Use of happy seeded for sowing of summer green gram has improved the nutritional status of soil, increased the yield, reduced weed infestation in the fields.

INM (Integrated Nutrient Management)

INM has multifaceted potential for the improvement of plant performance and resource efficiency while also enabling the protection of the environment and resource quality.

- Enhances crop yields by 8-15%
- Increases water-use efficiency.
- Increase economic returns to farmers
- Improving grain quality and Soil health and sustainability

New technology water saving/conservation

Broad bed and furrow (BBF) and Furrow irrigated raised bed (FIRB).

The BBF technology has many advantages including in-situ conservation of rainwater in furrows, better drainage of excess water and proper aeration in the seedbed and root zone. Similarly FIRB technology Management of irrigation water is simpler and more efficient. On an average about 30% less irrigation water was required compared to flatbed method and improved crop yields by more than 15%.

Fig 2: Water saving/Conservation in wheat followed by paddy

In the present study the cost benefit ratio of wheat after harvesting the paddy have been studied, in Paddy-wheat-green gram cropping system. The data reveals that the highest yield (41.6 q/ha) has been recorded in T3 (Sowing by happy seeder + Waste decomposer 200gm + 200 liters of water + Jaggery 2 kg) followed by T2 yield (39.7 q/ha) (Sowing by Happy seeder). The minimum Yield 37.00 q/ha was recorded in T1 Sowing of wheat after burning of crop residue by ordinary seed drill and imbalance fertilizer without proper weed management.

Table 2: Average Economic Performances under On Farm Trials during 2019-20 and 2020-21.

Details of technology	Name of Parameter	Unit of Parameter	Yield (q/ha)	Average Cost of cultivation (Rs/ha)	Average Gross Return (Rs/ha)	Average Net Return (Rs/ha)	Benefit-Cost Ratio (Gross Return/Gross Cost)
T1 FP	Weed Intensity (Nos of Weed/m2) Irrigation saving (%) Yield (q/ha)	65.3 Weeds/m2 - 38	37.00	27800	73150	45350	2.59
T2 RP		14.5 Weeds/m2 33% 38.5(q/ha)	39.7	20700	74112	53412	3.58
T3 RP		8.5 Weeds/m2 35-40% 42.8(q/ha)	41.6	20200	82390	62190	4.07

Energy/resource saving with reduced management: Happy Seeder Technology In this Fig. 3 it is one of the unique techniques which are used for direct sowing without any burning of crop residue. This technology is eco friendly with environment for the health of soil as well as save the energy of farm inputs. It's also save the water by using field moisture of last crop field.

Fig 3: Energy/Resource Saving with Reduced Management & Water Saving/Conservation

Performance of happy seeder in rice-wheat-summer Green gram cropping system

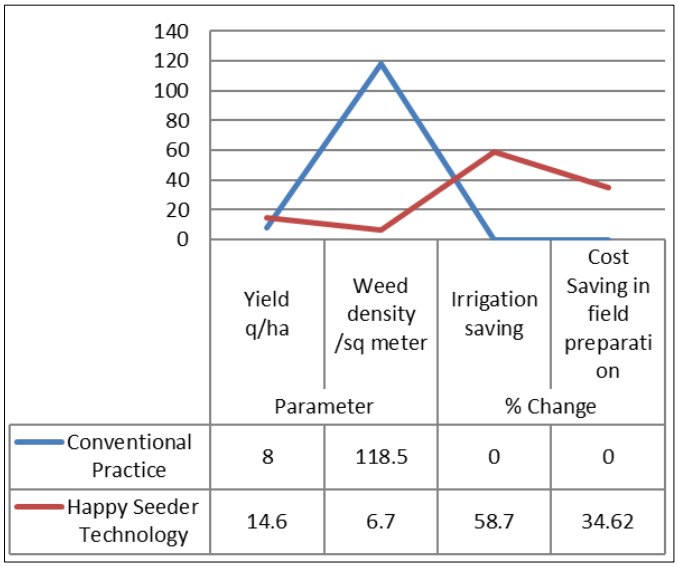

Fig 4: Performance of happy seeder

As shown in the Graph that wheat sowing with happy seeder reduces at least 8 tillage operations as compared to the conventional method of sowing. Comparison between happy seeder and conventional sown wheat plots on the basis of resources employed by the farmers in terms number of tillage operations, time, energy (fuel), number of weedicide sprays and money. The result from the farmers further showed that on a normal there was saving of roughly Rupees 3000/ - per ha under cheerful seeder planted wheat then the conventional method.

Table 3: Saving in energy consumption in Happy Seeder Technology as compared to Conventional

Farm Operation	Machine/Technology	Energy Consumption	Saving in energy consumption over conventional
		MJ ha -1	%
Happy Seeder Technology			
Residue Managements	Straw Spreading	49	93.54
Land preparation	None	0	100
Sowing	Happy Seeder	1551	-110.16
Irrigation	Submersible pump	2182	62.20
Total (INPUT operation)		3782	63.69
Conventional Practice			
Residue Managements	Stubble Shaver + Burning residues	758	
Land preparation	Harrowing (Twice)	1264	
	Cultivator (Twice)	1260	
	Planker	622	
Sowing	Seed cum Fertilizer drill	738	
Irrigation	Submersible pump	5773	
Total (INPUT operation)		10415	

Fig 5: Happy seeder in Wheat- Summer Green Gram benefits farmer and Scientist interaction

Sowing this Fig. 5 Happy seeder Technology is low cost technology and benefited to farmers for wheat management as well as increase organic carbon in soil. The yield obtained was 14.6 q /ha with net profit of 67800 Rs/ha

Conclusion

Timely sowing of each crop return in paddy-wheat-green gram cropping system is a challenging task and the dispose of crop residue in traditional ways is not beneficial. Therefore the improved implement happy seeder along with the bio digester have used and proven beneficial. Happy seeder zero tillage is a good option for growers of rice tract especially on clayey soil, as it ensures in time sowing of wheat crop. This equipment not only ensures maximum yield but also save fuel, energy, time of sowing, hence it is a most profitable practice. From the findings of the above study it is concluded that wheat crop sown with happy seeder requires less time, energy and money without compromising on yield. Retention of moisture, suppression of weed flora and in-situ management of paddy straw makes the happy seeder technology environment and farmers friendly. However, the long-term impacts of this technology on conservation of natural resources (water and soil), flora and fauna, role of civil society in rapid adoption of technology, technology contribution towards poverty alleviation etc. needs to be further explored.

Acknowledgement

The authors are thankful to the Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur and the Krishi Vigyan Kendra, Betul for providing financial assistance and necessary facilities to carry out the investigation.

Conflict of interest

All authors declare no conflict of interest.

References

1. Gupta R. The economic causes of crop residue burning in Western Indo Gangetic Plains. Proc 6th Annual Conference on Econ Growth and Dev. Indian Statistical Institute, New Delhi, India; c2010.
2. Singh A, Kang JS, Kaur M, Goel A. Root parameters, weeds, economics and productivity of wheat (*Triticum aestivum* L.) as affected by methods of planting in-situ paddy straw Int. J Curr. Microbiol App Sci. 2013;2(10):396-40.
3. Gujral, J, Davenport A, Jayasuriya S. 'Is there a role for agricultural offsets in sustainable infrastructure development', chapter 25 in India Infrastructure Report 2010, Oxford University Press; c2010.
4. Siddhu HS, Manpreet-Singh, Humphreys E, Yadvinder-Singh, Balwinder-Singh, Dhillon SS, *et al*. The Happy Seeder enables direct drilling of wheat into rice stubble Aust J Exp Agr. 2007;47:844-854.
5. Pratibha G, Biswas PP, Chaudhari SK. Best Practices of Conservation Agriculture in India. Best Practices of Conservation Agriculture in South Asia: SAARC Agriculture Centre; c2017, 51.