



A Study on Constraints and Suggestions in Agriwaste Management by Farmers of Medak District in Telangana

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Agriculture is the largest contributor of any resource sector, to the economy. Agriculture is also a larger generator of waste material. This paper focused to study the constraints and suggestions in agri waste management. The Ex-post facto research design was adopted for the study with a sample of 120, covering Medak district of Telangana state. This study focus on analysis of profile characteristics respondents, constraints and suggestions of of respondents in agri waste management. Major constraints expressed by the farmers in adoption of agri waste management practices were, agri waste management practices requires additional work and cost, non availability of labour for the agri waste management practices, difficult to manage huge volume of agri waste, decomposition of agri waste takes time and low preference of farmers for doing waste management practices. Suggestions expressed by respondents for increased adoption of agri waste management were extension agents should educate and demonstrate about latest

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technologies in agri waste management, promotion of group approach to manage agri waste, promotion of more number of custom hiring centers for easy access by small and marginal farmers at village level (Happy seeder, Turbo seeder), village level industries should be developed (vermi-compost).

Keywords: Agriwaste; management; adoption; constraints; suggestions.

1. INTRODUCTION

India faces a difficult problem in maintaining food security for its rapidly rising population. Furthermore, farming in the future must be multifunctional and environmentally sustainable in order to provide ecosystem products and services as well as livelihoods for farmers and society. As a result, farming should effectively handle local, national, and international difficulties such as food, water, and energy insecurity; climate change issues; and natural resource degradation. Agri waste management, as a key component, is a viable option for long-term development.

Every year India produces 550 million tonnes of agriculture waste [1]. Agriculture waste management is a part of the ecological cycle, in which everything is recycled and cycled in order to sustain the ecosystem's interdependency. All plant wastes are placed in the correct place at the right time for best use in order to convert into usable goods and control pollution through waste management. Burning agricultural waste releases soot particles and smoke, posing health risks to humans and animals. It also causes the release of greenhouse gases such as carbon dioxide, methane, and nitrous oxide, which contribute to global warming and the loss of plant nutrients such as N, P, K, and S from the soil. Crop residue burning is a waste of precious resources that could be used to provide carbon, bioactive chemicals, feed, and energy to rural households and small businesses. The heat generated by burning crop leftovers raises soil temperature, killing active beneficial microbial populations. However, this effect is only temporary because the bacteria regrow after a few days. Repeated burnings in a field, however, diminishes the microbial population permanently results in soil hardening & erosion of soil.

Agri waste management aids farmers in lowering fertiliser costs and increasing crop output. Creates jobs for low-skilled workers on a local level (vermi-compost). Agri waste conversion decreases the amount of trash that enters the air and water. Reduces carbon dioxide and nitrous oxide emissions, which are both greenhouse

gases. Hydraulic conductivity is increased by incorporating agricultural waste into soil or retaining it on the surface. Modifies soil structure and aggregate stability to increase water holding capacity and lower bulk density. Reduces evaporation from the upper strata of the soil, which aids crop productivity in a variety of cropping methods and climates. With this in mind, the purpose of this study is to learn about agricultural waste management strategies and how farmers use them in agriculture and related industries.

2. METHODOLOGY

An Ex-post facto research design was adopted for the study. The State of Telangana was chosen since the researcher was familiar with local language and culture. Medak (Erstwhile) district of Telangana state was selected purposively for the study as it is having maximum number of diversified cropping systems throughout the year. Four mandals viz., Nyalkal, Sangareddy, Gajwel and Medak were selected using simple random sampling technique. A total of eight villages at the rate of two from each selected mandal were chosen for the study. From each village 15 respondents were selected by following simple random sampling technique, thus a sample 120 respondents were selected for the study. The data from the respondents was collected with the help of an interview schedule. The data collected was analysed and interpretations were drawn based on results. The statistical techniques frequency, percentage, exclusive and inclusive class interval were adopted for analyzing data. Frequency was used to know the distribution pattern of the respondents according to the objectives under study. Percentages were used for standardization of sample size by calculating the number of individuals that would be under the given category if the total number of individuals were 120.

3. RESULTS AND DISCUSSION

The data was collected from the respondents on the selected profile characteristics, constraints and suggestions were analysed, interpreted, and

accordingly the following results and conclusion were drawn.

3.1 Profile Characteristics of the Respondents

It is very important to scan the profile of farmers as it influences their awareness about agri waste management. Keeping this in view, an attempt was made to analyze the selected profile characteristics of the farmers.

3.1.1 Age

Age was operationalized as the chronological age of the respondent in terms of the total number of years completed at the time of the study. Data presented in Table 1. shows that the majority (55.00%) of the respondents were belonged to middle age followed by old (25.00%) and young (20.00%) age.

In the villages, the profession of agriculture is primarily done by middle and elderly farmers. The majority of the time, people are looking for non-agricultural jobs or businesses. Other than agriculture, youth prefer to pursue more lucrative and less risky careers. The results were in accordance with the findings of Savitha [2] and Anuse [3].

3.1.2 Education

It was operationally defined as the formal schooling, an individual has undergone. Data presented in table the Table 2 that majority of the

farmers were educated up to primary school (26.66%) followed by illiterate (22.50%), high school (21.66%), functional literate (12.50%) intermediate (11.66%), under graduate (3.33%) and Post graduation and above (1.66%) respectively.

The aforementioned data show that the majority of farmers have only completed primary school and are closely followed by illiterates.

It's possible that this is linked to the end of primary school instruction. Because of their financial situation and livelihood sustenance, the majority of the interviewees, who are small and marginal farmers, may not have pursued further education. Another cause for this trend could be a lack of higher education facilities and respondents' poor socioeconomic level. As a result, efforts must be made to improve education in rural regions. Farmers must be educated about the resources available to them through literacy efforts. The results were in accordance with the findings of Savitha [2].

3.1.3 Farm size

It was operationalized as the number acres owned by the respondents at the time of conducting the study. Data presented in Table 3. shows that the majority respondents had a small farm size of land (40.00%) followed by 26.66 per cent had marginal land holding, 20.83 per cent of respondents had small medium land holding, 12.50 per had medium land holding and none of them had large farm size.

Table 1. Distribution respondents according to age (n =120)

S.No	Age	Frequency	Percentage
1.	Young age (up to 35 years)	24	20.00
2.	Middle age (36-50 years)	66	55.00
3.	Old age (above 50 years)	30	25.00
Total		120	100.00

Table 2. Distribution offarmers according to their education (n =120)

S.No	Category	Frequency	Percentage
1.	Illiterate	27	22.50
2.	Functional literate	15	12.50
3.	Primary school	32	26.66
4.	High school	26	21.66
5.	Intermediate	14	11.66
6.	Under graduation	4	3.33
7.	Post graduation and above	2	1.66
Total		120	100.00

Table 3. Distribution of respondents based on their farm size (n = 120)

S. No	Farm size	Frequency	Percentage
1.	Marginal (Less than 1 ha)	32	26.66
2.	Small (Between 1 to 2 ha)	48	40.00
3.	Small-medium (Between 2 to 4 ha)	25	20.83
4.	Medium (Between 4 to 10 ha)	15	12.50
5.	Large (More than 10 ha)	0	0.00
Total		120	100.00

From the above results, it could be concluded that majority of the respondents had a small farm size, division of joint families into nucleous families might have resulted in fragmentation of land. The results were in accordance with the findings of Anuse [3].

3.1.4 Farming experience

It was operationalized as the number of years of experience a respondent had in farming and allied sectors. Data presented in Table 4. shows that majority of the farmers had medium farming experience (56.66%), followed by high (22.50%) and low farming experience (20.83%).

According to the preceding findings, the majority of the farmers had a medium level of agricultural experience. This trend could be explained by the fact that the majority of the respondents (55.00%) were in the middle age bracket. It is clear that farming experience has a significant impact on farmers' willingness to embrace, analyse, and test emerging technology linked to agro waste management. As a result, extension organisations must implement extension programmes such as trainings, demonstrations, meetings, exposure trips, and group discussions to improve the quality and breadth of experience

of farmers. The same result was also reported by Afhia pheica [4].

3.1.5 Cropping intensity

It was operationally defined as the proportion of acres annually under different crops to the total cropped area, expressed in percentage. Data presented in the Table 5. indicated that majority (51.66%) of farmers were under medium category of cropping intensity followed by low (27.50%) and high (20.83%) categories.

The reason for the majority of farmers having medium cropping intensity, could be attributed to their small and marginal land holdings and lack of water resources for taking up more crops from same piece of land. The results were in accordance with the findings of Chendrashekhara [5].

3.1.6 Cropping pattern

It was operationally defined as the number of different crops (seasonal, bi-seasonal, annual, biannual and perennial) grown by a respondent at a point of time. The results in the Table 6 indicated that majority (51.70%) of farmers were under low category of cropping pattern followed by medium (28.30%) and high (20.00%) of categories.

Table 4. Distribution of respondents based on their farming experience (n= 120)

S. No	Farming Experience	Frequency	Percentage
1.	Low (2-16)	25	20.83
2.	Medium (16-30)	68	56.66
3.	High (30-44)	27	22.50
Total		120	100.00

Table 5. Distribution of farmers according to their cropping intensity (n=120)

S. No	Category	Frequency	Percentage
1.	Low	33	27.50
2.	Medium	62	51.66
3.	High	25	20.83
Total		120	100.00

Table 6. Distribution of farmers according to their cropping pattern (n=120)

S.no	Category	Frequency	Percentage
1	low	69	51.70
2	Medium	34	28.30
3	High	17	20.00
Total		120	100.00

Table 7a. Distribution of farmers according to their infrastructure facilities (n=120)

S.no	Category	Frequency	Percentage
1	low	86	71.66
2	Medium	29	24.16
3	High	5	4.16
Total		120	100.00

From the above results, it could be concluded that, majority of farmers had low, cropping pattern the reason behind this majority of them were small and marginal farmers prefer to take up commercial crops. The results were in accordance with the findings of Hajare [6].

3.1.7 Infrastructure facilities

It was operationally defined as the, different types of agri waste management facilities available in the village or possessed by the farmers like, compost plant, vermi-compost unit, biogas plant, Silage making unit, transportation facility for waste, community waste collection center and others. It was evident from Table 7 that, majority (71.66%) of the respondents had low infrastructure facilities followed by medium (24.16%) and high (4.16%) categories.

Due to the small land holdings and poor socio economic conditions respondents might have not preferred to have separate facilities for agri waste management on their farms. The results were in accordance with the findings of Raina [7].

3.1.8 Level of Aspiration

It was operationally defined as the individual conception of his future prospectus and expectation of future performance which is affected by desire to do well.

It is evident from Table 8 that, majority (40.00%) of the farmers belonged to low level of aspiration category followed by medium (35.00%) and high (25.00%) level of aspiration.

Table 7b. Distribution of farmers according to their available infrastructure facilities of agri waste management

S.no	Particulars	No. of Respondents	Percentage
1	Compost plant	60	50.00
2	Vermi compost unit	6	5.00
3	Biogas plant	0	0.00
4	Silage making unit	3	2.50
5	Collective waste collection center	1	0.83
6	Transport facility	90	75.00
Total		120	100.00

Table 8. Distribution of farmers according to their level of aspiration (n=120)

S.no	Category	Frequency	Percentage
1	Low	48	40.00
2	Medium	42	35.00
3	High	30	25.00
Total		120	100.00

Majority of the farmers had low level of aspiration followed by medium and high. The reason might be majority of the farmers were having literacy level of primary school to illiterate, small land holdings with medium farm experience, low infrastructure facilities. All these might have led to low intensity of desire. The results were in accordance with the findings of Bhemappa (8).

3.1.9 Innovativeness

It was operationally defined as the degree to which an individual adopt agri waste management practices, relatively earlier than others in his social system. The findings presented in Table 9 indicated that 51.66 per cent of the respondents had medium level of innovativeness followed by low (30.00%) and high (18.33%) level of innovativeness.

The possible reason for the above trend might be that the farmer with medium information seeking behavior were able to update their knowledge and skills from time to time and were ready to accept the new technologies. On the other side as the 22.50 per cent of the farmers were found to be illiterate with poor infrastructure facilities, might have not shown interest in trying new ideas in their farms. The results were in accordance with the findings of Raina [7].

3.1.10 Achievement motivation

It is operationally defined as the degree to which a respondent is oriented towards profit

maximization and excellence in farming. The findings presented in Table 10 indicated that 51.66 per cent of the respondents had medium level of motivation followed by low (30.00%) and high (18.33%) level of innovativeness [8].

The above results might be because of the reason that most of the respondents were less educated, not aware of better planning and goal setting for their farm activities due to fear failure. Similar results also reported by Shiv kumar [9].

3.1.11 Information seeking behavior

It was operationally defined as the frequency of contact or exposure of a farmers to different sources for obtaining information related to agri waste management practices and uses. The results in the Table 11 indicated that, most of the farmers fell under the category of medium (50.00%) information seeking behavior followed by low (30.00%) and high (20.00%) categories.

The results indicated that majority of the farmers had medium, information seeking behavior which imply that, the farmers had access various information sources like neighbors, relatives, agriculture extension officer, agriculture officer, magazines, journals and news paper. Rest of those who noticed in low level of information seeking behavior might be less educated or illiterate. The results were in accordance with the findings of Gowda [10].

Table 9. Distribution of farmers according to their innovativeness (n=120)

S.no	Category	Frequency	Percentage
1	low	36	30.00
2	Medium	62	51.66
3	High	22	18.33
Total		120	100.00

Table 10. Distribution of farmers according to their level of motivation (n=120)

S.no	Category	Frequency	Percentage
1	Low	33	27.50
2	Medium	62	51.66
3	High	25	20.83
Total		120	100.00

Table 11. Distribution of farmers according to their information seeking behavior n=120

S.no	Category	Frequency	Percentage
1	low	36	30.00
2	Medium	60	50.00
3	High	24	20.00
Total		120	100.00

3.1.12 Training received

It was operationally defined as the number of trainings received by the respondents. It was measured in terms of number of trainings attended by the respondents as revealed by them at the time of interview. The results in the Table 12 indicated that, majority of the farmers fell under the category of low training received (72.66) followed by medium (24.16) and high (4.16) training received. This finding was in line with the findings of Ramalakshmi Devi [11].

It could be due to the fact that farmers were not giving much importance to the utilization of agri waste in agriculture due to lack of practical knowledge about uses of agri waste. Thus extension agencies should try to impart more trainings on the technical aspects of agri waste management and its importance. This finding was in line with the findings of Prashanth [12].

4. CONSTRAINTS AND SUGGESTIONS ELICITED BY THE RESPONDENTS IN AGRI WASTE MANAGEMENT

The data presented in the Table 1. indicated the major constraints expressed by the farmers in adoption of agri waste management practices were, agri waste management practices requires additional work and cost [13] (Rank I), non availability of labour for the agri waste management practices (Rank II), difficult to manage huge quantity of agri waste (Rank III), decomposition of agri waste takes time and affects the germination of the crop [14] (Rank IV), low preference of farmers for doing waste management practices (Rank V), lack infrastructure facilities to manage the agri waste (Rank VI), The returns from the adoption of agri waste management were less (Rank VII) and fear of increase of pest and disease attack due to agri waste incorporation (Rank VIII).

Table 12. Distribution of farmers according to their Training received (n=120)

S.no	Category	Frequency	Percentage
1	Low	86	72.66
2	Medium	29	24.16
3	High	5	4.16
Total		120	100.00

Table 13. Constraints elicited by the respondents in agri waste management (n=120)

S.No.	Statement	F	%	Rank
1.	Decomposition of agri waste takes time and affects the germination of the crop	70	58.33	VI
2.	Non availability of labour for the agri waste management practices	103	85.30	II
3.	Agri waste management practices requires additional work and cost	110	91.66	I
4.	It is difficult to manage huge quantity of agri waste	84	70.00	III
5.	The returns from the adoption of agri waste management were less	62	51.66	VII
6.	Low preference of farmers for doing waste management practices	72	60.00	V
7.	Lack infrastructure facilities to manage the agri waste	76	63.33	IV
8.	Fear of increase in pest and disease attack due to agri waste incorporation	24	20.00	VIII

Table 14. Suggestions elicited by the respondents in agri waste management (n=120)

S.No.	Suggestions	F	%	Rank
1.	Extension agents should educate and demonstrate about latest technologies in agri waste management	95	79.16	I
2.	More Custom hiring centers may be promoted for easy reach of costly equipment for small and marginal farmers at village level (Happy seeder, Turbo seeder)	60	50.00	III
3.	Promote group approach of farmers to manage agri waste	65	54.16	II
4.	Village level industries should be developed.(vermi-compost)	54	45.00	IV
5.	Farmers should adopt different farming system to utilize crop waste as feed to livestock and livestock waste as a manure to crop	48	40.00	V
6.	Scientist should develop suitable chemicals (Decomposition/reduce pest attack) for waste management.	36	30.00	VI
7.	Establishing self-help groups and encouraging unemployed youths to take up custom hiring of conservation agriculture machineries as a profession.	12	10.00	VIII
8.	Development and establishment of on farm facilities for agri waste management.	18	20.00	VII

Suggestions expressed by farmers for enhancing adoption and overcome problems in agri waste management are presented in Table 2. Suggestions given by farmers in adoption of agri waste management in sequence are as follows: Extension agents should educate and demonstrate about latest technologies in agri waste management (Rank I), promote group approach of farmers to manage agri waste (Rank II) more custom hiring centers may be promoted for easy reach of costly equipment for small and marginal farmers at village level (Happy seeder, Turbo seeder) (Rank III), village level industries should be developed.(vermi-compost) (Rank IV), farmers should adopt different farming system to utilize crop waste as feed to livestock and livestock waste as a manure to crop (Rank V), scientist should develop suitable chemicals (decomposition/reduce pest attack) for waste management, (Rank VI), development and establishment of on farm facilities for agri waste management (VII) and establishing self-help groups and encouraging unemployed youths to take up custom hiring of agriculture machineries and waste industries as a profession (VII).

5. CONCLUSION

Agriculture produces agri waste at every stage of its life cycle, which includes soil preparation, seed sowing, irrigation, fertiliser application, weeding, bug and pest control, harvesting, and storage, among other things. The adoption of

agri waste management methods is hampered by a lack of labour, the difficulty of managing large quantities of agri waste, the time it takes for agri waste to decompose, which impacts crop germination, and farmers' low desire for undertaking waste management practises. Farmers should adopt different farming systems to utilise crop waste as feed for livestock and livestock waste as a manure to crop are the major s. Extension agents should educate and demonstrate about latest technologies in agri waste management, promote group approach of farmers to manage agri waste, more custom hiring centres may be promoted for easy access to costly equipment for small and marginal farmers at village level, village level industries should be developed, and farmers should adopt different farming systems to utilise crop waste as feed for livestock and livestock waste as a manure to crop.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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