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Assessment of crop rotation practices followed by the farmers

¹Shravani V Thaknaik, ²Lahariya KT, ³Bhople PP, ⁴Ganvir MM and ⁵Vaidkar RD

¹M.Sc. Student, Department of Agricultural Extension Education, PGI, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

²Professor (CAS), Department of Agricultural Extension Education, PGI, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

³Professor (CAS), Department of Agricultural Extension Education, Deputy Director of Research, Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

⁴Professor (CAS), Department of Agronomy, AICRP on Dry land Agriculture, Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

⁵Assistant Professor, Department of Agricultural Economics and Statistics, Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

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Corresponding Author: Shravani V Thaknaik

Abstract

Crop rotation is an important sustainable farming practice that involves growing different crops on the same field in a planned sequence across seasons or years. It helps maintain soil productivity, improve nutrient use, reduce pest and disease problems and minimize the risks associated with continuous cultivation of a single crop. The present study was conducted to assess the crop rotation practices followed by farmers in Amravati district of Maharashtra. Dhamangaon Railway and Teosa talukas were purposively selected, and ten villages were selected randomly for the study. Data were collected from 120 farmers through personal interviews using a pre-tested structured interview schedule. The collected information was analysed using frequency, percentage, mean, standard deviation and correlation analysis. The findings revealed that, the Cotton (*khariif*)–Soybean(*khariif*) sequence was the most followed recommended crop rotation, followed by 84.17 per cent of the respondents. Overall, 56.67 per cent of farmers were found to follow crop rotation practices at a medium level, while 22.50 per cent and 20.83 per cent belonged to the low and high categories, respectively. Land holding, cropping pattern and annual income showed a significant positive relationship with crop rotation practices, whereas irrigation facility showed a significant negative relationship. The study highlights the need for location-specific extension support, demonstrations and timely technical guidance to encourage effective crop rotation among farmers.

Keywords: Crop rotation, farmers, cropping pattern, sustainable agriculture, extension service

1. Introduction

Crop rotation is one such sustainable practice in which different crops are grown on the same field in a planned sequence across seasons or years. Properly selected crop sequences can support soil fertility, improve the utilization of nutrients, interrupt pest and disease cycles and reduce the risks associated with dependence on a single crop. However, the crop rotations followed by farmers can differ with soil conditions, rainfall, availability of irrigation, market demand, access to inputs and labour, and the farmers' knowledge and experience. Studying the actual sequences used at the farm level is therefore important for understanding local practices and identifying suitable extension interventions. Amravati district of Maharashtra is an important agricultural area where cotton, soybean, pigeonpea and chickpea are widely grown. Variations in rainfall and other production constraints make appropriate crop sequencing especially relevant in the district. Accordingly, Dhamangaon Railway and Teosa

tehsils were selected for the present investigation. The study was undertaken to assess the crop rotation practices followed by farmers and to generate information that can support location-specific extension planning.

2. Materials and Methods

An ex-post facto research design was adopted for the study. Amravati district of Maharashtra formed the study area, from which Dhamangaon Railway and Teosa talukas were purposively selected. Ten villages from these talukas were selected at random, and 120 farmers following crop rotation were included in the sample. Primary data were gathered through face-to-face interviews using a structured interview schedule that had been pre-tested before the survey. Respondents were described on the basis of age, education, land holding, soil type, cropping pattern, irrigation facility, annual income, social participation, sources of information, extension contact, attitude and knowledge. The information

collected was organized and analysed using frequency, percentage, mean and standard deviation, along with correlation analysis where required, to understand the profile of farmers and their crop rotation practices.

3. Results and Discussion

The respondents were grouped according to the selected personal, socio-economic, communication and psychological characteristics, and the distribution is presented in Table-1.

Table 1: Distribution of farmers according to recommended crop rotation practices followed

Sr. No.	Crop	Recommended Practices of Crop Rotation	Respondents(n=120)		Remark
			Followed	Not followed	
			Frequency (%)	Frequency (%)	
1	Cotton	Cotton(<i>khari</i>) – Soybean (<i>khari</i>)	101 (84.17)	19 (15.83)	Next year
2	Pigeonpea	Pigeonpea (<i>khari</i>) - Soybean (<i>khari</i>)	65 (54.17)	55 (45.83)	Next year
3	Soybean	Soybean (<i>khari</i>) – Chickpea (<i>rabi</i>)	67 (55.83)	53 (44.17)	Same year
4	Soybean	Soybean (<i>khari</i>) – Wheat (<i>rabi</i>)	51 (42.50)	69 (57.50)	Same year

Table-1 describes the extent to which farmers followed the recommended crop sequences in relation to the crops they cultivated during the relevant seasons or following year. The comparison was made by considering whether the sequence followed on the farm matched the recommended crop rotation.

The Cotton (*khari*)–Soybean (*khari*) sequence recorded the highest level of practice, with 84.17 per cent of respondents following it, while 15.83 per cent did not. The Pigeonpea (*khari*)–Soybean (*khari*) sequence was followed by 54.17 per cent and not followed by 45.83 per cent. Soybean (*khari*)–Chickpea (*rabi*) was followed by 55.83 per cent of the respondents, whereas the Soybean (*khari*)–Wheat (*rabi*) sequence was followed by 42.50 per cent and not followed by 57.50 per cent. Thus, Cotton–Soybean was the most frequently followed recommended sequence, whereas Soybean–Wheat was comparatively less common.

The differences among the rotations indicate that farmers selected crop sequences in accordance with the crops grown on their farms, seasonal circumstances and their preferred cropping choices. Among the sequences assessed, Cotton–

Soybean had the widest practice, while Soybean–Wheat had the lowest level of following.

Table 2: Distribution of farmers according to level of crop rotation practices followed

Sr. No.	Crop Rotation	Respondents (n=120)	
		Frequency	Percentage (%)
1	Low (Up to 1)	27	22.50
2	Medium (2 to 3)	68	56.67
3	High (3 and above)	25	20.83
	Total	120	100.00

The overall distribution of respondents by level of crop rotation practice showed that 56.67 per cent were in the medium category. A further 22.50 per cent were in the low category, while 20.83 per cent were in the high category. Therefore, more than half of the farmers followed crop rotation practices at a medium level. Similar findings were reported by Kubade *et al.* (2007) ^[4], who observed that a considerable proportion of soybean growers followed systematic crop rotation practices.

Table 3: Relationship between selected characteristics of respondents and crop rotation practices followed

Sr. No.	Characteristics	Crop rotation
A	Personal and Socio-Economic	
1	Age	-0.0713 ^{NS}
2	Education	0.0636 ^{NS}
3	Land holding	0.4033 ^{**}
4	Soil type	0.1570 ^{NS}
5	Cropping pattern	0.6276 ^{**}
6	Irrigation facility	-0.3516 ^{**}
7	Annual income	0.4432 ^{**}
8	Social participation	0.1337 ^{NS}
B	Communication	Crop rotation
1	Sources of information	-0.0190 ^{NS}
2	Extension Contact	0.0487 ^{NS}
C	Psychological	Crop rotation
1	Attitude	0.0062 ^{NS}
2	Knowledge	-0.0727 ^{NS}

* Significant at 0.05 level of probability

** Significant at 0.01 level of probability

NS – Non-significant

Table-3 shows that, land holding, cropping pattern and annual income had positive and statistically significant relationships with crop rotation practices. In practical terms, farmers with larger holdings, more diversified cropping patterns and higher annual income tended to follow crop rotation to a greater extent. Cropping pattern had the

strongest positive association among the variables studied, indicating that the nature of the existing farm cropping system was closely linked with the extent of crop rotation. Irrigation facility, however, had a significant negative relationship with crop rotation showing an inverse association in the study sample.

Age, education and soil type did not have statistically significant relationships with crop rotation practices. Likewise, social participation, sources of information and extension contact were not significantly associated with the practice. Among the psychological variables, attitude showed a very small positive and non-significant relationship while knowledge had a negative and non-significant association. Overall, the results indicate that land holding, cropping pattern and annual income were important positive correlates of crop rotation, whereas irrigation facility was negatively associated; the other characteristics viz. age, education, soil type, social participation, sources of information, extension contact, attitude and knowledge did not show significant relationship with crop rotation followed by the respondents.

4. Conclusion

The study concluded that respondent farmers in the selected area of Amravati district were following crop rotation practices mainly at a medium level. Among the recommended crop sequences, Cotton (*kharif*)–Soybean (*kharif*) was the most followed sequence, while Soybean (*kharif*)–Wheat (*rabi*) was comparatively less followed. The findings further revealed that, land holding, cropping pattern and annual income had a significant positive relationship with crop rotation practices, indicating that these factors played an important role in farmers' crop-sequencing decisions. In contrast, irrigation facility showed a significant negative relationship with crop rotation. Other characteristics, such as age, education, soil type, social participation, sources of information, extension contact, attitude and knowledge, did not show any significant relationship with crop rotation practices. Overall, the findings indicate that farmers have scope to improve the use of suitable crop rotations according to their farm resources and local conditions. Strengthening extension support through farmer training, field demonstrations, timely technical guidance and location-specific recommendations can help farmers select appropriate crop sequences and encourage more effective crop rotation practices for sustainable agricultural production.

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