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Farmers Knowledge on System of Rice Intensification (SRI) in Andhra Pradesh, India

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Abstract

The present investigation focused to study farmers Knowledge on SRI cultivation was carried out in Mahaboobnagar district, Andhra Pradesh. 120 SRI cultivated farmers constituted the sample. Ex-post facto research design was adopted in the investigation as selected variables have already occurred. A well prepared interview schedule consisting of 35 items testing the level of knowledge of farmers on recommended practices in SRI was prepared and administered. The findings revealed that on majority of farmers (67.5%) had knowledge on SRI cultivation practices to a medium level. Item analysis of Knowledge statements revealed that large majority of respondents had knowledge on items such as seed rate (100%), Varieties suitable for SRI (95%) spreading of seeds loosely and sparsely on nursery bed (85.83%), marker helps in drawing lines (89.17%) etc. Large majority do not possess knowledge on practices such as: number of hills recommended per square meter (62.5%) and weeding interval (43.3%). Correlation analysis revealed that, the variables viz. education, training in SRI, Extension contact, sources of information utilization, perception of respondents on SRI, innovativeness and input availability were found to be positively and significantly correlated to the level of Knowledge of SRI cultivating farmers.

Keywords: Knowledge, SRI, Andhrapradesh.

Introduction

Rice is life for millions of people in the world, particularly in developing countries. Rice is water intensive crop. Unfortunately in India, the productivity of rice is already very low and the area for growing rice cannot be increased further. If efforts are directed to increasing yield by just one ton per hectare on the rice□cultivating area, then our country can easily increase its production to 40 million tonnes, enough to meet the projected food security requirements by 2030[1].

Therefore any efforts that successfully reduce the water allocation for rice even by 20□30 per cent will help in averting both the food and water crises as farmers can continue to grow more rice with less water. Several management strategies have been tried to alleviate the crisis but the yield potential could not be matched with that of irrigated transplanted rice. Therefore a more efficient and fundamental approach for reducing the water requirement is the need of the hour. In this context, System of Rice Intensification (SRI) was tried as an alternative practice to solve the water crisis. SRI, a novel approach to rice production, which originated in Madagascar emerged in the 1980's as a synthesis of locally advantageous rice by Fr Henri de Laulanie, a Jesuit Priest.

The main components of SRI include careful transplanting of single young seedlings at wider spacing, water management that keeps the soil moist but not continuously flooded, early and frequent mechanical /manual weeding before canopy closure and ensuring adequate nutrient supplies. SRI is expected to yield 15-20T/Ha reduces the capital investment on fertiliser, labour and water inputs[2].

Noting that the National Food Security Mission has set a target of 10 million additional tons of rice production by 2011□12, System of Rice Intensification (SRI) was tried as an alternative practice to traditional rice cultivation to solve the water crisis and to improve paddy yields in India. Though Andhra Pradesh was the first to start large scale promotion of SRI, but no substantial increase in area could be achieved during the last few years. Even after 9-10 years of introduction of SRI technology in India, the pace of spread of technology is not rapid as to the expectations among farmers of Andhra Pradesh. Hence this study was undertaken to find out the extent of knowledge possessed by farmers on SRI practices, which is presumed to be one of the important causes influencing spread of SRI in the state.

Methodology

The district Mahaboobnagar was selected purposively as it had highest area under SRI in the state of Andhrapradesh. Ex-post facto research design was followed. A sample of 120 SRI cultivated farmers from 12 villages of four mandals of the district were selected randomly. The level of Knowledge of SRI cultivating farmers was assessed with help of a pre-tested schedule, which comprised of 35 items.

Knowledge: Knowledge is defined as "those behaviours and test situations which emphasizes the remembering either by recognition or by recall of ideas and material on some phenomena". Knowledge in this study is operationalised as the amount of information and understanding possessed by the respondents about SRI practices in paddy.

For measuring respondents knowledge on SRI, a knowledge schedule was developed in the study. An item pool of knowledge items relating to SRI cultivation were prepared by referring literature developed by Acharya N G Ranga Agricultural University (ANGRAU) and State Department of Agriculture.

A good number of knowledge items were also obtained from extension personnel of Department of Agriculture and ANGRAU. The items were administered to 30 farmers of the study area outside the main sample area of the study and pre-tested.

The initially prepared knowledge schedule comprised of 40 items, out of which based on responses obtained from respondents very easy, very difficult, ambiguous and confusing questions were deleted. The finalized knowledge schedule comprised of 35 items, all these items were grouped into 4 different types of objective questions namely Yes/No, True/False, Selecting correct answer, fill in the blanks and multiple choice.

The translated version (Telugu) of knowledge schedule was administered to respondents of sample area. Each item was read out to the respondents by the investigator and the responses were recorded against the alternatives given in the schedule. The correct answer was assigned a score of two and incorrect a score of one.

Total score on knowledge for a respondent was obtained by adding the scores obtained for all items present in knowledge schedule. The maximum possible and minimum possible scores for knowledge were 70 and 35 respectively where as the maximum obtained and minimum obtained scores were 65 and 53 respectively. Based on obtained scores the respondents were grouped into low, medium and high knowledge categories according to equal class interval method as shown below. To gain more insight in the knowledge of respondents on SRI, item analysis was also carried out.

Category	Class Interval
Low	53-57
Medium	57-61
High	61-65

The results were expressed in the form of frequencies and percentages at the time of presentation of results.

Results and Discussion

From the Table-1 it was evident that, majority of the respondents (67.50%) had medium level of knowledge followed by low (21.67%) and high (10.83%)[3].

The reason for this kind of result might be their low education and medium status in training's, extension contacts, sources of information utilization, risk orientation and innovativeness [3].

Table-1
Distribution of the respondents based on their level of knowledge on SRI technology (N=120)

Level of knowledge	Frequency	Percentage
Low	26	21.67
Medium	81	67.50
High	13	10.83
Total	120	100.00

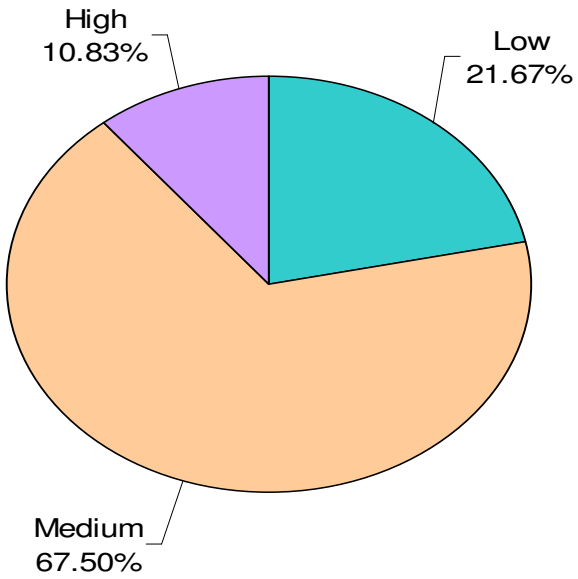

Figure-1
Distribution of respondents based on their level of knowledge

Item analysis of knowledge of farmers on SRI technology in paddy: To get more insight on the knowledge of the respondents on SRI cultivation, item analysis was carried out and the results of knowledge of respondents on each and every item of SRI cultivation was furnished in the table- 2 and figure-2

Table-2
Item analysis of knowledge of farmers on SRI technology in paddy (N=120)

Statement	Correct		Incorrect	
	n	%	n	%
SRI is not the name of paddy variety	110	91.67	10	8.33
Any paddy variety can be cultivated under SRI method	114	95.00	6	5.00
Soaking period of seeds in SRI method (24 hr.)	98	81.66	22	18.34
What is the incubation period in SRI method (24hr- 36hr).	96	80.00	24	20.00
What is the spacing recommended in SRI method is (25 cm x 25 cm)?	91	75.83	29	24.17
2 kg seed / acre is sufficient in SRI, because it contains enough grains for planting in one acre	120	100	0	0
Perfect levelling is not required for SRI	87	72.50	33	27.55
Wider spacing and planting single seed gives more space and aeration to plants, there by helps in yields increase	65	54.17	55	45.83
Seeds are to be spread loosely and sparcely on the bed	103	85.83	17	14.17
Application of finely powdered FYM / vermicompost is recommended before and after sowing seeds in nursery	71	59.17	49	40.83
Seedlings are to be pulled out from nursery bed by inserting a plate below roots and pulling it up along with the soil	105	87.50	15	12.50
Transplanting at 2-3 leaf stage helps in inducing more tillers in main field	81	67.50	39	32.50
In SRI nursery period is short (8-12 days)	87	72.50	33	27.50
Age of seedlings for transplantation	89	74.16	31	25.84
Depth of planting of seedlings?	86	71.66	34	28.34
Number of hills recommended per sq.m.in SRI?(16)	45	37.50	75	62.50
Number of seedling's planted per hill.(1)	94	78.33	26	21.67
The weeds incorporated into soil by conoweeder adds nutrients to the soil	85	70.83	35	29.17
Weeding is not necessararily to be done with cono weeder	99	82.50	21	17.50
In SRI, incorporation of weeds into soil is not recommended	85	70.84	35	29.16
Weedings are to be done at an interval of (10) days	68	56.67	52	43.33
In SRI main field lines are drawn using marker	107	89.17	13	10.83
Saturated condition (moist condition) in field helps in more root and plant growth compared to flooded condition	72	60.00	48	40.00
Furrows are not necessary in main field for drainage	48	40	72	60
Field condition recommended in SRI?	99	82.50	21	17.50
In SRI, water consumption is very less	116	96.67	4	3.33
In SRI soil become more fertile than in conventional method	63	52.50	57	47.50
In SRI more tillers are obtained	85	70.83	35	29.17
In SRI we get uniform and early maturity	48	40.00	72	60.00
In SRI healthier and strong plants are obtained	62	51.66	58	48.34
In SRI more number of grains are obtained	56	46.66	64	53.34
In SRI we get more grain weight	52	43.33	68	56.67
In SRI quality grain is obtained	61	50.83	59	49.17
In SRI more yield is obtained	74	61.66	46	38.34
Cultivation under SRI is easy than conventional method	40	33.33	80	66.67

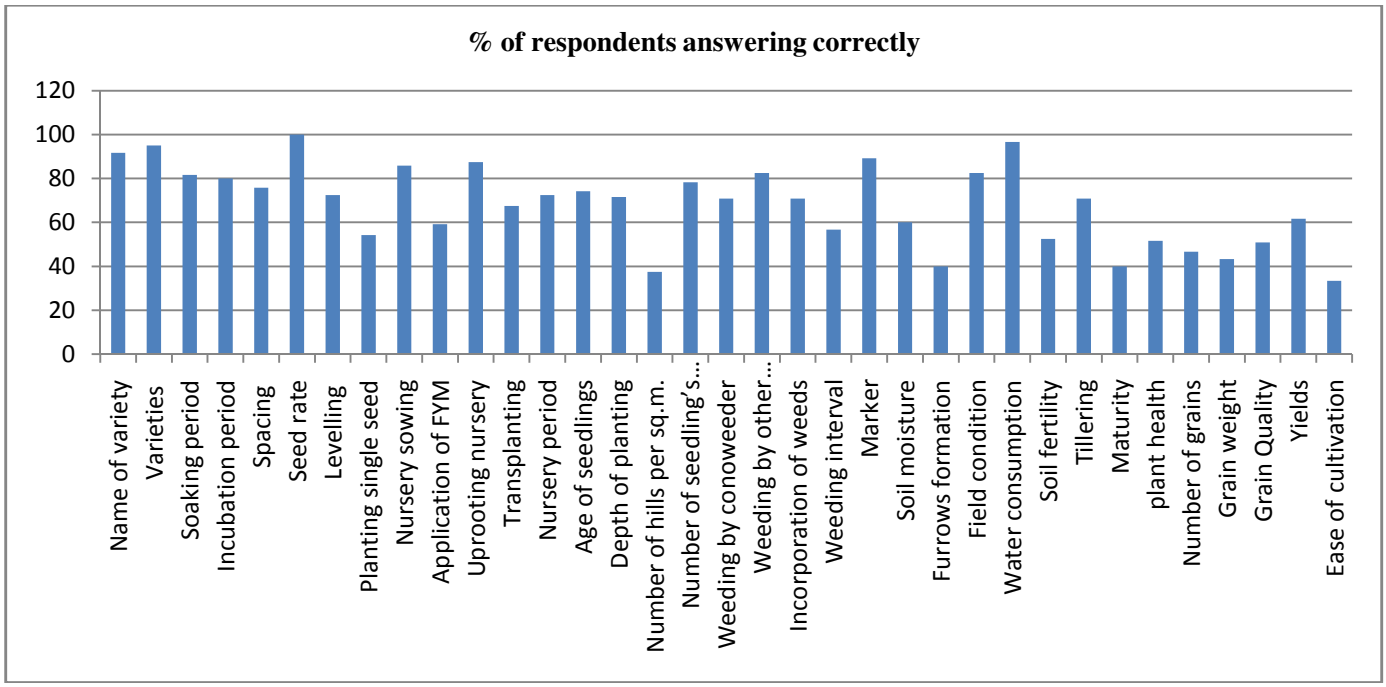

Figure-2
Distribution of respondents based on their Knowledge on SRI technology in paddy

It could be observed from table-2 and figure -2 that 100 percent of the respondents had knowledge that SRI requires 2kg seed per acre. In order to drag farmers attention any training or demonstration or lecture or radio talk or TV program on SRI starts with a statement that 2kg/acre seed rate is enough for SRI cultivation. Hence all the respondents had knowledge on this item.

More than 90 percent of the respondents had knowledge on item that SRI is not the name of paddy variety, any paddy variety can be cultivated under SRI method and in SRI, water consumption is very less. Any farmer on hearing about SRI for the first time enquires whether it is the name of a new paddy variety, for further motivating farmers towards SRI, the extension officer highlights two important benefits in SRI cultivation i.e. any paddy variety can be cultivated under SRI and SRI consumes less water. Due to these reasons farmers had more knowledge on above said items comparatively.

Similarly, 80-90 per cent of the respondents had knowledge that seeds are to be spread loosely and sparsely on the nursery bed, seedlings are to be pulled out from nursery bed by inserting a plate below roots and pulling it up along with the soil, lines are drawn using marker, weeding has to be necessarily done with cono weeder, field condition recommended is muddy, soaking period of seeds in SRI method and incubation period of seeds. These are also the fundamental recommended package of practices explained by extension officers hence more respondents had knowledge on these items.

Similarly, 50 to 80 per cent of the respondents had knowledge on items viz. transplanting at 2-3 leaf stage helps in inducing more tillers in main field, saturated condition in field helps in more root and plant growth compared to flooded condition, weeds incorporated into soil by cono weeder adds nutrients to the soil , wider spacing and planting single seed gives more space and aeration to plants, there by helps in increase in yields, application of finely powdered FYM / vermicompost is recommended before and after sowing seeds in nursery, Furrows are necessary in main field for drainage, perfect levelling is not required for SRI, incorporation of weeds into soil is recommended, age of seedlings for transplantation, depth of planting of seedlings, weedings are to be done at an interval of 10 days, spacing recommended in SRI method, number of seedling's planted per hill, short nursery period, soil become more fertile in SRI than in conventional method, more tillers are obtained, healthier and strong plants are obtained, quality grain is obtained and more yield is obtained[4,5].

Less than fifty per cent of the respondents had knowledge on aspects such as furrows are necessary in main field for drainage, number of hills recommended per sq. when compared to conventional method, in SRI, uniform and early maturity can be expected, SRI panicles have more number of grains, more grain weight and SRI cultivation is easy than conventional method. These can be answered by respondents only if they adopt it or see in neighbour's field, with the respondents neither of these might have happened hence they have not answered correctly. Though nearly 75-80 percent of respondents answered correctly about spacing and number of seedlings/hill, number of hills/sq.m in SRI was not correctly answered by all respondents since it is a purely technical term.

Table-3
Distribution of respondents according to their knowledge on various categories in SRI (N= 120)

S.No	Category	Respondents			
		Correctly Answered		Incorrectly Answered	
		n	%	n	%
1	Seeds, Spacing and Land preparation	98	82	22	18
2	Nursery and Transplanting	85	71	35	29
3	Weeding and marking	89	74	31	26
4	Soils and Irrigations	80	67	40	33
5	Tillers and Yields	60	50	60	50

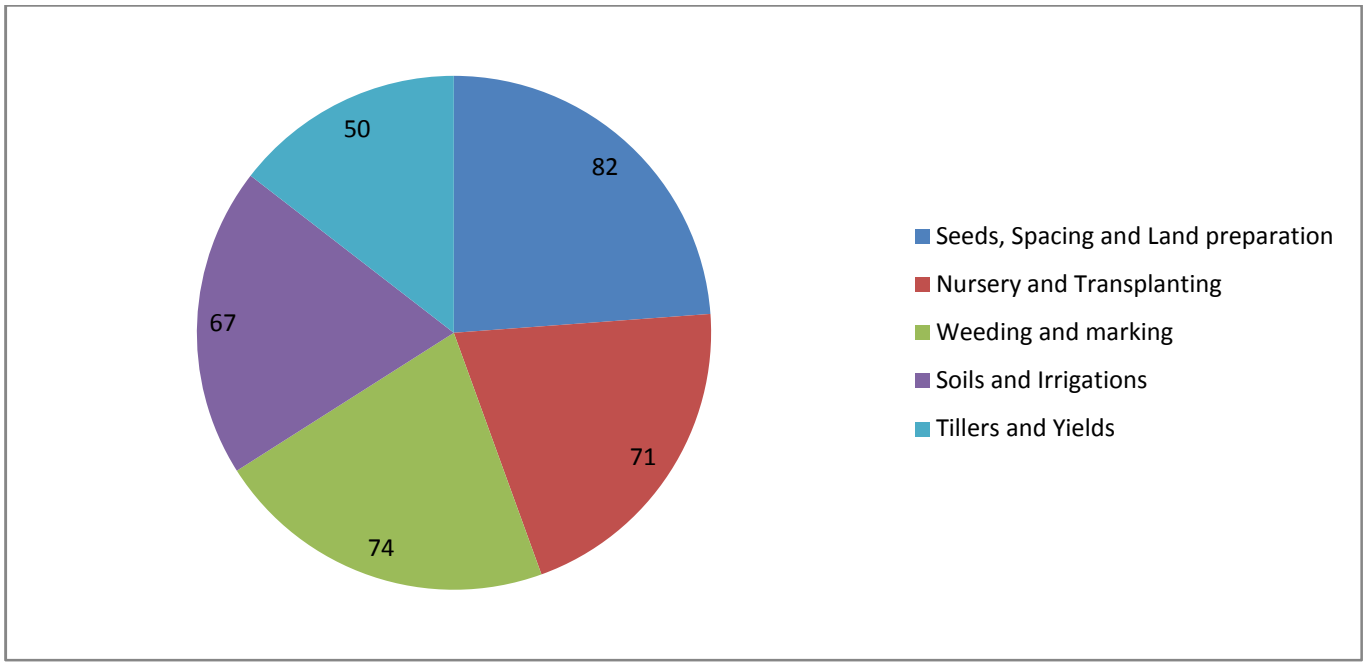

Figure-3
Percentage of respondents possessing Knowledge on various category in SRI

Results in table-3 and Figure-3 clearly indicated that majority of respondents (82%) had good knowledge in various SRI cultivation practices pertaining to Seeds, Spacing and Land preparation. This is followed by percentage of respondents having knowledge in Weeding and marking in SRI. Whereas, 50 per cent of respondents did not possess knowledge on tillering ability and yield potential of SRI.

The researcher has carried out this item analysis mainly to unearth the knowledge gaps in SRI. The results of this item analysis can be used by State Department of Agriculture or Agriculture University or NGOs while organising extension activities. The items where respondents had > 90 percent knowledge need not be stressed all the time but more efforts are to be made on the gaps viz., wider spacing and planting single seed gives more space and aeration to plants, there by helps in yield increase, application of finely powdered FYM / vermicompost is recommended before and after sowing seeds in nursery, furrows are necessary in main field for drainage, number of hills recommended per sq.m, weedings are to be done at an interval of 10 days, soil become more fertile in SRI than in conventional method[6]. In SRI we get uniform and early maturity, healthier and strong plants are obtained, SRI panicles have more number of grains, more grain weight, and In SRI quality grain is obtained, i.e. on items where respondents knowledge is poor. Special training's and exposure visits or demonstrations are to be organised to improve farmers knowledge on these aspects.

Relationship between selected profile characteristics and level of knowledge on SRI technology by the respondents: In order to study the relationship between the level of knowledge and the profile characteristics of SRI farmers, correlation analysis was done and findings are furnished in table -4.

It is revealed from the table-4 that, calculated 'r' values between level of knowledge of respondents and education, training in SRI, extension contact, Sources of Information utilization, perception of respondents and innovativeness were greater than table 'r' value at 0.05 level of probability, whereas, the

calculated 'r' value of the variable Input availability is greater than table 'r' value at 0.01 level of probability. Therefore, it can be concluded that there was a positive and significant relationship between level of knowledge of respondents on SRI technology and the variables viz. education, training in SRI, extension contact, Sources of Information utilization, Perception of respondents, innovativeness and input availability [7]. Hence for these variables, null hypothesis was rejected and empirical hypothesis was accepted.

For rest of the variables null hypothesis was accepted and empirical hypothesis was rejected.

Education enhances the level of knowledge of respondents. Higher the education, wider and better will be the interaction. It is a well known fact that education brings desirable changes by improving knowledge, adoption and social status. The higher the education of a person, the more is his knowledge on any sphere of life and vice versa. Hence this kind of relationship appeared in the investigation [8].

Table-4
Relationship between profile characteristics and level of Knowledge of respondents on SRI technology (N=120)

Characteristics	Correlation coefficient (r)
Age	0.023 NS
Education	0.207*
Farm size	0.099 NS
Farming experience	0.051 NS
Training in SRI	0.198*
Extension contact	0.302*
Sources of Information utilization	0.288*
Perception of respondents on SRI	0.219*
Risk orientation	0.154 NS
Innovativeness	0.311*
Input availability	0.177 **
Labour availability	0.145 NS

* Significant at 0.05 level of probability, ** Significant at 0.01 level of probability NS –Non Significant

It is clear from table- 4 that there was a positive and significant relationship between training and level of knowledge of respondents [9]. The reason might be that, generally in training's lectures and demonstrations are given to improve knowledge of farmers on SRI. In addition, participation in training's improves farmers interaction with scientists, officials and progressive farmers.

The results revealed that there was a positive and significant relationship between extension contact and level of knowledge of respondents. Due to frequent extension contacts there will be definitely knowledge transfer from extension agent to farmer. Logically, a farmer with more extension contacts will have more knowledge on agricultural innovations. Hence this kind of result was noticed.

It is clear from above table that there was a positive and significant relation between sources of information utilization and level of knowledge of respondents [3]. The reason might be that the respondents who utilized more sources of information had advanced knowledge regarding innovations. Naturally, the more the usage of sources of information, the more the increase in knowledge for any individual on any aspect. Hence this kind of relationship might have appeared.

It is evident from Table - 4 that there was a positive and significant relation between level of knowledge and perception of respondents, the reason might be that respondents who have adequate knowledge on SRI will have accurate perception [9]. If knowledge is partial or incomplete, perception will also be faulty. The lesser the knowledge, the more is the confusion on SRI technology among the respondents. On the other hand, for a farmer with adequate knowledge, fears or misconceptions on SRI will be less and due to this his perception will be clear. Hence this kind of relationship appeared in the study.

Perusal of Table 4, indicated that there was a positive and significant relationship between level of knowledge and innovativeness of the respondents [2]. The reason might be that the farmer who is more innovative will try to gather the information on SRI from all media sources available to them and further gets their doubts clarified by interacting with Extension officers and becomes more knowledgeable than rest of the farmers. Hence it can be clearly concluded that knowledge and innovativeness are positively correlated.

The results revealed that there was a positive and significant relationship between input availability and level of knowledge of respondents. The reason might be that, if SRI inputs viz conoweeder, marker or vermicompost are easily accessible or with in reach of farmers interms of cost and distance, for example, if these inputs are available in near by Mandal Agricultural office or village private dealers, then their attention is easily dragged towards them and they try to find out more information and become more knowledgeable. Hence this kind of relationship might have appeared.

Conclusion

Majority of the SRI cultivating farmers had medium level of knowledge on SRI cultivation practices. Though the respondents had good knowledge in certain practices, they lacked conceptual clarity on some of the practices such as age of transplanting, formation of furrows, frequency of weeding, maintenance of saturated conditions etc. Hence the Researchers, NGOs and Department of Agriculture who are popularising this technology, should develop complete knowledge among farmers on all SRI practices, which can be done through training

programs and field demonstrations with the involvement of farmers and labour and by conducting study tours, frequent visits of extension staff and by publicity through mass media.

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