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Editorial

Maharashtra Society of Extension Education (MSEE) registered in 1982, has the foremost objective to publish the research journal. Accordingly, the society was publishing the journal entitled Maharashtra Journal of Extension Education. Since the year 2004 this journal has been renamed as Asian Journal of Extension Education.

The journal includes research articles from the researchers and extension workers in the field of extension education from various faculties of various institutes in the country. Extension education plays an important role not only in transfer of innovative technologies but also in developing appropriate methodology in the field of extension more suited for field application. The innovative research methods can be very well communicated for its application and use in further research by the extension fraternity. This can be achieved by publishing research articles.

Asian Journal of Extension Education is a very humble attempt to provide platform towards this goal of networking with the all extension professionals who could kindle the minds of their peers and young scientists through their research articles.

I have immense pleasure to present this 36th issue of Asian Journal of Extension Education for the year 2018. The Journal has received an encouraging response from all corners of the country. We have made an effort to encompass the best articles for the issue. Thanks are due to all the authors who have contributed for this issue.

I extend sincere thanks to Capt. Dr. L. B. Kalantri, Hon'ble President, Dr. D. M. Mankar, Vice President and Respected Member of Executive Body Dr. N. R. Koshti, Dr. N. V. Kumbhare for their constant inspiration, valuable guidance and concrete suggestions to maintain the quality of the journal.

I appreciate the tireless contribution of my colleagues and Joint-Secretary Dr. M. K. Rathod and Dr. S. D. More for their endless efforts in publishing this issue. I am confident that this issue of the Journal will be appreciated by the extension scientists, researchers, students and readers for its usefulness and contents. I solicit their suggestions for further enhancement of quality of the Journal.

Akola
Date: June 2019

P. K. Wakle
Chief Editor

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CONTENTS

RESEARCH ARTICLE

Listening Behaviour of Community Radio Listeners

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ABSTRACT

Community radio can reach a large number of poor people and broadcasts the need based, relevant and popular information to a local specific audience. For any community radio understanding the need and demand of listeners is very necessary. Therefore, this study was conducted with an objective to study the listening behaviour of community radio listeners, to study the extent of effectiveness of information broadcasted on CRS and to study the listener's preference to the CRS programmes by selecting 120 representative community radio listener farmers in Rahata, Rahuri and Shrirampur tahsils of Ahmednagar district of Maharashtra state. Data was processed and analyzed by using suitable statistical tools.

The study revealed that majority of the community radio listeners had medium listening behaviour, listened CRS at home, listened the programmes up to one hour, had partial attention towards the programmes and had listened CRS daily either in morning or evening. The majority of the listeners had given preference to *Krishivani* and *Mix Gane* (songs) programme, followed by *Yashogatha*, *AmcheAarogya*, *Gram Jagat*, *KrishiVarta*, *Dnyanganga* and *PravaraKath* programmes. Regarding the effectiveness of CRS it is found that the CRS programmes are very effective and rank first in spreading knowledge, followed by persuasion, decision, confirmation and implementation. Thus, the study will be helpful for the operator and staff of CRS to understand the listening behaviour and for doing suitable modifications in the programmes and programme schedule

Keywords: Community Radio, Listening behaviour, CRS listeners

INTRODUCTION

Radio is a powerful communication tool. In India, where literacy remains a substantial barrier to development, radio especially community radio, can reach a large number of poor people. Community Stations serve geographic communities and communities of interest. They broadcast content that is popular and relevant to a local specific audience but is often overlooked by commercial or mass media broadcasters. Community Radio Station (CRS) PIRENS is run by KrishiVigyan Kendra, Babhaleshwar in Rahata tahsil of Ahmednagar district. KVK, PIRENS broadcasts different type of programmes with help of rural people. Thus, it is necessary to find out the awareness of people towards the CRS and also to find out their listening behaviour and preferences. This study will be helpful to programme officers, operators and staff of Community Radio Stations, PIRENS and others CRSs toget the feedback from the people about its programme and if necessary to make changes in programmes and format of presentation according to need and demand of listeners. Therefore, this study was conducted with an objective to study the listening behaviour of community radio listeners, to study the extent of effectiveness of information broadcasted on CRS and to study the listener's preference to the CRS programme

METHODOLOGY

The study was conducted in the periphery of PIRENS Community Radio Station i.e. in Rahata, Rahuri and Shrirampur tahsils of Ahmednagar district of Maharashtra State in India. The data was collected with the help of well structured interview schedule by interviewing 120 respondent Community Radio Listener farmers. Collected data was processed and analyzed by using frequency, percentage, mean, standard deviation and ranking method. Here in this study the listening behaviour was operationalised as the place of listening, duration of listening, attention paid while listening and regularity of listening to a community radio programmes (K. Aruna, 2010).

RESULTS AND DISCUSSION

I. Listening behaviour of community radio listeners

Listening behaviour was aggregate of observable responses in terms of total score with references to;

place of listening, duration devoted to listening, attention paid to radio and regularity/ time of listening. The listening behaviour of respondents is presented in Table 1.

Table 1: Distribution of respondents according to their Listening behaviour

Sr. No.	Listening behavior (score)	Respondents (n=120)	
		Frequency	Percentage
1	Low (up to 7)	15	12.50
2	Medium (8 to 11)	84	70.00
3	High (12 and above)	21	17.50
	Total	**120**	**100.00**

From Table 1, it is found that majority (70.00%) of the community radio listeners were having medium listening behaviour, followed by high (17.50%) and low (12.50%) listening behaviour. The results are in line with the result of Krishnamurthy *et al.* (2008) and Pattanashetti (2010).

1. Place of listening the CRS programme

It refers to the venue or the place where respondents listened the CRS programme. The place of listening of respondents is presented in Table 2.

Table 2 : Distribution of respondents according to their Place of listening the CRS programmes

Sr. No.	Place of listening	Respondents (n=120)	
		Frequency	Percentage
1	At home	68	56.66
2	In farm	37	30.84
3	Neighbor/friend	15	12.50
	Total	**120**	**100.00**

Table 2 depicted that, more than half (56.66 %) of the community radio listeners listened the CRS programme at their home, while 30.84 and 12.50 per cent of the listeners listened the CRS programme at their farm and neighbour or at friend's home, respectively. The findings are contradictory with the findings of Sasidhar*et al.* (2006)

2. Duration of listening

Duration was operationalised as the choice of listening to the farm broadcast for a certain duration of time.

Table 3 : Distribution of respondents according to their duration of listening the CRS programmes

Sr. No.	Duration	Respondents (n=120)	
		Frequency	Percentage
1	Less than half an hour	27	22.50
2	Up to 1 hrs.	61	50.83
3	1 to 2 hrs.	28	23.33
4	2 to 3hrs.	4	3.34
	Total	**120**	**100.00**

It was observed from Table 3 that,more than one half (50.83 %) of community radio listeners listen to the programmes up to one hour, while 23.33 per cent of them listen for 1 to 2 hours and 22.50 per cent listen for less than half an hour and only 3.34 per cent listen up to 2 to 3 hours. Therefore, it is concluded that more than 50.00 per cent listeners listen to the programmes about one hour. The findings are in line with the findings Pattanshetti (2010).

3. Attention while listening the CRS programme

The attention was operationlised as notice taken by respondents to farm radio programme while listening. The findings about the attention of listening are presented in the Table 4.

Table:4 Distribution of respondents according to their attention while listening

Sr. No.	Attention	Respondents (n=120)	
		Frequency	Percentage
1	No attention	27	22.50
2	Partial attention	61	50.83
3	Full attention	32	26.67
	Total	**120**	**100.00**

It is clear from the Table 4, that nearly one and half (50.83 %) of the community radio listeners had partial attention the towards the CRS programmes, while 26.67 and 22.50 per cent of the listeners had full attention and no attention towards the

CRS programmes, respectively. The findings are in similar to the findings of Badodiya*et al.* (1999).

4. Regularity / Time of listening CRS programme

Regularity of listening CRS programme was operationalised as the frequency of listening the broadcasted community radio programmes. The findings about the time of listening behaviour are shown in the Table 5.

Table 5: Distribution of respondents according to the regularity /time of listening the CRS programme

Sr. No.	Regularity / time of listening	Respondents (n=120)	
		Frequency	Percentage
1	Daily at morning and evening	25	20.83
2	Daily at morning or evening	66	55.00
3	Two to three times in a week	14	11.66
4	Occasionally	15	12.51
	Total	**120**	**100.00**

The data in respect of regularity or time of listening of the respondents about community radio (Table 5) revealed that a majority (55.00 %) of the respondents listenedthe CRS programme daily during morning or evening, followed by daily at morning and evening (20.83%), occasionally listening (12.51%) and listening for two to three times in a week (11.66%).

II. Listeners preference to the CRS programme

List of all the programmes broadcasted on CRS was prepared and the listeners preference to these different programme was analysed in terms of frequency and percentages and presented in Table No. 6.

Table 6: Distribution of respondents as per the preference to CRS programme

Sr.No.	Programmes of CRS	Listeners Preference				Rank
		Yes	%	No	%	
1	Krishivani	80	66.66	40	33.34	I
2	Mix gane (song)	80	66.66	40	33.34	I

3	Yashogatha	78	65.00	42	35.00	II
4	Amcheaarogya	75	62.50	45	37.50	III
5	Gramjagat	70	58.33	50	41.67	IV
6	Krishivarta	64	53.34	56	46.66	V
7	Dnyanganga	62	51.66	58	48.34	VI
8	Pravarakath	36	30.00	84	70.00	VII

From the Table 6, it was observed that maximum number of listeners had given preference to *Krishivani*and *Mix Gane* (songs) (66.66%) programme, followed by *Yashogatha* (65%), *AmcheAa*rogya (62.5%), *Gramjagat* (58.33%), *Krishivarta* (53.33%), *Dnyanganga* (51.66%) and *Pravara Kath* (51.66%) programmes. The findings are in line with the findings Talwar (2011).

III. Extent of effectiveness of information broadcasted on CRS

Extent of effectiveness of information was opertionalised as how far the listeners utilized the information broadcasted on CRS at different stages of adoption process according to Innovation Decision Process.

The findings about the extent of effectiveness of information broadcast through CRS during various stages of adoption as expressed by the respondents are shown in the Table 7.

Table 7. Extent of effectiveness of information broadcast on CRS (N =120)

Sr. No	Stage	Very Effective	Effective	Undecided	Least effective	Not effective	Total	Mean	Rank
1	Knowledge	81 (67.50)	36 (30.00)	0 (00.00)	3 (2.5)	0 (00.00)	120 (100)	3.625	1
2	Persuasion	33 (27.50)	59 (49.10)	25 (20.80)	3 (2.5)	0 (00.00)	120 (100)	3.016	2
3	Decision	8 (6.66)	67 (55.80)	11 (9.16)	14 (11.6)	20 (16.6)	120 (100)	2.241	3
4	Implementation	33 (27.50)	41 (34.10)	0 (00.00)	2 (1.66)	44 (36.60)	120 (100)	2.141	5
5	Confirmation	26 (21.66)	55 (45.83)	10 (8.33)	4 (3.33)	25 (20.83)	120 (100)	2.216	4

(Figures in parenthesis indicates percentages)

Results in the Table 7, showed that among the extent of effectiveness of information broadcast through community radio programmes during various stages of Innovation Decision Process, knowledge stage received first rank with mean score 3.63, followed by persuasion stage (second rank with mean score 3.02), decision stage (third rank with mean score 2.24), confirmation stage (fourth rank with mean score 2.22) and implementation stage (fifth rank with mean score 2.14).These results are in accordance with the results of Praveena (1991).

CONCLUSIONS

Findings help to conclude that majority of the radio listeners had medium listening behaviour, majority of the listeners had listened CRS at home,most of them listen the programmes up to one hour, most of them had partial attention towards the programmes and a majority of the respondents had listened CRS daily at morning or evening time.Regarding the preference to the CRS programmes majority of the listeners had given preference to *Mix Gane* (songs) and *Krishivani* programmes. Regarding the effectiveness of CRS it is concluded that the CRS programmes are very effective and rank first in spreading knowledge, followed by persuasion, decision, confirmation and implementation.

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RESEARCH ARTICLE

Existing Animal Breeding and Healthcare Practices by Dairy Farmers in Kolhapur District of Maharashtra

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ABSTRACT

A Field survey was conducted to study cattle management practices followed by the dairy farmers of Kolhapur district in Maharashtra. It was found that a significantly higher percentage (100.00 %) of respondents use sterilized scalpel for cutting naval cord and application of tincture iodine on the cut end of naval cord.Cent percent respondents had knowledge and adoption about heat detection. and 61.66 percent adopted artificial insemination (A.I.). The postpartum breeding intervals in 84.16, 13.33 and 2.50 percent cases were 2-3, 3-5, 5 months, respectively. The gram panchayat bull was available in only 26.66 percent cases. 81.66 percent respondents were following vaccination against contagious diseases. Only 34.16 percent respondents were completely adopting deworming of adult animals and calves. 35.83 percent farmers were completely adopted isolation of sick animals and cent percent adopted tick and flies control measure.

Keywords: Breeding feeding practices, dairy farmers.

INTRODUCTION

Farming is widely recognized as a hazardous occupation for all persons of all ages and the extent of animal related injury in the agricultural industry has been documented, Low et al (1996). Livestock is occupies an important place in Indian dairy industry as well as rural Indian economy. Most of the reproductive problems are due to mismanagement of feeding and poor nutrition leads to, delayed, puberty, reduced conception rate (Fleck et at, 1980). The net performance of domestic livestock is the result of the combined influence of all these factors. Advance made in management and technological procedures and adopted in most of the modern lives stock enterprises, have

contributed enormously to make the livestock industry profitable, in several cases these attitudes have markedly influenced the health of animals and economy of lives stock form. It has been demonstrated in a study that there exists a close relationship between a livestock farmers personal characteristics, attitude and management practices and farm performance maintaining animals' good health is essential to ensure high production. In developing countries, cows are an important source of protein as well as income, but if not handled property they can cause loss to the handler. The knowledge of various cows management practices followed by the farmers is of great importance as it may help in filling the gap between existing practices followed and the recommended scientific practices. Therefore, this undertaken to document the existing breeding and health management practices being followed by the farmers under field condition.

METHODOLOGY

The study was conducted in four blocks (Karveer, Kagal, Hatkanangale and Pahnala) of Kolhapur district through random sampling method. Twelve villages from each block were selected randomly and from each village, ten farmers were taken. 120 respondents were selected on the basis of number of milch animals (three or more than three milch animals). Twelve villages from each block were selected randomly and from each village, ten farmers were taken. In all 120 farmers were interviewed with the help of interview schedule. The data was analyzed in form of mean, average, frequency and percentage.

RESULTS AND DISCUSSION

In feeding practices cultivation of green fodder, mode of concentrate feeding to lactating animals, providing clean and fresh water for drinking to animals had complete knowledge with complete adoption.

Table1: Knowledge and adoption of existi ng dairy management practices

Sr. No.	Existing Dairy Management Practices	Knowledge		Adoption		
		Yes	No	Complete	Partial	No
(A)	**Breeding practices**					
1.	Heat detection (Mucous discharge, bellowing)	100.00	0.00	100.00	0.00	0.00
2.	Service to cattle					
	Natural	38.33	0.00	38.33	0.00	0.00
	Artificial Insemination	61.66	0.00	61.66	0.00	0.00
3.	Service provided after heat detection					
	Within 12 hrs.	63.33	0.00	63.33	0.00	0.00
	Between 12-18 hrs.	36.66	0.00	36.66	0.00	0.00
4.	Provision of natural service					
	Gram panchayat bull	26.66	0.00	26.66	0.00	0.00
	Private bull	73.33	0.00	73.33	0.00	0.00
5.	Pregnancy diagnosis	83.33	16.67	83.33	0.00	16.67
6.	Insemination of cattle					
	2-3 months 48%	84.16	0.00	84.16	0.00	0.00
	3-5 months 26%	13.33	0.00	13.33	0.00	0.00
	After 5 months 25%	2.5	0.00	2.5	0.00	0.00
7.	Use of sterilized scalpel for cutting naval cord and application of tincture iodine on the cut end of the naval cord	100.00	0.00	100.00	0.00	0.00
B)	**Health care practices**					
1.	Dairy inspection	100.00	0.00	100.00	0.00	0.00
2.	Regular screening and treatment of sick animals	100.00	0.00	57.5	35.00	7.5
3.	Control of flies and ticks	100.00	0.00	100.00	0.00	0.00
4.	Timely and regular vaccination against common contagious diseases	100.00	0.00	81.66	18.33	0.00
5.	Isolation of sick animals from the healthy ones in a separate house / shed	100.00	0.00	35.83	30.00	34.16
6.	Spraying / Dusting	100.00	0.00	41.66	42.50	15.83

7.	Deworming	100.00	0.00	34.16	55.00	10.83
8.	Vaccination	100.00	0.00	59.16	36.36	4.16
9.	Treatment of sick animals by veterinary staff	100.00	0.00	100.00	0.00	0.00

In breeding practices heat detection (mucous discharge, bellowing) and use of sterilized scalpel for cutting naval cord and application of tincture iodine on the cut end of the naval cord had complete knowledge with complete adoption, opposite results were reported by Munish Kumar (2015). In service of cattle 38.33 per cent of the respondents had knowledge as well as complete adoption for natural servicing of cattle and 61.66 per cent of the respondents had knowledge as well as complete adoption for A.I., opposite results were reported by Kalyankar*etal.*(2004). In service provided after heat detection within 12 hrs. 63.33 per cent of the respondents had knowledge as well as complete adoption and for service provided after heat detection between 12-18 hrs. 36.66 per cent of the respondents had knowledge as well as complete adoption. In provision of natural service 26.66 per cent of the respondents had knowledge as well as complete adoption for using gram panchayat bull and 73.33 per cent of the respondents had knowledge as well as complete adoption of using private bull. In pregnancy diagnosis 83.33 per cent of the respondents had knowledge and complete adoption and 16.67 per cent had no adoption. In insemination of cattle after 2-3 months 84.16 per cent of the respondents had knowledge as well as complete adoption, 13.33 per cent of the respondents had knowledge as well as complete adoption about insemination of cattle after 3-5 months and 2.5 per cent of the respondents had knowledge as well as complete adoption about insemination of cattle after 5 months.

In health care practices daily inspection, treatment of sick animals, control of flies and ticks had complete knowledge with complete adoption In health care practices, in regular screening and treatment of sick animals 120 of the respondents had full knowledge (100.00 %) and 35.00 per cent had partial adoption. In timely and regular vaccination against common contagious diseases 120 of the respondents had full knowledge (100.00 %) and 18.33 per cent had partial adoption. In isolation of

sickanimals from the healthy ones in a separate house/ shed 120 of the respondents had full knowledge (100.00 %) and 30.00 per cent had partial adoption.

CONCLUSION

It could be concluded from the present findings that the most of farmers were having quite satisfactory health management in term of use of vaccination and treatment of sick animals, control of flies and ticks but still some gap was there as far as adoption of deworming, disinfections and isolation of sick animals. But the breeding management practices followed were not very good, they needed to be improved. Therefore, efforts should be made to educate the farmer and encourage them to adopt improved management practices.

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RESEARCH ARTICLE

Adoption of Improved Cultivation Practices by the Grape Growers in Buldhana District of Western Vidarbha

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ABSTRACT

The present investigation entitled "Adoption Behaviour of Grape Growers" was carried out in purposively selected Chikhali Panchayat Samiti of Buldana district in Vidarbha region of Maharashtra state for ascertaining the gap between recommended cultivation practices of grapes and actual adoption of these practices by the grape growers.

An exploratory research design was adopted for the study. A purposive sample of 100 grape growers from sixteen (16) villages was drawn and the data were collected with the help of structured interview schedule and used for drawing the conclusions. Adoption of improved cultivation practices by grape growers were observed in medium level (72%).The reasons for medium adoption in major operations and low benefits from grape cultivation may be due to high wages of labour, timely non-availability of labours, not getting remunerative price of grape fruit, inadequate sources of finance, fluctuation in market, adverse climatic condition, short of capital, etc.As regards, existence of medium adoption behaviour in manures and fertilizer practices it may be because of non availability of good quality FYM, high cost of FYM, inadequate and timely availability of fertilizers, high cost of fertilizers, pesticides, fungicides and micronutrient. Shortage of irrigation water during summer, were also one of the reasons of the medium adoption.

Key words- Adoption, cultivation practices, grape growers, buldhana

INTRODUCTION:

Grape cultivation is one of the most remunerative farming enterprises in India. Grape is grown under variety of soil and climatic condition in three distinct agro climatic zones, namely, sub tropical, hot tropical and mild tropical climatic zones in India. The botanical name of grape is *Vitisvinifera.* L. Family- Vitiaceae and Origin Armenia near the Caspian Sea.

The cultivated grapes are believed to have been introduced in to the north India by the Persian invaders in 1300 AD, from where they were introduced into the South (Daulatabad in Aurangabad district of Maharashtra) during the historic event of changing the capital from Delhi to Daulatabad by King Mohammed-bin-Tughlak. Ibn Batata, a Moorish traveler who visited Daulatabad in 1430 AD, reported to have flourishing vineyards in South India. Grape was also introduced in the South in Salem and Madurai district of Tamil Nadu by the Christian missionaries around 1832 A.D. and in Hyderabad province by HEH, the Nizam of Hyderabad in the early part of the 20th Century. From Delhi, Daulatabad, Madurai, Salem it was spread in different parts of the country. The major grape growing states in India are Maharashtra in the west, Karnataka, Andhra Pradesh and Tamilnadu in the south and Punjab, Haryana and Western Uttar Pradesh in the North. In Maharashtra, viticulture industry is based on prominent commercial varieties of grape namely, Thompson seedless, Sharadseedless, Tas-e-ganesh, Maru, Sonaka, Manikchaman, Krishna and Banglore purple.

The products from grapes are rasins, sweet juice, beverages, wine, dry fruits, manuka, kismis etc. which are the only processed products in India. Grape juice is rich in vitamin B and is a good source of vitamin C; the juice contains fruit sugar, fruit acid, minerals like calcium, phosphorus and iron, which play the role of health promoting ingredients in human diet. The juice is used on a large scale for preparing wine.

In our country, grape production is less because of non adoption of improved cultivation practices like use of improved varieties, optimum use of manure and fertilizers, irrigation management, use of plant growth regulator, training and pruning of fruit plant and plant protection against adverse weather along with control of diseases and pests. Efficient

management of these practices substantially increases fruit production.

The area under grape is increased up to 200 ha in Buldana district (2009-10) but average yield i.e. 18 tons per ha, which is comparatively very low considering the other districts of Maharashtra. It is, therefore felt necessary to know the reasons for low yield and constraints in cultivation of grape.

The reasons for low productivity may be due to traditional method of cultivation followed by the grape farmers. Productivity of grapes can be enhanced by adopting improved practices recommended by the research institutes and agricultural universities. The reason for low productivity may be because of non-adoption of improved package of practices by the grape growers or they might not be aware about these practices.

With this study, it comes to know the knowledge of the grape growers about improved cultivation practices of grape and its actual adoption by the grape growers and also attitude towards grape growing hence, this study found useful for identifying the adoption behaviour and constraints faced by the farmers in adoption of improved cultivation practices. It is, therefore looking towards the need and importance of grape crop particularly in Chikhali tahsil of Buldana district, it was decided to study the adoption behaviour of Grape growers with the following specified objectives.

1. To study the personal, social-economic, situational, communication and psychological characteristics of grape growers.
2. To study the adoption of improved cultivation practices by grape growers

METHODOLOGY

The present investigation entitled Adoption Behaviour of Grape Growers was conducted in Chikhali Panchayat Samiti of Buldana district in Vidarbha region of Maharashtra state, based on more concentration on grape cultivation in this Panchayatsamiti. An exploratory research design of social research was used for the present investigation. The list of villages having cultivation of grape was obtained from Taluka Agril. Office Chikhali. The villages having more area under grape cultivation were indentified, out of which 16 villages were selected purposively. The villages selected were namely, Chikhali, Sawrgaon (Dukare),

Chandhai, Palaskhed (Daulat), Kavala, Mangrul (Navghre), Divthana, Amdapur, Undri, Godri, Shelgaon atoll, Mangrula (Isrul), Peth, Kinhola, Bramhapuri, Malshemba.A list of grape growers whose orchards were in bearing stage was prepared from each of selected village and all these grape growers were selected as universe or population for the studyto constitute sample size of 100 respondents.

Dependent variable:

Adoption:

Rogers (1983) defined as adoption is decision to make full use innovations in the best courses of action available.

It was operationally defined as the actual use of identified scientific grape cultivation practices by individual grape grower. The responses on adoption of such practices i.e. primary tillage to marketing was collected in three point's scale that is complete adoption, partial adoption and no adoption with numerical score of 2, 1 and 0 respectively. A total adoption score for individual respondent was obtained by adding scores of all improved cultivation practices. The raw adoption score of each individual was converted in adoption index as follow.

$$\text{Adoption Index} = \frac{\text{Actual obtained score by the respondent}}{\text{Maximum obtainable score}} \times 100$$

Later on by using adoption index respondents were categorized into low, medium and high adoption categories on equal interval basis.

Sr. No.	Adoption levels	Index range
1	Low	Up to 33.33
2	Medium	33.34-66.67
3	High	Above 66.67

RESULTS AND DISCUSSION

Table 1 Distribution of the respondents according to personal, situational, psychological and communication characteristics of the grape growers

Sl No	Characteristics	Category	Respondents (n=100)	
			Frequency	Percentage
1	Age (Years)	Young (Below 35)	22	22
		Middle (36 to 50)	45	45
		Old (Above 50)	33	33
2	Education	Illiterate	00	00.00
		Primary school	12	12.00
		Middle school	21	21.00
		High school	45	45.00
		College	22	22.00
3	Land holdings	Marginal	8	08.00
		Small	20	20.00
		Semi-medium	32	32.00
		Medium	37	37.00
		Large	03	03.00
4	Size of grape Orchard	Small (up to 0.80 ha.)	46	46.00
		Medium (0.81 to1.40 ha.)	36	36.00
		Large (above 1.40 ha.)	18	18.00
5	Annual income	Up to 161666	32	32.00
		161667 to 293333	49	49.00
		293334 and above	19	19.00
6	Experience in Grape cultivation	Low (up to 3.Years)	26	26.00
		Medium (4 to 6.Years)	57	57.00
		High (more than 6.Years)	17	13.00
7	Sources of information	Low	17	17.00
		Medium	68	68.00
		High	15	15.00

8	Social participation	Low	16	16.00
		Medium	75	75.00
		High	09	09.00
9	Innovativeness	Low	24	24.00
		Medium	64	64.00
		High	12	12.00
10	Economic motivation	Low	18	18.00
		Medium	72	72.00
		High	10	10.00
11	Risk preference	Low	23	23.00
		Medium	69	69.00
		High	8	08.00
	Scientific orientation	Low	23	23.00
		Medium	66	66.00
		High	11	11.00

The age wise distribution of the respondents presented in Table 1 shows that less than half of grape growers (45.00 %) were observed in the middle age group of 36 to 50 years. Less than half (45.00%) of the respondents were educated up to high school. More than one third of the respondents (37.00%) belonged to the category of medium land holding ranging from 4.01 to 10.00 ha. Less than half (46.00%) of the respondents had a grape orchard up to 0.8 ha. under cultivation. Relatively higher proportion of the respondents (49.00%) had annual income ranging from Rs.1,61,667to Rs.2,93,333. Most of the respondents (57.00%) had experience of 4 to 6 years in grape cultivation. Majority of the respondents (68.00%) were having medium level sources of information. Three-fourth of the respondents (75.00%) were observed in medium category of social participation. It is apparent from the Table 1 that nearly two third of the respondents (64.00%) were included in the medium category of innovativeness. The distribution of the respondents according to their level of economic motivation in Table 1 showed that majority of the respondents (72.00 %) had medium level of economic motivation. Maximum per cent of the respondents (69.00%) were observed under medium level of risk preference

category. It is observed from Table 1 that maximum per cent of the respondents (66.00%) were under medium level of scientific orientation category.

Table 2: Distribution of the respondents according to their adoption of grape vine cultivation

Sr. No.		Recommended Cultivation practices of grape	Adoption Respondents (N=100)		
			C.A.	P.A.	N.A.
A.		**Land preparation**			
	i)	Type of soil recommended for cultivation of grape. (light, friable loamy soils, free drainage, etc.)	87	10	3
	ii)	Practices necessary for land preparation. (traditional, mechanical)	69	17	14
B.		**Variety**			
	i)	Varieties of grape recommended for cultivation in study area. (Sonaka, Sharad)	48	38	14
	ii)	Quality characteristic of recommended variety of grape (i.e. wine, manuka, sweet juice, etc.)	32	25	43
C.		**Propagation**			
	i)	Propagation method generally use in study area. (Cuttings, etc.)	45	30	25
D.		**Planting**			
	i)	Suitable planting time recommended for grape crop. (January and February)	40	37	23
	ii)	Planting depth for grape crop. (50-75 cm)	41	30	29
E.		**Spacing**			
	i)	Recommended spacing for grape crop. (3.0 x 1.5 m, 3.0 x 1.4, etc.)	27	50	23
	ii)	Optimum grapevine population of grape crop. (2200, 2380, etc.)	33	45	22
F.		**Training**			
	i)	Type of training recommended in grape crop. (Head system, pergola system , etc.)	27	40	33

G.		**Pruning**			
	i)	Suitable time for pruning in grape crop. (April, October pruning)	25	48	27
H.		**Organic manure**			
	i)	Recommended dose of FYM per hectare for grape crop. (90-100 CL)	45	38	17
	ii)	Suitable time of FYM application in grape crop. (complete growth of orchard)	29	38	33
I.		**Fertilizer application**			
	i)	Recommended dose of fertilizer per hectare (900 kg N : 500 kg P_2O_5 : 700 kg K_2O)	18	37	45
J.		**Irrigation**			
	i)	Recommended time for irrigation of grape	40	27	33
	ii)	Suitable method of irrigation use in this area	43	42	15
K.		**Growth regulat**or			
	i)	Growth regulator used for dipping /spraying (GA, NAA)	38	33	29
	ii)	Number dipping/spraying in one season (2-3)	39	35	26
L.		**Girdling**			
	i)	Adoption about girdling practices	36	39	25
M.		**Thinning**			
	i)	Method used for thinning (manual or chemical)	29	36	35
N.		**Plant protection**			
	i)	Major pests of grape crop (chafer beetle, thrips)	18	44	38
	ii)	Insecticide recommended for control of pests (0.05% malathion, Seedless tolerant var.)	25	48	27
	iii)	Major diseases of grape crop (powdery mildew, downy mildew)	27	42	31
	iv)	Chemical recommended for control of major disease (sulphur, Bordeaux mix.)	51	34	15
O.		**Harvesting**			
	i)	Appropriate stage of harvesting of grape crop (February, March)	39	36	25
P.		**Marketing**			
	i)	Size suitable for marketing of grapes (Large, etc.)	21	42	37

From Table 2, it is revealed that, with respect to land preparation majority of the respondents (87.00%) and (69.00%) were complete adoption

about type of soil selection of grape cultivation and practices necessary for land preparation respectively.

In case of variety use, maximum numbers of respondents (48.00 %) were observed in complete adoption about varieties recommended in the study area. Whereas, 32.00 per cent of them were complete adoption about characteristics of recommended varieties.

With regards to propagation, planting and spacing, 45 per cent of the respondents possessed complete adoption about propagation, whereas in case of planting 40.00 per cent of the respondents were having adoption about suitable planting time (January and February) and adoption about planting depth for grapes (50 to 75 cm) possessed by 41.00 per cent of the respondents. As concerned to spacing, the respondents (50.00%) and (45.00%) were having partial adoption about recommended spacing and optimum grape vine population respectively.

Relatively higher proportion of the respondents (40.00%) and (48.00%) possessed partial adoption about type of training and pruning time respectively.

As concerned to the organic manures, maximum number of the respondents (45.00%) complete adoption and (38.00 %) were observed in having partial adoption of recommended dose of FYM and suitable time of application respectively.

With respect to fertilizer application majority (37.00%) of the respondents possessed partial adoption about recommended dose of fertilizers.

The respondents (40.00%) and (43.00%) were possessed complete adoption about recommended time of irrigation and suitable method of irrigation in the study area.

As regards to dipping or spraying higher proportion (38.00%) and (39.00%) of the respondents were completely adopted the practices of the growth regulator use (GA, NAA) and numbers of dipping in one season (2-3) respectively.

Equal proportion of the respondents (36.00%) possessed the complete adoption about girdling practices and partial adoption of method used for thinning respectively.

In case of plant protection measures, higher proportion of the respondents (44.00%), (48.00%) and (42.00%) were possessed partial

adoption about major pests of grapes (chafer beetle, thrips), and insecticides recommended for control of pests, major disease (powdery mildew, downy mildew) and little more than half(51.00%)of the respondents completely adopted recommended chemical for control of disease (Sulphur, Bordeaux mixture) respectively.

As regards harvesting and marketing 42.00 per cent and 36.00 per cent of the respondents were partial adoption about appropriate stage of harvesting of grape (Feb., March) and size suitable for marketing (large).

Adoption is decision making process and important to the grape growers in receiving maximum production from grape crop. Looking to the importance of adoption, about improved practices of grape crop has been studied and the data in this regard have been presented in Table 3.

Table 3: Distribution of respondents according to their adoption level about grape cultivation practices

Sr. No.	Adoption level	Respondents (n=100)	
		Number	Percentage
1.	Low	10	10.00
2.	Medium	72	72.00
3.	High	18	18.00
	Total	**100**	**100.00**

It can be seen from Table 3 that,majority of the respondents (72.00%) had medium level of adoption of grape cultivation technology. The percentage of respondents having high level of adoption was (18.00%), where as one tenth (10.00%) respondents were having low level of adoption.

Thus it can be inferred that most of the respondents were grouped in medium level of adoption about recommended grape cultivation practices.

These findings were in conformity with the findings of Thakare (2008).

CONCLUSION

Majority of the respondents (72.00%) had medium level of adoption of grape cultivation technology. The percentage of respondents having high level of adoption were (18.00%), where as one tenth (10.00%) respondents were having low level of adoption.

The reasons for medium adoption in major operations and low benefits from grape cultivation may be due to high wages of labour, timely non availability of labours, not getting remunerative price of grape fruit, inadequate sources of finance, fluctuation in market, adverse climatic condition, short of capital, etc.As regards, existence of medium adoption behaviour in manures and fertilizer practices it may be because of non availability of good quality FYM, high cost of FYM, inadequate and timely availability of fertilizers, high cost of fertilizers, pesticides, fungicides and micronutrient. Shortage of irrigation water during summer, were also one of the reasons of the medium adoption

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RESEARCH ARTICLE

Effect of Rajyoga Meditation on Mental Health

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ABSTRACT

The stress levels among the people have resulted into many health problems such as diabetes, cardiac diseases, and psychological disorders. Raj yoga Meditation helps all by reformation of the human ethics and directs them to follow the ethical conduct in order to progress the self which directly helps them to maintain better health. The Present investigation was undertaken to know the benefits of Raj yoga meditation perceived by respondents and to study the effect of Raj yoga meditation on the health status. The study was confined to Parbhani town in Marathwada region of Maharashtra state. Present investigation was conducted by interviewing eighty respondents practicing Raj yoga Meditation for more than five years. It was seen that more than half (52.50 per cent) of the respondents were having excellent mental health whereas 41.25 per cent of the respondents were having good mental health and 6.25 per cent of the respondents were having poor mental health as a result of practicing Raj yoga Meditation.

Key words - Rajyoga Meditation, mental health ,effect

INTRODUCTION

The stress levels among the people have resulted into many health problems such as diabetes, cardiac diseases, and psychological disorders. Raj yoga Meditation helps all by reformation of the human moral ethics and directs them to follow the ethical conduct in order to progress the self which will directly help them to maintain better health.

Research has scientifically proven that meditation is a safe and simple way to balance your physical emotional and mental state and more and more doctors are encouraging patients to practice meditation to cure many stress related illnesses.

What is rajyoga meditation ?

- It is a process to know the inner self for better empowerment to live life outside.
- It is the way to experience super sensuous joy and bliss.
- Rajyoga meditation enables the soul to attain the twin objective of virtues development and the combating of negative traits.
- It is the way to establish a mental link with God.

For meditation the knowledge of both soul and supreme soul is must. Soul is understood. Hence this should not be difficult practice. One needs to withdraw himself from all his sense organs and establish himself in the faith that he has a soul distinct from his body he will be reminded of the supreme soul. The study is undertaken the following objectives.

- To know the benefits of Raj yoga meditation perceived by the respondents.
- To assess the effect of Raj yoga meditation on the mental health status perceived by the respondents.

METHODOLOGY

The present investigation is a part of post graduate dissertation entitled 'Perceived effect of raj yoga meditation on health status'. The study was confined to Parbhani town in Marathwada region of Maharashtra state.

Present investigation was carried out by randomly selecting BK sisters and brothers attending murli classes regularly at PBIVV, Parbhani centre. The data were collected by personally interviewing 80 BK sisters & brothers practicing raj yoga meditation for more than five years were collected. Perceived effect of raj yoga meditation t refers to the personal feeling, expression of the respondent towards the result of practicing raj yoga meditation and its impact on mental health status.

For measuring the mental health status a five continuum scale was administered with eight statements. For positive statements 4,3,0,2 and 1 scores were assigned to Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree responses respectively. For negative statements 4, 3, 0, 2 and 1scores were assigned to Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree responses respectively. Thus the total score obtained by adding scores for each statement in each area the respondents were categorized. The

data were tabulated by using frequency and percentages.

FINDINGS

1.1 Benefits of raj yoga meditation

The responses to the open ended question were collected from the respondents for the benefits experienced by them.

Table1. Distribution of respondents according to benefits of raj yoga meditation as perceived by the respondents (N=80)

Sr. No.	Benefits of raj yoga meditation	Frequency	percentage
1	Healthy relations within and outside the family	63	78.75
2	Self confidence is increased.	21	26.25
3	Improvement in quantum and quality of work	39	48.75
4	Getting sound sleep	27	33.75
5	Concentration is increased	31	38.75
6	Mind became happy , healthy ,strong & stable	76	95.00
7	Able to overcome any kind of stress & strain	31	38.75
8	Leadership qualities are improved	17	21.75
9	Became Familiar with the powers of soul	34	42.50
10	Success is achieved in the life	28	35.00
11	Became addiction free	12	15.00

The data from Table1 illustrated that majority (95.00%)of the respondents reported mind become happy healthy strong and stable as the benefit of the rajyoga practice More than three fourth(78.75%) of the respondents expressed that healthy relations within and outside the family were developed due to rajyoga practice .Near about half (48.75%)and 42.50% of the respondents mentioned, improvement in quantum and quality of work and became familiar with the powers of soul as benefits of rajyoga practice respectively .Concentration is increased and able to overcome any kind of stress and strain were claimed by38.75% respondents as benefits of rajyoga meditation. The findings are in line with findings of kubose 1976, linden 1973, rani &rao1996 valentine, 1988.

Getting sound sleep(33.75%), self confidence is increased (26.25%) leadership qualities are improved (21.75%) and became addiction free (15.00%) were also benefits of the

rajyoga meditation reported by the respondents.

Perceived effect of raj yoga meditation on mental health status

Perceived effect of rajyoga meditation refers to the personal feeling, expression of the respondent towards the result of practicing rajyoga meditation and its impact on mental health status.

Table 2. : Distribution of respondents according to their Perceived effect of raj yoga meditation on Mental Health N=80

Sr. No.		Mental Health Status	
1	Excellent (25-32)	42	52.50
2	Good (17-24)	33	41.25
3	Poor Up to 16	05	6.25

As far as mental health status is concerned, it was seen that more than half (52.50 per cent) of the respondents were having excellent mental health whereas 41.25per cent of the respondents were having good mental health and 6.25 per cent of the respondents were having poor mental health.

Conclusion

It can be concluded that regular practice of raj yoga meditation may help human mind to become happy, healthy, strong and stable and to have healthy relations within and outside the family. The regular practice of raj yoga meditation may also help the human beings to have good mental health.

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RESEARCH ARTICLE

Impact of Drudgery Reducing Technologies on Work Efficiency and Health Security of Farm Women

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ABSRACT

Agriculture has been established as one of the drudgery prone occupation of unorganized sector due to lack of access to improved agricultural technologies. Rural women play a vital role in farm and home stead activities. Women's participation in agro-based activities is much more than what statistics reveals. They do most tedious and hard work from early morning to late night. They are involved in all household activities, child care, farm activities, livestock management, post-harvest management and allied activities. These tasks not only demand considerable time and energy but also are the sources of drudgery for rural women which are not yet been precisely identified. Involvements in these drudgery prone activities have adverse effect on their health, work efficiency and family welfare. Hence the study was carried out to study the impact of drudgery reducing technologies on work efficiency and health security of farm women. So the drudgery reducing technologies such as Maize sheller, Apron for cotton picking, Mittens for vegetable harvesting, Milking stand and stool and Vaibhav sickles were introduced to 60 farm women of 5 villages of Gevrai tehsil, dist. Beed. Use of each tool was demonstrated and was issued to them for use minimum for one month. Their work efficiency was calculated on the basis of work output. Health security was assessed on the basis of rate of perceived exertion and satisfaction gained after using the tool. The results depicted on the basis of comparison between the traditional method and use of improved tools. It showed that the new technologies reduces the drudgery of farm women, increase their work efficiency, saves her time as well as provides health security.

Key words: Drudgery, technology, work efficiency, health security

INTRODUCTION

Rural women play a vital role in home, farm and allied activities. They contribute about 70 percent farm operations. They do most tedious and back breaking tasks in the physical aspects of farming, live stock and post harvest management. These tasks not only demand considerable time and energy but also are sources of drudgery for rural women. Involvement in these activities also affects the health of farm women which has adverse effect on work efficiency and their health.

Activities like weeding, cutting, uprooting, picking, harvesting, transplanting, removing of stalk and stubbles, threshing etc were found to be maximum drudgery involved agricultural activities performed by farm women (Oberoi & Singh 2001). The work environment and tools used by farm women in agriculture are also important reasons to lower the productivity and increase the health hazards. The agricultural women are needed to be mechanized appropriately for increasing their productivity, income and reduce the drudgery. Hence the study was carried out to know the impact of drudgery reducing technologies on work efficiency and health security of farm women.

METHODOLOGY

The study was carried out in five adopted villages of Gevrai Tehsil, district Beed of Marathwada region.

Selection of sample: The farm women selected were in the age group of 25 -50 years who were healthy, non pregnant, non lactating and free from any serious health hazards.

Selection of activities: Maize shelling, Cotton picking, Brinjal harvesting, Milking and Weeding were the activities selected for the study.

Selection of drudgery reducing technologies: The drudgery reducing technologies selected were Maize Sheller, Apron for cotton picking, Mittens for vegetable harvesting, Milking stand and stool and Vaibhv sickle.

These tools were distributed to 12 farm women of each village and demonstration of use of each tool was given to them. The data was collected after one month of use of each technology by each respondent. The subjective perception of exertion expressed towards the performance of farm activities was recorded by using five point scale developed by Varghese et al (1994). It was measured at five point continuums i.e. 5- Very heavy exertion, 4- Heavy exertion, 3-

Moderately heavy exertion, 2- Light exertion and 1- Very light exertion.

Total mean scores of perceived exertion were calculated.

Work efficiency was calculated by following formula

$$WE\ (\%) = \frac{W_1 - W_2}{W_1} X\ 100$$

Where W_1 = Output by traditional method

W_2 = Output by improved method

RESULTS AND DISCUSSION

Table 1. Specification of technologies used for reducing the drudgery of farm women

The specification of technologies selected for reduction of drudgery is given below.

Sr. No.	Activities	Technologies used	Source of technologies	Specifications	Cost (Rs.)
1	Maize shelling	Maize sheller	CIAE, Bhopal	Hand operated tool, easy to operate, low cost and easily available.	60.00
2	Cotton picking	Apron	AICRP Family Resource Management, College of Home Science, VNMKV, Parbhani	Prepared from cotton cloth namely Manjarpat. Economically affordable. It has long sleeves. A bag is attached for storing the cotton	350.00
3	Vegetable Harvesting	Mittens	AICRP Family Resource Management, College of Home Science, VNMKV, Parbhani	Simple design for stitching Made from locally available material Useful for increasing speed of work Low cost Reduces musculo-skeletal problems	80.00
4	Milking	Stand and stool	AICRP Family Resource Management, College of Home	Can be prepared by local artisan Reduces the drudgery of milkman	900.00

			Science, VNMKV, Parbhani		
5	Weeding	Improved sickle	CIAE, Bhopal	Easy to operate Low cost	50.00

1. Maize Sheller

It is a hand operated tool to shell the maize from dehusked cobs. It is made up of mild steel sheet and is octagonal in shape. The unit is having four tapered fins inside the Sheller. The sheller is held in left hand, a cob held in right hand is inserted into it with forward and backward twist to achieve the shelling.

2. Apron for cotton picking

Apron makes the women comfortable while picking cotton and prevents scratching of the skin while moving in the field as well as gives protection from heat stress. Long sleeves give protection from direct exposure to sunlight. A bag attached to apron has capacity to hold cotton about 3-4 Kgs. It can be easily dressed up as laces are provided at the back side to tie up.

3. Mittens for vegetable harvesting

These mittens reduce the drudgery, injuries and musculo-skeletal problems of women. Provision of sticking belt makes possible to adjust the mittens to any size of hand and arm. Mittens are useful in Okra and Brinjal harvesting.

4. Milking stand and stool

It reduces the stress and strain of milkman regarding fear of splitting milk by the kick of animal. It helps to avoid wastage of milk. Milkman use to sit in uncomfortable position with pot picked in two legs which is very unnatural position which involves drudgery. It reduces the drudgery as stool is very comfortable for sitting while milking.

5. Improved sickle

It is serrated (improved) blade sickle. It facilitates cutting and requires less effort. It consist of serrated blade ferrule and wooden handle. Operator's safety has been taken care by providing appropriate size of raised wooden handle.

Table 1. The information of selected drudgery reducing technologies

The information of selected drudgery reducing technologies is

depicted in table 1. It can be seen that the source of three technologies selected Viz., Apron, Mittens and milking stand and stool is VNMKV, Parbhani where as two technologies viz., Maize sheller and sickle are from CIAE, Bhopal. All technologies are simple in fabrication or simple in design and its cost ranging from Rs. 50 to 900/- only.

Table 2. Work output by traditional and improved method

Sr. No.	Farm Activities	Work output	
		Traditional Method	Improved method
1	Maize shelling	6.5 Kg/Hour	9 Kg/Hour
2	Cotton picking	15 Kg/Hour	18.5 Kg/Hour
3	Vegetable Harvesting	6 Kg /Hour	8.8 Kg/Hour
4	Milking	3.5 Liters/20 mins	3.5 Liters/15 mins
5	Weeding	17.5 Sqmt/Hour	25.6 Sqmt/Hour

It can be depicted from the table 2 that the farm women completed maize shelling by Maize sheller on an average 9 kg per hour as compared to traditional method (6.5 Kg/hour). Work efficiency increased was 38.46 percent by improved tool.

Comparison of cotton picking using apron and without apron depicted that women could pick the cotton 18.5 kg per hour as compared to traditional method where it was 15 Kg per hour. Increase in efficiency was 23.33 percent.

Brinjal harvesting by hand was 6 Kg per hour where as it was increased up to 8.8 Kg per hour by using mittens prepared for brinjal harvesting with increased efficiency 46.66 percent.

When comparison was made with traditional and improved method of milking, it was observed that milking of animals by improved method saves time of women (5 Minutes) and activity could done without fear of spilling milk or kicking animals. Women expressed the task could complete without stress. Work efficiency was 33.33 percent when time factor was considered.

Comparison between two weeders revealed that traditional tool could complete 17.5 sqmt area per hour where as improved tool could complete 25.6 sqmt area with increased efficiency 46.66 percent then traditional one.

These results support the study carried out on ergonomic evaluation of newly developed weeding tools by Zend *et al* (2005). The study concluded that output was increased by 41 to 64 percent with better weeding efficiency with Saral Khurapi and newly developed weeder which was further recommended for weeding.

Table 3. : Work efficiency of farm women by using traditional and improved methods

Sr. No.	Activity	Traditional Method	Improved Method	Percentage increase in efficiency over traditional method
1	Maize shelling	By hand	Maize sheller	38.46 extra shelling
2	Cotton picking	Sari pallo	Apron made for cotton picking	23.33 extra picking
3	Vegetable Harvesting	By hand	Mittens for vegetable harvesting	46.66 extra harvesting
4	Milking	No tool for sitting	Milking stand and stool	33.33 time saved
5	Weeding	Traditional sickles	Vaibhav sickles	46.28 extra weeding

These results are in the line of study carried out by Singh etal (2007) on weeders for drudgery reduction of farm women in India. Results of the study revealed that weeders proved efficient on ergonomic parameters, reduced average working heart rate and energy expenditure compared to traditional tool.

These results are also in the line with study conducted by Oberoi and Gupta (2007) where the muscular stress of rural women while performing different household, allied and farm activities with use of traditional and improved tools were assessed. The results showed that all improved tools improved the work posture, reduced the muscular stress of women while performing selected activities, and enhanced the work efficiency and health of farm women. Similar studies were carried out by Badigar *et al* (2006) and Patil (2012) which support the results of this study those technologies reduces the drudgery, saves time and provide health security.

Table 4. Rate of perceived exertion of farm activities after using traditional and improved method

Sr. No.	Farm Activities	Rate of perceived exertion		
		Traditional method	Improved method	Difference
1	Maize shelling	4	2	2
2	Cotton picking	4	2	2
3	Vegetable Harvesting	4.5	1.5	3
4	Milking	4.5	1.5	3
5	Weeding	4	2	2

The above table showed that maize shelling, cotton picking and weeding activity reduced the exertion of farm women by score 2 i.e. showing activity very exertive to light exertive. The activities brinjal harvesting and milking were heavy exertive and perceived moderately exertive after using traditional method.

CONCLUSION

It can be concluded that the improved technologies reduces the drudgery of farm women, increases their efficiency, saves time and provide health security.

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Fig. 1. Farm women's using the improved technologies

Use of Mittens for brinjal harvesting

Use of Improved sickle

Use of Apron for cotton picking

Use of Maize sheller

Use of Milking stand and stool

RESEARCH ARTICLE

Knowledge and Adoption of *Panchsutri'* Technology by the Sorghum Growers

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ABSTRACT

Sorghum (*Jowar*) is an important and most preferred short duration crop grown in rabi season in Maharashtra. But even though the improved technologies like *Panchsutri technology* is available with farmer, the yield level of sorghum crop is not as per the potential due to uneven nature of rainfall and lack of scientific knowledge to accept the new technology. The present study was conducted in Solapur district of Maharashtra state to study the Knowledge and adoption of *Panchsutri* technology by the sorghum growers.

The findings of the study revealed that more than one half of the sorghum growers had medium level of knowledge and adoption about *Panchsutri* production technology of *rabi* sorghum. That means there is a wide gap between the expected and existing knowledge level and adoption level about the *Panchsutri* technology of the sorghum growers. Therefore, more focus should be given for imparting and enhancing the knowledge through conducting more training programmes and wide publicity. Crop front line demonstrations should be taken to convert the sorghum growers from awareness to adoption stage by the state department of agriculture and SAUs so that it ultimately increase the adoption level of *Panchsutri* technology.

INTRODUCTION

Sorghum (*Jowar*) is an important and most preferred short duration dry land rabi crop grown in Maharashtra on 18.44 lakh ha. area with an average yield of 702 kg per hectare. Western Maharashtra is having 12.58 lakh hectares area under rabi sorghum, having productivity of only 831 kg per ha. (Anonymous, 2014). In rabi sorghum, a significant increase in productivity could not be achieved due to the biological and environmental limitations like variations in soil types, variation in rainfall, susceptibility to low temperature and climate change.

Considering these constraints in production and productivity and the large area under rabi sorghum; Mahatma Phule Krishi Vidyapeeth, Rahuri has developed a *Panchsutri* rabi sorghum production technology i.e. Five point Production technology to increase the yield of rabi sorghum under dry land condition. *Panchsutri* technology consists of soil moisture conservation practices before sowing, use of improved varieties as per the soil types, soil moisture conservation practices after sowing, nutrient management and plant protection. Therefore, the present study entitled, 'Knowledge and adoption of *Panchsutri* technology by the sorghum growers' was planned and conducted to study the profile of the sorghum growers; to study the knowledge of the sorghum growers about *Panchsutri* technology and to study the adoption of *Panchsutri* technology by the sorghum growers.

METHODOLOGY

For the present study 120 representative sorghum growers were selected from two villages each from Mangalwedha, Mohol and North Solapur tahsils of Solapur district by proportionate random sampling. The data were collected through specially developed interview schedule to know the knowledge and adoption of *Panchsutri* technology by the sorghum growers; thereafter the data were analyzed, tabulated and interpreted with suitable statistical instruments like frequency and average.

RESULTS AND DISCUSSION

The data collected for the study have been analyzed and results are presented as below,

I. Knowledge of the sorghum growers about *Panchsutri* technology

In this study 'knowledge' is defined as factual information possessed by the sorghum growers about *Panchsutri* technology of *rabi* sorghum. The distribution of the sorghum growers according to their knowledge about *Panchsutri* technology is given in Table 1.

Table 1. Distribution of sorghum growers ac cording to their knowledge level

Sl. No.	Knowledge Level (Score)	Respondents (N=120)	
		Frequency	Per cent
1	Low (Upto 11)	24	20.00
2	Medium (12 to 19)	65	54.16
3	High (20 and above)	31	25.84
	Total	**120**	**100**
Mean = 15.92		**SD = 4.44**	

The data from Table 1 revealed that more than half of (54.16 per cent) sorghum growers had medium level of knowledge, while, 25.84 per cent had high level of knowledge and 20.00 per cent had low level of knowledge about *Panchsutri* production technology of *rabi* sorghum.

Therefore, it is observed that there is a wide gap between the expected and existing knowledge level about the *Panchsutri* technology of the sorghum growers. Therefore, attention of the state department of agriculture and SAUs need to be diverted on this aspect and necessary steps like demonstrations, publicity should be taken to enhance the knowledge level so that it will enhance the adoption level of *Panchsutri* technology. These findings are similar with the findings of Chahande (2012) and Patil *et al.* (2015).

Practice wise knowledge of sorghum growers about *Panchsutri* technology

The practice wise knowledge about *Panchsutri* is presented in Table 2.

Table 2. Distribution of sorghum growers as per their knowledge level about *Panchsutri* technology

Sl. No.	Recommended practices of *rabi* sorghum	Complete Knowledge		No Knowledge	
		Frequency	Per cent	Frequency	Per cent
A.	**Knowledge level about soil moisture conservation practice before sowing**				
1	Ploughing	120	100.00	00	00.00
2	Harrowing	120	100.00	00	00.00
3	Preparation of beds	78	65.00	42	35.00
4	Mulching	48	40.00	72	60.00
B.	**Knowledge level about sowing practices**				
1	Improved variety (Phule Vasudha, M-35-1, Phule Anuradha)	77	64.16	43	35.84

2	Sowing time (15Sep-15Oct.)	102	85.00	18	15.00
3	Seed treatment of Sulphar (4gm/kg.) + Azatobacter (25g /kg.)	58	48.33	62	51.67
4	Spacing (45 X 15 cm)	64	53.33	56	46.67
5	Seed rate (10 kg / ha.)	81	67.50	39	32.50
C.	**Knowledge about soil moisture conservation practice after sowing**				
1	Thinning (12-15 DAS)	71	59.16	49	40.84
2	Hoeing 1st (3 weeks after sowing), 2nd (5 weeks after sowing), 3rd (7 weeks after sowing)	109	90.83	11	9.17
3	Weeding (One or Two)	112	93.33	8	6.67
4	Water management	104	86.66	16	13.34
D.	**Knowledge about nutrient management practices**				
1	Application of organic manure (FYM)	74	61.66	46	38.34
2	Application of recommended chemical fertilizer (NPK)	63	52.50	57	47.50
E.	**Knowledge about plant protection measures**				
1	Insecticide	38	31.66	82	68.34
2	Fungicide	52	43.34	68	56.66

A. Knowledge of soil moisture conservation practice before sowing

Conservation of soil moisture consists of ploughing, harrowing, preparation of beds and mulching. The data revealed in Table 2 indicated that all most all the sorghum growers had complete knowledge of ploughing and harrowing. At the same, 65.00 per cent of the sorghum growers had knowledge about preparation of beds and 40.00 per cent of the sorghum growers had knowledge of mulching to conserve the available soil moisture.

B. Knowledge level about sowing

It was observed that 64.16 per cent sorghum growers had knowledge about the improved varieties of the rabi sorghum, 85.00 of the sorghum growers had complete knowledge about proper sowing time, 67.50 per cent of the sorghum growers had knowledge of seed rate, seed treatment

was known to 48.33 per cent of the sorghum growers and 53.33 per cent of the sorghum growers knew about spacing.

C. Knowledge about soil moisture conservation practice after sowing

Conservation of soil moisture consists of thinning, hoeing, weeding and water management. In case of soil moisture conservation practices after sowing 93.33 per cent of sorghum growers had knowledge about weeding while, 90.83 per cent and 86.66 per cent of the sorghum growers had knowledge of hoeing and water management, respectively.

D. Knowledge about nutrient management practices

Nutrient management consists of application of organic matter (FYM) and recommended chemical fertilizers. It was observed that, 61.66 per cent and 52.50 per cent of the sorghum growers had knowledge about recommended dose of FYM and chemical fertilizers requirement (NPK), respectively.

E. Knowledge about plant protection measures

Plant protection measures consist of use of insecticide and fungicide. It was observed that 43.34 per cent and 31.66 per cent of the sorghum growers had knowledge about the use of fungicide and insecticide, respectively. This may be due to that in case of sorghum sorghum growers are not worried and given no importance to plant protection measures.

II. Adoption of the sorghum growers about *Panchsutri* technology

Overall adoption of *Panchsutri* technology

In this study adoption is operationalized as, a process by which sorgum growers passes from first knowledge of *Panchsutri* technology to a decision to adopt the *Panchsutri* technology. The distribution of the sorghum growers according to their adoption about *Panchsutri* technology is given in Table 3.

Table 3. Distribution of sorghum growers as per the adoption level about *rabi* sorghum *Panchsutri* technology

Sl. No.	Adoption Level (Score)	Respondents (N=120)	
		Frequency	Per cent
1.	Low (Upto 19)	27	22.50
2.	Medium (20 to 33)	68	56.66

3.	High (34 and above)	25	20.84
	Total	**120**	**100**
Mean = 26.46 SD = 7.83			

The data from Table 3 revealed that more than half of (56.66 per cent) the sorghum growers had medium level of adoption. While, 22.50 per cent had low level of adoption and 20.84 per cent had high level adoption of *Panchsutri* production technology in *rabi* sorghum. Similar to knowledge gap there is a great scope to enhance the adoption level of sorghum growers and overall. Therefore, there is a need to conduct demonstrations and convert the sorghum growers from awareness to adoption stage. These findings are similar with the findings of Chahande (2012), Lad (2013) and Patil (2015).

Practicewise adoption of *Panchsutri* technology

The practice wise adoption about *Panchsutri* technology *is* given as below.

Table 4. Distribution of sorghum growers as per the adoption level of soil moisture conservation practice before sowing

Sl. No.	Recommended practices of *rabi* sorghum	Adoption					
		Complete		Partial		No	
		Freq.	Per cent	Freq.	Per cent	Freq.	Per cent
A.	**Adoption of soil moisture conservation practice before sowing**						
1	Ploughing	116	96.66	0	00.00	4	3.34
2	Harrowing	114	95.00	0	00.00	6	5.00
3	Preparation of beds	22	18.33	51	42.50	47	39.17
4	Mulching	13	10.83	29	24.17	78	65.00
B.	**Adoption level of sowing practices**						
1	Improved variety (Phule Vasudha, M-35-1, Phule Anuradha)	52	43.34	28	23.33	40	33.33
2	Sowing time (15Sept-15Oct.)	93	77.50	0	00.00	27	22.50
3	Seed treatment of Sulphar (4gm/kg.)+ Azatobacter (25g /kg.)	19	15.83	73	60.84	28	23.33
4	Spacing (45 X 15 cm)	49	40.83	59	49.17	12	10.00

5	Seed rate (10 kg / ha.)	69	57.50	51	42.50	00	00
C.	**Adoption of soil moisture conservation practice after sowing**						
1	Thinning (12-15 DAS)	19	15.83	57	47.50	44	36.67
2	Hoeing 1st (3 weeks after sowing), 2nd (5 weeks after sowing), 3rd (8 weeks after sowing)	48	40.00	59	49.17	13	10.83
3	Weeding	109	90.83	00	00.00	11	9.17
4	Water management	24	20.00	62	51.66	34	28.34
D.	**Adoption of nutrient management practices**						
1	Application of organic manure (FYM)	53	44.16	52	43.34	15	12.50
2	Application of recommended chemical fertilizer (NPK)	39	32.50	58	48.33	23	19.17
E.	**Adoption of plant protection measures**						
1	Insecticide	12	10.00	26	21.66	82	68.34
2	Fungicide	21	17.50	68	56.66	31	25.84

A. Adoption of soil moisture conservation practice before sowing

Conservation of soil moisture consists of ploughing, harrowing, preparation of beds and mulching. From Table 4 it is revealed that 96.66 per cent of the sorghum growers had completely adopted the ploughing, 95.00 per cent had completely adopted the harrowing, 18.33 per cent had completely adopted the 'preparation of bed' and 10.83 per cent had completely adopted the mulching practice.

The low adoption of bed preparation and mulching was observed very less as compared to other. This is may be because these practices are quite labour consuming and farmers may not completely be aware about advantages of these practices.

B. Adoption level of sowing practices

As far as use of improved varieties, it was observed from Table 4 that 43.34 per cent of the sorghum growers had fully adopted improved varieties, followed by partially adoption (23.33 per cent), while, 33.33 per cent used other varieties. This may be due to non availability of seed of recommended variety on time.

As about proper sowing time, 77.50 per cent of the sorghum growers timely sown the sorghum and 22.50 per

cent did not followed proper sowing time. It may be due to early or late rainfall in particular region.

It was noticed that 23.33 per cent of the sorghum growers not done seed treatment, while 60.84 per cent treated seed with any one of the recommended and only 15.83 per cent treated the seed with Sulphar (4gm/kg.)+ Azatobacter (25g /kg.).

In case of spacing 40.83 per cent of the sorghum growers had sown sorghum at proper spacing, while 10.00 per cent not followed spacing.

Similarly, 57.50 per cent of the sorghum growers used recommended seed rate. Other used more seed than recommended.

C. Adoption of soil moisture conservation practice after sowing

The data regarding adoption of sorghum growers about soil moisture conservation practice after sowing is presented in Table 4. About half (47.50 per cent) of the sorghum growers partially adopted thinning practice, 15.83 per cent adopted thinning practice to complete extent, while, 36.67 per cent not followed thinning. This may because of sorghum growers feel that it reduces the plant population and resulted in less fodder yield. In case of hoeing operation 40.00 per cent adopted it fully, whereas, 49.17 per cent adopted partially and 10.83 per cent had not adopted hoeing operation.

Weeding practices followed by large majority (90.83 per cent) of the sorghum growers to full extent. As regards the application of protective irrigations it was observed that 28.34 per cent have not given protective irrigation, while, only 20.00 per cent had protective irrigation facility and 51.66 per cent applied supplementary irrigation partially to their crop.

D. Adoption of nutrient management practices

From table 4 it is revealed that 44.16 per cent of the sorghum growers applied organic manure as per recommendation and partial adoption was done by 43.34 per cent. In case of chemical fertilizers, 48.33per cent used the fertilizers in indiscriminate quantity, whereas, 32.50 per cent applied as per the recommendation of SAU and 19.17 per cent not applied chemical fertilizers. This may be because of the rainfed farming.

E. Adoption of plant protection measures

As regards the spraying of insecticide data revealed from Table 4 that 68.34 per cent of the sorghum growers not used the insecticides,

21.66 per cent used insecticides indiscriminately, whereas, 10.00 per cent used as per the recommendation. In case of application of fungicides 56.66 per cent applied indiscriminately, 25.84 per cent had not used the fungicides, whereas, 17.50 per cent used the fungicides as per the recommendation.

CONCLUSION

From the study it can be concluded that half of the sorghum growers had medium level of knowledge and adoption about *Panchsutri* production technology of *rabi* sorghum. That means there is a wide gap between the expected and existing knowledge level and adoption level about the *Panchsutri* technology of the sorghum growers. Therefore, focus of the state department of agriculture and SAUs need to be diverted on this aspect and organization of demonstrations, publicity should be taken to enhance the knowledge level and convert the sorghum growers from awareness to adoption stage so that it ultimately enhance the adoption level of *Panchsutri* technology.

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RESEARCH ARTICLE

Prospects of contract farming

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ABSTRACT

In India, the contract farming concept was prevalent in the sugar industry where farmers agreed to grow sugarcane at a pre-notified price for decades. The present study was conducted in the native state of Haryana. Four districts i. e. Hisar, Sirsa, Kurukshetra and Karnal were selected purposively from all the districts of Haryana state. 10 farmers were selected randomly from each village thus, making a total sample size of 160. Majority of the respondents i.e. 42.1 per cent of the respondents were least prosperous about contract farming followed by 39.0 per cent of the respondents who had been categorized as under prosperous whereas 18.9 per cent of all respondents were highly prosperous about contract farming. There was a highly significant association between social participation and prospects of contract farming.

Key Words: Contract, Farming, Prospects

INTRODUCTION

Diversification of agriculture has been considered very necessary to raise income of the cultivators and generate additional employment for the rural community. Contract farming may help in the diversification of agriculture by providing financial support, technology and assured market to the growers. Various agricultural and horticultural crops such as tomatoes, potatoes, chillies, gherkin, baby corn, onions, cotton, wheat, basmati rice, groundnuts, flowers, medicinal plants, etc. are cultivated in the form of contractual agreements with farmers in India.

Contract farming is a system for production and supply of agricultural/horticultural produce under forward contracts between producers/suppliers and buyers (Haque, 2000). In India, the contract farming concept was prevalent in the sugar industry where farmers agreed to grow sugarcane at a pre-notified price for decades. Later on established business houses like Pepsi Co., Reliance,

ITC, Hindustan Uni. Lever and McDonalds have entered into agricultural production and introduced a number of horticultural crops and now their products have a high demand in the international markets. Kaur (1990) found that majority of growers perceived low prospects of diversification in crop alternatives and dairy. Form the crop alternative, maximum numbers of cultivators were willing to shift to sugarcane, plus raya and 88 per cent of the officials perceived area shift to this crop rotation. In case of orchids, kinnow prospects were perceived as good both by cultivators and the officials.

The literature on contract farming has been limited as it is limited and scattered through various disciplines. From the literature survey, it is proved that most of the studies on contract farming were taken up from outside India. Very few in depth studies have been carried out in Haryana in particular and India in general. The agriculture based food industry requires timely and adequate inputs of good quality agricultural produce. Against this backdrop, contract farming is considered to be a real instrument to address many of the traditional limitations of the agriculture sector.

METHODOLOGY

The present study was conducted in the native state of Haryana. Four districts i.e. Hisar, Sirsa, Kurukshetra and Karnal were selected purposively from all the districts of Haryana state. There are nine blocks in Hisar district, six blocks in Sirsa district, five blocks in Kurukshetra district and six blocks in Karnal district. Out of these, two blocks from each district were selected randomly. A list of all the villages of the two selected blocks was prepared and two villages from each block were again selected randomly. Thus, 16 villages were selected for the study. Further 10 farmers were selected randomly from each village thus, making a total sample size of 160. A list of farmers involved in contract farming was obtained from the respective contracting companies e.g. HAFED – Haryana State Co-operative Supply and Marketing Federation Limited, NSC – National Seed Corporation, HSDC – Haryana Seed Development Corporation Ltd., Dept. of Agriculture, Govt. of Haryana, Kingfisher Breweries, Skol Breweries India Ltd, etc. A village-wise list of contract farmers was prepared and from that list, 10 farmers were selected randomly.

This variable was measured by constructing a structured schedule. A several numbers of contract farmers and private firms/organisations were contacted to form an inventory of the prospects. A review of literature concerned to the field was also deeply consulted. Finally, lists of 10 items were prepared to measure prospects. This dependent variable measured by using a 3-point continuum rating scale ranged from more bright, somewhat bright and not at all bright and scores were given 2, 1 and 0, respectively. The responses of all contract farmers were obtained from respondents.

RESULTS & DISCUSSION:

It is evident from Table 1 that 42.1 per cent of respondents were least prosperous about contract farming followed by 39.0 per cent of respondents had categorized as under prosperous whereas, 18.9 per cent of all respondents were highly prosperous about contract farming.

Table 1: Prospects of contract farming **N=160**

Sl. No.	Level of Prospects	Frequency	Per cent
1.	Least prosperous (8 to 12 score)	67	42.1
2.	Prosperous (12 to 16 score)	62	39.0
3.	Highly prosperous (16 to 19 score)	31	18.9
Total		**160**	**100.00**

Table 2: Distribution of respondents according to the prospects of contract farming.

N=160

S. No.	Items	Levels of prospect			Total weighted score	Weighted mean score	Rank
		More bright	Somewhat bright	Not at all bright			
1.	Better economic returns	**32**	**118**	**10**	182	1.13	**VII**
		(20.1)	(73.6)	(6.3)			
2.	Demand is increasing	**103**	**57**	**00**	263	1.64	**I**
		(64.2)	(35.8)	(0.0)			
3.	High price in commercialised crop / enterprises	**53**	**89**	**18**	195	1.21	**VI**
		(33.3)	(55.3)	(11.3)			
4.	Better technical support	**24**	**119**	**17**	167	1.04	**VIII**
		(15.1)	(74.8)	(10.1)			

5.	Better credit facilities are available at present	**69** (43.4)	**68** (42.1)	**23** (14.5)	206	1.28	**IV**
6.	Food habits of people are changing	**61** (38.4)	**80** (49.7)	**19** (11.9)	202	1.26	**V**
7.	Purchasing power of people is increasing	**74** (45.9)	**78** (49.1)	**08** (5.0)	226	1.41	**III**
8.	Better market facilities are available at present	**91** (56.6)	**66** (41.5)	**03** (1.9)	248	1.55	**II**
9.	Better input facilities are available	**20** (12.6)	**118** (73.6)	**22** (13.8)	158	0.98	**IX**
10.	Better for only those who residing near the city	**31**	**62**	**67**	124	0.77	**X**

Farmers` opinion towards Contract Farming

The data presented in Table 2 were analysed to know the prospects of contract framing. The table revealed that the "Demand is increasing" was found highly prosperous which got highest mean score of 1.643. "Better market facilities available at present" and "Purchasing power of people is increasing" were ranked second and third with mean score of 1.55 and 1.412, respectively. "Better credit facilities are available at present" with mean score of 1.287 and "Food habits of people are changing" with mean score of 1.262 were other prospects of contract farming.

Further, it can be revealed from the data that contract farming had prospects like "High price in commercialised crops/enterprise" with mean score of 1.218, "Better economic returns" with mean score of 1.317, "Better technical support" with mean score of 1.043, "Better input facilities are available" with mean score of 0.987 and "Better for only those who are residing near the city" with mean score of 0.775 were other important items of prospects of contract farming.

Association between socio-economic and personal characteristics of the contract farmers and the prospects of contract farming

This section presents the association of independent variables on the prospects of contract farming which was established by statistical test chi-square test (□□). The chi-square (□□) values are given in Table 3. A perusal of data indicated that the variables like education, land holding, irrigation facility, farm income and area under contract farming were significantly associated with prospects. There was a

highly significant association between social participation and prospects of contract farming. Whereas variables like age, farm power, innovativeness, risk orientation, mass media exposure and economic motivation are not significantly associated with prospects of contract farming.

Table 3: Association between socio-economic and personal characteristics of the farmers and the prospects of contract farming. N=160

Sr. No.	Independent Variable	Chi-square (□□)
1.	Age	0.980
2.	Education	0.010*
3.	Land holding	0.010*
4.	Farm power	0.107
5.	Irrigation facility	0.010 *
6.	Innovativeness	0.309
7.	Farm income	0.010 *
8.	Social participation	0.024 **
9.	Risk orientation	0.203
10.	Mass media exposure	0.234
11.	Economic motivation	0.293
12.	Area under contract farming	0.018 *

**** Significant at 0.01 level of probability** *** Significant at 0.05 level of probability**

CONCLUSION

Majority of the respondents i.e. 42.1 per cent of the respondents were least prosperous about contract farming followed by 39.0 per cent of the respondents who had been categorized as under prosperous whereas 18.9 per cent of all respondents were highly prosperous about contract farming. The "Demand is increasing" was found highly prosperous which got highest mean score of 1.643. "Better market facilities available at present" and "Purchasing power of people is increasing" were ranked second and third with mean score of 1.55 and 1.412, respectively. "Better credit facilities are available at present" with mean score of 1.287 and "Food habits of people are changing" with mean score of 1.262 were other prospects of contract farming. The variables like education, land holding, irrigation facility, farm income and area under contract farming were

significantly associated with prospects. There was a highly significant association between social participation and prospects of contract farming. Whereas variables like age, farm power, innovativeness, risk orientation, mass media exposure and economic motivation were not significantly associated with prospects of contract farming.

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RESEARCH ARTICLE

Constraint and Suggestions measures of SRI Technology of Paddy Cultivation in Balaghat Block of District Balaghat (M.P.)

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ABSTRACT

The SRI efficiently uses scarce land, labour, capital and water resources, protects soil and groundwater from chemical pollution and is accessible to poor farmers. It is spreading fast because it is versatile and can more than double farmer's net income. The study revealed that the major constraints as expressed by the paddy growers were high intervention of inadequate supply of electricity and labour are not available at the time of transplanting (100.00%). Followed by lack of knowledge about disease and insect (87.50%), lack of knowledge about improved seed (86.66%), lack of appropriate knowledge about and preparation (81.66%), lack of co-operative societies in the village (79.16%), high cost of weedicide (75.00%), lack of irrigation resources (72.50%), irregular visit of RAEO's (66.66%), lack of complete knowledge about SRI method of paddy cultivation (63.33%), lack of fund to purchase agriculture input (62.50%) and high labour charges (58.33%).and the suggestions offered by the paddy growers for the adoption of SRI method of paddy cultivation Out of the total paddy growers 100 per cent suggested to follow the guideline of extension workers and agriculture department, maximum personal contact with agriculture functionaries, Demonstration should be conducted on farmer field by agriculture department, 87.50 per cent regular listening of radio program, 85.83 per cent visit of RAEOs should be regular, 83.33 per cent training camps for providing technological knowledge should be organized time to time, 70.00 per cent knowledge of SRI should be provided by the extension workers, 58.33 per cent Field visit should be taken by ADO at two times in a months and 50.83 per cent produce should be sold by government policy or co-operative societies to avoid the intervention of middlemen in the market.

Key words: - System of Rice Intensification, constraints, suggestions

METHODOLOGY

The Present study was conducted in Balaghat district. Out of ten blocks of the district, Balaghat block was purposively selected for the study. The study was conducted in six selected villages where the SRI method of paddy cultivation has been popularized among the paddy growers by KVK, Balaghat through demonstration, trials, trainings and other extension activities. After the selection of villages, a village wise list of such farmers who were benefited from transfer of technology programmes of KVK concerned with SRI system of paddy cultivation was formulated and paddy growers were selected with proportional allocation method to make a sample of 120 farmers who adopted the SRI method of paddy cultivation. The data were collected using survey method through a pre-tested interview schedule and responses were recorded. Collected data were then tabulated and analyzed using percentage, mean, rank order and Chi-square test.

RESULTS AND DISCUSSION

Constraints perceived by paddy growers in adoption of SRI technology and suggestions to overcome them- The constraints reported by the respondents in adoption of improved paddy production technology (SRI) are presented in Table 1. It is evident from the data that the major constraints as expressed by the paddy growers were high intervention of inadequate supply of electricity and labour are not available at the time of transplanting (100.00%). Followed by lack of knowledge about disease and insect (87.50%), lack of knowledge about improved seed (86.66%), lack of appropriate knowledge about and preparation (81.66%), lack of co-operative societies in the village (79.16%), high cost of weedicide (75.00%), lack of irrigation resources (72.50%), irregular visit of RAEO's (66.66%), lack of complete knowledge about SRI method of paddy cultivation (63.33%), lack of fund to purchase agriculture input (62.50%) and high labour charges (58.33%).

Table1: Constraints perceived by paddy growers in adoption of SRI technology

S.No	Constraints	Frequency	Percentage	Rank
1.	Lack of complete knowledge about SRI method	76	63.33	IX
2.	Inadequate supply of electricity	120	100.00	I(a)
3.	Lack of co-operative societies in the village	95	79.16	V
4.	High labour charges	70	58.33	XI
5.	High cost of weedicide	90	75.00	VI
6.	Labours are not available at the time of transplanting	120	100.00	l(b)
7.	Irregular visit of RAEO's	80	66.66	VIII
8.	Lack of fund to purchase agricultural input	75	65.50	X
9.	Lack of irrigation resources	87	72.50	VII
10.	Lack of appropriate knowledge about land preparation	98	81.66	IV
11.	Lack of knowledge about improved seed	104	86.66	III
12.	Lack of knowledge about insect and disease	105	87.50	II

Thus over all respondents reported the problem which they faced in adoption of SRI in paddy cultivation viz., electricity problem and labour are not available at the time of transplanting, lack of knowledge about insect and disease, lack of appropriate knowledge about land preparation, lack of co-operative societies in the village, irregular visit of RAEO's, lack of knowledge about SRI method, which minimized the adoption of SRI method and other improved production technology, whereas lack of awareness about interest and need were not much affected the adoption of improved rice production technology.

Table 2 : Suggestions by paddy growers in adoption of SRI method of paddy cultivation

S. No.	Suggestions	Frequency	Percentage	Rank
1	Knowledge of SRI should be provided by the extension workers	84	70.00	V
2	To follow the guideline of extension workers and agriculture department	120	100	I(a)
3	Maximum personal contact with agricultural functionaries	120	100.00	I(b)
4	Training camps for providing technological knowledge should be organized time to time	100	83.33	IV
5	Visit of RAEOs should be regular	103	85.83	III
6	Demonstration should be conducted on farmer field by agriculture department	120	100.00	I(c)
7	Regular listening of radio program	105	87.50	II
8	Produce should be sold by government policy or co - operative societies to avoid the intervention of middlemen in the market	61	50.83	VII
9	Filed visit should be taken by ADOs at two times in a months	70	58.33	VI

Suggestions: The Table 2. shows the suggestions offered by the paddy growers for the adoption of SRI method of paddy cultivation Out of the total paddy growers 100 per cent suggested to follow the guideline of extension workers and agriculture department, maximum personal contact with agriculture functionaries, Demonstration should be conducted on farmer field by agriculture department, 87.50 per cent regular listening of radio program, 85.83 per cent visit of RAEOs should be regular, 83.33 per cent training camps for providing technological knowledge should be organized time to time, 70.00 per cent knowledge of SRI should be provided by the extension workers, 58.33 per cent Field visit should be taken by ADO at two times in a months and 50.83 per cent produce should be sold by

government policy or co-operative societies to avoid the intervention of middlemen in the market.

CONCLUSION

Constraints perceived by paddy growers in adoption of SRI technology and suggest the measures to overcome them :- The major constraints reported by the paddy growers were inadequate supply of electricity, labours are not available at the time of transplanting as major constraint in adoption of SRI method of paddy cultivation which received rank I, followed by lack of knowledge about insect and disease, lack of knowledge about improved seed and lack of appropriate knowledge about land preparation.

Similarly, the main suggestions given by paddy growers for adoption of SRI method of paddy cultivation were that to follow the guideline of extension workers and agriculture department, maximum personal contact with agriculture functionaries, demonstration should be conducted on farmers field by agriculture department, regular listening of radio program, visit of RAEO's should be regular.

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RESEARCH ARTICLE

Correlates of Resource Management Behaviour of Oil Palm Growers in Khammam District of Telangana State

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ABSTRACT

The present study conducted in Dammapeta mandal of Khammam district of Telangana state. There are 10 villages having maximum area under oil palm cultivation were selected purposively. The total 150 oil palm growers constituted the sample. The finding indicated that most of the respondents (45.34%) were in middle age group, three-fourth (34%) were having secondary high school level education, (42%) were possessed small category of land holding from (1.01 to 2.00 ha), (50.66%) were having low category of annual income ranges from Rs.0 to 4 lakhs, (61.33%) were having 9 to 16 years of experience, (46%) were found to be in medium category of socio-economic status, (80.66%) oil palm growers possessed medium number (79 to 541) of oil palm trees, majority of respondents (92.66%) were having tube well or well as source of irrigation, (63.34%) were medium level of sources of information, (78.66%) were having medium availability of resources, (53.34%) found to be moderate in planning and production management of technology, (59.34 %) were having high level of knowledge about recommended oil palm cultivation practices. As regards the relationship of the profile of the respondents with resource management behaviour of oil palm growers, in case of independent variables viz. experience in oil palm cultivation, knowledge about recommended oil palm cultivation practices, socio-economic status, annual income, source of information, number of oil palm trees, land holding, education, availability of resources, management orientation were found to be positive and established highly significant correlation with the resource management behaviour of the respondents at 0.01% level of probability. The age and irrigation availability were found to be non significant and did not established any significant correlation with the resource management behaviour of the respondents.

Key words: Oil palm growers, resource management

INTRODUCTION

The oil palm (*Elaeis guineensis*) is one of the important economic crops in the tropics. It belongs to the family *palmae*, The oil palm is a versatile tree crop with almost all parts of the tree being useful and of economic value. The principal product of oil palm is the palm fruit, which is processed to obtain three commercial products. These include palm oil, palm kernel oil and palm kernel cake. It is originated from West Africa, where evidence of its use as a staple food crop dates as far back as 5,000 years.

India is the largest consumer of oil palm in the world (18% of world consumption) and also largest importer of oil palm (45% of world imports). Andhra Pradesh has been the leading palm oil producing state in India (85% of country's production) followed by Kerala (10%), Karnataka (2%). In India about 80% of the area is located in Andhra Pradesh and Karnataka. It is the highest oil yielding plant in the world with 5 times higher oil yield per hectare compared to other vegetable oil yielding crops

The state of A.P. has been bifurcated in two parts namely Andhra Pradesh and Telangana states. In Telangana state Dammapeta mandal, a hub of oil palm cultivation in the entire state. The move has gained prominence as the special programme on Oil Palm Area Expansion (OPAE) launched by the central government in 2011-12 envisaged augmentation of production of palm oil. As per the plan, the production of the Fresh Fruit Bunches (FFBs) is expected to increase from 64,663 metric tonnes in 2014-15 to 1, 32,741 metric tonnes in 2018-19 in Khammam district.

Khammam and Nalgonda districts are the only two districts in the new state of Telangana where oil palm is being cultivated on a large scale. The area under the oil palm cultivation in the Khammam districts stands at 13,511.38 hectares. Oil palm is being grown on 12,182 hectares in Khammam district mainly spread in Dammapeta, Aswaraopet and Sattupalli mandals. The crop is being cultivated in little over 758 acres in Nalgonda district. The oil palm development programme is being implemented in 50 mandals of two districts in Telangana state in Khammam (35 mandals) and Nalgonda (15 mandals), the total cultivated area in Telangana state is 14,269.38 hectare.

METHODOLOGY

The present research study was conducted in Dammapeta mandal of Khammam district of Telangana state. In Khammam district Dammapeta mandal were purposively selected for the research. Ten villages in Dammapeta mandal were purposively selected for the research. These villages are considered on basis of large area under oil palm growers. From each village fifteen oil palm growers were selected comprising total 150 respondents selected for the research work. An interview schedule was developed with the help of scientists of Dr.P.D.K.V., Akola. Data was collected with the help of interview schedule. Structured interview method was used for data collection. For the analysis of collected data simple statistical techniques like frequency, percentage, standard deviation and coefficient of correlation were employed for the analysis data.

RESULTS AND DISCUSSION

The data collected from 150 respondents from 10 villages from Dammapeta mandal of Khammam district were compiled into primary table. They were transferred in secondary tables in view of the objectives of the study. Appropriate statistical tests were used for drawing the inferences. The results of the investigation are presented under following heads.

Table1. Distribution of oil palm growers according to their profile characteristics (n = 150)

Sl.No.	Category	Frequency	Percentage
A. Independent Variables			
1.Age			
	Young (up to 35 years)	30	20.00
	Middle (36 to 50 years)	68	45.34
	Old (above 50 years)	52	34.66
2.Education			
	Illiterate (No schooling)	16	10.67
	Primary school (1^{st}-4^{th} class)	17	11.33
	Middle school (5^{th}-7^{th} class)	26	17.33
	Secondary school (8^{th} -10^{th} class)	51	34.00
	Higher secondary school (11^{th} - 12^{th} class)	19	12.67

	College (above 12 th class)	21	14.00
3.Land holding			
	Marginal (Up to 1.00 ha)	29	19.30
	Small (1.01 to 2.00 ha)	63	42.00
	Semi-medium (2.01 to 4.00 ha)	34	16.00
	Medium (4.01 to 10.00 ha)	24	22.70
	Large (Above 10 ha)	0	0.00
4.Annual income			
	Low (up to Rs 400000/-)	76	50.66
	Medium (Rs.400001 -Rs.800000/-)	42	28.00
	High (Above Rs.800000/-)	32	21.34
5.Experience in oil palm cultivation			
	Low (up to 8 years)	40	26.67
	Medium (9-16 years)	92	61.33
	High (above 16 Years	18	12.00
6.Socio-economic status			
	Very low SES (up to 5.21)	0	0.00
	Low SES (5.22 to 8.37)	2	1.34
	Medium SES (8.38 to 11.52)	69	46.00
	High SES (11.53 to 14.67)	62	41.33
	Very high SES (above 14.67)	17	11.33
7.Number of oil palm trees			
	Small (up to 78 trees)	2	1.34
	Medium (79 to 541 trees)	121	80.66
	High (above 541 trees)	27	18.00
8.Irrigation availability			
	No source/ rain fed	0	0.00
	River	0	0.00
	Well/tube well/ farm pond	139	92.66
	Canal	11	7.34
	Canal+river/well/farm pond	0	0.00
9.Source of information			
	Low	42	28.00
	Medium	95	63.34
	High	13	8.66

10.Availability of resources			
	Low	21	14.00
	Medium	118	78.66
	High	11	7.34
11.Management orientation			
	Low	38	25.33
	Medium	80	53.34
	High	32	21.33
12.Knowledge about recommended oil palm cultivation practices			
	Low (Up to 33.33)	10	6.66
	Medium (33.34 to 66.66)	51	34.00
	High (Above 66.66)	89	59.34

1. Age

It was noticed from Table 1. That most of the respondents (45.34%) belonged to middle age group category having age between 36 to 50 years. It was followed by (34.66%) of respondents who belonged to old age category i.e. above 50 years and remaining (20.00%) of the respondent were observed to be in the young age category i.e. up to 35 years.

2. Education

The data furnished in Table 1. Indicates that three-fourth of the respondents (34%) were having secondary high school level education followed by 17.33 per cent respondents who belonged to middle school level education, 14 per cent of the respondents belonged to college level education 12.67 per cent respondents belonged to high secondary school education, 11.33 per cent respondents belonged to primary school level education and 10.67 per cent of the respondents belonged to no education.

3. Land holding

It was revealed from Table1. That most of the respondents (42%) were belonged to small category of land holding from (1.01 to 2.00 ha), followed by 22.7 per cent of the respondents were in medium category of land holding (4.01 to 10.00 ha), whereas (19.3%) had marginal i.e. (Up to 1.00 ha**)** and 16% in semi-medium land holding (2.01 to 4.00ha).

4. Annual income

It was observed from Table 1. Indicated that half (50.66%) per cent of the respondents were belonged to low category of annual income ranges from Rs.0 to 4 lakhs, followed by 28 per cent of the respondents were from medium category of annual income ranges Rs. 4 to 8 lakhs, where as 21.34 per cent of the respondent had high category of annual income i.e. more than Rs. 8 lakhs. Similar types of finding were reported Kadu (2016) in orange orchard.

5. Experience in oil palm cultivation

It was evident from Table 1. That majority of oil palm growers (61.33%) were having 9 to 16 years of experience in oil palm cultivation as much as 26.67 per cent of oil palm growers were found to engaged in oil palm cultivation from up to 8 years. About (12%) of oil palm growers were experienced in oil palm cultivation more than 16 years.

6. Socio-economic status

It was observed from Table1. That majority of oil palm growers (46%) were found to be in medium category of socio-economic status, followed by 41.33 per cent of oil palm growers were high socio-economic status, 11.33 per cent of oil palm growers were very high socio-economic status and only 1.34 per cent of oil palm growers were low socio-economic status. These findings are agreeing with the findings of Kadam (1999).

7. Number of oil palm trees

It is noticed from Table 1. That majority of oil palm (80.66%) respondents, possessed medium number of oil palm trees followed by high (18%) and small (16.66%) number of oil palm trees.

8. Irrigation availability

It was shown from Table 1.That majority of respondents (92.66%) were having tube well or well as source of irrigation on their farm and less number of respondents having canal along with tube wells as a source of irrigation (7.34%). These findings of the study are nearly similar to the findings of Kadu (2016) and Wankhede (2016).

9. Source of information

It was revealed from the Table 1. That majority (63.34%) of the respondents were using medium level of sources of information, while 28 per

cent and 8.66 per cent of them uses low and high level of sources of information respectively.

10. Availability of resources

It was noticed from Table 1. That majority of the respondents (78.66%) were .having availability of resources are belonged in medium category it was followed by in low (14%) and high category (7.34%).

11. Management orientation

It was evident from Table 1.That most of the oil palm growers have (53.34%) found to be moderate in planning, production management of technology. Whereas (25.33%) of respondent were less oriented towards planning and production management. However, the remaining respondents (21.33%) possessed high management orientation.

12. Knowledge about recommended oil palm cultivation practices

It was revealed from Table 1. That majority (59.34 %) of the respondents were having high level of knowledge about recommended oil palm cultivation practices, while 34 per cent and 6.66 per cent of the respondents having medium and low level of knowledge about recommended oil palm cultivation practices respectively. These findings of the study are similar to the findings of Ahire and Shinde (2002).

Table.2 Relationship of the profile of the respondents with resou rce management behaviour of oil palm growers

Sl. No.	Independent variable	Correlation coefficient ('r')
1	Age	0.100 NS
2	Education	0.275**
3	Land holding	0.315**
4	Annual income	0.380**
5	Experience in oil palm cultivation	0.582**
6	Socio-economic status	0.434**
7	Number of oil palm trees	0.316**
8	Irrigation availability	0.078 NS
9	Source of information	0.326**
10	Availability of resources	0.275**
11	Management orientation	0.212**

12	Knowledge about recommended oil palm cultivation practices	0.487**

- Significant at 0.05 level of probability** *- Significant at 0.01 level of probability**

NS- Non significant

The relationship between profile characteristics of oil palm growers with resource management behaviour of oil palm growers was tested by computing the correlation coefficient(r), the data presented in Table 2.

It is revealed from Table 2. That in oil palm growers the independent variables viz. experience in oil palm cultivation, knowledge about recommended oil palm cultivation practices, socio-economic status, annual income, source of information, number of oil palm trees, land holding, education, availability of resources, management orientation were found to be positive and established highly significant correlation with the resource management behaviour of the respondents at 0.01% level of probability.

The age and irrigation availability were found to be non significant and did not established any significant correlation with the resource management behaviour of the respondents.

Therefore it could be concluded that an educated oil palm growers and better availability of resources had significant management towards resources of oil palm.

CONCLUSION

In case of profile characters of oil palm growers, it is observed that most of the oil palm growers were medium age group, educated up to secondary school level, possessed small size land holding between 2.01 to 4.00 ha, small range of annual income i.e. up to Rs.4, 00,000/-, medium range of (9 to 16) year experience in oil palm cultivation, medium category of socio-economic status, medium range of oil palm trees(79 to 540), majority of respondents had well/tube well/farm pond as a source of irrigation (92.66%), medium range of source of information (63.34%), medium category of availability of resources (78.66%), moderate level of management orientation (53.34%) and had high level of knowledge(59.34%).

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RESEARCH ARTICLE

Rural Entrepreneurship and Skill Enhancement for Promotion of Rural Enterprises

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ABSTRACT

Rural Entrepreneurship plays a major role in the economic development of the country. The success of the rural entrepreneurship depends on effective skill development program and providing supporting environment to promote rural enterprises. The present study aims to assess impact of efforts made by skill enhancement program of a Technology park cum training institution in Hyderabad, Telangana. A well designed questionnaire consisting of semi-structured questions on various aspects of training effectiveness and its usefulness was formulated and pre-tested before the data collection. A sample for the study consisted of 90 respondents belonging to Andhra Pradesh, Karnataka and Odisha from where the trainees were attended Skill Development programme on various Rural Enterprises during four years. It was observed that majority of the respondents had established own enterprises based on the skills received and substantial monthly income received through established enterprises. Further, the result indicated that finance was the major constraint to establish own enterprises. The profile of trainees showed that majority of the trainees were belonging to youth category and possessed education upto High School. The spread of technology transfer from trainees to others was found to be less due to various reasons.

Key words : Rural, entrepreneurship, skill enhancement

INTRODUCTION

Skills are central to improve employability and livelihood opportunities, reduce poverty, enhance productivity and promote environmentally sustainable development. Coordinated efforts are needed to develop and integrated approach that improves access to relevant, good quality education and training to all rural community (ILO, 2011). Therefore, empowering human resource in rural India will promote national development. It is reported that more than 65% of total population in India is under 35 years. This signifies large potential that country possess in terms of labour power. Since, most of the country's resources are concentrated on remote areas, by leveraging manufacturing and industry in rural landscapes, the nation can utilize them in an efficient manner (*Chhangani. A*, 2015). Considering the importance of skill development for rural community, various organizations are involved for promotion of professional skill and employment oriented training. However, access to training is a major constraint among rural people in developing countries. For instance, nearly 90% of rural workers in India have no formal training (Singh. 2008). Training outside the formal training system is often the most important source of skills training in developing countries for eg. in Benin, Senegal and Cameron, informal apprenticeship account for almost 90 % of all trades training (ILO: 2007).

Rural Entrepreneurship plays a major role in the economic development of the country. The success of rural entrepreneurship helps on providing employment opportunity by reducing poverty and increase the standard of living in order to reach balanced regional development. It can contribute towards society in uplifting the backward region by various mean (Lavender and Ruccia 2001). Recognizing the importance of rural entrepreneurship and skill enhancement among the rural community, the technology park at Hyderabad had initiated skill based capacity building programmes for the farmers, women groups, rural youth and school dropouts.

The Entrepreneurship andskill based training programmes to rural community were preparation of leaf plates, vermi-compost, natural dye, food processing, handmade paper, bio-pesticides, value addition in soybean, solar based technologies etc. The skill

based training program have been imparted to facilitate the trainees to become entrepreneurs and to generate self-employment by themselves with the aim to improve their livelihood and also their economic status. The skill based training programmes were organized at on campus with a view to provide practical exposure and handling of machineries, raw material etc., by the technical experts. The trainees from different parts of the country were participated in the programme.

Objective of the Study

To find the effectiveness of the programme and to prepare a roadmap for livelihood promotion through skill enhancement in rural enterprises, a study was conducted among the sample of 90 trainees with the following objectives.

1. To study the personnel profile of trainees who have undergone skill based training programmes on rural enterprises
2. To assess the effectiveness of the skill based training programmes on rural entrepreneurship in terms of establishment of own enterprises
3. To find out the constraints experienced by the trainees for non-utilization of training undergone
4. To suggest strategies for enhancing the effectiveness of skill development programme

METHODOLOGY

An interview schedule was designed encompassing relevant questions on the respondents personal profile, occupational status (before and after training), monthly income (before and after training), entrepreneurship training program in other institutions, spread of transfer of technologies to other members, status of existing enterprise and reasons for non-utilization of capacity building program received and their suggestion to enhance the effectiveness of skill development program of technology park. In this research, interview and case study techniques were employed and the data was collected adopting the following methodology.

I . Selection of Respondents

a. **Selectionof rural enterprises**

The study was confined to the rural enterprises namely leaf plate preparation, fashion jewellery, fashion designing, vermin-compost, natural dye, food processing, handmade paper production, handmade paper

conversion, tribal jewellery, bio-pesticides, home based products, solar based technology and soya processing, honey processing and candle making.

b. Selection of states :

The selection of states was purposive. It was decided to conduct the study covering AP, Karnataka and Orissa where most of the trainees were undergone skill-based capacity development programmes.

c. Selection of Study Area:

To list out the study area, a directory of trainees indicating their contact details and details of training undergone have been compiled. The directory has been used to list out the locations in the select states to collect the data. Accordingly, Raichur district in Karnataka, Bargarh district in Orissa and a couple of district from Andhra Pradesh have been selected as study area to locate and to collect the data from the trainees.

d. Selection of Primary Respondents :

It was decided that from the prepared directory, 10% of the trainees will be selected as a primary respondents of the study to whom an interview schedule will be administered to collect their personal information, details of the training undergone, feedback of the trainee and present status of the trainees. Accordingly, efforts were made to collect the data from 10 % of the total trainees of 900 i.e., from 90trainees (Table. 1).

Table:1 Details of skill training organized on Rural Enterprises

Sl.No	Name of the Rural Enterprise	No. of trainees undergone	Primary Respondents	Secondary respondents
1	Home based products	300	9	-
2	Vermi compost	143	3	-
3	Handmade paper	125	9	-
4	Candle making	65	9	-
5	Fashion designing	48	7	-
6	Tribal jewellery	40	2	2
7	Leaf plate making	39	8	-
8	Natural dye	36	17	14

9	Honey processing	34	5	-
10	Bio-pesticides	23	2	-
11	Solar energy	12	8	-
12	Food processing	9	2	-
13	Fashion jewellery	12	9	2
	Total	**900**	**90**	**18**

e. **Selection of Secondary Respondents :**

It was envisaged that trainees who have initiated their own enterprises and utilized their skill training to get employment in their formal or informal sector are to be interviewed out of the primary respondents of the study. Accordingly about 20% of the total primary respondents (i.e., 18 entrepreneurs) who are managing their own self-employment oriented rural enterprises have been interviewed using a structured interview schedule and their business transaction has been recorded. The data were collected from 18 entrepreneurs who were established their own units on the technologies they received from Technology Park.

II Data Collection:

The data were collected from the primary respondents by contacting them individually / through workshops and recorded their responses on a structured interview scheduled developed for study. Similarly, another interview schedule was also prepared to collect the data from entrepreneurs who have established the rural enterprises.

III Data Analysis

The data collected were subjected to simple statistical tools like frequency and percentage analysis for proper interpretation of results to arrive at some conclusion.

RESULTS AND DISCUSSION

a. Personal profile of the trainees:

The data presented in Table 2 revealed that most of the respondents (66 %) belong to young aged followed by medium aged (20%) and old aged (14%). The age of the trainees for skill development programme is more important as it arouses interest and involvement in learning and to undertake any entrepreneurial activity. The result indicated that less than 30

years of youth are interested to undergo skill training to establish own enterprises or to secure job in any rural based industries under skilled category.

It could be seen from Table 2 that about majority (44%) of the trainees had education up to high school (up to 10th standard) followed by education up to 12th standard (26%). This indicates rural people's access to education and training is often limited by financial barriers (eg. training and transportation cost) and non-financial barriers (eg. scarce education and training infrastructure, inflexible training schedules). The willingness of trainees to participate in the training programs at Technology Park showed that possessing school and high school educational background will increase their ability to innovate and adopt new technologies in rural enterprises based on the skill training received by them.

Table 2: Personal profile of the trainees **n=90**

Profile particulars	Category	Frequency	Percentage
Age	Young aged (< 30)	59	66
	Medium (31 - 40)	18	20
	Old aged (> 40)	13	14
Education	Illiterate	2	2
	Primary (upto 5th)	16	18
	High School (upto 10th)	40	44
	Junior College (upto 12th)	23	26
	Degree	9	10
Marital status	Married	51	58
	Un-married	38	42
Occupational status (before training)	Un-employed	46	51
	Self-employed	16	18
	Wage employed	28	31
Occupational status (after training)	Un-employed	23	25
	Self-employed	50	56
	Wage employed	17	19
Monthly income (before training)	No income	28	31
	<1000	11	12

	1000-2000	15	17
	2000-4000	16	18
	Above 4000	20	22
Monthly income (after training)	No income	10	11
	<1000	25	28
	1000-2000	16	18
	2000-4000	15	16
	Above 4000	24	27
Training undergone other than Technology Park	Yes	12	13
	No	78	87
Transfer of technologies to others	Yes	20	22
	No	70	78
Need additional skill from Technology Park	Yes	53	59
	No	37	41

The perusal of Table 2, inferred that majority of the trainees (58%) were married. This result clearly indicates that married were experiencing freedom and receiving support directly / indirectly to attend skill training to establish own enterprises. Further, it appears that due to economic pressure/ demand the married trainees underwent skill based training programme which will enable them to have livelihood security.

Occupational status determine the need of education and vocational training for rural community to meet the economic challenges and social challenges. Economic challenges highlight the importance of skills that can contribute to economic growth and social challenges address the issues related to need for poverty reduction, employment generation and creation of social capital. The data on occupational status revealed in Table 2 that majority of the trainees (51%) were unemployed before attending the skill development training programme followed by self-employed representing 18%. Whereas, the occupational status have been improved among the trainees after they underwent skill training. I trevealed that majority (56%) of the trainees were self-employed and only 18% of them were unemployed. The data analysis also supported that considerable reduction

has been occurred among the wage employed category from 31 % to 19% due to training. It implies that after imparting skill training, the wage employed trainees have moved to self-employment opportunities in rural enterprises.

A similar trend was also observed in monthly income of the trainees before and after the training (12% to28%). The enhancement of monthly income (< 1000) among the trainees revealed that the skill received by them from the training programme have facilitated to initiate either own enterprises or to work in any industry under wage employed skilled category.

Table 2 revealed that majority of the trainees couldn't 't undergo any skill based training programme (87%) other than Technology Park due to less awareness of the ongoing programme. Therefore, they (59%) suggested that additional skill based training programmes are required to have in depth knowledge on handling of raw materials and marketing of finished products. Due to their limited knowledge on rural enterprises, they couldn't transfer the acquired technologies to others.

b. Perceived Constraints by the trainees for non-utilization of training undergone:

The constraints perceived by the trainees which had hindered the utilization of skill based training programme on rural enterprises are presented in Table 3.

Table 3: Constraints for non-utilization of training undergone n-90

Constraints	Frequency	Percentage
Limited finance	31	35
Lack of awareness on marketing	15	17
Shortage of Electricity / Power	12	13
Non availability of raw materials	10	11
Non availability of manpower	7	8
Insufficient skill training	7	8
Limited job opportunities	3	3
Due to family problems	2	2
Others	3	3

Table 3 indicated that majority of the trainees (35%) expressed limited finance is the major constraints to utilize the training for initiating new enterprises. During the discussion the trainees expressed that high rate of interest and lack of sufficient financial assistance from the govt. agencies couldn't move forward them to take up new enterprises. Further, they also expressed that existing financial assistance from the government in the form of loans and subsidies are very meagre.

It is inferred from Table 3 that lack of awareness on marketing was also one of the constraints perceived by 17% of the trainees. While viewing the difficulties in marketing it was expressed that the trainees need marketing skill and knowledge on channelizing the end product to the customers. Additional trainings were demanded by the trainees on marketing process covering branding and certifications issues.

It could be noticed from the Table 3 that shortage of electricity / power supply in rural areas hindering the trainees (13%) to venture into rural enterprises. The discussion with the trainees indicated that for various machinery operations like processing etc. need uninterrupted power supply. Due to frequent power breakdown and power cuts the production process, quantity, and quality of the output etc., were likely to be affected adversely.

The constraints perceived by the trainees indicated that non availability of quality raw materials (11%) hindered to establish new rural enterprise. It is inferred that the high scarcity and low quality of raw material may be felt due to the over dependence of almost all the enterprise on their local resources only. Further, the seasonality in the availability of raw materials also expected as a problem as many of them are available in certain seasons.

The other perceived constraints reported by the trainees are non-availability of manpower, insufficient skill training, limited job opportunities, due to family problems and others etc.

Conclusion and suggested strategies

The promotion of rural enterprises through skill development programme is an important component of the rural economy. It supports the livelihoods of rural poor by providing gainful employment, supplementing their meagre income and preventing them from falling further below the poverty line. Education, occupational status, and skill training have been

found to be important factors for promotion of rural enterprises. The trainees faced constraints in aspects of finance, marketing, electricity, raw material and other location specific problems. Therefore, strategies to be framed as a solution to these problem which can help the trainees to deal with these problems effectively and utilize the skill trainings received.

In order to promote skill enhancement in rural enterprises the following strategies are recommended.

1. Developing an holistic approach to rural skills development
2. Providing quality education and vocational training and its accessibility
3. Promoting diversified skills development systems

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RESEARCH ARTICLE

Correlates of Knowledge about Integrated Pest Management Practices of Soybean Growers

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ABSTRACT

The present investigation was carried out in Buldhana Panchayat Samiti of Buldhana district in Vidrabha region of Maharashtra state. The exploratory research design was used. Buldhana Panchayat Samiti was purposively selected. The data about area under soybean in each village of the panchayat samiti was obtained from Taluka Agriculture Officer of Buldhana tahsil. From these villages, 10 villages having more area under soybean cultivation were identified and selected. From each selected villages, 15 soybean growers as respondents having more area under soybean crop were selected purposively by proportionate random sampling method to constitute sample size of 150 respondents

The findings of the study revealed that considering the total awareness of knowledge, majority of the soybean growers (67.33%) were observed in medium level of awareness knowledge regarding integrated pest management practices of soybean.

With regards to relational analysis, variables namely education (r=0.255), annual income (r=0.246), sources of information (r=0.379), economic motivation (r=0.232) and scientific orientation were found to be positively and highly significant relationship with the knowledge of soybean growers about integrated pest management practices at 0.01 level of probability. Whereas, variables such as While the relationship of land holding (r=0.16) was also found to be positive and significant with the knowledge of soybean growers of integrated pest management practices at 0.05 level of probability. The relationship of age (r= -0.15), area under soybean (r=0.118), availability of inputs (r=0.121) and risk preference (r= -0.071) were found to be non-significant with knowledge of soybean growers about integrated pest management practices of soybean

Key words: Cultural, mechanical, bio-control, knowledge, IPM (Integrated Pest Management Practices).

INTRODUCTION:

Soybean (*Glycine max*. L. Merrill) as legume and oilseed crop has attained a great importance due to its nutritional and industrial value. It is highly nutritious food item, as it contains 20 per cent oil and 40 per cent protein. Oilseed crops occupy prominent place in agricultural economy of India.

Soybean is originated from China. Soybean in India, occupy an important place because of getting more foreign exchange from the export of soya meal or powder due to its great demand in the international market.

The major oilseed crops grown in India are groundnut, mustard, sesamum, linseed, castor etc. Now a days, soybean is premier oilseed in India with 9.7 M ha, exceeding all traditional oilseed crops in the country. However, low productivity, ever increasing population and domestic demand for edible oils leads to tremendous price escalation which put a heavy drain on the scarce foreign exchange reserve of the country.

In India, during the year 2007-08 area under soybean crop was 8.88 M ha and total production was 9.90 MT with productivity 1124 kg per hectare. In India, Maharashtra is the second largest soybean growing in the country having 30.684 lakh ha area under soybean crop and production of 36.478 lakh MT with productivity 1189 kg per hectare in 2008-09. In Buldhana district, the area under soybean crop was 2.364 lakh ha and production of 2.811 lakh MT with productivity of 1076 kg per hectare (Anonymous, 2008).

One of the most important reasons for low level of yield is incidence of pests and diseases. With a view to keep the infestation of pests and diseases within normal limits, knowledge about integrated pest management practices in soybean by soybean growers is essential and accordingly the objectives were framed as to study the knowledge about integrated pest management practices by soybean growers and to study the relationship between selected variables with knowledge of soybean growers about integrated pest management practices.

METHODOLOGY

The present investigation was carried out in Buldhana Panchayat Samiti of Buldhana district in Vidrabha region of Maharashtra state. The exploratory research design was used. Buldhana Panchayat Samiti was purposively selected. The data about

area under soybean in each village of the panchayat samiti was obtained from Taluka Agriculture Officer of Buldhana tahsil. From these villages, 10 villages having more area under soybean cultivation were identified and selected. From each selected villages, 15 soybean growers as respondents having more area under soybean crop were selected purposively by proportionate random sampling method to constitute sample size of 150 respondents. A structured interview schedule consisting relevant information was used for the collection of data.

RESULTS AND DISCUSSION

Table 1. Practice-wise knowledge of soybean growers about integrated pest management practices of soybean

Sr. No	Practices	Respondents (n=150)	
		Frequency	Percentage
A	**Cultural practices**		
1	Summer ploughing: To destroy resting pests stages of pests of soybean by exposing stage to hot sunlight and predating birds.	128	85.33
2	Complete the sowing operation before 2nd week of July	88	58.66
3	Use of healthy / improved seeds	145	96.66
4	Use of resistant varieties e.g. TAMS-38, TAMS-98-21, JS-335, JS-95-60, JS-93-05 etc.	135	90.00
5	Do not rotate soybean crop with groundnut	22	14.66
6	Follow proper crop rotation	114	76.00
B	**Mechanical practices**		
1	Keep soybean field free from weeds which may act as collateral host of certain pests	113	75.33
2	Uprooting and burning of unhealthy and diseased plants	82	54.66
3	Destruction of infested plants along with larval stages of girdle beetle and stem fly.	36	24.00
4	As the larval stages of Hairy caterpillars and *Spodoptera* are congregated/ feeds gregariously their larvae should be destroy easily by plucking infested leaves.	39	26.00

C	**Chemical practices**		
1	Seed treatment for healthy and proper growth of crop e.g. Trichoderma, Rhizobium, Thiram as fungal antagonist	91	60.66
2	Keep close watch on crop with regular survey of soybean crop. If the pest level is above ETL use suitable insecticides with recommended dose/ha (Endosulphan 0.07% 35 EC/ Dimethoate 0.03% 30 EC)	145	96.66
D	**Biological control practices**		
1	Use of 5% NSE for management of pests	78	52.00
2	Favourable ecosystem for development of entomopathogenic fungi to control lepidopterous pests	71	47.33
3	Setting of light traps (1 light trap/ 5 acre)	0	0.00
4	Conservation of biological control such as spiders, lizards, praying mantids, tachnid fly, dragon fly, crysoperla and meadow grass hoppers	0	0.00
5	Use of biopesticides (*Bacillus thuringiensis* and *Beauveria bassiana*)	0	0.00
6	Installation of sex pheromone traps for early monitoring of *Spodoptera litura* @ 10 traps/ha	0	0.00
7	Erect bird perches @ 4-5/ha (depends on pest population)	0	0.00

Among cultural practices large majority of soybean growers had knowledge of use of improved seed (96.66%), use of resistant varieties (90.00%), summer ploughing to destroy resting pests stages of pests of soybean by exposing stages to hot sunlight and predating birds (85.33%) and proper crop rotation (76.00%). In the mechanical practices majority of soybean growers (75.33%) had knowledge about the keeping soybean field free from weed which may act as collateral host of certain pests and with regards to uprooting and burning of unhealthy and diseased plants 54.66 per cent of the respondents had knowledge of this practice.

In the group of chemical practices, the 60.66 per cent of the soybean growers had knowledge about seed treatment for healthy and proper growth of crop. As regards keeping close watch on crop, conduct regular survey of soybean crop if the pest level is above ETL use suitable insecticides

with recommended dose/ha, 96.66 per cent of soybean growers had knowledge regarding this integrated pest management practice of soybean. About the biocontrol practices, little more than half of the respondents (52.00%) soybean growers had knowledge about use of 5% NSE for management of pests followed by 47.33 per cent of soybean growers had knowledge about favourable soybean ecosystem for development of entomopathogenic fungi to control lepidopterous pests.

With regards to other biocontrol practices, it is however, surprising to note that, none of the soybean growers had knowledge about the setting of light traps (1 light trap/5 acre), conserving the biological control such as spiders, lizards, praying mantids, technid fly, dragon fly and crysoperla, use of biopesticides (*Bacillus thuringiensis* and *Beauveria bassiana*), Installation of sex pheromone trap for early monitoring of *S. litura* @ 10 traps /ha and erect bird perches @ 4-5 /ha.

Table 2. Distribution of soybean growers according to their level of knowledge about integrated pest management practices of soybean

Sr. No.	Category	Respondents	
		Number (n=150)	Percentage
1	Low	30	20.00
2	Medium	101	67.33
3	High	19	12.67
	Total	150	100.00

The results in Table 2, shows that majority of the soybean growers (67.33%) were observed in medium level of awareness knowledge regarding integrated pest management practices of soybean. The respondents, 20.00 per cent and 12.67 per cent of soybean growers had low and high level of knowledge about integrated pest management practices of soybean respectively.

It could be inferred from the above findings that majority of the soybean growers had medium level of knowledge about integrated pest management practices of soybean. These findings are in line with the findings reported by Zade (1998) who reported that, nearly three fourth (72.67%) of the respondents had medium level of knowledge of improved soybean cultivation practices while rest of them were more or less equally divided into high and low levels of knowledge which was similar to the present findings.

3. Correlates of knowledge

With the assumption that knowledge is influenced by personal, socio-economic, communication and psychological characteristics of the soybean growers, the relationship has been worked out and the results are mentioned in Table 3

Table 3. Correlates of knowledge of soybean growers about integrated pest management practices of soybean

Sr. No.	Characteristics	Coefficient of correlation (r)
1	Age	-0.15
2	Education	0.255**
3	Land holding	0.16*
4	Area under soybean	0.118
5	Annual income	0.246**
6	Availability of inputs	0.121
7	Sources of information	0.379**
8	Economic motivation	0.232**
9	Scientific orientation	0.253**
10	Risk preference	-0.071

**** Highly significant at 0.01 level of probability**

*** Significant at 0.05 level of probability**

It could be observed from Table 3, that the variables namely education (r=0.255), annual income (r=0.246), sources of information (r=0.379), economic motivation (r=0.232) and scientific orientation were found to be positively and highly significant relationship with the knowledge of soybean growers about integrated pest management practices at 0.01 level of probability.

While the relationship of land holding (r=0.16) was also found to be positive and significant with the knowledge of soybean growers of integrated pest management practices at 0.05 level of probability. The relationship of age (r=-0.15), area under soybean (r=0.118), availability of inputs (r=0.121) and risk preference (r=-0.071) were found to be non-significant with knowledge of soybean growers about integrated pest management practices of soybean. The hypothesis of no relationship between characteristics of farmers and their knowledge about integrated pest management practices of soybean therefore has to be partially rejected.

It is clear from the above findings that, the characteristics namely education, land holding, annual income, sources of information, economic motivation and scientific orientation of the soybean growers goes hand in hand with their

knowledge about integrated pest management practices. Hence, it could be made out that the soybean growers with higher education, greater land holding, more annual income, more exposure to various sources of information and also better economic motivation and scientific orientation about integrated pest management practices of soybean, belonging to higher economic characteristics to be adequately aware about integrated pest management practices of soybean.

These findings are in conformity with the findings reported by Ghodichor (2004) in case of education, land holding, sources of information were positively significant in relation with the knowledge of respondents.

The relationship of age, area under soybean, availability of inputs and risk preference with knowledge about integrated pest management practices of soybean were found to be non-significant. The probable reason might be the traditional outlook of soybean growers.

CONCLUSION

Findings of the study revealed that the characteristics namely education, land holding, annual income, sources of information, economic motivation and scientific orientation of the soybean growers goes hand in hand with their knowledge about integrated pest management practices. Hence, it could be made out that the soybean growers with higher education, greater land holding, more annual income, more exposure to various sources of information and also better economic motivation and scientific orientation about integrated pest management practices of soybean, belonging to higher economic characteristics to be adequately aware about integrated pest management practices of soybean.

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RESEARCH ARTICLE

Varietal Preference of the Sugarcane Cultivators from Kolhapur District of Maharashtra

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ABSTRACT

The reason for low sugarcane productivity is that unavailability of good quality varieties seed to the farmers. Therefore, it is felt necessary to study the varietal preferences of the farmers regarding the recommended sugarcane varieties. The study was undertaken in Kolhapur region i.e. Kolhapur, Sangli and Satara district. The data was collected from 132 Sugarcane growers from 6 selected villages.. 66.67 percent and 56.06 percent of the cultivators opined that C0-7527 and Co-86032 variety of Sugarcane is best for delayed cutting., Co.740 variety of Sugarcane can withstand to water stress (58.33 percent) followed by Co.86032 (43.94 percent) .The Sugarcane variety Co.86032 (68.94 percent), Com-0265(62.88 percent), Co-740(59.85 percent) and Co.94012(53.79 percent) can give better ratoon crop. It is necessary to supply new varieties planting material like Co.86032 and Com.0265 through the Agril. Universities, Depatment of Agriculture and sugar factories.

Key words : Varietal preference, sugarcane, Kolhapur

INTRODUCTION

Sugarcane occupies a place of pride in the agricultural economy of Maharashtra .Sugarcane is most important crop is cash crops. Sugarcane changed the face of rural area and occupies first position to contribute in the rural development.

It contributes nearly 22.5 percent of the gross national product of India. India stands first in area and second in production of sugarcane in the world. During the year 2007-08 area under sugarcane was 50.43 lakh haters in India, and 10.88 lakh hectors in Maharashtra. The productivity of sugarcane in India was 67.50 Tons/

hectors during the year 2007-08 and that of Maharashtra were 74.10 Tons/ha .Maharashtra state contributes about 30 percent of the national sugarcane production.

In Maharashtra, though area under sugarcane is increasing steadily, the productivity showed declining trend during recent past. Sugarcane plays a very important role in economic development of sugarcane growers in particular. It is seen that most of the sugarcane varieties released for cultivation since from 40 years but some are accepted by the farmers and some are rejected. The reason for low sugarcane productivity is that unavailability of good quality varieties seed to the farmers. Therefore, it is felt necessary to study the varietal preferences of the farmers regarding the recommended sugarcane varieties.

METHODOLOGY

The study was undertaken in Kolhapur region i.e. Kolhapur, Sangli and Satara district. The adjoining three Tahsils having maximum sugarcane area were selected for the study i.e. karveer from Kolhapur district, Walwa from Sangli district, and Karad from Satara district. The two sugarcane growing villages from each Tahasil were selected for the study purpose i.e. Shiroli dumala and Vadanage from Karveer., Ashta and Walwa from Walwa and Kale and Rethare Bk. from Karad Tahasil. Twenty two sugarcan e growers were selected from each village randomly with the help of Agril Asstt. of the State Department of Agriculture . Thus the data was collected from 132 Sugarcane growers from 6 selected villages..

RESULTS

Adoption of sugarcane verities during the period from 2005 onwards. (Last five years)

Table 1 : Distribution of the respondents by their adoption of sugarcane verities during the period from 2005 onwards.

Sr. No	Varieties adopted	Frequency (N = 132)	Percent
1	Co - 740	23	17.42
2	Co -7527	39	29.55
3	Co -7219	14	10.61
4	Co -8014	36	27.27
5	Co - 86032	123	93.18
6	Co - 94012	47	35.61
7	Com - 0265	113	85.61
8	Co - 92005	37	28.03
9	Co -9805	1	0.76

Data from table 1 revealed that all the respondents tried most of the varieties as soon as released for cultivation, but Co-86032 and Com-0265 occupies about 93.18 percent and 85.61 percent share. It is following by Co-94012 (35.61 percent), Co-7527 (29.55 percent), Co-92005 (28.03 percent) and Co-8014 (27.27 percent).

Opinion about the continuation of Sugarcane varieties for next year and onwards.

Table 2 : Distribution of the respondents according to their opinion about varieties to be continued for next year and onwards.

Sr. No.	Name of Variety	Frequency (N = 132)	Percent
1	Co - 740	13	9.85
2	Co -7527	19	14.39
3	Co -7219	7	5.30
4	Co -8014	23	17.42
5	Co -86032	127	96.21
6	Co -94012	33	25.00
7	Com - 0265	129	97.73
8	Co -92005	52	39.39
9	Co -9805	2	1.52

It is seen from the table 2 that, nearly all the farmers opined that they will continue to take Com-0265 (97.73 percent) and Co-86032 (96.21 percent) variety of sugarcane for next year due to its high yielding potential and recovery of sugar.

It is also observed that 39.39 percent and 25.00 percent of the farmers expressed that they will continue Co-92005 and Co-94012 variety of sugarcane next year respectively.

Opinion of the sugarcane growers regarding the variety suitable for late cutting, tolerance for water stress and ratoon crop

Table 3: Distribution of the respondents according to their opinion regarding varieties suitable for late cutting, tolerance for water stress and ratoon crop

(N = 132)

Sr. No	Variety	Variety suitable for					
		Late Cutting		Tolerance for water stress		Ratoon crop	
		Freq.	Percent	Freq.	Percent	Freq.	Percent
1	Co - 740	71	53.79	77	58.33	79	59.85
2	Co -7527	88	66.67	19	14.39	12	9.09
3	Co -7219	17	12.88	13	9.85	8	6.06

4	Co -8014	7	5.30	12	9.09	13	9.85
5	Co -86032	74	56.06	58	43.94	91	68.94
6	Co -94012	63	47.73	46	34.85	77	53.79
7	Com -0265	59	44.70	6	4.55	83	62.88
8	Co -92005	47	35.61	-	-	49	37.12
9	Co -9805	1	0.76	-	-	-	-

Table 3 revealed the 66.67 percent and 56.06 percent of the cultivators opined that Co-7527 and Co- 86032 variety of sugarcane is best even after delayed cutting as no reduction in weight respectively. It is followed by Co-740 (53.79 percent), Co – 94012 (47.73 percent) and Com. 0265 (44.70 percent).

It is also revealed from table 3 that, Co.740 variety of Sugarcane can withstand to water stress (58.33 percents) followed by Co – 86032 (43.94 percent) and Co – 94012 (34.85 percent). It is also observed that Co-8014 and Com – 0265 varieties are not suitable for late irrigation.

It is observed from table 3 that Co-86032 (68.94 percent), Com – 0265 (62.88 percent) ,Co – 740 (59.85percent) and Co – 94012 (53.79percent) varieties can give better ratoon crop.

Opinion regarding sugarcane varieties suitable for jaggary making.

Table 4: Distribution of the respondents according to their opinion regarding the varieties suitable for jaggary making

Sr.No.	Name of Variety	Frequency (N = 132)	Percent
1	Co - 740	17	12.88
2	Co -7527	49	37.12
3	Co -7219	9	6.82
4	Co -8014	9	6.82
5	Co -86032	113	85.61
6	Co -94012	97	73.48
7	Com -0265	44	33.33
8	Co -92005	129	97.73
9	Co -9805	3	2.27

It is revealed from above table that most of the respondents (97.73 percent) expressed that Co – 92005 is best for jaggary making followed by Co - 86032 (85.61 percent) and Co – 94012 (73.48 percent).

Preference of sugarcane variety:

To know the overall preference of sugarcane variety, the respondents were asked to give their liking of variety. The data thus, obtained are presented in Table 10.

Table 5: Distribution of the respondents according to their overall preference of sugarcane varieties.

Sr. N0	Variety	Frequency (N = 132)	Percent
1	Co - 740	15	11.36
2	Co -7527	21	15.91
3	Co -86032	126	95.45
4	Com -0265	119	90.15
5	Co -92005	14	10.61

It is observed from table 5 that, 95.45 percent and 90.15 percent of the Sugarcane growers were given preference to the sugarcane varieties Co -86032 and Com – 0265 respectively. This is followed by Co - 7527 (15.91 percent), Co – 740 (11.36 percent) and Co -92005 (10.61 percent).

Constraints faced by the respondents.

The information regarding the constraints faced by the Sugarcane growers is given in Table 6.

Table11: Distribution of the respondents according to their constraints

Sr. No.	Constraints	Frequency (N = 132)	Percent
1	High cost of production of sugarcane and low rates by sugar factory.	112	84.85
2	Late harvesting of sugarcane crop from sugar factory.	103	78.03
3	Apposes for Com. 0265 variety of sugarcane from sugar factories.	97	73.48
4	Shortage of organic fertilizers for Sugarcane.	86	65.15
5	Sprouting problem of Com- 0265 variety of sugarcane.	69	52.27
6	Unavailability of sufficient and quality planting material of recent varieties from authentic source.	67	50.76

7	Low price for Com -0265 than the other varieties.	61	46.21
8	Uncertainty of rains as well as changing climatic conditions.	47	35.61

The data in Table revealed that the sugarcane cultivators faced the constraints like high cost of production of sugarcane and low rates by sugar factory (84.85 percent), late harvesting of sugarcane crop from sugar factory (78.03 percents), appose for Com-0265 sugarcane variety from sugar factory (73.48 percent), shortage of organic fertilizers for sugarcane (65.15 percents) , sprouting problem in sugarcane variety Com- 0265 (52.27 percent), unavailability of sufficient and quality planting material of recent varieties (50.76 percent), low price for Com.0265 than the other varieties (46.27 percent) and uncertainty of rains as well as changing climatic conditions (35.61 percent).

CONCLUSIONS

1. Nearly all the respondents adopted Co. 86032 (93.18 percent) and Com-0265 (85.61 percent) variety of Sugarcane during last 5 years.
2 Nearly all the respondents opined that they will continue to take Com-0265 (97.73 percent) and Co-86032 (96.21 percent) variety of Sugarcane for next year.
3 66.67 percent and 56.06 percent of the cultivators opined that C0-7527 and Co-86032 variety of Sugarcane is best for delayed cutting., Co.740 variety of Sugarcane can withstand to water stress (58.33 percent) followed by Co.86032 (43.94 percent) .

   The Sugarcane variety Co.86032 (68.94 percent), Com-0265 (62.88 percent), Co-740 (59.85 percent) and Co.94012 (53.79 percent) can give better ratoon crop.
4. Majority (97.73 percent) of them expressed that Co.92005 variety of Sugarcane is best for jaggary making followed by Co.86032 (85.61 percent) and Co.94012 (73.48 percent).
5. Majority (95.45 percent) and (90.15 percent) of the Sugarcane cultivators given their overall preference to the Sugarcane varieties Co.86032 and Com.0265 respectively.
6. The respondents faced the constraints like, high cost of Sugarcane production and low rates by sugar factory (84.85 percent), let harvesting of Sugarcane crop by sugar factories (78.03 percent),

oppose to Com.0265 Sugarcane variety from sugar factory (73.48 percent), shortage of organic fertilizers (65.15 percent), sprouting problem in Sugarcane variety Com.0265 (52.27 percent) and unavailability of sufficient and quality planting material of recent varieties (50.76 percent).

Implications :

1. It is necessary to follow proper varietal planning starting from planting to harvesting of Sugarcane by the sugar factories in consultation with the Sugarcane specialists.
2. It is necessary to supply new varieties planting material like Co.86032 and Com.0265 through the Agril. Universities, Deptt. of Agriculture and sugar factories.
3. Rates for Sugarcane should be given on the basis of cost of production and recovery of sugar by sugar factories.
4. Due to the high price of jaggary, majority of the farmers are interested in jaggary preparation. They should be given proper training in modern jaggary making
5. A variety of Sugarcane is developed which is suitable for climate change.
6. Soil testing facility should be made available at village level.

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RESEARCH ARTICLE

White Grub Management Practices Adopted by Sugarcane Growers

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ABSTRACT

White grub has become the most important polyphagous pest causing serious threat to sugarcane crop since 1960. The present study was conducted purposively in Hatkanangle and Karveer tahsils of Kolhapur district. These were selected purposively as major sugarcane grown tahsils, since the pest incidence of white grub was observed to be highest in these tahsils. In all 120 respondents from these two tahsils were randomly selected. The study indicated the low adoption of white grub management practices in sugarcane. Thus, there is need to create awareness among the sugarcane growers about the white grub management practices through extension activities like demonstrations and trainings. The awareness on adoption of biological treatment is needed through method demonstrations.

Key words: Adoption, sugarcane growers, white grub management

INTRODUCTION

Sugarcane (*Saccharum officinarum L.*) is one of the important crops fulfilling 60 per cent of the sucrose requirement. It is considered as a cash crop and plays the main role in the rural economy of the Maharashtra. The world production of sugarcane is 1,324 mill. tons with an area of 20.42 mill. ha. India rank second in both area and production next to Brazil. In India, sugarcane crop occupies about 4.86 mill. ha. area with production of 324.91 mill. tons. In Maharashtra, it is an important commercial crop occupying 0.896 mill. ha. of area with production of 54,046 lakh ton. Maharashtra is second to Uttar Pradesh in area and productivity (Anonymous, 2010).

Upto now 200 insect pests have been reported causing damage to sugarcane crop (David and Nandgopal, 1986). Amongst them, white grub has become the most important

polyphagous pest causing serious threat to sugarcane crop since 1960 (Mohalkar *et al*. 1997). The world fauna of white grub exceeds 30,000 species (Mittal, 2000) and about 1300 North American species (Borror *et al*.1975). Over 1500 species of white grubs (Scarabaeidae) belonging to the subfamilies Rutelinae, Dynastinae and Melolonthinae are known from India. About 40 different species under these subfamilies have been recorded as important pests of various crops in different parts of the country. White grub remains a problem in varied agro ecosystem and soil types (Veeresh, 1974). In India, white grub is one of the five pests of national importance (Vijayavergia *et al*., 2001).

Among the white grubs, *Leucopholis lepidophora* Bl. has recently been a threat to sugarcane, paddy and groundnut cultivation in Western Maharashtra especially in Kolhapur region. The pest is causing extensive damage to the number of other crops like jowar, bajara, groundnut and vegetables. Different species of white grubs are endemic form in some pockets of Ahmednagar, Buldhana, Dhule, Jalgaon, Kolhapur, Osmanabad, Parbhani, Sangli, Satara and Wardha districts. Sugarcane crop is heavily attacked by this pest (Vijayvergia *et al*., 2001).

The pest management practices of the last 50 years mainly relied on synthetic toxic chemical pesticide. The continued unabated overuse of pesticide brings development of resistance in insect to insecticides, environmental residues, resurgence of pests, decreased biodiversity in managed ecosystem and alteration in ecological balance so on. Despite dramatic increase in food production in terms of yield in the past thirty years the losses through the production system are still large. Therefore, sustained attempts in managing the white grub with alternative techniques that would eliminate these problems have not become forth. Among these, biological control especially using fungal pathogens holds promise. With this background, the study was undertaken with the main objective to study the extent of adoption of white grub management practices by the sugarcane growers.

METHODOLOGY

The present study was conducted purposively in Hatkanangle and Karveer tahsils of Kolhapur district. These were selected purposively as major sugarcane grown tahsils, since

the pest incidence of white grub was observed to be highest in these tahsils. In all 120 respondents from these two tahsils were randomly selected for the study. Exploratory research design was taken for the study. Keeping in view the objective of the study, an interview schedule was prepared and data were collected. Appropriate statistical methods were used for analysis of data and interpretation of the results.

RESULTS AND DISCUSSION

The data on adoption of white grub management practices by the sugarcane growers especially the cultural, mechanical, biological and chemical practices adopted are presented in Table 1.

Table 1 Distribution of respondents by their adoption of white grub management practices of sugarcane

Sr. No	Practices	Adoption					
		Complete		Partial		No	
		Frequency	%	Frequency	%	Frequency	%
A)	**CULTURAL PRACTICES**						
1.	Deep ploughing at the evening and morning time when the population of predators are more which eats grubs	120	100.00	0	0	0	0
2.	Crop rotation with						
	1. Paddy	12	10.00	60	50.00	48	40.00
	2. Sunflower	0	0	0	0	120	100.00
3.	Timely planting of sugarcane						
	1. Adsali (July-Aug)	56	46.67	-	-	64	53.33
	2. Preseasonal (Oct-Nov.)	47	39.17	-	-	73	60.83
	3. Seasonal (Jan-Feb)	35	29.17	-	-	85	70.83
4.	Flooding of the field due to which grubs present in soil come on soil surface and they are eaten by birds.	17	14.17	42	35.00	61	50.83

5.	Use of well decomposed organic manure	44	36.37	57	47.50	19	15.83
6.	Avoid cultivation of sugarcane in white grubs endemic area.	0	0	19	15.83	101	84.17
7.	Earthing up						
	1.First : 42-46 days after planting	110	91.67	10	8.33	0	0
	2.Final : 100-120 days after planting	109	90.84	11	9.16	0	0
B)	**MECHANICAL PRACTICES**						
9.	Collection & destruction of grub during intercultural operations like weeding & hoeing	92	76.67	17	14.17	11	9.16
10.	Collection & destruction of adult beetle from the host plants like Neem, Babul, Ber during night.	64	53.33	35	29.16	21	17.51
11.	Cultivate the white grub affected area with the help of rotavator 4 to 5 times in the month of April, May & June.	88	73.33	23	19.16	9	7.51
12.	Set up light trap (preferably white light > 150 watt) for attracting the adults of white grub	12	10.00	27	22.50	81	67.50
C) BIOLOGICAL PRACTICES							
13	Use of Biological agent						
	i) *Metarhizium anisoplea* @ 20 kg/ha	21	17.50	60	50.00	39	32.50
	ii*) Beauveria bassian*a @ 20 kg/ha	0	0	0	0	120	100.00
14	Soil application with neem cake powder @	53	44.17	-	-	67	55.83

	2000 kg/ha						
15.	Conservation of predators in the field						
	1.Caloglyphus	0	0	0	0	120	100.0.
	2.Sancacyris predatory mite	0	0	12	10.00	108	90.00
	3. Hetero rhabditis nematode	0	0	0	0	120	100.00
16	Grub present under sugarcane clumps are eaten by the wild pigs, mangoose, jackel, wild cats etc.	0	0	17	14.17	103	85.83
D) CHEMICAL PRACTICES							
17.	Soil application at the time of planting with						
	i) Quinlophos 5 G@25 kg/ha	0	0	0	0	120	100.00
	ii) Carbofuron 3G@ 25 kg/ha	18	15.00	45	37.50	57	47.50
	iii) Phorate 10G @ 25kg/ha	36	30.00	57	47.50	27	22.50
18.	Spray the host trees like neem, babul with 0.1 per cent Carbaryl (After first pre-monsoon shower May-June)	15	12.50	49	40.83	56	46.67
19.	Soil application with 2 % methyl parathion dust.	0	0	12	10.00	108	90.00
20.	Soil application with malathion 5D @ 125 kg/ha along with FYM	0	0	0	0	120	100.00
21.	Application of clothianidin 50WDG @ 150 gm/ha along with fertilizer	0	0	0	0	120	100.00
22.	Seed treatment: Before planting dipping of sugarcane sets for 10						

	min. in following chemicals						
	1. Imidacloprid 17.8 SL @ 5 ml/ 10 lit of water	26	21.16	53	44.16	41	34.17
	2. Malathion 35 EC @ 20ml/10 lit. of water	18	15.00	36	30.00	66	55.00
	3. Chloropyriphos 20 EC @ 20 ml/ 10 lit.of water	19	15.83	25	20.83	76	63.34
	4 .Indoxacarb 14.5 SC @ 10 ml/ 10 lit of water	12	10.00	17	14.17	91	75.83
23.	After planting of sugarcane soil drenching with-						
	1. Chloropyriphos 20 EC @ 1000 ml 500 lit/ha	17	14.16	22	23.33	81	63.50
	2. Imidacloprid 17.8 SL @ 500 ml 500 lit/ha	16	13.33	23	19.17	81	67.50
	3. Indoxacarb 14.5 SC @ 500 ml 500 lit/ha.	13	10.83	19	15.83	88	74.34
24.	Apply chloropyriphos 20 EC @ 80 lit/ha with equal quantity of water in ridges for ratoon sugarcane crop in first week of April.	05	4.17	08	6.66	107	89.17

The data on practice wise adoption of white grub management practices of sugarcane by the respondents as presented in Table 1 are discussed below.

I. Adoption of cultural practices

It was observed from the above table that cent percent sugarcane growers had complete adoption of deep ploughing management practices at the evening and morning time. The 10.00 per cent of respondents reported complete adoption, while, 50.00 per cent had partial adoption of crop rotation with paddy. About 46.67 per cent, 39.17 per cent and 29.17 per cent respondents had completely adopted

the timely planting of sugarcane in adsali, preseasonal and seasonal sugarcane, respectively. It was observed that flooding of the field of sugarcane practice was partially adopted by 35.00 per cent respondents, while, 50.83 per cent had not adopted this practice. It was noticed that 47.50 per cent of respondents had partial adoption of use of decomposed manure practice followed by complete adoption (36.37 %) of the practice. A large majority (91.67 %) of them had complete adoption about first earthing up practice and about 90.84 per cent respondents adopted final earthing up practice in sugarcane. These findings are in line with the findings of Borse (2003).

II. Adoption of mechanical practices

As regards to the adoption of mechanical practices, it was observed from the Table 1 that 76.67 per cent respondents had complete adoption of collection and destruction of grubs during intercultural operation followed by partial adoption (14.17 %) and 9.16 per cent no adoption of this practice. It was revealed that more than half (53.33 %) of the respondents had complete adoption of collection and destruction of adult beetle from host plant which was followed by 29.16 per cent and 17.51 per cent who had partial and no adoption of this practice, respectively. The data also indicated that 73.33 per cent, 19.16 per cent and 7.51 per cent had complete, partial and no adoption of use of rotavator practice, respectively. It was observed that 67.50 per cent respondents had not adopted the practice of use of light trap followed by 22.50 per cent and 10.00 per cent who had partial and complete adoption of this practice, respectively. These findings are in conformity with that of Kalaskar *et al.* (2001) and Borse (2003).

III. Adoption of biological practices

Further, as regards to the adoption of biological practices it was observed from the above table that half of the respondents had partially adopted the use of *Metarhizium anisoplea* followed by no adoption (32.50 %) and complete adoption (17.50 %) of this practice, respectively. It was found that not a single farmer adopted the use of *Beauveria bassiana* bioagent. The soil application with neem cake powder was completely adopted by 44.17 per cent of respondents, while, 55.83 per cent of respondents had not adopted this practice. The finding is in line with that of Chapke (2000).

IV. Adoption of chemical practices

Regarding the adoption of chemical practices, it was observed that no respondent had adopted the soil application of quinlophos 5 G at the time of planting, while, 47.50 per cent and 37.50 per cent respondents had partially adopted the phorate 10 G and carbofuron 3 G, respectively. It was found that 46.67 per cent respondents had not adopted the spray of 0.1 per cent carbaryl on host trees, while, that of 40.83 per cent had partial adoption and 12.50 per cent respondents had complete adoption of it. It was found that 90 per cent respondents had not adopted the soil application with 2 per cent methyl parathion dust and 10 per cent had partially adopted it. Further, it was revealed from Table 1 that seed treatment before planting (dipping of sugarcane sets for 10 min. in imidacloprid 17.8 SL) practice was partially adopted by 44.16 per cent of the respondents followed by no adoption (34.17 %) and complete adoption (21.16 %), respectively. Seed treatment with malathion 35 EC was not adopted by 55.00 per cent respondents, while, 30.00 and 15.00 per cent had partial and complete adoption of it, respectively. It was observed that 63.34 per cent respondents had not adopted chloripyriphos 20 EC seed treatment, while, 20.83 per cent had partially adopted it and only 15.83 per cent of the respondents had completely adopted this practice. It was observed that majority of the respondents had not adopted the soil drenching with chloropyriphos 20 EC (63.50 %), imidacloprid 17.8 SL (67.50 %) and indoxacarb 14.5 SC (74.34 %). Further, it was observed that a large majority (89.17 %) of the respondents had not applied chloropyriphos 20 EC for ratoon sugarcane crop. These findings are in the line with Borse (2003) and Ghadge (2005).

Implications

The study indicated the low adoption of white grub management practices in sugarcane. Thus, there is need to create awareness among the sugarcane growers about the white grub management practices through extension activities like demonstrations and trainings. Educational tours of farmers may be organized by sugar factories in co-ordination with the State Department of Agriculture and State Agricultural Universities to the research institutes and fields of progressive sugarcane growers to promote the farmers for adopting the

white grub management practices on their field. The awareness on adoption of biological treatment is needed through method demonstrations. The concept of Farmer Field School (FFS) on white grub management practices cultivation of sugarcane crop may be implemented by sugar factories for skill development of sugarcane growers.

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RESEARCH ARTICLE

Adoption of Production Technology of Hybrid Napier Phule Jaywant

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ABSTRACT

The study was conducted to analyse the adoption of production technology of Hybrid Napier Phule Jaywant by the farmers in Ahmednagar district of Maharashtra state. Total 120 respondents were selected for the study from Rahuri and Rahata tahsils of Ahmednagar district. The findings of the study regarding overall adoption level revealed that more than more than half of respondents (54.16 %) had medium level of adoption, followed by low level (26.67 %) of adoption and high level (19.17 %) of adoption. About 67.50 per cent of the respondents had complete adoption of seed rate, 52.50 per cent of them had partial adoption of planting spacing of hybrid Napier Phule Jaywant. 38.33 per cent of the respondents had complete adoption of recommended dose of fertilizer; majority (73.33 %) of the respondents had complete adoption of irrigation schedule. About 61.66 per cent of the respondents had complete adoption of harvesting/cutting time of hybrid Napier Phule Jaywant. Cent per cent of the respondents utilized the produced fodder for feeding their own animals. The important constraints reported by majority respondents were inadequate knowledge about use of chemical fertilizers, high wages of labour, salinity problem of soil, unavailability of labour in time and lack of improved tools for cutting fodder crops. Respondents had made various suggestions to overcome the constraints. The suggestions were organization of pre-seasonal training, crop demonstrations and training programmes on production technology should be conducted. They also suggested developing salt resistant varieties, to develop and make available improved tools for cutting fodder crops. The study revealed that most of the respondents did not follow the recommend spacing and recommended dose of chemical fertilizers so, there is need to organize method demonstrations and result demonstrations on these aspects. More emphasis should be given on publicity of production technology of hybrid Napier Phule Jaywant through print and electronic media.

Key words: Adoption, fodder growers, production technology, constraints, suggestions

INTRODUCTION

Improved and recommended agriculture practices are the product of modern science and technology. Development of new technology is generally not major problem in our country. The main problem exist today is the acceptance of these technologies by the farmer. Hybrid Napier Phule Jaywant is a perennial grass having the highest green fodder productivity as compared to other fodder crops or grasses in the world. But due to uneven nature of soil, rainfall and other climatic factors the yield level of Napier grass is not satisfactory even though the improved technologies are available with farmer. This is because of the lack of scientific knowledge of farmers to accept the new technology. This may be due to the different problems or constraints associated with the technology. Therefore, the study is very much needed to know the knowledge and adoption of production technology of hybrid Napier Phule Jaywant. To achieve higher level of production and productivity the inadequate level of knowledge of the recommended technology as well as its non-adoption may be a big hindrance which also hampers the production potential of the fodder crops. It is in this context that this study was undertaken to know the difference between the actual knowledge possessed by the famers about the recommended package of practices for production of hybrid Napier Phule Jaywant and also their extent of adoption.

METHODOLOGY

The study was conducted purposively in Ahmednagar district of Maharashtra state, since it is a leading district in dairy business and fodder crops. Two tahsils i.e. Rahuri and Rahata purposively selected for the study. The list of villages having the highest area under hybrid Napierwas obtained from Taluka Agriculture Officer and 6 villages were selected from both tahsils depending upon the highest area. The list of the fodder growers was obtained from AICRP on Forage crops and Utilization, MPKV, Rahuri and Taluka Agriculture Officer, Rahuri. From each village 20 farmers were selected by purposive sampling method. Thus, total 120 respondents were selected for the study. Ex-post facto design of social research was used for the present investigation.Well-structured interview schedule was prepared and data was collected by personal interview method. Collected information was analyzed and

tabulated. The statistical methods *viz.*, frequency, percentage, arithmetic mean and standard were used for analysis of data.

RESULTS AND DISCUSSION

1. Adoption of production technology of hybrid Napier Phule Jaywant by the farmers

The term adoption is operationalized as the degree of the use of recommended package of practices of hybrid Napier Phule Jaywant by the respondents. The information regarding the adoption of the respondents about package of practices was collected, tabulated and analysed. The results are presented in Table 1.

Table 1: Distribution of the respondents according to their overall adoption level

Sl. No	Category	Respondents(N=120)	
		Frequency	Per cent
1.	Low (upto 20)	32	26.67
2.	Medium (21 to 35)	65	54.16
3.	High (36 and above)	23	19.17
	Total	**120**	**100.00**

The data from Table 1 revealed that 54.16 per cent respondents had medium overall adoption level; and 26.67 per cent and 19.17 per cent respondents had low and high overall adoption level, respectively. Thus, it is concluded that more than half of the respondents belonged to medium level of adoption category.This finding is consistent with the findings of Marak et al. (2014).

2. Practicewise adoption of the recommended package of practices of hybrid Napier Phule Jaywant by the respondents

The practicewise information pertaining to the adoption level of respondents about the recommended package of practices of hybrid NapierPhuleJaywant was collected, tabulated and analyzed. The results are presented in Table 2.

Table 2: Distribution of the respondents according to practices wise adoption of the production technology of hybrid Napier Phule Jaywnt

Sl. No.	Recommended Technology	Adoption (N= 120)		
		Complete	Partial	No
	Soil			
1.	Soil: medium to heavy well drained with pH ranging from 5 to 8	64 (53.33)	29 (24.17)	27 (22.50)
	Land preparation			
1.	Deep ploughing and 2 to 3 harrowings	82 (68.33)	22 (18.33)	16 (13.33)
2.	FYM @ 10 ton/ha. before last harrowing	68 (56.67)	37 (30.83)	15 (12.50)
	Setts for planting			
1.	Use of improved and hybrid varieties of fodder crops	120 (100.00)	00 (0.00)	00 (0.00)
2.	Number of setts: One rooted slip or two eye budedcutting at each spot: 18,500 setts/ha. Two rooted slips or two eye budedcuttings at each spot: 37,000 setts/ha.	81 (67.50)	24 (20.00)	15 (12.50)
3.	Intercropping	25 (20.84)	56 (46.66)	39 (32.50)
	Planting			
1.	Time of planting: February-March or June-August is better	64 (53.33)	47 (39.17)	09 (7.50)
2.	Spacing : 90×60 cm	23 (19.16)	63 (52.50)	34 (28.34)
3.	2 eyebuded setts planted in such a way that one eye should remain above the soil.	102 (85.00)	13 (10.84)	5 (4.16)
	Fertilizers			
1.	-180:60:60 NPK (Kg/ha/.) -Basal dose : 30:30:30 NPK (Kg/ha.) -At the time of earthing up: 30:30:30 NPK (Kg/ha.)	46 (38.33)	36 (30.00)	38 (31.67)
2.	Apply 30 Kg nitrogen/ha after each cutting	48 (40.00)	35 (29.16)	37 (30.84)
	Irrigation management			
1.	In summer initially 2 irrigations and then every 7-8 days interval	88	19	13

2.	In *kharif* season apply irrigation every 10 to 12 days interval	(73.33)	(15.83)	(10.84)
	Intercultivation			
1.	Initially 1-2 hand weeding required	67 (55.84)	26 (21.66)	27 (22.50)
2	Earthing up after six month and at the end of each year remove extra/wilted tillers keeping 2-3 at one place	66 (55.00)	28 (23.33)	26 (21.67)
	Cutting/Harvesting			
1.	First cutting: 60-70 days after planting	74 (61.66)	20 (16.67)	26 (21.67)
2.	Succeeding cuttings @ 50-60 days	65 (54.17)	31 (25.83)	24 (20.00)
3.	Cutting should be done above 15-20 cm above the ground surface	46 (38.33)	51 (42.50)	23 (19.17)
4.	6-8 cuttings in a year	62 (51.67)	40 (33.33)	18 (15.00)

(Figures in parentheses indicate percentage)

The information pertaining to the adoption level of respondents about recommended package of practices of Hybrid NapierPhuleJaywant given in Table 2 is discussed as under.

1) Soil

From Table 2 it was observed thatmore than half (53.33 per cent) respondents had complete adoption, 24.17 per cent of the respondents had partial adoption about soil and 22.50 per cent of the respondents had no adoption.

2) Land preparation

It was revealed that 68.33 per cent of the respondents had complete adoption and 18.33 per cent partial adoption and 13.33 per cent of the respondents had no adoption of one deep ploughing followed by 2-3 harrowings. Further, 56.67 per cent, 30.83 per cent and 12.50 per cent of the respondents had complete, partial and no adoption of application of 10-12 ton/ha farm yard manuring, respectively.

3) Seed rate/ No. of setts for planting

It was observed that cent per cent of the respondents had complete adoption of hybrids. About 67.50 per cent, 20.00 per cent, and 12.50 per cent of the respondents had complete, partial and no adoptionabout number

of setts required for planting, respectively. While, 20.84 per cent, 46.66 per cent and 32.50 per cent of the respondents had complete, partial and no adoption of intercropping of hybrid NapierPhuleJaywant with other crops, respectively.

4)Sowing time /planting time

It was observed that 53.33 per cent of the respondents had complete adoption, 39.17 per cent partial adoption and 7.50 per cent no adoption of time of planting of hybrid NapierPhuleJaywant.

5) Planting distance/spacing

It was found that 19.16 per cent of the respondents had complete adoption of spacing, while, 52.50 per cent of respondents had partial adoption of spacing.

6) Fertilizers

It was observed that 38.33 per cent, 30.00 per cent and 31.67 per cent of the respondents had complete, partial and no adoption of recommended dose of chemical fertilizers, respectively. While, 40.00 per cent, 29.16 per cent and 30.84 per cent of the respondents had complete, partial and no adoption of application of 30 Kg N/ha after each cutting, respectively.

7) Irrigation management

The data in Table 2 revealed that 73.33 per cent, 15.83 per cent and 10.84 per cent of the respondents had complete, partial and no adoption of irrigation management, respectively.

8) Weed control/ Intercultivation

It was found that 55.84 per cent, 21.66 per cent and 22.50 per cent of the respondents had complete, partial and no adoption of manual weeding. The 55.00 per cent, 23.33 per cent and 21.67 per cent of the respondents had complete, partial and no adoption of earthing up, respectively.

9) Harvesting/cutting

The data in Table 2 revealed that 61.66 per cent, 16.67 per cent and 21.67 per cent of the respondents had complete, partial and no adoption of timely harvesting, respectively.

The above findings are consistent with findings of Mahadik*et al.*(2009) and Lad (2013).

3. Utilization pattern of hybrid NapierPhuleJaywant

After harvesting/cutting of the hybrid NapierPhuleJaywant the farmers used this for feeding their animals. The utilization pattern is shown in Table 3.

Table 3: Utilization pattern of hybrid Napier Phule Jaywant

Sl. No	Category	Respondents(N=120)	
		Frequency	Per cent
1.	Used completely for feeding own animals	120	100.00
2.	Whole quantity produced is for sale	00	0.00
	Total	**120**	**100.00**

The data in Table 3 indicated that cent per cent of the respondents utilized the produced quantity of hybrid Napier Phule Jaywant for feeding their own animals.

4.Constraints and suggestions of the respondents

4.1 Constraints faced by the respondents in adoption of production technology of hybrid Napier Phule Jaywant

The data regarding constraints faced by respondents is given in Table 4.

Table 4: Distribution of respondents according to the constraints faced

Sl. No.	Constraints	Respondents (N= 120)	Rank
1.	Inadequate knowledge about use of chemical fertilizers	65 (54.16)	I
2.	High wages oflabour	61 (50.83)	II
3.	Salinity problem of soil	52 (43.33)	III
4.	Unavailability of labour in time	50 (41.66)	IV
5.	Unavailability of improved tools for cutting fodder crops	37(30.83)	V

(Figure in parenthesis indicate the percentage)

The data presented in Table 4 revealed that respondents faced constraints of inadequate knowledge about use of chemical fertilizers (54.16 %), high labour cost (50.83 %), salinity problem of soil (43.33 %), unavailability of labour in time (41.66 %) and unavailability of improved tools for cutting fodder crops (30.83 %). These findings are in line with Lad (2013).

4.2 Suggestions of the respondents

An attempt was made to study the suggestions offered by the respondents. The details are presented in Table 5.

Table 5: Distribution of respondents according to suggestions given by them

Sl. No	Suggestions	Respondents (N=120)	Rank
1.	Organization of training and demonstrations before the season	92 (76.66)	I
2.	Develop salt resistant cultivars	45 (37.50)	II
3.	Develop improved tools for cutting the fodder crops	33 (27.50)	III

(*Figure in parenthesis indicate the percentage*)

The data presented in Table 5 indicated that the respondents suggested that training and demonstrations be organized before the season (76.66 %)and also suggested to develop salt resistant cultivars to overcome salinity problem of soils (37.50 %). Another suggestion was to develop improved tools for cutting the fodder crops (27.50 %). These suggestions were found similar to Pharate (2008) and Chahande (2012).

Implications

The study revealed that most of the respondents did not follow the recommended spacing and recommended dose of chemical fertilizers so, there is need to organize method demonstrations and result demonstrations on these aspects. More emphasis should be given on publicity of production technology of hybrid Napier Phule Jaywant through print and electronic media.

The important constraints reported by majority of respondents were inadequate knowledge about use of chemical fertilizers, high wages of labour and salinity problem of soil and unavailability of improved tools for cutting fodder crops. Hence based on suggestions, to overcome these constraints efforts should be made to organize training and demonstrations before the season, to develop and use salt resistant cultivars and to develop improved tools for cutting the fodder crops.

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RESEARCH ARTICLE

Eco Friendly –Farm Equipment for Reducing Drudgery and Work Related Stress of Farm Women.

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ABSTRACT

Almost agricultural operations were full of drudgery prone activities and it is also quite true that maximum field activities were performed by the farm women. Without knowing the adverse effect on the body they were continued their work honestly and face various problems afterwards. Looking that important aspect, the present study on Work related Muscular Skeletal Disorders (WMSDs) was conducted on farm women belongs to Village Kalyanpura (District- Ujjain) in 2017-18 for assessing the drudgery involved in the farm activity-Garlic Sowing. Garlic sowing is one of the times consuming and full of drudgery involved farm activity. A specially designed and developed eco friendly-Handy Garlic marker by Krishi Vigyan Kendra, RVSKVV, Ujjain (M.P.) was introduced to the selected farm women. In the study the various parameters were assessed which were directly related to drudgery which causes several health problems to the farm women. The results indicate that T2 reduces the drudgery by 17.00 % as compare to T1. Body muscular pain was reduced particularly at cervical, lumbar and fingers/ palm area. Drudgery Index dropped from 71.86 to 54.86 whereas Rate of Perceived Exertion (RPE) dropped 4.74 to 3.24 and Degree of Difficulty by 4.65 to 2.84. Advanced technology saves time, increases efficiency and maximum output in terms of area covered. Feedback regarding garlic marker was also asked at the end of the study.

Key words: drudgery, musculo problem, farm women, rate of perceived exertion (RPE), Garlic Marker

INTRODUCTION

Before discussing about drudgery one should know what is mean by drudgery. Drudgery is generally conceived as physical and mental strain, agony and monotony and hardship experience by human being. Such type of long hours of work put in by women fulfilling their multiple roles hardly leave any time for leisure which ultimately gives ill effect on their both

mental and physical, Badve (1996). As per Sadangi et al (2006) all most all farm women suffer physical drudgery in various operations in agriculture. Another study conducted on rice farming shows the result that transplanting, threshing, parboiling are the heavy activities whereas weeding, cutting and carrying were the moderately heavy activities (Anon.2004).

Over all view of farm women while performing the different farm activities in which the drudgery involved are Sowing, transplanting, manually uprooting, Weeding, harvesting, winnowing, de husking, shelling, pounding, grinding of cereals and pulses by manual method, Cutting, collecting and carrying fuel/ fodder over long distance and Excessive physical work in care and management, harvesting, threshing, processing and marketing etc.

Ergonomical Characteristics of Farm Women - Ergonomically suitable low cost drudgery reducing implements should be designed for the agricultural operations.

The ergonomical characteristics give information on capacity of a person to work at different comfort levels and include anthropometric data, muscular strength and maximum aerobic capacity. As per the Kulkarni et al (2009) the women have different ergonomical characteristics than men. Therefore, to make the equipment suitable for women workers, due and keen attention needs to be given, to match their capabilities and limitations, while designing equipment for use by women for various operations. Dipankar De (2009) also studied on drudgery reducing technologies for farm women and mentioned that a large no. of farm operations have been taken place in the country. However most of the technologies have been designed with men as the user group with the general concept of male being main users. However, the technological needs of female operators are different due to different in ergonomical characteristics, operational skills and experience and related factors. The technologies designed are often unsuitable for women causing fatigue, distress or even cause operational difficulties. Hence, it is necessary to provide the knowledge regarding introduction and adoption of labour saving and drudgery reducing technologies and methods to alleviate the suffering of farm women in agriculture works which would be

enable the rural women to participate more energetically and enthusiastically.

Hence, it is necessary to provide the knowledge regarding introduction and adoption of labour saving and drudgery reducing technologies and methods to alleviate the suffering of farm women in agriculture works which would be enable the rural women to participate more energetically and enthusiastically. Among all the farm activities sowing of garlic in the field was very tedious task and full of drudgery prone. It affects the health of farm women due to squatting posture. This gives a scorching and itching problem to farm women. Even the muscular pain was also noticed very high in existing method. Keeping this fact in view, the present study was conducted. In which especially garlic marker was designed and developed. The main objective of conducting the study were

- To assess the drudgery involved in farm activity-Garlic Sowing,
- To assess the Perceived exertion,
- To measure the muscular problem,
- To introduce the women friendly equipment/ tool – Garlic marker,
- To measure the output and feedback.

METHODOLOGY

The study was conducted in a village Kalyanpura (19 km away from District-Ujjain) which comes under the adopted cluster area and Nutri Smart village of KVK-Ujjain (M.P.). In Rabi season (Yr.2017 and 2018) randomly 30 farm women performing the farm activity-sowing garlic by hand were selected under the OFT one of the mandatory activity of KVK. Comparative study was carried out in improved technology which was designed and developed by KVK, Ujjain (Manually Garlic sowing - Planter) and existing practice (sowing of garlic cloves with the help of fingers) for assessing the drudgery involved in the activities. Well prepared Performa was used for assessing the data regarding drudgery involved in the farm activity-manually sowing of garlic cloves. While conducting the study special attention was given on the selected sample size with regards to their physical fitness and ensuring that none had any serious health hazard. These precautions were specially taken for assessing the correct data while selecting the farm women.

2.1 Participatory Mechanization of Planning and Evaluation:

The conventional "top-down" approach to extension has not

generally yielded positive results, hence the participatory research concept, which has its roots in the recognition that if smallholder farmers do not perceive the relevance of the results of research to their own situation, they will not adopt them. Participatory research transfers the initiative and the power of decision to farmers who, in the final analysis, have significant advantages over scientists because they have detailed and practical knowledge of their own production systems. Participatory planning involves the active participation of all stakeholders in planning and implementing mechanization strategies, with the role of farmers taking on paramount importance. Participatory planning builds upon the indigenous knowledge that already exists in the community and blends it with the ideas and knowledge of other stakeholders e.g. researchers, policy makers, private sector, etc. Based on the problems emerging among the farm women during the Participatory Rural Appraisal (PRA) of village Kalyanpura, design, size, weight and cost involved in fabricating a manually operated Garlic sowing marker.

2.2: Pre planned Questionnaire:

A specially designed and well planned questionnaire was prepared for assessing the data regarding the selected farm activity. It covers all the required information viz. time, degree of difficulty, and frequency of performance, RPE and muscular problem as well as the output. Even the feedback was also noticed for the more refinement in the technology and for better future of women friendly equipments based upon the self experience of the particular farm women towards the drudgery prone farm activity for making it simple/ convenient along with the better output.

2.3: Selection of Sample:

2.3.1 **Age Group -** The farm women were selected randomly and criteria of age group were selected below 40 years purposively. All the farm women were well experienced regarding all the farm activities along with the sowing of garlic clove activity.

Description of Technology:

T1- Existing Method: In this method the farm women use index finger or small stick of wood for sowing the garlic cloves.

T2- Manually Hand operated Garlic Marker (**Improved Technology)** :

Especially designed women friendly manually hand operated garlic Marker was designed and developed by the Krishi Vigyan Kendra, (RVSKVV) Ujjain (M.P.) for sowing the garlic cloves. It was compared with the existing practice (manual method).

Specification of the Garlic Marker-

- ¾ Easy to handle
- ¾ More suitable to farm women.
- ¾ Specially designed garlic marker is economic.
- ¾ Covers more Area.
- ¾ Saves time
- ¾ Light in Weight
- ¾ Minimizes body discomfort
- ¾ Reduce Drudgery
- ¾ Hence, Women friendly

2.4.: Factors influence the drudgery:

2.4.1: Degree of Difficulty: Degree of Difficulty was measured on five point scale ranging from very easy to very difficulty.

2.4.2: Time : One hr. (60 minutes) observations were made in all the practices for assessing and for comparing the data.

2.4.3: Frequency: Frequency of performance was measured on five point scale varies from daily to seasonally.

Evaluation of Drudgery: Drudgery Index was calculated by using the formula given by Rekha *et al* (2018) below .

Drudgery Index: Drudgery Index was measured by using fallowing formula

$$X + Y + Z / 3 \quad X \quad 100$$

Whereas X- Co-efficient of Frequency, Y - Co- efficient of Difficulty and Z- co efficient of time.

2.5: RPE: Rate of perceived exertion was measured on five point scale ranging from very easy to very difficulty.

2.6: Muscular Pain: Incidence of musculo-skeletal problems of the selected subjects was identified by using the 'body map'. After completing the activity incidence of body pain at body parts viz. upper extremities and lower extremities was recorded on five point scale i.e. very severe to very light.

2.7: Feed Back: Feed back of the technology was received after completing the activity. After using the manually operated garlic marker a simple questions were asked to the selected farm women regarding the advanced and improved technology and compared to the existing practice.

RESULTS AND DISCUSSION

Table 1 Personal Characteristics and Family Background of The Farm Women

(N=30)

Parameters	Details	No. of Respondents	Percentage	Mean ± SD	Variance
Age (Yr)	20-25	05	16.66	30.00	21.85
	26-30	09	30.00	±	
	31-35	12	40.00	4.56	
	35-40	04	13.33		
Weight (kg.)	35-40	07	23.33	44.0	17.44
	41-45	14	46.66	±	
	46-50	08	26.66	4.17	
	50 <	01	03.33		
Literacy level	Not Literate	11	36.66	2.1	4.98
		14	46.66	±	
	Up to Primary	04	13.33	2.23	
	Middle School	01	03.33		
	High School				
	College	00	-		
Type of Family	Nuclear	19	63.33	-	-
	Joint	11	36.66		
No. of Members	1-3	04	13.33	5.36	2.51
	4-6	20	66.66	±	
	>7	06	20.00	1.58	
Cultivated Land (ha)	0.5 – 1	17	56.7	1.71	1.68
	1.0-3.0	09	30.0	±	
	3.0 and more	04	13.3	1.29	
Annual Income (000 Rs)	40-60	09	30.0	71	-
	60-80	15	50.0	±	
	80 and more	06	20.0	14016	

Personal characteristics and family background of the selected farm women as depicted in Table. No. (1) reveal that maximum farm women (40 %) belonged to age group 31-35 years followed by (30 %) between 26-30 years category whereas 13.33 % were in the age group of 35-40 years. Only 16.66 % were in 20-25 years age group represented the youths. In case of body weight , it was observed that maximum women were having weight up to 45 kg (46.66 %) followed by 26.66 % dwelt in 46-50 kg range whereas 08 women's weight was between 46-50 kg and only one woman whose weight was more than 50kg. Further, analyzing the Body Mass Index (BMI) it was evident that, malnutrition was very common problem in village Kalyanpura across all the age groups and this can be theoretically concluded looking in to their literacy status as only 3.33 % respondents were matriculate and not a single graduate was found. Maximum women had no education or were school dropouts beyond primary level and 13.33 % studied up to middle school and only one lady had completed high school education. It was also quite true that illiteracy level was still remarkably poor in rural area; the studies showed 36.66 % were illiterate. Tandon (1993) studied on 100 socially underprivileged women in the age group of 25-50 yrs found that 83 per cent of women were illiterate, 13 % had studied up to primary school and only 4 % had studied up to secondary school. Similarly, Singh and Agrawal (2000) observed that major drawback of women education was related to drop outs and stagnation. As compared to boys, girl's dropout ratio was more due to social taboo, early marriage and cooperates in the earnings of the household. As per Chauhan (1999) the large workforce employed in industries and many other occupations comprised men as well as women. She stated that because of their low literacy level, large section of the employed women folk was compelled to take up jobs in the unorganized sector.

As regards to the family back ground of the farm ladies the result indicate that 63.33 % were from nuclear family where as 36.66 % still live under the joint family system. From the finding it was clear that nuclear family system has now a day has percolated in the rural areas, mainly due to fragmentation of holdings and other socio-economic reasons. But as regards to the family members still 66.66 % house hold have 4 to 6 members while 20.00 % had up

to 7 members in their family. Another reason which is closely related is the size of land holdings. Maximum respondents (56.7 %) were small farmers having up to one hectare land followed by 30 %up to 3 ha and only 13 % having more than 03 ha holding. This has been appropriately reflected in their economic status, as about 80% respondents have their annual income below 0.8 lacs and only 20 % had a satisfactory income.

Table 2 Drudgery involved in farm activity- sowing garlic

Sr. No.	Parameters	T1	T2
1	Time (Min.)	60	60
2	Frequency	5	5
3	Difficulty	4.65(4-5)	2.84(2-3.5)
4	DI*	71.86 (66.66-73.33)	54.86 (53.33-63.33)
5	RPE	4.74(4-5)	3.24 (3-4)
6	Output-Area covered (m./ hr.)	15.53(13-19)	20.53 (16-25)
*DI=Drudgery Index, (Figures in parenthesis indicates minimum and maximum values)			

Drudgery related study: Parameters related to drudgery and drudgery Index as depicted in the Table (2) for observing and analyzing the study all the related parameters viz. time, frequency of performance and degree of difficulty was assessed here in detail for calculating the drudgery Index for selected farm activity. Total two treatment were selected for assessing the data viz. T1 (existing Practice) and T2 (Manual Garlic marker). For assessing the data same time limit was allotted in each treatment and fixed time was 60 min to each respondent. Frequency and degree of difficulty was also calculated on five point scale. Based on time, frequency of performance and difficulty the Drudgery Index was calculated for the selected farm activity. It was clear that maximum drudgery was assessed in T1 (exiting practice) i.e. 71.86 % whereas in T2 it was noted 54.86 %. It means in T2 drudgery index was reduced up to 17.00 %. Perceived exertion (fatigue) was also high in T1 (4.74) as compare to T2(3.24). These findings are in agreement with the finding in different parts of the country

as reported by different Researcher's enumerated below. Bhatnagar (1995) stated that physiological fatigue was one of the causative factor of drudgery. Workers physiological fatigue was apparent from the temporal rise in heart rate reaction and significantly higher pulse towards the end of the day's work. Further, the factors which influenced the physiological workload were weight of load, speed of walking, frequency of trip, distance covered and duration of the work. Boki (2000) indicated that fetching water and collecting firewood scored high for perceived exertion i.e. 4.6 while preparing of food was rated least for perceived exertion i.e. 1.98.

Another most important factor was area coverage (m/hr.). Area was covered more i.e 20.53 m/hr in T2 as compare to T1(15.53 m/hr.). It means in advanced technology maximum output within one hour was 4.98 m/hr extra then the existing practice. By using this technology they can save 2-3 days on particular activity and utilize the that time for another important activity.

The major health problems related to abnormal working posture are the 'problems of aches' of the musculo-skeletal system. While working abnormal postures such as bending, stooping, twisting etc. which might likely to cause many health problems particularly in the musculo skeletal system in the long run. These may lead to body deformities.

Table 3 Body muscular pain of farm women while performing selected farm activity-garlic sowing

Sr. No.	Parameter	T1	T2
1	Head	3.56 (2-5)	2.33 (2-3)
2	Elbow Joint	4.00 (3-5)	2.83 (2-4)
3	Wrist	4.2 (3-5)	2.73 (2-4)
4	Fingers/ palm	4.83 (4-5)	2.93 (2-4)
5	Cervical point	4.4 (3-5)	2.73 (2-4)
6	Lumbar point	4.16 (3-5)	2.53 (2-3)
7	Thigh Muscles	3.5 (2-5)	2.26 (2-3)
8	Leg / Knee Joint	3.8 (3-5)	2.23 (2-3)
9	Feet/ Anklet joint	4.03 (3-5)	2.53 (2-4)

Body Muscular Pain in selected farm activity- sowing garlic was measured and depicted in table no. (3). All the major body parts (Upper and lower extremities) which influenced while performing the farm activity were covered in the present study. A specially designed body map was also used for assessing the body problem faced by the farm women while performing the farm activity-sowing garlic. Maximum body parts were adversely affected in T1 method as compare to T2. Fingers / palm and cervical point were most affected in T1 fallowed by wrist muscles and lumbar point i.e. lower back. It was minimized in T2 method. Head and thigh muscles were list affected as compare to other body part in T1 method.

In case of body discomfort an experiments conducted at Haryana of farm women, reported that women felt very sever to pain in shoulder joints, upper back and lower arm specially while drawing water. P ain was more evident in neck, upper arm, shoulder joints, calf muscles, while carrying load back home (anon. 1998)

Fingers/ Palm were most affected while sowing the garlic which give etching and burning sensation throughout the day to the farm women while on field. That was the major problem faced by the farm women hence the muscular rating was more for palm/fingers. Next to that cervical point was most affected due to the squatting posture while sowing the garlic cloves manually.Similar finding on other aspects farm mechanization have been reported by Alam, 2001 in the status report entitled "Future Requirements of Agricultural Machines for Mechanizing Agriculture".

Table 4 Comparisons between existing and improved practice based on feedback of the respondents

Sr. No.	T1	T2
1	More load on wrist muscles / palm	Due to the Garlic marker minimum load on the finger and palm.
2	Skin disorders, such as scabies, marked by intense irritation and itching specially figures and palm muscles	Minimises body itching problems and avoid irritation senses.
3	Body muscular problems were more particularly at Cervical (Upper part) and hand muscles were affected more	More efficiency in short time period, hence the body discomfort also less.

4	More energy consumable activity which leads to drudgery.	Less Energy required which minimises the drudgery involved in the activity.
5	Required time for completing the field task was more	Saves time, money and energy.
7	-	To operate on field it is easy to handle and women friendly. Hence, it can be operated by any family member.
8	-	Saves time, energy, body disorders, exertion and gives more output, minimises drudgery
9	-	Eco friendly with the atmosphere because it is manually operated and no diesel or petrol is required.
10	-	Economic and anybody can able to purchase it.

at the last of the study comparisons between existing and improved practice based on respondents feedback was given in Table No. (4). As the Table indicates that maximum negative effects faced by the respondents were more in existing practice as compare to the improved technology. As the study showed that it Minimizes body itching problems and avoid irritation senses which were the measure problem as quoted by the farm women. In case of other body discomfort also it was observed that cervical point was less affected in advanced technology (T2). It reduces the time hence; it could be minimizing the drudgery also.

The another important factors were it saves time, coverage area was more, output and work efficiency was also quite satisfactory and echo friendly with farm women as well as environment also. This garlic planter can be useful to the other crops also especially for horticultural crop because it was purposely designed for fulfilling the requirements of farm women.

CONCLUSION

The fact of the present study was that we must begin to give importance and essence of the farm women as

essential working force in agricultural sector that has the potentiality to bring quantum jump in agricultural production of the country.

Feminization of agriculture must be advance through the use of drudgery reducing farm implements. This will help in minimizing drudgery and will help in achieving higher production and in an efficient and diversified way. It will not only help in achieving the health status of the farm women but also minimize the muscular body pain of the particular farm women. It will help in giving them a better social status and recognition with self reliance confidence.

Specially designed and developed garlic marker not only minimize the drudgery (17 %) but also minimize the body muscular system of all essential body parts particularly cervical and lumbar point. It also covers the maximum area (20.53 m /hr) and gives better output which was 4.98m/hr more than existing practice. Even the non human resource time also saves.

Hence, the Krishi Vigyan Kendra,(RVSKVV) Ujjain (M.P.) India , is giving kind attention towards the minimizing drudgery and physiological workload of farm women by conducting need based training programmes , OFT (On Farm Trials) and FLD (Front Line Demonstration) even rural youth programmes also organize in this regard to minimize the health hazards and least muscular body pain.

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RESEARCH ARTICLE

Constraints and Suggestions of Pomegranate Growers under National Horticulture Mission

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ABSTRACT

The present study was conducted to assess constraints and suggestions of Pomegranate Growers under National Horticulture Mission (NHM) in Rahuri tahsil of Ahmednagar District of Maharashtra state. The study revealed that the major constraints *viz*.non availability of Bacterial blight disease resistant varieties, non availability of loan from bank, lack of knowledge about oily spot disease management practices, Frequency of visits of extension workers are not in time, more fluctuation in prices of fruits were faced by the pomegranate growers. Majority of pomegranate growers suggested that bacterial blight disease resistant variety should be made available through registered nurseries, rate of subsidy need to be increased considering price hike of input and wages, subsidy amount should be given in a single instalment; make available cold storage facility in locality and cent per cent subsidy should be given for drip irrigation.

Keywords: Constraints, National Horticulture Mission, Pomegranate growers, Suggestions.

INTRODUCTION

The horticultural crops *viz*., fruits cultivation gives remunerative returns to the farmers and improves socio-economic condition of farmers. The Government of India took the decision to implement National Horticulture Mission in 2005-2006 in order to increase area under fruit cultivation and to make available the employment opportunities on massive scale. National Horticulture Mission contributed lot in increasing horticulture plantation area in the Maharashtra state. NHM programmes have made impact on livelihood of farmers at the same time there might be some constraints faced by the pomegranate grower's .The present

study was therefore undertaken to identify the constraints faced by the pomegranate growers and their suggestions to made the NHM more effective.

METHODOLOGY

The present study was carried out in Rahuri tahsil of Ahmednagar district of Maharashtra state with the objectives to study the Constraints faced by the pomegranate growers and their suggestions for effective implementation of National Horticulture Mission.The list of beneficiaries was obtained from the In charge officer of NHM at Taluka Agriculture office, Rahuri. The eight villages having at least ten and above pomegranate growers under NHM were purposively selected for study. Total 120 pomegranate growers, on whose farm implementation of NHM scheme was done, were selected from these eight villages for the study. The data was collected through personal interview method by contacting the selected farmers. Collected data was processed and analyzed by using frequency, percentage, mean, standard deviation and coefficient of correlation.

RESULTS AND DISCUSSION

1. Constraints faced by the pomegranate growers

Table 1. Distribution of pomegranate growers according to constraints faced by them

Sl. No.	Constraints	Respondents (N=120)	Percent
A	**Production constraints**		
1.	Unavailability of bacterial blight disease resistant varieties	120	100.00
2.	Problem of climate change like rainfall, hailstorm	63	52.53
3.	Unavailability of labour.	45	37.50
4.	Seedlings supplied from the nursery poor quality	27	22.50
B	**Economic constraints**		
1.	Unavailability of loan from bank at proper time	95	79.16
2.	Delay in getting subsidy	92	76.66
3.	High cost of planting material, pesticides, Insecticides	85	70.83

C	**Technological constraints**		
1.	Lack of scientific knowledge about bacterial blight disease management practices	108	90.00
2.	Lack of knowledge about processing, storage of fruits and market intelligence	105	87.50
3.	More time required for sanction proposal through NHM scheme	40	33.33
D	**Extension constraints**		
1.	Less frequency of visits of extension workers.	65	54.16
2.	Unaware about NHM scheme and their components.	45	37.50
3.	Unaware about the dealer farmers exhibition/ group discussion.	30	25.00
E	**Marketing constraints**		
1.	More fluctuation in prices of fruits	101	84.16
2.	Unavailability of cold storage facility	68	56.66
3.	Lack of grading centres facilities at the remote location	64	53.33
4.	Good market facility is not available for sale of fruits	38	31.66

It is revealed from Table 1 that all (cent per cent) pomegranate growers had faced the constraint of unavailability of bacterial blight disease resistant varieties followed by 79.16 per cent had faced the unavailability of loan from bank at proper time, 76.66 per cent express delay in getting subsidy, 90.00 per cent had faced the lack of scientific knowledge about bacterial blight disease management practices followed by lack of knowledge about processing and marketing of fruits (87.50 per cent). The 54.16 per cent had faced the constraints of less frequency of visits of extension workers, the 84.16 per cent had expressed more fluctuation in prices of fruits followed by (56.66 per cent) faced the constraints about unavailability of cold storage facility, while, 31.66 per cent had faced the problem of unavailability of good market facility for sale of fruit.The same findings with the line of Sharnagat (2008).

3. Suggestions of pomegranate growers for effective implementation of NHM

Table 2. Suggestions of pomegranate growers for effective implementation of NHM

Sl. No.	Suggestions	Respondents (N=120)	Per cent
1.	Bacterial blight Disease resistant variety should be made available on large quantity.	20	100.00
2.	The rate of subsidy need to be increased considering price hike of input and wages	115	95.00
3.	Subsidy amount should be given in a single installment.	105	87.50
4.	The government should fix the prices of fruits every year and purchase the same on the line of onion	98	81.66
5.	Technical advice regarding plantation Bacterial blight management and processing of pomegranate crop should be made available	80	66.66
6.	Timely subsidy should be given for pomegranate cultivation.	77	64.16
7.	Provision of cold storage facility in locality.	70	58.33
8.	Proposal should be sanctioned within specific time	6	54.16
9.	High quality grafts/seedlings should be made available by Department of Agriculture through registered nursery	42	35.00
10.	Cent per cent subsidy should be given for drip irrigation	23	19.16

It is observed from Table 2 that cent percent pomegranate growers suggested that disease resistant variety should be made available because now a day's Pomegranate is affected by Bacterial blight and dieback disease. While, (95.00 per cent) of pomegranate growers expressed that the rate of

subsidy need to be increased considering hike of input and wages, subsidy amount should be given in a single instalment (87.50 per cent) the government should fix the prices of fruits every year and purchase the same on line of onion(81.66 per cent).It is also found that more than (66.66 per cent) of the respondents suggested that technical advice regarding plantation, Bacterial blight and processing of pomegranate crop should be made available, timely subsidies should be given for pomegranate cultivation (64.16 per cent) and provision of cold storage facility in locality should be made available (58.33 per cent), Good market facilities should be made available for sale of product through MARKNET and social media (37.50 per cent), high quality grafts/ seedlings should be made available by department of agriculture through registered nurseries (35.00 per cent) and (19.16 per cent) of pomegranate growers suggested that cent per cent subsidy should be given for drip irrigation. The findings with the line of Sharnagat (2008)

CONCLUSIONS

The present study revealed that majority of pomegranate had faced the constraints of lack of availability of Bacterial blight disease resistant varieties, timely availability of loan from bank, lack of knowledge about oily spot disease management practices, visits of extension workers are not in time, more fluctuation in prices of fruits. Majority of pomegranate growers suggested that bacterial blight disease resistant variety should be made available through registered nurseries, rate of subsidy need to be increased considering price hike of input and wages, subsidy amount should be given in a single instalment, make available cold storage facility in locality and 100 per cent subsidy should be given for drip irrigation.

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Participation of Tribal Youth *(Kokna)* in Agriculture and Allied Activities

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ABSTRACT

Youth especially the tribal youth face a number of problems related to educational cultural, social, economical, technological and vocational development, because low level of education, lack of vocational guidance and scientific outlook towards agriculture. They follow traditional occupations i.e. subsistence agriculture, collection of forest produce or under- take low status jobs. The present study was conducted in Nashik district of Maharashtra state to determine the participation of *Kokna* youth in agriculture and allied activities. By using systematic random sampling technique, total 140 *Kokna* youth were selected for the study from 10 villages of Surgana tehsil of Nashik district. Personal interview technique was used for collection of the data. The result showed that the *Kokna* youth had medium level of participation in agriculture and allied activities, were confined to manual operations like ploughing, harrowing *etc.*, and meager participation in operations involving improved farm practices like seed treatment, ado pting plant protection measures, application of fertilizers and adopting post harvesting practices. The study revealed that the *Kokna* youth had relatively medium participation in interculturing operations and high participation in crop harvesting practices. Relatively less proportion of them regularly participated in practices related to irrigation of crops. The study indicated that participation of the *Kokna* youth in selling of agricultural produce and farm management operations was very low. Also the study revealed that the participation of the *Kokna* youth in post harvesting practices and cattle management practices was medium. Further study indicated that the participation of the *Kokna* youth in collection of forest produce was low. Based on the findings, it is suggested that effective implementation of tribal development schemes for tribal youth should be done in order to increase the quality of participation in agriculture and allied activities.

Keywords: *Agriculture, Allied Activities, Kokna Youth, Tri bal Youth*

INTRODUCTION

The youth in every community is the supreme symbol of strength. They are the creative force potential however; *Kokna* youth are lagging behind in relation to other youth. Since they live in hilly, undulating, forest areas, they get limited opportunities for educational attainment. Most of the tribal youth do not go for higher education. Opportunities for vocational guidance are also limited for them. As such they have to depend on agricultural profession or seek a job of manual labour. Thus, it is necessary for them to provide technical know-how about agriculture and also to provide financial assistance for the development of agriculture. It is important to determine the present socio-economical and employment status of the tribal youth by studying their participation in farming and other allied activities. With this purpose in mind present investigation "Participation of *Kokna* youth in agriculture and allied activities" was planned and undertaken.

METHODOLOGY

The present study was conducted in Surgana tehsil of Nashik district of Maharashtra state with the objectives to study Participation of the *Kokna* youth in agriculture and allied activities. Surgana tribal tehsil was purposively selected for this study. The tehsil comprised of 191 villages of which 180 villages are tribal villages. A list of *Kokna* community villages was prepared and divided into ten groups one village from each group was randomly selected for the purpose of the study. Total 140 *Kokna* youth were selected for the study from 10 villages of by using systematic random sampling technique. An interview schedule was prepared by keeping in view the objective of the study. The data were collected by interviewing the *Kokna* youth personally contacting them during their leisure time. Collected data was processed and analyzed by using frequency, percentage, mean and standard deviation.In order to study the participation of *Kokna* youth in agriculture and allied activities sixty statements involving all the operations were developed in consultation with the experts and were included in the schedule.

RESULTS AND DISCUSSIONS

1. Participation of the *Kokna* youth in agriculture and allied activities.

Participation means the act of involving oneself in any kind of

operations. In this case participation is an activity by which the *Kokna* youth contributes in agricultural operations and allied activities by involving himself.

Table 1. Distribution of the *Kokna* youth according to their level of participation .

Sl. No.	Level of participation	Respondents (N = 140)	
		Number	Per cent
1.	Low participation (score up to 33)	29	20.72
2.	Medium participation (score 34 to 58)	90	64.28
3.	High participation (score 59 and above)	21	15.00
	Total	**140**	**100.00**

It is revealed from Table 1 that more than three-fifth (64.28per cent) of the *Kokna* youth had medium level of participation, however one-fifth (20.72 per cent) had less participation and (15.00 per cent) had more participation in agriculture and allied activities. This indicates that the *Kokna* youth had low to medium level of participation in agriculture and allied activities. The findings are in line with the Ahire, et.al. (2001).

1.1 Participation of the *Kokna* youth in preparatory tillage operations.

Table 2. Participation of the *Kokna* youth in preparatory tillage operations.

Sl. No.	Particulars about the operations	Participation (N = 140)			Mean score
		Regularly	Occasionally	Never	
A.	Preparatory tillage operations				
1.	Ploughing	80 (57.14)	45 (35.72)	15 (07.14)	1.46
2.	Harrowing	78 (55.72)	48 (34.28)	14 (10.00)	1.45
3.	Clod crushing	76 (54.28)	51 (36.44)	13 (09.28)	1.45
4.	Collection of stubbles	77 (55.00)	42 (30.00)	21 (15.00)	1.40
5.	Land leveling and bunding	62 (44.29)	42 (30.00)	36 (25.71)	1.18
	Total mean score				**1.39**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 2 revealed that majority of the *Kokna* youth regularly participated in preparatory tillage operation *viz.,* ploughing (57.14 per cent), harrowing (55.72 per cent), clod crushing (54.28 per cent), stubble collection (55.00 per cent) and leveling and bunding (44.29 per cent) . This clearly indicates that the *Kokna* youth had either occasionally or regularly participated in preparatory tillage operations. The findings are in line with the Desai, et.al. (2000).

1.2 Participation of the *Kokna* youth in seed treatment and sowing operations.

Table 3. Participation of the *kokna* youth in seed treatment and sowing operations.

Sl. No.	Particulars about the operations	Participation (N = 140)			Mean score
		Regularly	Occasionally	Never	
B.	**Seed treatment and sowing**				
1.	Seed treatment with chemicals	00 (00.00)	00 (00.00)	140 (100.00)	00.00
2.	Seed treatment with biofertilizers	00 (00.00)	00 (00.00)	140 (100.00)	00.00
3.	Dibbling of seed	00 (00.00)	00 (00.00)	140 (100)	00.00
4.	Sowing and transplanting	30 (21.42)	71 (50.71)	39 (27.87)	0.93
5.	Seedbed preparation	38 (27.14)	84 (60.00)	18 (12.86)	1.14
	Total mean score				**0.41**

(Figures in parenthesis indicate per centage to the total Kokna you)

The data from Table 3 revealed that all the *Kokna* youth never participated in the operations *viz.,* seed treatment with chemicals, seed treatment with biofertilizers and dibbling of seed. However, majority of the *Kokna* youth occasionally participated in operations *viz.,* preparation of seedbed (60.00 per cent) and transplanting (50.71 per cent). This shows that the *Kokna* youth had less participation in seed treatment and sowing operations. The findings are in line with the findings of Tanawad e (2001).

1.3 Participation of the *Kokna* youth in application of manures and fertilizers.

Table 4. Participation of the *Kokna* youth in application of manures and fertilizers.

Sl. No.	Particulars about the operations	Participation (N =140)			Mean score
		Regularly	Occasionally	Never	
C.	**Application of manure and fertilizers**				
1.	Application of manure	51 (36.43)	68 (48.57)	21 (15.00)	1.21
2.	Loading of manure	60 (42.86)	69 (49.28)	11 (07.86)	1.38
3.	Application of chemical fertilizer dose	00 (00.00)	08 (5.71)	132 (94.29)	0.05
4.	Spraying of micronutrients	00 (00.00)	00 (00.00)	140 (100.00)	0.00
Total mean score					**0.66**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 4 revealed that almost all the *Kokna* youth never participated in operations *viz.,* spraying of micronutrients (100.00 per cent) and application of fertilizer dose to crops (94.29 per cent).This indicates that the *Kokna* youth had relatively less participation in application of manures and fertilizers. The findings are in line with the findings of Furtado (2000).

1.4 Participation of the *Kokna* youth in interculturing operations.

Table 5. Participation of the *Kokna* youth in interculturing operations

Sl. No.	Particulars about the operations	Participation (N =140)			Mean score
		Regularly	Occasionally	Never	
D.	**Interculturing operation**				
1.	Weeding	80 (57.14)	53 (37.86)	07 (05.00)	1.51
2.	Hoeing	72 (51.12)	55 (36.42)	17 (12.16)	1.39
3.	Thinning	00 (00.00)	00 (00.00)	140 (100.00)	0.00
4.	Uprooting of weeds	52 (37.14)	38 (27.14)	50 (35.72)	1.01
Total mean score					**0.97**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 5 revealed that all of the *Kokna* youth never participated in thinning operations (100.00 per cent), while majority of them regularly participated in interculturing operations *viz.,* weeding (57.14 per cent), hoeing (51.42 per cent). This indicates that the *Kokna* youth had relatively medium participation in interculturing operations. The findings are in line with the findings of Sinha and Singh. (2000).

1.5 Participation of the *Kokna* youth in irrigation management practices.

Table 6. Participation of the *Kokna* youth in irrigation management practices.

Sl. No	Particulars about the operations	Participation (N=140)			Mean score
		Regularly	Occasionally	Never	
E.	**Irrigation management**				
1.	Preparation of ring basin and flat bed	35 (25.00)	81 (57.85)	24 (17.15)	1.07
2.	Irrigation for the crop	50 (35.71)	82 (55.71)	14 (08.58)	1.27
Total mean score					**1.17**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

From the Table 6 it is observed that more than half of the *Kokna* youth occasionally participated in operations *viz.,* preparation of bed for irrigation (57.85 per cent) and giving irrigation to the crop (55.71 per cent). Relatively less proportion of them regularly participated in practices related to irrigation of crops. The findings are in line with the findings of Tanawade (2001).

1.6 Participation of the *Kokna* youth in plant protection practices.

Table 7. Participation of the *Kokna* youth in plant protection practices.

Sl.No	Particulars about the operations	Participation (N =140)			Mean score
		Regularly	Occasionally	Never	
F.	**Plant protection**				
1.	Spraying of pesticides	00 (00.00)	00 (00.00)	140 (100.00)	0.00

2.	Preparation of spraying solution	00 (00.00)	00 (00.00)	140 (100.00)	0.00
3.	Crop monitoring during day time	65 (46.42)	37 (26.43)	38 (27.15)	1.19
4.	Crop monitoring during night time	00 (00.00)	40 (28.57)	100 (71.43)	0.28
Total mean score					**0.37**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 7 revealed that all of the *Kokna* youth never participated in practices related to plant protection *viz.,* spraying of pesticides and preparation of spraying solution (100.00 per cent) and majority (71.43 per cent) of them never participated in crop monitoring work during night time. However, large proportion (46.42 per cent) of them regularly participated in the work of crop monitoring during day time. This indicates that participation of the *Kokna* youth in plant protection practices was very low. The findings are in line with the findings of Suryawanshi (2002).

1.7 Participation of the *Kokna* youth in crop harvesting practices

Table 8. Participation of the *Kokna* youth in crop harvesting practices

Sl. No.	Particulars about the operations	Participation (N =140)			Mean score
		Regularly	Occasionally	Never	
G.	**Crop harvesting practices**				
1.	Harvesting of crop	113 (80.72)	26 (18.57)	01 (0.71)	1.80
2.	Tieing bundles	117 (83.57)	23 (16.43)	00 (00.00)	1.83
3.	Overhead loading of bundles	116 (82.86)	23 (16.43)	01 (0.71)	1.82
4.	Cutting of earheads	94 (67.14)	45 (32.14)	01 (0.71)	1.66
5.	Threshing	94 (67.14)	44 (31.43)	02 (1.43)	1.66
6.	Beating (separation of grains)	86 (61.43)	51 (36.43)	03 (2.14)	1.59

7.	Winnowing	91 (65.00)	46 (32.86)	03 (2.14)	1.62
8.	Sugarcane harvesting	02 (1.43)	65 (46.43)	73 (52.14)	0.49
Total mean score					**1.55**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 8 revealed that a large majority of the *Kokna* youth regularly participated in practices of crop harvesting *viz.,* tieing of bundles (83.57 per cent), overhead loading of bundles (82.86 per cent) and crop harvesting (80.72 per cent). This was followed by threshing and cutting of earheads (67.14 per cent), winnowing (65.00 per cent) and beating (61.43 per cent) *etc.* This indicates that participation of the *Kokna* youth in crop harvesting practices was high. The findings are in line with the findings of Suryawanshi (2002).

1.8 Participation of the *Kokna* youth in post harvesting practices.

Table 9. Participation of the *Kokna* youth in post harvesting practices.

Sl. No	**Particulars about the operations**	**Participation (N=140)**			**Mean score**
		Regularly	**Occasionally**	**Never**	
H.	**Post harvesting practices**				
1.	Draying of grains	78 (55.71)	52 (37.14)	10 (7.15)	1.48
2.	Storing of grains in gunny bags	71 (50.71)	57 (40.71)	12 (8.58)	1.42
3.	Control of pest on stored grains	00 (00.00)	52 (37.14)	88 (62.86)	0.37
Total mean score					**1.09**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data presented in Table 9 revealed that about two-third (62.86 per cent) of the *Kokna* youth never participated in control of pests on stored grains, while half of them were regularly participating in the work *viz.,* drying of grains (55.71 per cent) and storing of grains in gunny bags (50.71 per cent). The findings are in line with the findings of Sinha and Singh. (2000).

1.9 Participation of the *Kokna* youth in selling of agricultural produce.

Table 10. Participation of the *Kokna* youth in selling of agricultural produce.

Sl. No	Particulars about the operations	Participation (N =140)			Mean score
		Regularly	Occasionally	Never	
I.	**Selling of agricultural produce**				
1.	Cleaning	00 (00.00)	00 (00.00)	140 (100.00)	0.00
2.	Grading	00 (00.00)	00 (00.00)	140 (100.00)	0.00
3.	Filling and packing	40 (28.57)	36 (25.71)	64 (45.72)	0.82
4.	Selling	00 (00.00)	62 (44.29)	78 (55.71)	0.44
Total mean score					**0.31**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 10 revealed that all the *Kokna* youth never participated in work activities *viz.,* cleaning and grading and also a large proportion of them never participated in work activities *viz.,* selling (55.71 per cent) and filling and packing (45.72 per cent). This indicates that participation of the *Kokna* youth in selling of agricultural produce was very low. The findings are in line with the findings of Furtado (2000).

1.10 Participation of the *Kokna* youth in farm management work.

Table 11. Participation of the *Kokna* youth in farm management work.

Sl. No	Particulars about the operations	Participation (N =140)			Mean score
		Regularly	Occasionally	Never	
J.	**Farm management**				
1.	Supervision on labour	24 (17.14)	31 (22.14)	85 (60.72)	0.56
2.	Farm budgeting	00 (00.00)	18 (12.86)	122 (87.14)	0.12

3.	Farm planning	00 (00.00)	05 (03.57)	135 (96.43)	0.03
Total mean score					**0.24**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 11 revealed that most of the *Kokna* youth never participated in farm management work *viz.,* farm planning (96.43per cent), farm budgeting (87.14 per cent) and labour supervision (60.72 per cent). This indicates that the participation of the *Kokna* youth in farm management operations was very low. The findings are in line with the findings of Longananahan and Singh. (2000).

4.2.11 Participation of the *Kokna* youth in collection of forest produces.

Table 12. Participation of the *Kokna* youth in collection of forest produces.

Sl. No	**Particulars about the operations**	**Participation (N =140)**			**Mean score**
		Regularly	**Occasionally**	**Never**	
K.	**Forest produce**				
1.	Collection of Mahua fruits and flowers	00 (00.00)	21 (15.00)	119 (85.00)	0.15
2.	Collection of medicinal plants	00 (00.00)	00 (00.00)	140 (100.00)	0.00
3.	Collection of honey	00 (00.00)	50 (35.71)	90 (64.29)	0.35
4.	Collection of lac and gum	00 (00.00)	00 (00.00)	140 (100.00)	0.00
5.	Collection of timber wood and firewood	09 (06.43)	99 (70.71)	32 (22.86)	0.83
6.	Green fodder collection and selling	11 (07.86)	109 (77.86)	20 (14.28)	0.93
7.	Fishing	04 (02.85)	83 (59.29)	53 (37.86)	0.65
Total mean score					**0.41**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

From the data presented in Table 12 it is found that majority of the *Kokna* youth occasionally participated in activities of collection of forest produce *viz.,* collection and selling of green fodder (77.86 per cent), collection of timber wood and firewood (70.71 per cent) and fishing (59.29 per cent). This indicates that participation of the *Kokna* youth in collection of forest produce was low. The findings are in line with the Desai, et.al. (2000).

1.13 Participation of the *Kokna* youth in cattle management practices.

Table 13. Participation of the *Kokna* youth in cattle management practices.

Sl. No	Particulars about the operations	Participation (N =140)			Mean score
		Regularly	Occasionally	Never	
L.	**Cattle management practices**				
1.	Cattle grazing	02 (1.43)	108 (77.14)	30 (21.43)	0.84
2.	Taking animal for watering	83 (59.29)	25 (17.85)	32 (22.86)	1.36
3.	Care of animals	79 (56.43)	31 (22.14)	30 (21.43)	1.35
4.	Arrangement of fodder for animals	84 (60.00)	26 (18.57)	30 (21.43)	1.38
5.	Preparing feed mixture	13 (09.29)	77 (55.00)	50 (35.71)	0.73
6.	Milking	10 (07.14)	17 (12.14)	113 (80.72)	0.26
7.	Sale of milk	03 (02.14)	23 (16.43)	114 (81.43)	0.26
8.	Poultry	09 (06.43	88 (62.86)	43 (30.71)	0.75
9.	Goat /Sheep keeping	13 (09.28)	91 (65.00)	36 (25.72)	0.74
10.	Cleaning of byre	00 (00.00)	104 (74.28)	36 (25.72)	0.74
11.	Rabbit keeping	00 (00.00)	00 (00.00)	140 (100.00)	0.00
Total mean score					**0.76**

(*Figures in parenthesis indicate percentage to the total Kokna youth studied*)

The data from Table 13 reveals that majority of the *Kokna* youth regularly participated in the cattle management practices *viz.,* arrangement of fodder for cattle (60.00 per cent), watering of animals (59.29 per cent), care of animals (56.43 per cent). never participated in the work *viz.,* milking (80.72 per cent) and selling of milk (81.43 per cent). This indicates that participation of the *Kokna* youth in cattle management practices was medium. The findings are in line with the Ahire et.al. (2001).

CONCLUSIONS

The findings of the study revealed that the *Kokna* youth had medium level of participation in agriculture and allied activities. The *Kokna* youth were confined to manual operations like ploughing, harrowing *etc.*, and meager participation in operations involving improved farm practices like seed treatment and application of fertilizers. Participation of the *Kokna* youth was medium in practices *viz.,* post harvesting practices, inter culturing operations and cattle management practices. About irrigation management practices and collection of forest produce participation was low. Regarding selling of agricultural produce, farm management operations and plant protection the participation of the *Kokna* youth was very low. Further it was found that the *Kokna* youth had high participation in crop harvesting practices.

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RESEARCH ARTICLE

Qualitative analysis and constraints experienced by the faculty members of college of Agriculture, Pune

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ABSTRACT

In the era of privatization, number of private colleges has been started in Maharashtra and affiliated to Mahatma Phule Krishi Vidyapeeth, Rahuri to analyze the constraints experienced by the faculty members. Large proportion of manpower is engaged in teaching learning, research and extension activities in agriculture. In this context, research was conducted in College of Agriculture, Pune. Data were collected personally with help of structured interview schedule. Findings revealed that majority of faculty members had medium to low job satisfaction and achievement motivation due to certain constraints viz. delay in promotions and filling of vacant posts, engagement of teaching staff in non-technical work. Further study can be implied that university should decide the policy to fill the vacant posts in time.

Key words : Qualitative analysis, constraints, faculty, college of agriculture, Pune

INTRODUCTION

Education is the process of transformation of human into social, moral and spiritual being by producing desirable changes in the behaviour. Education humanizes humanity and makes life progressive, cultured and civilized. Every educational institution is recognized by its potential and capable human resource than its infrastructure, physical facilities hence development of human resource is the key factor for determining the institutional prosperity.

Agricultural education is different from that of general education and the main purpose of agricultural universities is to produce human resources for rural development in general and agricultural and allied sector in particular. Developed human resource play a significant role to meet the challenges of agriculture and add value to the agricultural economy and

agricultural transformation. The purpose of the education is not only confer the degrees but also enable the student to follow agriculture per suite as and when necessary and try to solve problems, which can assist agricultural development.

At present, agricultural education system of India is one of the largest systems in the world. In the era of privatization, number of private colleges has been started in Maharashtra and affiliated to *Mahatma Phule Krishi Vidyapeeth, Rahuri.* Large proportion of manpower is engaged in teaching learning, research and extension activities in agriculture. To cope with the present challenges and changing needs of agriculture, the role of teacher is very significant. In this context, research was conducted in College of Agriculture,Pune which is one of the important constituent college of Agril. University.

The present study was undertaken with the important objectives *viz.,* to analyze the educational profile of faculty members and to identify constraints faced and suggestions made by them for improving teaching at college level.

METHODOLOGY

Present study had been purposively conducted in the College of Agriculture, Pune, wherein under graduate B.Sc (Agri.), B.Sc.(Hort.) and post graduate M.Sc.(Agri.) and M.B.A(Agri.) instructional programmes are being undertaken. College of agriculture, Pune has ten sections *viz.,* Agronomy, Botany, Entomology, Horticulture, Plant Pathology, Soil Science and Agricultural Chemistry, Agricultural Engineering, Extension Education, Agricultural Economics (Including Statistics and Computer Science). The faculties being engaged in under graduate as well as post graduate teaching are considered as sample for the study .A detailed list of the teaching staff along with their discipline was obtained from the office of the Associate Dean, from the list it is observed that total 51 faculty members are engaged in teaching. Exploratoty and analytical research design was used for the present investigation. Data were collected personally with help of structured interview schedule, out of 51 members 45 were responded within stipulated time, so their responses were considered. Data were tabulated and analysed for obtaining the results.

FINDINGS

Personal, educational and psychological characteristics of the faculty members

Personal characteristics

Table 1. Personal characteristics of the faculty members

Sr. No. A	Age category	Respondents	
		Number	Percentage
1	Young (Upto 35 years)	9	20.00
2	Middle (36 to 50 years)	31	68.89
3	Old (Above 50 years)	5	11.11
		Mean =46.73	SD = 7.57
B	Sex	Number	Percentage
1	Male	35	77.78
2	Female	10	22.22
	Total	45	100

Data presented in Table1 indicates that majority (68.89 per cent) of the faculty members were belonged to middle age group i.e.36 to 50 years followed by one fifth (20.00 per cent) were in young age group i.e. upto 35 years and only 11.11 per cent were in the old age group i.e. above 50 years. Thus it can be concluded that majority (88.89 per cent) members belonged to middle to young age group, this might be due the reason that majority of the faculty members might have joined university services at the same time .

Data shown in table 1 reveals that more than three forth (77.78 per cent) members were male and 22.22 per cent members were female faculties engaged in teaching might be due to recruitment procedure and establishment pattern of the university.

Professional characteristics

Table.2 Professional characteristics of the faculty members

Sr. No.	**Particulars**	**Standard**	**Respondents**	
A	**Educational Qualification**		**Number**	**Percentage**
1	M.Sc.(Agri.)	12+4+2=18	11	35.56
2	Ph.D.	12+4+2+3=21	34	64.44
B	**Service Experience**			
3	Low (Less than 8 yrs.)		10	22.22
4	Medium (9 to 22 yrs.)		27	60.00
5	High (Above 22 yrs.)		8	17.78

		Mean=15	**S.D.= 6.95**
C	**Teaching Experience**		
6	Low (Upto 5 years)	4	8.89
7	Medium(6-10 years)	24	53.33
8	High(Above11years)	17	37.77
	Total	**45**	**100**
		Mean=8	**SD=2.93**

The data from the table 2 revealed that more than three fifth (64.44 per cent) of the teachers completed doctorate degree in respective subjects whereas 35.56 per cent of them finished Master of Science in Agriculture which is minimum eligibility criteria for university services. Similar findings were recorded by Potawade (2012).

Data pertaining to service experience revealed that three fifth (60.00 per cent)of respondent teachers were having medium (09 to 22 yrs.) service experience followed by 22.22 per cent and 17.78 per cent respondent teachers were having low (less than 8 yrs)and high (above 22 yrs.) total service experience respectively. Majority (80.22 per cent) had medium to low service experience might be due to their age group and might have joined university services at same time. Similar findings were recorded by Brahmankar (2008), Tayade *et al* (2011).

Further data revealed that more than half (53.33 per cent) of respondent teachers were having medium (6 to 10 yrs.) total teaching experience followed by 37.77 per cent respondents teachers were having high and 8.89 per cent had low teaching experience respectively. Thus overwhelming majority (91.10 per cent) were having medium to high experience of teaching might be due the reason that they have directly engaged in teaching work immediately after joining the services.

Participation of the faculty members in HRD Programmes

Human resource development is an important aspect for imparting quality instructions to the students and thereby developing their capabilities. Data pertaining to participation of faculty members in HRD programs is presented in Table 3 states that more than half(57.78 per cent) teachers attended training programmes up to 5

organised at national level followed by 46.67 per cent undergone International trainings upto 5. Nearly half (48.89 per cent) attended 6to 10 trainings organized at university level and also workshops organized at national level. Whereas majority(60.00 per cent) of them attended International level workshops, equal per cent (46.67 per cent) of members attained state and university level workshops.

Data further revealed that equal members (62.22 per cent) preferred to attend conference and seminars up to 5 organised at national level . Also 53.33 per cent attended state level conferences and 48.89 per cent attended state level seminars. This programm es help to develop professional efficiency of members and also to fulfill the API score members might have undergone HRD programmes.

Table 3. Participation of the faculty members in HRD Programmes

Sr. No.	Category	Training				Workshop			
		IN	N	S	U	IN	N	S	U
1	Not Attended	16 (35.56)	4 (1.8)	0 (00.00)	0 (00.00)	14 (31.11)	4 (1.80)	2 (4.46)	0 (00.00)
2	Upto 5	21 (46.67)	26 (57.78)	18 (40.00)	19 (42.22)	27 (60.00)	22 (48.89)	16 (35.55)	21 (46.67)
3	6 to 10	6 (13.33)	12 (26.67)	22 (48.89)	18 (40.00)	4 (8.89)	12 (26.67)	21 (46.67)	18 (40.00)
4	Above 10	2 (4.46)	3 (6.67)	5 (11.11)	7 (15.55)	2 (4.46)	3 (6.67)	6 (13.33)	7 (15.55)
5	Total	45	45	45	45	45	45	45	45
	Category	Conference				Seminar			
		IN	N	S	U	IN	N	S	U
6	Not Attended	22 (48.89)	8 (17.78)	3 (6.67)	0 (00.00)	20 (44.44)	4 (8.89)	2 (4.46)	0 (00.00)
7	Upto 5	19 (42.22)	28 (62.22)	24 (53.33)	18 (40.00)	21 (46.67)	28 (62.22)	18 (40.00)	18 (40.00)
8	6 to 10	4 (1.8)	6 (13.33)	16 (35.55)	19 (42.22)	3 (6.67)	10 (22.22)	22 (48.89)	19 (42.22)
9	Above 10	0 (00.00)	3 (6.67)	2 (4.46)	7 (25.55)	1 (2.22)	3 (6.67)	3 (6.67)	7 (15.55)

*** IN – international, N- National, S – State, U- University**

Table 4. Use of teaching aids by the faculty members

Sr. No.	Teaching aids used	Frequency of use		
		Always	Sometimes	Never
1.	Chalk and Black board.	23 (51.11)	15 (33.33)	07 (15.55)
2.	Charts/ Models.	19 (42.31)	13 (28.88)	13 (28.88)
3.	Video Clips/ Documentaries.	7 (15.55)	02 (4.44)	36 (80.00)
4.	Posters.	5 (11.11)	26 (57.77)	14 (31.10)
5.	Computer aided lectures.	5 (11.12)	11 (24.43)	29 (64.44)
6.	LCD.	36 (80.00)	07 (15.55)	02 (04.43)
7.	Interactive classroom.	02 (04.44)	09 (20.00)	34 (75.54)

Teaching aids used by the faculty members

Data regarding teaching aids used by the teachers revealed that majority of the respondents(80.00 per cent) were always using LCD projector followed by chalk and black board (51.11 per cent) as conventional aid and 42.31 per cent were using charts /models for classroom teaching. Whereas there was mere use of Interactive classroom(4.44 per cent), computer aided lectures(11.12 per cent), video clips or documentary(15.55 per cen). This might be due stipulated time limit for conducting the class as well as completion of syllabus and multitasking role of the teachers.

Psychological characteristics of the faculty members

The data from table 5.indicated that 60.00 per cent of faculty members have medium achievement motivation, 22.22 per cent of faculty members were observed to have low achievement motivation, while only 17.77 per cent faculty members were having high achievement motivation. medium to low achievement motivation might be due to their age group and other family respossibilities.

This finding is in line with the findings Potawade (2012).

The data regarding job satisfaction indicated that 73.36 per cent of the respondent teachers have expressed medium job satisfaction, followed by 13.40 per cent and13.34 per cent of the respondent teachers were having high and low job satisfaction respectively. This might be due to stress and overburden of work due to vacant position in college.

The findings are in agreement with the findings of Laharia (2007).

Table 5. Distribution of teachers according to their psychological characteristics.

Sr.No. A	Achievement motivation	Frequency (N=45)	Per cent
1	Low (Up to 12)	10	22.23
2.	Medium (13 to 19)	27	60.00
3.	High (Above 19)	8	17.77
		Mean = 16	**S.D.= 3.77**
B	**Job satisfaction**		
4.	Low (Upto 5)	6	13.32
5	Medium (6 to 11)	33	73.36
6	High (Above 11)	6	13.32
		Mean = 08	**S.D.= 2.78**
C	**Workload/week**		
7	Low (up to 19hrs)	00	00
8	Medium (20 to 41hrs)	39	86.67
9	High (above 41hrs)	6	13.33
	Total	**45**	**100**
		Mean= 30	**SD =11.24**

The distribution of respondents according to workload presented in Table 5 indicates that (86.67%) of the respondents had medium workload followed by 13.33 per cent with high workload. The respondents with low workload were only 00 percent. The mean workload was observed to be 30 hours \ week which includes all activities. This might be due to vacant posts in colleges.

Table 6. Respondents ranking on various activities performed by them as per mean Indices of work load

Sr. No.	Work items	Ranking Hrs./ week	
		Mean index	Rank
1	Teaching	25.00	I
2	Research	3.00	II
3	Extension	2.00	IV
4	Administration	6.00	III

The distribution of respondents according to various activities performed by them and ranking of work items as per mean indices has been presented in Table 6. The majority of the respondents had Teaching workload with mean index of 25 hours

/ week followed by Research workload with mean index 3.00 hours / week. The mean indices for work items Extension and Administration were 2 and 6 hours / week respectively.

Constraints faced by the faculty members

Table 7 Constraints expressed by the respondents

Sr. No.	Constraints faced	Respondents (N=45)		Rank
		Number	Percentage	
1.	Lack of Internet facility and poor network	19	42.22	IX
2.	Lack of opportunities for updating the knowledge	40	88.89	III
3.	Subjects allotted for teaching change frequently	15	33.33	X
4.	Heavy strength of students in theory class	35	77.78	IV
5.	Lack of operating skills of modern teaching aids	35	77.78	IV
6.	Insufficient time to complete the syllabus	30	66.67	V
7.	No separate faculties for Undergraduate and Postgraduate teaching	35	77.78	IV
8.	Mostly, subject related Journals, periodicals, documentaries are not available in the library	15	33.33	X
9.	Lack of guidance from superiors	20	44.44	VIII
10.	Delay in promotions and recruitment of vacant post by the university.	44	97.78	I
11.	Improper maintenance of available teaching aids	28	62.22	VII
12.	Most of time engaged in non-technical work	42	93.33	II

The per cent for each constraint was worked out and based on this rank was assigned to each constraint.The major constraintts expressed by members were delay in promotions and filling of vacant post by

the university (97.78 per cent), most of time engaged in non-technical work (93.33 per cent),Lack of opportunities for updating the knowledge (88.89 per cent) with I II and III rank respectively. Also heavy strength of students in theory class(77.78 per cent), Lack of modern teaching aids and their operating skill(77.78 per cent), no separate staff for undergraduate and Postgraduate teaching were assigned IV rank.s Similar constraints were reported by Pankaj kumar and Prabhjot Kaur(2015) and Bhatt *et al.*(2011).

Suggestions expressed by the members

Table 8. Suggestions expressed by the members

Sr. No.	Suggestions	Respondents (N=45)		Rank
		Number	Per cent	Assigned
1	Individual Internet access should be provided to the faculties.	38	84.89	IV
2	Faculties should be exposed and trained to advanced teaching techniques	40	88.89	III
3	Strength of students should not exceed 50 in a theory class	40	88.89	III
4	To acquire command, subjects allotted for teaching should not be changed frequently	15	33.33	VIII
5	Separate Staff should be provided for Under graduate and Post Graduate Programme	32	77.78	V
6	Duration of the semester be matched with the syllabus	20	44.45	VII
7	The superiors should regularly guide their subordinates	33	75.56	VI
8	Timely post filling and promotions be followed by the university to minimize the workload	44	97.78	I
9	Teaching staff should not be engaged in non-technical work	43	95.55	II

The suggestions given by the members in Table-8 revealed that, timely post filling and promotions be followed by the university to minimize the workload (97.78%), Teaching staff should not be engaged in non-technical work (95.55), Faculties should be exposed and trained to advanced teaching techniques (88.89%) strength of students should not exceed 50 in a theory class (88.89%) with I,II ,III and IV ranks respectively in descending order as per their importance.

CONCLUSION

It is always the justified concern of every organization to strive to improve the performance of their employees with to increase its efficiency. One way to enhance the performance of the employees is to know their qualities to contribute the performance and to overcome the problems hindering their performance.Study can be concluded that majority members belonged to middle age group, completed doctorate degree with medium (9-22 yrs) service experience and attended seminars ,workshops, trainings for improving their professional efficiency. Mostly they are using modern as well conventional teaching aids for classroom teaching and had medium to low job satisfaction and achievement motivation due to certain constraints *viz.* delay in promotions and filling of vacant posts, engagement of teaching staff in non-technical work. Further study can be implied that university should decide the policy to fill the vacant posts in time. Also faculties should be exposed and trained to advanced teaching techniques for better teaching output by the teachers.

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RESEARCH ARTICLE

Assessing Livelihood Variation among Smallholders Practising Integrated Farming Systems in Tribal Areas of Maharashtra

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ABSTRACT

In India, smallholder farmers are contributing 78% to the total production but weak in terms of generating adequate income and sustaining their own livelihood. This article analyses the variation in livelihood of smallholders practicing different integrated farming systems. An Integrated Livelihood Security Index (ILSI) was developed for assessing livelihood of smallholders in tribal areas of Maharashtra. ILSI based livelihood analysis revealed that 35.84% of the smallholders had high (0.74-0.76) level of livelihood security followed by medium (0.70-0.73) level of livelihood security (40.41%).There was wide variation in livelihood dimensions especially in food security, economic security and health security of smallholders. The smallholder farmers who integrated livestock enterprises with crop had better economic security and their livelihood wasim proving. The 'Z' values 7.25 and 6.87 demonstrated that there was significant difference in livelihood of smallholders who were practicing dairy+goatary and dairy+poultry enterprise integration, respectively. ILSI also assessed the dimensions of livelihood security which required immediate attention and also identified the farm enterprises needs to target in the policy initiatives for sustaining the livelihood of smallholder tribal farmers.

Key words: Agricultural security, Food security, Integrated farming systems, Livelihood, Smallholder, Tribal

INTRODUCTION

In India, agriculture is a source of livelihood for the majority but the declining trend in average agricultural land holding poses a serious threat to the profitability and sustainability of farming. The average size of the landholding has declined to 1.1 ha

during 2010-11 from 2.28 ha in 1970-71. If this trend continues, the average size of holding in India would be mere 0.68 ha in 2020, and would be further reduced to 0.32 ha in 2030 (Agriculture Census 2010).As per estimates, more than 95% of the holdings will be under the category of small and marginal in 2050 (APCAS 2010). In India, smallholders are major contributors to the total production (78%) but weak in terms of generating adequate income and sustaining their own livelihood. In Maharashtra, 80% of farmers are smallholders. Hence, the livelihood of smallholder farmers is the major concern today.

In the tribal district of Maharashtra, the livelihood of small holder sismostly depends on the forestand monsoon. Hence, they used to migrate for getting employment to nearby cities (Surat and Mumbai) from post-kharif to pre-kharif season (Baseline survey report 2009). In fact, our past experience has also evinced that the income from cropping alone is hardly sufficient to sustain the smallholder's livelihood. Hence, it is imperative to promote integration of different farm enterprises by considering existing socio-economic condition of smallholder tribal farmers for adequate employment and income generation round the year. Under the gradual shrinking of land holding, there is need to integrate complementary farm enterprises requiring less space, optimum input and give more return. By visualising this, under National Agricultural Innovation Project (NAIP)the integration of land based enterprises like vegetable cultivation, floriculture, goatary, poultry, apiary, forestry, fishery etc. with cropping was promotedto make farming more profitable and sustain livelihood of farmers in backward districts of India.

A realisation of how the integration of different farm enterprises with cropping contributes to generate additional income and employment for smallholders in tribal areas of Maharashtra might encourage such policy initiatives which can lead to improved and sustained livelihood. Therefore, the study was undertaken to examine the different integrated farming systems practiced by smallholders and to assess the variation in their livelihood aiming to address their livelihood security being improved through integrated farming systems.

METHODOLOGY

The Maharashtra state was purposively selected for the study. Out

of eleven backward districts of Maharashtra identified by the Planning Commission of India, Integrated Farming System (IFS) approach under NAIP was implemented in five districts. Out of five districts, two districts (Ahmadnagar and Nandurbar) were selected randomly. All four village clusters formed under NAIP namely Devthan, Samsherpur (Ahmadnagar) and Mandane Khandbara (Nandurbar) were taken for the study. These four clusters were predominantly occupied by tribal farmers. Total six integrated farming systems were identified in the study area through participatory rural appraisal. The sample of 240 small holder farmers (<5 acres of land holding) was drawn from the identified farming systems by proportionate random sampling method.

For analysing variation in livelihood of smallholders, we developed Integrated Livelihood Security Index (ILSI). It is characterised by seven dimensions of livelihood security identified through available literature scan and selected for the study in consultation with social scientists, farming system experts and livelihood experts (Anil *et al.* 2008,Smitha2005,Diener 1995and Edwards 1957). These were prioritised according to their significance by following Normalized Rank Order Method suggested by Guilford (1954).The scale values (R_c)of respective dimensions were obtained and presented in Table 1. All the dimensions ILSI are not measured directly and thus, relevant indicators required to assess them were collected from available literature and considered for the study in consultation with experts from the relevant fields. Finally, the indicators were retained in the final ILSI according to their relevancy weightage and mean relevancy score. The set of various statements was prepared under each indicator in the form of structured interview schedule for final data collection from the respondents.

Computation of the composite ILSI

Each dimension of ILSI consists of number of indicators and hence, their range of total scores was different. Therefore, the total score of each dimension was converted into unit score by using the formula as given below,

$$U_{ij} = \frac{Y_{ij} - \text{Min } Y_{ij}}{\text{Max } Y_{ij} - \text{Min } Y_{ij}}$$

Where,

U_{ij} = Unit score of the i^{th} respondents on j^{th} dimension

Y_{ij} = Value of the i^{th} respondent on the j^{th} dimension

Max Y_j = Maximum score on the j^{th} dimension

Min Y_j = Minimum score on the j^{th} dimension

Thus, the score of each dimension range from 0 to 1 i.e. when Y_{ij} is minimum, the score is 0 and when Y_{ij} is maximum the score is 1. Then, the unit scores of each respondent was multiplied by respective scale value of the each dimension and summed up. Thus, the score obtained was divided by the sum of scale values in order to get the ILSI for each respondent.

Where,

$ILSI_i$ = Integrated Livelihood Security Index of i^{th} respondent

U_{ij} = Unit score of the i^{th} respondent on j^{th} component

S_j = Scale value of the j^{th} component

Σ =Sum

The status of respondent's livelihood security was calculated based on the total index score of all the indicators of respective dimensions. The respondents were grouped into the categories of very low, low, medium, high and very high livelihood security status by cumulative square root of frequency method. The correlation analysis was used for identifying the relationship between profile variables and livelihood status of smallholder tribal farmers. Further, 'Z' test was used for comparing means of ILSI and its dimensions between different combinations of enterprises. The statistical analysis was done with the help of computer software, namely MS-Excel Spread Sheet and SAS.

RESULTS AND DISCUSSION

Livelihood security is a multifaceted attribute consisting of a number of dimensions. In the present study an attempt was made to assess the livelihood variation among smallholders practicing different integrated farming systems.It also identified the dimensions which were significantly contributing to the livelihood of smallholders in tribal areas of Maharashtra.

Existing IFS in the study area

The different IFS practised by tribal farmers were identified through participatory rural appraisal were Crop (C) + Dairy (D) + Horticulture (H), C + Goatary (G) + H, C + D + G + H, C + D + Forestry (F) + H + Poultry (P), C + F + G + H + P and C + D + F + G + H + P. It was observed that tribal farmers were more concern towards integration of different farm enterprises especially livestock on their farm to sustain their

income and livelihood round the year. In Samsherpur and Devthan clusters, C+D+H and C+D+G+H farming systems were dominant. Onion, tomato, wheat and bajra were major crops. Animal breeds in these clusters were *Holstein Fresian* and Jercy (Cross breds), Dangi (Desi cow), Sangamneri and Osmanabadi (Goat), Murrah (Buffalo), and Giriraj (Poultry). Pomogranate and teak cultivation were more popular among the farmers. In Mandane and Khandbara clusters, C+G+H and C+F+G+H+P farming systems were dominant. Cotton, paddy, wheatandsorghum were major crops. Local cows (Non-descript), Murrah and Surti (Buffalo), Osmanabadi (Goat) and Giriraj (Poultry) were major animal breeds. Guava, mango and bamboo cultivation were more popular among the farmers. Goat farming was more popular in the study area as compared to dairy farming due to lack of milk procurement facilities and high cost of improved milch breeds. The average animal holding desi cows was more (3) followed by buffalo (0.75) and crossbreds (0.50). In case of goatary and poultry, respondents had average 9 goats and 10 poultry birds in their herd.

Profile of tribal IFS farmers

The detailed analysis of profile of smallholder tribal farmers shows that 46.67% of farmers were young (<35 years) followed by middle(36-50 years) aged (41.25%) and old (>50 years) aged (12.08%). About 32.50% of farmers had middle school education followed by high school education (21.67%), higher secondary school (15%) and graduation (6.66%). It was also satisfying to note that only 5% of farmers were illiterate. About 56.67% of farmers had low dependency ratio followed by medium (23.75%) and high (19.58%) dependency ratio. About 41.67% of the tribal farmers possessed a land holding <2.5 acres followed by 2.6-3.5 acres (37.08%) and 3.6-5 acres (21.25%) of land holding. About 72.92% of farmers had high extension participation followed by medium (17.92%) and low (9.16%) extension participation. About 44.58% of farmers had low access to the market facilities followed by medium (40.84%) and high (14.58%) access to the market facilities. The sizable number (55%) of respondents belonged to low technology utilisation followed by medium (28.33%) and low (16.67%)technology utilisation. About 83.80% of farmers had high economic

motivation followed by medium (13.33%) and low (5.84%)economic motivation. About 56.24% of farmers had low managerial ability followed by medium (27.92%) and high (15.84%)managerial ability. About 55.01% of farmers had high employment generation followed by medium (30.83%) and low (14.16%) employment generation. About 39.17% of farmers had high income generation followed by medium (35.83%) and low (25%) income generation.

Relative performance of ILSI and its dimension indexes under different IFS

The variation in livelihood and its dimensions under different IFS is presented in Tables2 and 3. The index value towards 0 indicated weakand towards 1 indicated strong livelihood status of smallholders. About 35.84% of the tribal farmers had high level of livelihood status followed by medium level of livelihood status (40.41%). It was satisfying to note that only 8.75% of tribal farmers had low to very low level of livelihood status (Table 2).The trend in livelihood variation under different IFS shows that the livelihood status was high with the every additional integration of farm enterprise (Figure 1).The livelihood of farmers adopted C+D+F+G+H+P farming system(0.77) was more secured as compared to other IFS having less farm enterprise integration. This might be due to optimum utilisation of available resources through effective input recycling which reduced input cost and generated additional income and employment with every additional integration of farm enterprise leads significant reduction in the migration of farmers to nearby cities for getting employment. Similar findings also reported by Jayanthi*et al.* (2009) concluded that integrated farming systems for different farm situations enhances productivity and profitability through recycling of crop and animal waste as well as contributes to additional income and employment generation for small and marginal farmers thus leading to reduction in their migration.

The C+D+G+H and C+F+G+H+P farming systems adopted by tribal farmers lead to same ILSI value (0.73). It shows that these combinations of farm enterprises providing equal opportunities to improve livelihood status. Hence, the tribal farmers who are unable to adopt dairy farming can integrate forestry and poultry with crop farming for sustaining their livelihood. The C+D+ H and C+G+H farming systems adopted by tribal

farmers lead to same ILSI value (0.71). It depicts that in case of fodder scarcity and lack of milk procurement facilities, farmers can adopt goatary with crop farming for sustaining their livelihood. The mean food security index values were also quite high in the farming systems having integration of dairy, poultry and horticulture systems (0.87 & 0.84). The agricultural security index value (0.61)demonstrated the poor crop and animal productivity which leads to less income generation. There was significant gap between the actual yield and potential to yield in major crops in the study area. This might be due the low technology utilisation, low managerial abilities, low market access and lack of training among the farmers. The overall infrastructure security index value 0.66 also demonstrated that there were weak infrastructure facilities (Table 3). The better infrastructure facilities at household and village level may increase production efficiency of tribal farmers. Hence, infrastructure facility and agricultural development at village level should give prime importance for sustaining livelihood of smallholders in tribal areas of the state.

Comparison of ILSI and its dimensions between different combinations of enterprises

The 'Z' value 5.28 demonstrates significant difference in livelihood status of tribal farmers practicing dairy based and non-dairy based IFS. Similarly the 'Z' values 4.64, 2.24 and 3.49 also depicts that there was significant difference in food security, economic security and health security status tribal farmers adopting dairy based and non-dairy based IFS, respectively. This might be due to milk consumption helps to improve the health status and complete nutritional requirements as possible. Because milk is great source of all major nutrients which provides better immunity against many diseases. It saves money by reducing medical expenditure (See Table 4 and Figure 2A).

The 'Z' value 7.25 shows significant difference in livelihood status of tribal farmers who adopted dairy-goatary based IFS and non dairy-goatary based IFS. The 'Z' values 4.25, 4.11 and 3.11 represent the significant difference in food security, economic security and health security status of dairy-goatary based and non dairy-goatary based IFS farmers, respectively. This might be due to the fact that milk was the great source of food as well as daily income for small and marginal farmers. The goat farming also requires less input which are easily affordable to

resource poor farmers but provides more income. Both the enterprises are complementary to each other (See Table 4 and Figure 2B).

The 'Z' value 6.87 demonstrates significant difference in livelihood status of tribal farmers who adopted dairy-poultry based IFS and non dairy-poultry based IFS. The 'Z' values 6.03, 4.86, 2.13, 3.02, 3.71 and 2.54 been evidence for the significant difference in food security, economic security, agricultural security, health security, social security and environmental security status of smallholders practicing dairy-poultry based IFS and non dairy-poultry based IFS, respectively. This might be due to the fact that milk and poultry products (eggs and chicken) were the good source of food and nutritious diet for the small and marginal farmers which ensure their food and nutritional security. Backyard poultry requires fewer inputs, less space and provides additional income source to resource poor farmers which ensures their economic security. The wastage (dung and poultry excreta) from dairy and poultry farming could be the great source of nutrients to the crops and recycling of the wastage through biogas provides sustainable energy source to the farm family and ensures environmental security. The income generated through dairy-poultry based farming systems leads to improved standard of living which provides prestige and respect to the farmers in the society.(See Table 4 and Figure 2C).

There is no significant difference in livelihood status of tribal farmers who adopted dairy-poultry based IFS and dairy-goatary based IFS. Hence, the promotion of either dairy-poultry or/and dairy-goatary based integrated farming systems in the tribal areas needs special attention in the development initiatives for reducing farm vulnerability and sustaining livelihood of tribal farmers (See Table 4 and Figure 2D).

Relational analysis of profile of tribal farmers with their livelihood security

Correlation coefficient analysis was employed to identify the relationship of profile characteristics of tribal farmers with their livelihood security status. The positively significant correlation coefficients indicated their positive influence on livelihood status of tribal farmers and vice-versa. The correlation coefficients are presented in Table 5, which shows education, economic motivation and managerial ability had positive and significant ($p<0.05$) influence on

livelihood status. Similarly, technology utilisation, employment generation and income generation had positive and significant ($p<0.01$) influence on livelihood status. The similar findings were also reported by Ugwumba*et al.* (2010).Dependency ratio had negative and significant ($p<0.05$) influence on livelihood status.In contrary to the prior expectation, variables like age, land holding, extension participation, market access and animal holding were not having significant influence on livelihood status of tribal farmers. It suggests that emphasis has to be laid upon promotion of modern technologies, impart training and additional employment and income generation through integration of suitable farm enterprises.

CONCLUSION

ILSI as a composite index of its seven dimensions of food security, economic security, agricultural security, health security, social security, infrastructure security and environmental security works as a powerful policy tool for assessing the livelihood conditions of smallholders in order to develop suitable strategies. The food, economic and health security of tribal farmers found significantly different who had integration of dairy, goataryand poultry enterprises which implicated the significance of targeting such enterprises in development initiatives. The agricultural and infrastructural securities were found weak in the study area. Hence, improving agricultural and infrastructural status should be given prime importance in the development initiatives of the state. The majority of farmers were found young aged who practicing different IFS which reduced their migration for getting employment to great extent. Hence, the implementation of IFS approach in tribal areas could attract and retain youth in agriculture to great extent.

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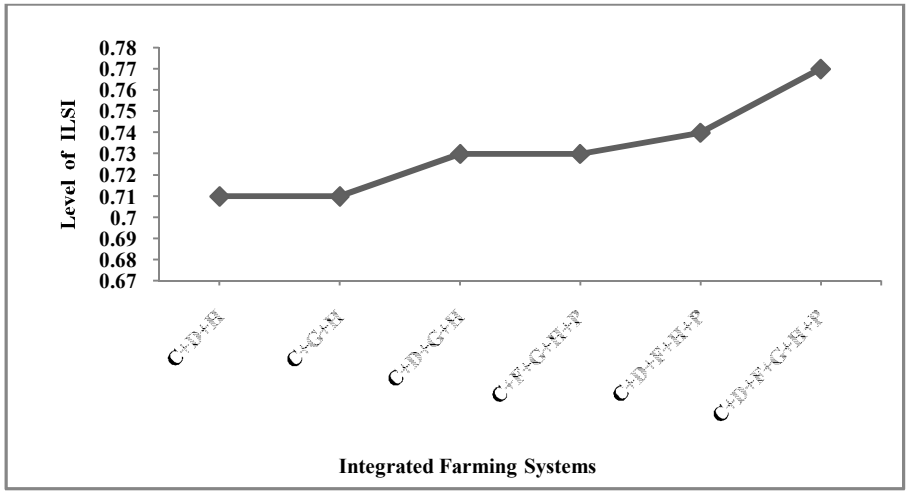

Fig.1 Mean ILSI under different IFS

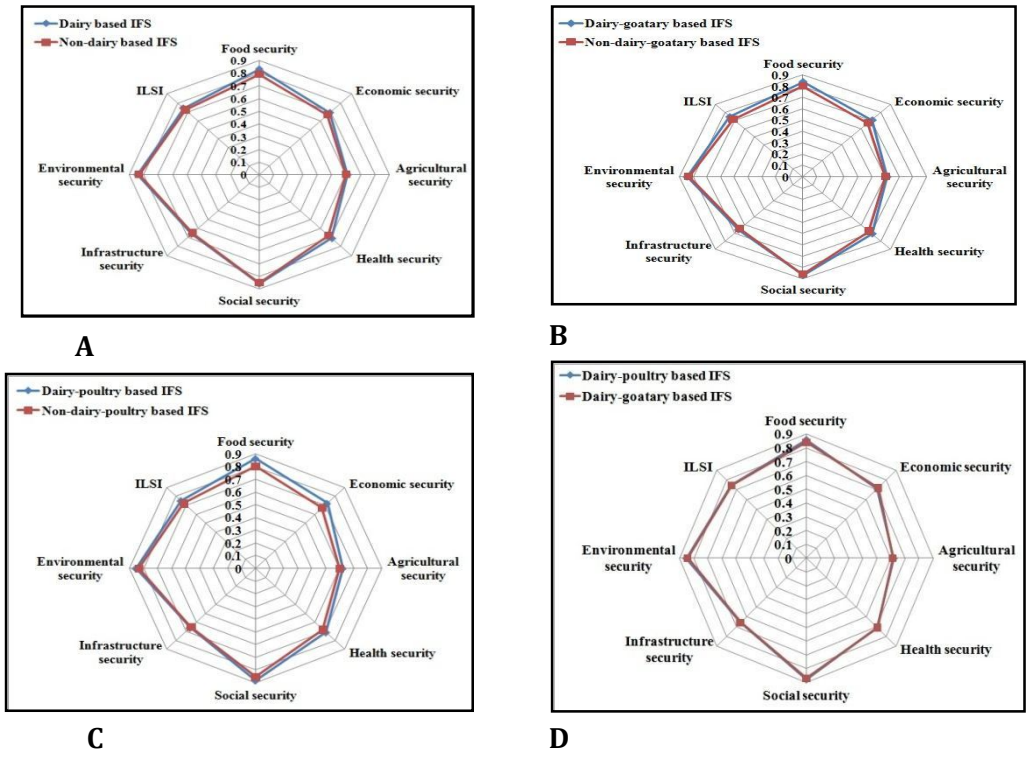

Fig.2 Comparison of ILSI and its dimensions between different combinations of IFS enterprises

Table 1 : The scale values obtained for seven dimensions of ILSI

Dimensions of ILSI	Scale values (R_c)
Food security	6.93
Economic security	6.63
Agricultural security	6.50
Health security	6.03
Social security	5.30
Infrastructure security	4.87
Environmental security	4.74

Table 2: Status livelihood security level of smallholders under different IFS

Livelihood status	Integrated farming systems						Overall
	C+D+H	C+G+H	C+D+G +H	C+F+G +H+P	C+D+F +H+P	C+D+F+ G+H+P	
Very low (Up to 0.67)	2 (0.83)	3 (1.25)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	5 (2.08)
Low (0.68-0.69)	1 (0.42)	11 (4.58)	0 (0.00)	4 (1.67)	0 (0.00)	0 (0.00)	16 (6.67)
Medium (0.70-0.73)	20 (8.33)	25 (10.42)	18 (7.50)	20 (8.33)	9 (3.75)	5 (2.08)	97 (40.41)
High (0.74-0.76)	2 (0.83)	16 (6.67)	26 (10.83)	19 (7.92)	19 (7.92)	4 (1.67)	86 (35.84)
Very high (> 0.76)	0 (0.00)	0 (0.00)	4 (1.67)	5 (2.08)	8 (3.33)	19 (7.92)	36 (15.00)

C- Crop; D- Dairy; F- Forestry; G- Goatary; H- Horticulture and P- Poultry

Figures in parenthesis indicate percentage

Table 3 Integrated farming system wise variation and ranking of ILSI and its dimensions

Integrated farming systems	Food security		Economic security		Agricultural security		Health security		Social security		Infrastructure security		Environmental security		ILSI	
	Index value	Rank	Index value	Rank	Index value	Rank	Index value	Rank	Index value	Rank	Index value	Rank	Index value	Rank	Index value	Rank
C+D+H	0.78	6	0.64	6	0.57	5	0.68	3	0.85	4	0.65	3	0.82	4	0.71	4
C+G+H	0.79	5	0.65	5	0.59	4	0.68	3	0.85	4	0.65	3	0.81	5	0.71	4
C+D+G+H	0.82	3	0.69	3	0.60	3	0.71	2	0.85	4	0.66	2	0.83	3	0.73	3
C+F+G+H+P	0.80	4	0.68	4	0.62	2	0.68	3	0.86	3	0.66	2	0.84	2	0.73	3
C+D+F+H+P	0.84	2	0.70	2	0.62	2	0.71	2	0.87	2	0.65	3	0.84	2	0.74	2
C+D+F+G+H+P	0.87	1	0.75	1	0.63	1	0.72	1	0.89	1	0.68	1	0.85	1	0.77	1
Overall	0.81		0.69		0.61		0.70		0.86		0.66		0.83		0.73	

Table4 Comparison of ILSI and its dimensions between different combinations of IFS enterprises

ILSI & its dimensions	**'Z' values**			
	Dairy based IFS*Vs* Non-dairy based IFS	**Dairy-goatary based IFS*Vs* Non-dairy-goatary based IFS**	**Dairy-poultry based IFS*Vs* Non-dairy-poultry based IFS**	**Dairy-poultry based IFS*Vs* Dairy-goatary based IFS**
Food security	4.64*	4.25*	6.03*	1.92
Economic security	2.24*	4.11*	4.86*	0.86
Agricultural security	1.23	1.13	2.13*	0.97
Health security	3.49*	3.11*	3.02*	0.00
Social security	1.43	1.31	3.71*	1.05
Infrastructure security	1.67	1.53	1.45	0.00

Environmental security	1.47	1.34	2.54*	1.30
ILSI	5.28*	7.25*	6.87*	0.00

*Significant at 5% level

Table 5 Relationship of profile variables with livelihood status of tribal farmers

Profile variables	'r' values
Age	0.11
Education	0.13*^
Dependency ratio	- 0.15*
Land holding	- 0.05
Extension participation	0.10
Market access	0.05
Technology utilisation	0.18**
Economic motivation	0.14*
Managerial ability	0.15*
Employment generation	0.30**
Income generation	0.17**
Animal holding	0.01

*Correlation is significant at the 5% level

**Correlation is significant at the 1% level

^Spearman correlation coefficient

RESEARCH ARTICLE

Extent of benefits obtained from Agricultural Polyclinic activities by the beneficiary respondents

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ABSTRACT

The present study was undertaken in Parbhani, Nanded and Osmanabad districts of Marathwada region with specific objectives; to assess the knowledge of respondents about extension activities of Agricultural Polyclinic and to study the extent of benefits availed by the beneficiary respondents from it. Total number of sample comprised of 150 beneficiary respondents. The results revealed that majority (70.00 %) of the respondents were having medium level of knowledge. Out of nine beneficial activities/practices, the benefits of three Agricultural Polyclinic activities/practices namely contour development on essential lands, increased incomes derived from agricultural produce and allied business and decreased production costs of agricultural produce and allied business were availed by 88.67, 78.00 and 76.00 per cent by the respondents, respectively. Overall extent of benefits availed from Agricultural Polyclinic, considerable proportion (63.33%) of the respondents had availed medium level of benefits from Agricultural Polyclinic activities.

Key words: Beneficiaries of Agricultural Polyclinics, Knowledge, Benefits

INTRODUCTION

In many countries, there are wide gaps between the yields that could be obtained through use of available production technologies and the yields obtained by the majority of the farmers, their production cost is high and majority of farmers have not any subsidiary business in supporting their farming. This is mostly due to knowledge gap.

Technology development and technology transfer are the two crucial processes in agricultural development and socio-economic upliftment of the farming community. In Marathwada

area of Maharashtra state, there is a large section of farming community, which is still unaware of technological development in the field of agriculture. It is also needed to minimize the production cost and influence the farmers towards the subsidiary businesses and safeguard them against uncertainty of monsoon with the acquisition of technical skills, management of agriculture and transfer of technology through training and demonstration.

In this regard, the government of Maharashtra has realized the importance of agricultural research and its extension. Several policies were framed and adopted to narrow down this gap between research and its actual application by disseminating the agricultural technologies with greater speed. With this background, the government of Maharashtra has launched a pilot programme- "Agricultural Polyclinic" in 1997-98 in all talukas/districts step by step as the innovative institutions for imparting vocational training, demonstration and diagnostic services in agriculture and allied subjects.

It is the programme for farmers to be able to improve their knowledge and be well informed about findings of agricultural research, which are relevant to their situation. In the light of this, it was therefore, thought worthwhile to take up an study of Agricultural Polyclinics to broadly understand knowledge of beneficiaries included in the programmes and whether they are actually taking benefits of programme. With this view, the present study was undertaken with the specific objectives.

1. To assess the knowledge of respondents about extension activities of Agricultural Polyclinic.
2. To study the extent of benefits availed by the beneficiary respondents.

METHODOLOGY

The present study was undertaken in three districts namely, Parbhani, Nanded and Osmanabad, out of eight districts in Marathwada region having more than two Agricultural Polyclinics functioning in the districts. Two talukas were selected on the basis of earlier establishment of Agricultural Polyclinics and two Agricultural Polyclinics from each district were selected on the basis of same principle. From the list of beneficiaries of Agricultural Polyclinic 25 respondents were drawn by n^{th} method of random

sampling from each Agricultural Polyclinics. Thus, final sample comprised of 150 respondents.

There were 22 items included in the teacher made knowledge test. The items selected reflected the opinion of the farmers in respect of Agricultural Polyclinic activities/ practices and their organizational setup.

The procedure adopted in quantification of extent of benefits obtained from Agricultural Polyclinic activities/practices by the respondents is depicted below;

Sr. No	Items	Procedure	
		Index = After / Before X 100	**Benefit = 100 –index**
1	Waste land utilization (ha)	Actual wasteland taken under Cultivation after participation (ha) ---------- X100 Available wasteland possessed by respondents before participation (ha)	Benefit = 100 –index
2	Increased income from all sources (Rs)	Income derived from all sources by respondents after participation (Rs) ---------- X100 Income from all sources by respondents before participation (Rs)	Benefit = 100 –index
3	Decreased production cost/expenditure on farming and allied business (Rs)	Production cost / expenditure on farming and allied business after participation (Rs) ---------- X100 Production cost / expenditure on farming and allied business before participation (Rs)	Benefit = 100 –index
4	Contour development on essential land to develop counter (ha)	Contour developed on essential land to develop contour (ha) ---------- X100 Available land essential to develop contour (ha)	Benefit = 100 –index
5	Coverage of land under irrigation through farm ponds and improved irrigation systems (ha)	Land covered under irrigation by utilization of farm ponds and improved irrigation systems (ha) ---------- X100 Maximum possibilities of land covered under irrigation by utilization of farm ponds and improved irrigation system (ha)	Benefit = 100 –index
6	Expenditure saving on fertilizer cost (Rs)	Annual expenditure on fertilizer after participation (Rs) ---------- X100 Annual expenditure on fertilizer before participation (Rs)	Benefit = 100 –index

For collecting data in light of objectives, structured schedule was prepared and personal interview method was employed for collecting data. Simple statistical tools like frequency and percentage were used.

RESULTS AND DISCUSSION

1. Knowledge of respondents about extension activities of Agricultural Polyclinic

Table 1: Knowledge of the respondents about extension activities of Agricultural polyclinic and their organizational set up (n=150)

S.N.	Statements	Correct		Incorrect	
		F	%	F	%
1	Govt. of Maharashtra state started the Agricultural Polyclinic programme.	134	89.33	16	10.67
2	Agricultural Polyclinic programme was started in 1997-98	42	28.00	108	72.00
3	Agricultural Polyclinic programme was linked with State Department of Agriculture, Maharashtra.	111	74.00	39	26.00
4	Separate permanent establishment is working there in Agricultural Polyclinic.	76	50.66	74	49.34
5	All the farmers are the beneficiaries of this programme	137	91.33	13	8.67
6	More than two Agril Polyclinics are working in the district	82	54.66	68	45.34
7	Training, Demonstration & Agricultural services were the major aims to start the Agricultural Polyclinic programme	107	71.33	43	28.67
8	Liliput gin was utilized for training and demonstration to remove lint from cottonseed on Agricultural Polyclinic.	46	30.66	104	69.34
9	Contour development demonstration is organized to demonstrate the full utilization of rain water in field.	141	94.00	9	6.00
10	Taluka Agricultural Officers were responsible to organize training programmes.	101	67.33	49	32.67
11	PKV watershed model (farm pond) prepared on Agricultural Polyclinic and its demonstration is shown.	124	82.66	26	17.34
12	Training was given on organic fertilizers production on Agricultural Polyclinic.	133	88.66	17	11.33
13	Diagnostic services were given to control insect pest and diseases on Agricultural Polyclinic.	130	86.66	20	13.34

14	Bioagent was produced for control insect pest on the Agricultural Polyclinic.	121	80.66	29	19.34
15	Trainings were given to produce Neemark from Neemseed.	135	90.00	15	10.00
16	On decided rates, available and produced products are sold in small quantity on Agricultural Polyclinic	101	67.33	49	32.67
17	For proper utilization of farmland & water, soil and water testing services was given on Agricultural Polyclinic.	148	98.66	2	1.34
18	For information on agriculture, library and museum facilities were provided on Agricultural Polyclinic	97	64.66	53	33.34
19	More information was provided on utilization of sprinkler and drip irrigation system on Agricultural Polyclinic.	133	88.66	17	11.34
20	Thorough information was given on high tech agriculture based on green house, shadenet and 'zero' energy cold storage in Agricultural Polyclinic.	79	52.66	71	47.34
21	One or two days training courses were organized on Agricultural Polyclinic.	130	86.66	20	13.34
22	Services for seed germination testing were provided to the farmers on Agricultural Polyclinic	98	65.33	52	34.67

1.1 Organizational set up and activities/practice wise knowledge level.

Knowledge was assessed by putting twenty-two questions to the respondents about general working of Agricultural Polyclinic and their organizational set up. Perusal of the data in Table 1 elucidates that 98.66 per cent of the respondents knew proper utilization of farmland and water, soil and water-testing services given on Agricultural Polyclinic, while 94.00 per cent knew that contour development demonstrations were organized to demonstrate full utilization of rainy water in field. Further, it was noted that 91.33 per cent were in the know that all the farmers are the beneficiaries of this programme, followed by 90.00 per cent knew that the trainings were given to produce Neemark from Neemseed. Government of Maharashtra state had started the Agricultural Polyclinic programme was known by 89.33 per cent. Training was given on organic fertilizers production on Agricultural Polyclinic and more information was provided on utilization of sprinkler and drip irrigation system on Agricultural Polyclinic was known by 88.66 per cent

of the respondents and also about equal (86.66 %) of the respondents were knowing activities like diagnostic services were given to control insect pest and diseases on Agricultural Polyclinic and one or two days training courses were organized on Agricultural Polyclinic.

Further, it was noticed that as many as 82.66 per cent, 80.66 per cent and 74.00 per cent of the respondents were knowing activities like PKV watershed model (farm pond) prepared on Agricultural Polyclinic and its demonstration is shown, Bioagent was produced for control insect pest on the Agricultural Polyclinic and Agricultural Polyclinic programme was linked with State Agricultural Department, respectively. Training, Demonstration and Agricultural services, was the major aims to start the Agricultural Polyclinic programme, was known by the 71.33 per cent respondent. Taluka Agricultural Officers were responsible to organize training programmes, and on decided rate available and produced products are sold in small quantity on Agricultural Polyclinic were equally (67.33 %) known by the respondents. In case of services for seed germination testing provided to the farmers on Agricultural Polyclinic, 65.33 per cent of the respondents were having this knowledge. As many as 64.66 per cent of the respondents knew that information on agriculture is provided to the farmers through established library and museum.

In this context further, it is manifested that substantial (54.66 %) percentage of the respondents were knowing that more than two Agricultural Polyclinics are working in the district and 52.66 per cent of the respondents were knowing that thorough information was given on high tech agriculture based on green house, shade net and zero energy cold storage on Agricultural Polyclinic. Whereas half (50.66 %) of the respondents were knowing that separate establishment was functioning on the Agricultural Polyclinic work, while 30.66 % and 28.00 per cent of the respondents were knowing that Liliput gin was utilized for training and demonstration to remove lint from cotton seed on Agricultural Polyclinic and Agricultural Polyclinic programme was started in 1997-98, respectively.

This indicates that the beneficiary respondents of Agricultural Polyclinics had moderate knowledge about the extension activities of

Agricultural Polyclinic and their organizational set up.

1.2 Overall knowledge level

The respondents were categorized on the basis of their overall knowledge about extension activities of Agricultural Polyclinic and their organizational set up and data are presented in Table 2.

Table 2: Distribution of the respondents by knowledge about extension activities of Agricultural Polyclinics and their organizational set up. (n-150)

Sr.No.	Category (score)	Frequency	Per cent
1.	Low (up to 13.68)	28	18.67
2.	Medium (13.69to 18.91)	105	70.00
3.	High (18.92 and above)	17	11.33
	Mean score 16.30		

It is depicted from Table 2 that majority (70.00 %) of the respondents were having medium level of knowledge about extension activities of Agricultural Polyclinics and their organizational set up. Whereas 18.67 per cent were having low level of knowledge. About11.33 per cent of the respondents possessed high level of knowledge. The mean knowledge score of respondents was 16.30. It can, therefore, be stated that majority of the respondents were having medium knowledge level. The inference can be drawn from these findings that Agricultural Polyclinic beneficiary respondents had good knowledge about extension activities of Agricultural Polyclinics and their organizational set up.

The findings of this study are similar with the findings of Chapke (2000), Chinchmalatpure *et al.* (2001), Pulikken (2001), Chawane *et al.* (2004), Prakash and Brar (2006), Patil *et al.* (2006) and Halakatti *et al.* (2007).

2. Extent of benefits availed from Agricultural Polyclinic activities/practices by beneficiary respondents.

Benefits are the advantages received by the respondents after participating in Agricultural Polyclinic activities. Certain activities/ practices which were influencing the programme were identified by discussion with

Agricultural Polyclinic experts. Thus, nine benefited activities/practices were included in the study and the respondents were asked to give the response in terms of whether they have availed or unavailed benefits and how much benefits availed before participation and after participation in Agricultural Polyclinic activities/ practices was taken in to consideration for calculating the benefits availed from Agricultural polyclinic activities/ practices, that has been presented under the following headings.

2.1 Activity/practicewise benefits availed from Agricultural Polyclinic

The data pertaining to benefits availed from Agricultural Polyclinic activities/practices was assessed in case of beneficiary respondents of Agricultural Polyclinic, which are presented in Table 3.

Table 3: Distribution of respondents according to Agricultural Polyclinic activity / practice wise benefits availed by respondents (n=150)

S.N.	Activities/Practices	Benefits availed		Benefits unavailed	
		F	%	F	%
1	Utilization of wasteland.	27	18.00	123	82.00
2	Increased incomes derived from agricultural produce and allied business.	117	78.00	33	22.00
3	Decreased production costs of agricultural produce and allied business.	114	76.00	36	24.00
4	Contour development on essential lands to develop contour.	133	88.67	17	11.33
5	Coverage of lands under irrigation by utilization of farm ponds and improved irrigation systems.	35	23.33	115	76.67
6	Average expenditure on fertilizers.	71	47.33	79	52.67
7	Average expenditure on insecticide-pesticides.	87	58.00	63	42.00
8	Average expenditure on storage of agricultural produce.	42	28.00	108	72.00
9	Requirement of seeds in kgs per hectare for sowing.	80	53.33	70	46.67

It is evident from Table 3 that majority (88.67%) of the respondents had availed benefit from Agricultural Polyclinic activities/practices as contour development on essential lands to develop contour is important. The other important benefits availed from Agricultural Polyclinic activities/ practices were in the following order namely; increased incomes derived from agricultural produce and allied business (78.00%), decreased production costs of agricultural produce and allied business (76.00%), average expenditure on insecticide-pesticides (58.00%), requirement of seeds in kgs per hectare for sowing (53.33%). Some of the other activities/practices like average expenditure on fertilizers (47.33%), average expenditure on storage of agricultural produce (28.00%), coverage of lands under irrigation by utilization of farm ponds and improved irrigation systems (23.33%) and utilization of wasteland (18.00%) also benefited respondents.

2.2 Overall extent of benefits availed from Agricultural Polyclinic activities/practices.

The overall extent of benefits availed from Agricultural Polyclinic activities/practices was assessed in terms of utilization of wasteland, increased income derived from agricultural produce and allied business, decreased production costs of agricultural produce and allied business, contour development on essential lands to develop contour, coverage of lands under irrigation by utilization of farm ponds and improved irrigation systems, average expenditure on fertilizers, average expenditure of insecticide-pesticides, average expenditure on storage of agricultural produce and requirement of seeds in kgs per hectare for sowing. Index for each of these was calculated and also average index was computed to get overall picture. Results are presented in Table 4.

Table 4: Distribution of the respondents by benefit availed from Agricultural Polyclinic activities/ practices (n=150)

Sr. No.	Category	Frequency	Per cent
1.	Low (score up to 14.84)	27	18.00
2.	Medium (score14.85 to 30.83)	95	63.33
3.	High (score 30.84 and above)	28	18.67
	Mean score 22.84		

A glance at relevant data in Table 4 would make it apparent that considerable percentage (63.33%) of

the respondents were having medium level of benefits availed from Agricultural Polyclinic activities, whereas nearly equal percentages (18.67 and 18.00) of respondents were having high and low level of benefits availment, respectively. These findings are in consonance with the findings of Phadtare (1985), Bhalla (1992), Pimparikar and Shetay (1993), Sawsakde (1998) and Dixit (2001).

CONCLUSIONS

On the basis of findings out of twenty-two questions about extension activities/practices of Agricultural Polyclinic and their organizational set up, twelve activities/practices namely proper utilization of farmland and water; soil and water-testing services given on Agricultural Polyclinic, contour development demonstrations organized to demonstrate full utilization of rainy water in field, all the farmers are the beneficiaries of this programme, training given to produce Neemark from Neemseed, Govt. of Maharashtra state had started the Agricultural Polyclinic programme, training was given on organic fertilizers production on Agricultural Polyclinic, more information was provided on utilization of sprinkler and drip irrigation system on Agricultural Polyclinic, diagnostic services given to control insect pest and diseases on Agricultural Polyclinic, one or two days training courses were organized on Agricultural Polyclinic, PKV watershed model (farm pond) prepared on Agricultural Polyclinic and demonstrations were given for their utilization, biological insect pest control measure was produced on the Agricultural Polyclinic and Agricultural Polyclinic programme was linked with State Agricultural department were known by 98.66, 94.00, 91.33, 90.00, 89.33, 88.66, 88.66, 86.66, 86.66, 82.66, 80.66 and 74.00 per cent of the respondents, respectively. With regards overall knowledge about extension activities of Agricultural Polyclinic and their organizational set up, it was observed that majority (70.00 %) of the respondents were having medium level of knowledge. The mean knowledge score of respondents was 16.30.

It was also concluded that out of nine beneficial activities/practices, the benefits of three Agricultural Polyclinic activities/practices namely contour development on essential lands, increased incomes derived from agricultural produce and allied business and decreased production

costs of agricultural produce and allied business were availed by 88.67, 78.00 and 76.00 per cent by the respondents, respectively. As reg ards, overall extent of benefits availed from Agricultural Polyclinic, considerable proportion (63.33%) of the respondents had availed medium level of benefits from Agricultural Polyclinic activities. The mean benefits availed score was 22.84.

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RESEARCH ARTICLE

Factors Influencing Short Term Credit Borrowing Behaviour of Farmers

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ABSTRACT

The Factors influencing short term credit borrowing behaviour of farmers was undertaken in Indapur and Daund tahsils of Pune District. Which are purposively selected for the study because maximum turnover of Primary Agriculture Credit Societies of Pune district. The data were collected on personal, socio-economic, psychological and communication characteristics of respondent farmers, their behaviour towards short term credit borrowing, factors influencing short term credit borrowing behaviour of respondent farmers, constraints faced by them and suggestions made to overcome the problems regarding short term credit borrowing studied with the help of pre structured interview schedule. A majority (90.83 per cent) of the respondent farmers were in the 'medium' category of the amount of short term credit borrowed. It is observed that majority 70.83 per cent of the respondents came in medium category of factors influence on short term credit borrowing behaviour of farmers. Major constraints faced by the short term credit borrowing farmers were non- repayment due to crop failure (natural calamities), lack of proper guidance by financial agencies, inadequacy of credit amount disbursed, preparing the proposals for short term credit borrowing, requirements of more documents, non-repayment due to heavy family expenditure, tedious or lengthy loan procedure, delay in credit disbursement and charging high rate of interest by credit societies.

Key words - Credit, Borrower, repayment, agencies etc

INTRODUCTION

The increased demand for agricultural credit can be met by a systematic expansion of rural credit system. The agricultural credit structure in the developing countries is characterized by dualism that co-exist with both formal (institutional) and

informal (non-institutional) sectors. The important sources of non-institutional credit are money lenders, traders, landlords, commission agents and credit taken from relatives. Whereas, sources of institutional credit are Primary Agricultural Credit Societies (PACS), District Central Cooperative Banks(DCCB), State Cooperative Banks, Commercial Banks, Regional Rural Banks(RRB). Small and marginal farmers are usually depend on private money lenders, landlords, input traders and private micro-finance institutions for meeting the financial needs for cultivation and family expenses, which obviously costs them heavily, where the rate of interest is n ot only exorbitant but the terms and conditions of the loan are often exploitative. Generally the credit needs of the farmers fall into three categories namely, the short term loans, medium term loans and long term loans. The short term loans also called as crop loan are for a period of one year, they are taken for purchase of seeds, fertilizers, to pay labours and plant protection chemicals etc. The crop loan is most popular source of short term investment in farming for adoption of improved farm practices through use of various inputs. Credit was to be given to cultivators on the basis of their "production-worthiness" rather than "asset-worthiness". Agriculture credit is one of the important ingredient in increasing production and income of the farmers. Therefore, credit is extended on the belief that the borrower will be willing and able to repay the loan at specified period in future . At the grass root level the co-operative form of organization is regarded as the most ideal agency for providing credit to the farmers. Strengthening of co-operative credit structure is essential because, these institutions play crucial role in meeting the agricultural credit requirement because of their deep penetration into the rural area. Keeping this in view, the present study entitled "Factors influencing short term credit borrowing behaviour of farmers" was undertaken following objectives-

Objectives

- To study the factors influencing the short term credit borrowing behaviour of farmers.
- To study the association between the profiles of the short term credit borrowing farmers and factors influencing short term credit borrowing behaviour of farmers.

- To study the Constraints faced and suggestions made to overcome the problems of short term credit borrowing farmers.

METHODOLOGY

The present study was conducted in Pune district of Maharashtra state. Pune district was selected for the study .Out of 14 tahsils of Pune 2 tahsils purposively selected viz., Indapur and Daund having maximum turnover of PACS and credit borrowing behaviour of farmers. Out of 10 villages from 120 farmers were selected randomly. These two tahsils were purposively selected because maximum turnover of Primary Agriculture Credit Society and credit borrowing behaviour is on large scale in these two tahsils than other tahsils of Pune district. With the help of Pune District Central Co-operative Bank (PDCC) and on the basis of maximum turnover of Primary Agriculture Credit Society (PACS) detailed information of credit borrowing farmers of interested area is collected. An interview schedule, based on the selected objectives of the study was prepared in order to get accurate responses from the short term credit borrowers. The pre-testing of interview schedule is necessary on the part of researcher. It identifies mistakes, ambiguities and shortfalls. It also helps in achieving clarity, reliability and validity of the interview schedule.

RESULTS AND DISCUSSION

1. Factors influencing short term credit borrowing behaviour of farmers

Influence was the power to have an important effect on someone or something. If some factors influence on someone, they are changing a behavior of that person. The information regarding factors influencing short term credit borrowing behaviour of the respondent farmers is given in table 1.

Table 1. Distribution of the respondents according to their factors influencing short term credit borrowing behaviour of farmer

Sr. No.	Factors influencing short term credit borrowing behaviour (Score)	Respondents (n=120)	
		Number	Percentage
1	Low (Up to 7)	28	23.33
2	Medium (8 to 10)	85	70.83
3	High (11 and above)	07	05.83
	Total	120	100.00

It could be observed from table 1 that, majority 70.83 per cent of the respondents came in medium category of factors influence on short term credit borrowing behaviour of farmers, followed by 23.33 per cent of the respondents belonged to low level category of factors influence on short term credit borrowing behaviour, followed by 05.83 per cent of the respondents came in high level category of factors influence on short term credit borrowing behaviour. It could be understood that, a vast majority of the factors influence on the short term credit borrowing behaviour of farmers.

Table 2 : Association between the profiles of the short term credit borrowing farmers and factors influencing short term credit borrowing behaviour of farmers.

Sr. No.	Variables	Factors influencing			n=120
		Low	Medium	High	Total
A.	**Age (Years)**				
1	Young	01 (09.09)	09 (81.81)	01 (09.09)	11 (100.00)
2	Middle age	21 (26.92)	56 (71.79)	01 (01.28)	78 (100.00)
3	Old age	07 (22.58)	19 (61.29)	05 (16.12)	31 (100.00)
B.	**Education**				
1	Illiterate	00 (00.00)	06 (85.71)	01 (14.28)	07 (100.00)
2	Primary	04 (30.76)	09 (69.23)	00 (00.00)	13 (100.00)
3	Secondary	18 (24.65)	50 (68.49)	05 (06.84)	73 (100.00)
4	Higher secondary	04 (21.05)	14 (73.68)	01 (05.26)	19 (100.00)
5	Graduation	03 (75.00)	01 (25.00)	00 (00.00)	04 (100.00)
6	Post-graduation	00 (00.00)	04 (100.00)	00 (00.00)	04 (100.00)
C.	**Land Holding**				
1	Marginal	13 (25.00)	36 (69.23)	03 (05.76)	52 (100.00)
2	Small	08 (17.77)	35 (77.77)	02 (04.44)	45 (100.00)
3	Semi medium	06 (28.57)	14 (66.66)	01 (04.76)	21 (100.00)

4	Medium	00 (0.00)	00 (0.00)	01 (100.00)	01 (100.00)
5	Large	01 (100.00)	00 (00.00)	00 (00.00)	01 (100.00)
D.	**Occupation**				
1	Only Agriculture	08 (15.09)	43 (81.13)	02 (03.77)	53 (100.00)
2	Agri. + Dairy	16 (30.76)	35 (67.30)	01 (01.92)	52 (100.00)
3	Agri. + Business	02 (25.00)	03 (37.50)	03 (37.50)	08 (100.00)
4	Agri. + Service	02 (28.57)	04 (57.14)	01 (14.28)	07 (100.00)
E.	**Annual income**				
1	Low	03 (09.09)	29 (87.87)	01 (03.03)	33 (100.00)
2	Medium	14 (29.16)	33 (68.75)	01 (02.08)	48 (100.00)
3	High	11 (28.20)	23 (58.97)	05 (12.82)	39 (100.00)
F.	**Period of membership**				
1	Low	05 (20.83)	17 (70.83)	02 (08.33)	24 (100.00)
2	Medium	21 (26.58)	57 (72.15)	01 (01.26)	79 (100.00)
3	High	02 (11.76)	11 (64.70)	04 (23.52)	17 (100.00)
G.	**Repayment potential**				
1	Low	01 (33.33)	02 (66.66)	00 (00.00)	03 (100.00)
2	Medium	24 (23.07)	77 (74.03)	03 (02.88)	104 (100.00)
3	High	03 (23.07)	06 (46.15)	04 (30.76)	13 (100.00)
H.	**Social participation**				
1	Low	08 (29.62)	17 (62.96)	02 (07.40)	27 (100.00)
2	Medium	18 (21.95)	62 (75.60)	02 (02.43)	82 (100.00)
3	High	02 (18.18)	06 (54.54)	03 (27.27)	11 (100.00)
I	**Extension contact**				
1	Low	07 (25.92)	18 (66.66)	02 (07.40)	27 (100.00)

2	Medium	14 (18.66)	59 (78.66)	02 (02.66)	75 (100.00)
3	High	07 (38.88)	08 (44.44)	03 (16.66)	18 (100.00)
J.	**Risk orientation**				
1	Low	04 (22.22)	12 (66.66)	02 (11.11)	18 (100.00)
2	Medium	20 (21.97)	69 (75.82)	02 (02.19)	91 (100.00)
3	High	04 (36.36)	04 (36.36)	03 (27.27)	11 (100.00)
K	**Economic motivation**				
1	Low	02 (09.09)	18 (81.81)	02 (09.09)	22 (100.00)
2	Medium	22 (26.82)	58 (70.73)	02 (02.43)	82 (100.00)
3	High	04 (25.00)	09 (56.25)	03 (18.75)	16 (100.00)

(Figures in parenthesis indicates percentage)

It was seen that the proportion of the farmers from the medium group of extension contact had more association with factors influencing short term credit borrowing behavior of farmers than low and high group farmers It was further seen that more percentage of medium group farmers were come under factors influencing short term credit borrowing behaviour as compared to those in the low and high group. This showed that, medium group farmers were more in factors influencing short term credit borrowing behaviour. This indicates that, there was a statistically significant association between economic motivation of the short term credit borrowing farmers and factors influencing short term credit borrowing behaviour of farmers.

It was further seen that more percentage of medium group farmers were come under factors influencing short term credit borrowing behaviour as compared to those in the low and high group. This showed that, medium group farmers were more in factors influencing short term credit borrowing behaviour.

3. Constraints faced and suggestions made to overcome the problems of short term credit borrowing farmers.

3.1 Constraints faced by short term credit borrowing farmers

One of the objectives of the study is to find out the constraints faced by the respondents in borrowing the credit. During interview, respondents expressed many difficulties while borrowing the credit. The data were collected on the constraints faced by the short term credit borrowing farmers and analyzed. The findings are presented in Table 3.

Table 3: Distribution of the short term credit borrowing farmers by their constraints faced in credit borrowing.

Sr. No.	Particulars of constraints	Respondents (n=120)	
		Number	Percentage
1	Non- repayment due to crop failure (natural calamities)	115	95.83
2	Lack of proper guidance by financial institutions in crop loan process	110	91.66
3	Inadequacy of credit amount disbursed	98	81.66
4	Preparing the proposals for credit borrowing	95	79.16
5	Requirements of more documents	72	60.00
6	Non- repayment due to heavy family expenditure	72	60.00
7	Loan procedure is lengthy or tedious	70	58.33
8	Delay in credit disbursement	69	57.50
9	Charging high rate of interest by credit societies	65	54.16

It is observed that, 95.83 per cent respondents faced problem of non-repayment due to crop failure (natural calamities), followed by 91.66 per cent of them facing problem of lack of proper guidance by financial agencies.

The percentage of respondents who faced problem of inadequacy of credit amount disbursed was 81.66 per cent. Whereas, 79.16 per cent respondent farmers facing problem of preparing the proposals for credit borrowing. Whereas, same per cent of respondent farmers like 60.00 per cent faced problem of requirements of more documents and non-repayment due to heavy expenditure respectively. Followed by, 58.33 per cent farmers facing problem of loan procedure is lengthy and tedious. Whereas, 57.50

per cent and 54.16 per cent of respondent farmers facing problem of delay in credit disbursement and charging high rate of interest by credit societies respectively.

4.6.2 Suggestions given by the short term credit borrowing farmers

Suggestions regarding the short term credit borrowing farmers are given in Table 4.

Table 39: Distribution of the short term credit borrowing farmers by their suggestions given in credit borrowing.

Sr. No.	Particulars of suggestions	Respondents (n=120)	
		Number	Percentage
1	Documents required should be limited	102	85.00
2	Urgency of need should be considered while sanctioning credit	101	84.16
3	Simplified procedure should be follow for loan demand	84	70.00
4	Recovery of credit during natural calamities should be withheld	73	60.83
5	Reasonable interest rate should be charged	65	54.16
6	Financial institutions should timely sanction loan	60	50.00

It is observed that, the respondents in almost equal proportion (85.00 per cent and 84.16 per cent) suggested that documents required should be limited and urgency of need should be considered while sanctioning credit respectively, while 70.00 per cent of farmers suggested that simplified procedure should be follow for loan demand. Whereas, 60.83 per cent of respondents suggested that the recovery of credit during natural calamities should be withheld. Further, 54.16 per cent of the respondents suggested that reasonable interest rate should be charged on credit. Whereas, 50.00 per cent respondent farmers suggested that financial institutions should timely sanction loan.

Summary and Conclusion

Majority 70.83 per cent of the respondents came in medium category of factors influence on short term credit borrowing behaviour of farmers, followed by 23.33 per cent of the respondents belonged to low level category of factors influence on short term credit borrowing behaviour,

followed by 05.83 per cent of the respondent farmers came in high level category of factors influence on short term credit borrowing behaviour. Period of membership and risk orientation was non-significantly associated with crop loan borrowing behaviour of farmers. Whereas, age, education, land holding, occupation, annual income, repayment potential, social participation, extension contact and economic motivation were significantly associated with crop loan borrowing behaviour of farmers. Education was non-significantly associated with factors influencing short term credit borrowing behaviour of farmers.All other variables like age, land holding, occupation, annual income, period of membership, repayment potential, social participation, extension contact, risk orientation and economic motivation were significantly associated with factors influencing short term credit borrowing behaviour of farmers.

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RESEARCH ARTICLE

Knowledge and Adoption of Buffalo Owner of Surat District of South Gujarat

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ABSTRACT

Gujarat has around 4.43 per cent of cattle and 9.09 per cent of buffalo population of the country. Gujarat is considered as pivotal state in milk production and marketing in India on co-operative dairy system. It contributed around 10.315 million tonnes (7.65 per cent) of milk to the total milk pool of India and during 2015-16 per capita milk availability was 545gms/day. The present study was conducted in surat district of south Gujarat. In all 60 buffalo owners will be selected as respondents. Ex-post facto research design was used. Thirteen independent and two dependent variables were chosen. In light of the objectives, the interview schedule was prepared and respondents were interviewed at their home and field. The collected data were analyzed by using percentage, mean, standard deviation, rank and correlation coefficient (*r*).

Keywords- Milk, marketing, correlation coefficient and Ex-post facto research

INTRODUCTION

India is agrarian country and the livestock becomes a supportive enterprise to Agriculture. India contributes with 57.00 per cent World buffalo population and by milk is 55.00 per cent. Animal Husbandry plays a prominent role in supplementing the income of rural households, particularly the landless, small and marginal farmers. According to 19th livestock census, the livestock sector alone contributes nearly 25.60 per cent of value of output at current prices of total value of output in Agriculture, Fishing & Forestry sector. The overall contribution of Livestock Sector in total GDP is nearly 4.11 per cent. Livestock contribute 24.00 per cent to Agriculture GDP and the livestock population was about 3.69 crore and density was about 120/sq.km. Milk production in India was about 116.2

million tonnes. Milk production in India during 2016-17 was 144.3 million tonnes and growth rate was 4.26 per cent. The buffalo's population contributes 21.23 per cent of the total livestock population and *i.e.* total number of female buffalo is 108.7 million numbers in 2012.Gujarat has around 4.43 per cent of cattle and 9.09 per cent of buffalo population of the country. Gujarat is considered as pivotal state in milk production and marketing in India on co-operative dairy system. It contributed around 10.315 million tonnes (7.65 per cent) of milk to the total milk pool of India and during 2015-16 per capita milk availability was 545 gms/day. Surat district possess nine talukas namely Choryasi, Palsana, Kamrej, Bardoli, Olpad, Mangrol, Mandvi, Mahuva and Umarpada. This district is spread over an area of 4327 sq. km and has 761 villages. In the year of 2016, cattle and buffalo population of Surat district was 268730 and 246600, respectively. This district contributed around 49, 56, 16,679 Kilo milk of milk during 2016-17. Due to the various schemes of Government of Gujarat for dairy development in rural area and subsidies extended for purchase of animals, rearing of crossbred heifers, conducting competition of crossbred heifers and distribution of fodder mini kits, etc., this district has taken stride in enhancing milk production.

METHODOLOGY

The south Gujarat region consists of seven District viz., Narmada, Bharuch, Surat, Tapi, Navsari, Valsad and The Dangs. Under this investigation Surat district was be selected for present investigation and from that two talukas will be selected on the highest of milk production. Five villages will be selected from each Taluka in this way ten village and ten buffalo owners will be randomly selected from those villages. The list of respondents will be obtained from respective milk cooperative society working under SUMUL Dairy. In all 100 buffalo owners will be selected as respondents. Ex-post facto research design was used. Thirteen independent and two dependent variables were chosen. In light of the objectives, the interview schedule was prepared and respondents were interviewed at their home and field. The collected data were analyzed by using percentage, mean, standard deviation, rank and correlation coefficient (*r*).

RESULTS AND DISCUSSION

Table: 1 Level of knowledge of improved dairy husbandry practices (n=60)

Sr. No.	Categories	No.	Percentage
1	Low	14	23.33
2	Medium	33	55.00
3	High	13	21.67
	Total	**60**	**100**

Knowledge level of the respondents regarding improved dairy husbandry practices was measured by asking various questions related to dairy husbandry practices Viz., feeding, breeding, general management and healthcare. A set of thirty seven questions related with above mentioned practices were asked to the respondents. Then with the help of mean and standard deviation the respondents were categorized as low (Below X - S.D.), medium (X ± S.D.) and high (Above X + S.D.) with respect to their knowledge level for various practices.

The data presented in Table 1 indicated that majority of the respondents (55.00 per cent) had medium knowledge level about improved dairy husbandry practices and 23.33 and 21.67 per cent of them were found to have low and high knowledge level about improved dairy husbandry practices, respectively. Sharma, *et. al.* (2016).

Table: 2. Extent of adoption of improved dairy husbandry practices (n=60)

Sr.No.	Categories	No.	Percentage
1	Low	06	10.00
2	Medium	41	68.33
3	High	13	21.67
	Total	60	100

The extent of adoption is the degree to which a respondent actually adopts a practice for the purpose of measurement of extent of adoption of dairy innovations. Level of adoption of the respondents regarding improved dairy husbandry practices was measured by asking various questions related to dairy husbandry practices Viz., feeding, breeding, general management and healthcare. Then with the help of mean and standard deviation the respondents were categorized as low (Below X - S.D.), medium (X ± S.D.) and high (Above X +

S.D.) with respect to their level of adoption for various practices.

The data presented in Table 2 indicated that majority of the respondents (68.33 per cent) had medium adoption level about improved dairy husbandry practices and 21.67 and 10.00 per cent of them were found to have high and low level of adoption about improved dairy husbandry practices, respectively. Sabapara *et.al* (2016).

CONCLUSION

On the basis of findings of the study it may be concluded that majority of the respondents had medium adoption and knowledge level about improved dairy husbandry moreover high and low level of adoption and knowledge level about improved dairy husbandry practices hence

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RESEARCH ARTICLE

Relationship between Characteristics of Users and Non-Users of Drip Irrigation and Constraints of Farmers

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ABSTRACT

The drip irrigation technology is proved to be superior to traditional methods of irrigation due to its precise application of water to the root zone of the crop in a controlled manner. The present study was conducted in Raver and Chopda tahsil of Jalgaon district. Out of the banana growing villages, 6 villages (3 from each tahsil) were selected on the basis of prominent area under drip irrigation. A majority of the users of drip irrigation system were from young age group, educated, having medium size of family, high level of annual income, moderate level of experience in banana cultivation, moderate level of experience of drip irrigation, medium level of social participation, medium level of risk orientation, medium sources of information, medium sized area under drip and area under orchard. There are many advantages of drip irrigation technology over other methods. It helps in minimizing the water losses due to percolation and evaporation. It is also possible to save labour charges. Moreover, the efficiency of water and fertilizer can be increased. Due to this system, the land leveling is not essential and at the same time cultural operations could be carried out easily. The family size of the respondent exhibited negative and significant relationship. The characteristic risk orientation exhibited non significant relationship with the level of knowledge of irrigation technology for banana orchard. As reveled from the study main problem faced by the respondents are technical problem during use, fail to maintain water management during summer season due to shortage of water and lack of electricity, time consuming loan procedure and irregularity of electricity.

Keywords -Users, non-users, drip, irrigation

INTRODUCTION

The availability of sufficient quantity of water at right time and place helps the socio-economic development of the country and helps to boost up the crop yield. Also it is essential to develop irrigation water resources coupled with efficient use of irrigation water. The irrigated farming is not feasible in major parts of the states due to inadequate irrigation facilities. Hence efficient utilization of irrigation water by precise method such as drip and need to be applied. The technology of drip irrigation is becoming increasingly popular in regions of the water scarcity. Since water is deciding factor for crop yield selected blocks of tahsils comes under scarcity area of water. Though most of the banana cultivators of these blocks use drip irrigation system, some factors induce temporary or continued rejection of use of drip irrigation system. This may divide banana cultivators in two categories, one using drip irrigation system on continued basis (users) and those who have adopted but now discontinued its use temporarily or permanently (non-users) for one or some other problems/reasons. This 'non-user' factor is the theme of proposed study. There is need to find out the constraints behind it. Considering all these views in mind the present study entitled is undertaken.

METHODOLOGY

Raver and Chopda tahsils of Jalgaon districts were selected for the study purpose. These tahsils situated in Jalgaon district of Maharashtra state Raver and Chopda tahsils are famous for banana production. Thus in all total 120 banana growers were selected randomly from Raver and Chopda tahsils of Jalgaon district. The structured interview schedule serve as a tool for collection of data. The researcher personally interviewed the respondents included in the sample. The information collected through interview was processed into primary table and then into the secondary tables. The qualitative data were quantified and later the quantified data were converted into frequency, percentages, wherever necessary the scoring was also done. Further the coefficient of correlation was worked out and inferences were drawn.

RESULT AND DISCUSSION

Table-1 Relationship between selected characteristics of the respondents and their knowledge level

Sr. No	Independent variables	Dependent variables knowledge correlation coefficient.		
		Users (r1)	Non-Users (r2)	Overall (r)
1.	Age	-0.441**	-0.267*	-0.274*
2.	Education	0.521**	0.337**	0.436**
3.	Experience	0.303*	0.341**	0.306*
4.	Drip irrigation exp.	0.449**	0.402**	0.424**
5.	Area under orchard	0.259*	0.252*	0.347**
6.	Area under drip	0.307*	0.268*	0.364**
7.	Risk orientation	-0.168NS	-0.043NS	-0.05 NS
8.	Information sources	0.386**	0.296*	0.418**
9.	Family size	-0.292*	-0.309*	-0.398**
10.	Annual Income	0.266*	0.257*	0.321**
11.	Income from banana orchard.	0.338**	0.254*	0.386**
12.	Social participation	0.543**	0.379**	0.494**

*** Significant at 5 per cent level** **** Significant at 1 per cent level**

The computed correlation coefficient of age and the size of family was found to have negative and significant relation with knowledge level of drip irrigation system at 1 per cent level of significance while, risk orientation has negative and non-significant relation with knowledge level of drip irrigation system.

Constraints experienced by the users and non-users of drip irrigation system for banana orchard.

The users and non-users of drip irrigation system in banana orchard

may have many problems in respect of different aspects of drip irrigation system. The constraints faced by the respondents are presented in the Table-2.

Table-2 Constraints experienced by the users and non- users of drip irrigation system for banana orchard

Sr. no.	Constraints faced by banana growers	Respondents	
		Number	Percent
1	Initial cost of drip irrigation system is more	70	58.33
2	Loan procedure is time consuming	102	85.00
3	Irregularity of electricity	92	76.66
4	Technical problem occurs during use	106	88.33
5	Accessories are not easily available	64	53.33
6	Fail to maintain water management during summer season	104	86.66
7	Services are not available after purchasing of the product	62	51.66

The data from the table 2 revealed that the problems faced by considerable number of the users and non-users of drip irrigation system for banana orchard were; technical problems during use of drip irrigation system (88.33 per cent), fail to do water management during summer (86.66 per cent), loan procedure is time consuming (85.00per cent) and irregularity in electricity (76.66 per cent), while considerable number of farmers had problems like high initial cost of drip irrigation set (58.33 per cent), accessories are not easily available (53.33 per cent) and after-sale services are not available to farmers for drip system (51.66 per cent).

CONCLUSION

A majority of the users of drip irrigation system were from young age group, educated, having medium size of family, high level of annual income, moderate level of experience in banana cultivation, moderate level of experience of drip irrigation, medium level of social participation, medium level of risk orientation, medium

sources of information, medium sized area under drip and area under orchard. On the other hand a majority of the non-users of the drip irrigation system were from middle age group, educated, having medium size of family, medium level of annual income, medium level of income from banana orchard, moderate experience in banana cultivation, moderate experience in drip irrigation, medium level of social participation, low level of risk orientation, medium sources of information, low sized area under drip and very small area under orchard. A large number of users had medium level knowledge, while a large number of non-users had low level of knowledge was found.

Relationship of selected characteristics of the users and non-users with their knowledge

It can be concluded that, the level of education, experience in banana cultivation, experience of drip irrigation, annual income, income from banana orchard, social participation, information sources, area under drip, area under orchard of the respondents influenced the level of knowledge of practices recommended for drip irrigation technology. The risk orientation exhibited non significant relationship with the level of knowledge of irrigation technology for banana orchard.

CONSTRAINTS

As revealed from the study, main problems faced by the users are time consuming loan procedure and the major problems of non users are facing technical problems during use and they fail to maintain water management during summer season.

RECOMMENDATION

Top priority needs to be given for spread of knowledge by arranging regular training sessions for the farmers, field demonstration on their farms and by use of mass media.

The major problems reported during the use of drip irrigation system were technical problem occurs such as clogging of emitters and breakage of laterals. Farmers need to be trained in using measures like chlorination and acidification for the clogging, use good quality of accessories, burry submain line at proper depth and periodical care etc.

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RESEARCH ARTICLE

Constraints faced by the farmers in adoption of dry land farming systems

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ABSTRACT

The present study was carried in Akola and Balapur Taluka of Akola district of Maharashtra state. An exploratory design of social research was used and total 100 respondents were selected for the present study. Findings reported that the respondent adopted different dry land farming systems such as agriculture + cow farming system, agriculture + goat and agriculture + buffalo farming systems. Majority of the respondents faced the constraints in adoption of different dry land farming systems such as non availability of common grazing land in the village, non availability of improved breeds, lacked the training in rearing different animals, could not realize the proper amount from sale of animal and animal products due to fluctuation of prices since there was no proper marketing system, veterinary facilities for medical aid to their animal were lacking and non availability of loan from the financial institution.

Key words: Adoption, constraints, dry land farming system

INTRODUCTION

Dry land farming is the important segment of Indian agriculture which is backbone of national economy. India has about 108 million ha Dry land area which constitutes nearly 75 per cent of the total 143 million ha of arable land in such area crop production become relatively difficult as it mainly depends upon intensity and frequency of rainfall. The crop production in such area is called rainfed farming. As there is no facility to give any irrigation and even protective life saving irrigation is not possible. This area gets annual rainfall up to 750 mm which is unevenly distributed, highly uncertain and erratic. The crop production depending upon this rain is technically called dry land farming. Therefore dry land farming is defined as a practice of

growing profitable crops without irrigation in area which receive an annual rainfall of 750 mm or even less. India achieved a record production of food grains that means 243 million tons in 2011. This achievement is no doubt spectacular and highly commendable but this needs further increase for meeting the challenges of feeding the even growing population of the country. To feed this large population they needed 300 million tones under present situation. The contribution of the food grains from dry land is only 42 per cent from 70 per cent area it indicates very low productivity. From this 42 per cent production these area produces 75 per cent of pulses and more than 90 per cent of Sorghum, millet, Ground nut from arid and semi arid regions. Thus dry land and Rainfed farming will continue to play a dominant role in agriculture production. Maharashtra state has highest proportion of Rainfed area among the state. About 85 per cent of net cultivated area is rainfed Agriculture in Vidarbha region. The production of crop in this region depends on natural rains, small size of land holdings, periodical droughts, soil erosion, and large dry spells, low crop yield and poor economic returns are the important features of the dry farming areas. The productivity in dry land areas is low because of lack of use soil moisture conservation technology.

Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola identified and recommended a package of dry land technology in respect of cropping systems in situ moisture conservation, integrated nutrient management, cropping systems and contingent planning. However, it was observe that farmers were not fully aware about this technology and adopt only few component of this technology at a given time. It may be related to the technology itself or to the farmers themselves and their situation. It is therefore through desirable to identify different constraints faced by the farmers in adoption of different farming system.

METHODOLOGY

The emphasis in the study was on identifying different constraints in adoption of the different farming systems in Akola district. Therefore, the exploratory design of social research used for the present investigation. The present study was undertaken in Akola and Balapur Taluka of Akola district in Vidarbha region of Maharashtra state

because this area comes under dry land farming. For the present study a random sampling method was used. After selection of Akola and Balapur Taluka, 5 villages were purposively selected from each Taluka and 100 farmers were selected from these Taluka; it means 10 farmers from each village were selected randomly.

RESULTS AND DISCUSSION

It is observed that 40 per cent dry land farmers adopted agriculture +cow farming system nearly same percentage (40%) of the respondents adopted agriculture + goat farming system and few respondents (13%) adopted agriculture + buffalo farming system and very small percentage of the respondent adopted (2%) farmers adopted agriculture +poultry farming system. There is also different mixed farming systems are identified that are agriculture +cow + goat (3%), agriculture +cow + buffalo (1%), and agriculture +other (pigeon) farming system (1%). From above it can be concluded that the majority of the dry land farmer's follows agriculture +cow and agriculture +goat farming systems.

Constraints faced by the farmers in dry land farming systems

One of the objectives of the present study was to identify different constraints faced by respondent in adopting different farming systems.

Table.1. Different identified constraints in farming systems in the selected villages

SN	Constraints	Frequency	Per cent	Rank
1	Non availability of common grazing land in village	80	80.00	I
2	Non availability of improved breed	75	75.00	II
3	Lack of training facilities	74	74.00	III
4	No proper realization of income from sale of animal and animal products due to fluctuation of prices and unavailability of markets.	65	65.00	IV
5	Lack of veterinary facilities	55	55.00	V
6	Non availability of loan from Financing institution	55	55.00	V

7	Lack of cooperation from bank extension personnel	40	40.00	VI
8	Lack of technical knowledge	35	35.00	VII

From the above table it is observed that the majority of the respondents faced the constraints in adoption of different dry land farming systems are non availability of common grazing land in the village (80.00%) and non availability of improved breeds (75.00%). This was follow by 74 per cent of respondent stating that they lacked the training in rearing different animals. Majority of the respondents (65%) was also expressed that could not realize the proper amount from sale of animal and animal products due to fluctuation of prices since there was no proper marketing system. Over 55 per cent of the respondents expressed that veterinary facilities for medical aid to their animal were lacking and non availability of loan from the financial institution. Moreover, 40 per cent of the respondents also expressed that they did not get the cooperation from bank extension personnel as well as 35 per cent of them were lacking in the technical knowledge about the dry land farming systems.

The above findings are in the line with the results reported by Mavi et al.(2006), Shinde (2004), Sankhala et al. (2006) and Sharma et al. (2007)

CONCLUSION

From the above findings, it can be concluded that all the selected respondents were adopted different farming systems because they get additional income like get by-product which is useful to own farming, availability of raw material and input for systems locally, proper utilization of time of family members and get daily income from the farming system adopted. Majority of the respondents faced the constraints in adoption of different dry land farming systems are non availability of common grazing land in the village, non availability of improved breeds, lacked the training in rearing different animals, could not realize the proper amount from sale of animal and animal products due to fluctuation of prices since there was no proper marketing system, veterinary facilities for medical aid to their animal were lacking and non availability of loan from the financial institution. Therefore it is implied that the extension agencies and other

development organizations should concentrate on the above mentioned constraints.

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RESEARCH ARTICLE

Needs and Constraints Perceived by the Smallh olders Practicing Integrated Farming Systems in Backward Districts of Maharashtra

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ABSTRACT

The smallholders are contributing 78% to the India's total agricultural production but weak in terms of generating adequate income to sustain their own livelihood. The adoption of the technology is associated with a range of constraints and needs. In this contexts, the study was conducted for identifying the constraints and needs of input supply and services as perceived by the small holders practicing integrated farming systems in backward districts of Maharashtra. Continuous electricity supply, improved crop varieties, high yielding dairy animals, perennial fodder crop seeds, multipurpose forest trees seedlings, superior bucks, impr oved layersbreed, what, when and how to produce, when and where to sell produce, assured remunerative price, efficient milk procurement system, artificial insemination services, assured market for the timber, marketing of goats should be on live body weight basis, access to small ruminant's veterinary doctors and timely credit supply at lower interest rate with minimum collateral security were perceived needs of input supply and services by the smallholders in order to sustain their farming business. The constraints perceived by the smallholders in practicing different integrated farming systems were difficult to manage, difficulty in intercultural operations, competition for resources among the enterprises, effect of shade and defoliation on yield, long transition period, high initial capital investment, fly nuisance, polluting house environment, difficulty in animal care during peak crop season, high water requirement and damaging crops by animals. This paper concludes that the adoption of integrated farming systems among smallholders would accelerate when policymakers acknowledge needs and constraints accordingly.

Keywords : Constraints, input supply, integrated farming systems, needs, smallholder

INTRODUCTION

Agriculture is the main source of livelihood for the majority of the India's population. Raising the productivity of the food grain crops, vegetables, trees, and livestock is depends on the timely availability of farm inputs and services. Therefore, an efficient delivery system for agricultural inputs and services can play a crucial role in the growth of farm income. The most of the farmers are experiencing challenges and constraints in accessing the agricultural inputs and services. The timely availability of critical farm inputs and relevant information enable smallholder farmers to take right decisions for increasing their farm productivity as to sustain their own livelihood. On another side, the optimum use required farm inputs and resource recycling help to maintain environmental and economic balance. Hence, timely availability of farm inputs and services is the need of hours for sustainable agricultural growth.

Smallholder farmers are vital for India's agriculture and rural economy. The smallholders are contributing 78% to the India's total agricultural production but weak in terms of generating adequate income and sustaining their own livelihood. Small holding (below 0.8 ha) does not generate enough income to keep a farm family out of poverty despite high productivity[4].As per estimates, more than 95% of the holdings will be under the category of small and marginal in 2050[2].The livelihood of the small and marginal farm families is the major concern. In fact, our past experience has clearly evinced that the income from cropping alone is hardly sufficient to sustain the small and marginal farmer's livelihood.

Hence, there is need of intervention to reverse resource degradation, optimum resource utilization, farm input recycling and stabilize farm income especially on small and marginal lands. In the context of declining average land holding, Integrated Farming System (IFS) approach appeared as a sustainable alternative and year round source of income and employment for smallholder farmers. Therefore, farmer's livelihood security would have to be increased and supplemented by integration of efficient allied enterprises like dairy, poultry, goatary, mushroom cultivation, fisheries, apiculture, etc. with crop enterprise.

The success or failure of any technological intervention can be known by assessing the reactions of the people involved in it. In spite of its potential, the adoption of integrated farming systems among smallholders in Maharashtra is low. The adoption of the technology is associated with a range of constraints and needs. Hence, it was pertinent to undertake a scientific and objective investigation for identifying the constraints and needs of input supply and services as perceived by the smallholders practicing integrated farming systems in backward districts of Maharashtra.

Study area

TheState of Maharashtra was purposively selected for the study. Maharashtra is one among frontrunner state in agricultural field and has a robust presence in dairy development activities. Maharashtra state is having more number of small farmers as compared to other states [1].Maharashtra occupies the western and central part of the country and has a long coastline stretching nearly 720 km along the Arabian Sea. It is positioned between 16°N and 22°N latitudes and 72°E and 80°E longitudes. Maharashtra is the second largest state in India in population and third in geographical area. On the basis of agriculture productivity per worker, agricultural wage rate and schedule cast/schedule tribe population Planning Commission of India has identified eleven backward districts-Gadchiroli, Gondiya, Chandrapur, Dhule, Nandurbar, Hingoli, Nanded, Ahmadnagar, Aurangabad, Bhandara and Yawatmalin Maharashtra. Out of eleven backward districts, Ahmadnagar and Nandurbar districts were selected randomly for study. From the rando mly selected two districts, all four i.e. Devthan&Samsherpur (Ahmadnagar) and Mandane&Khandbara (Nandurbar) clusters were taken for the study (Fig. 1).

Ahmadnagar is the largest district in Maharashtra. The district is located between 73°9'E to 75°5'E longitude and 18°2'N to 19°9'N latitude. Ahmadnagar is famous for sugar factories. The average annual rainfall in this district is 501.8 mm. Although the rainfall is heavy near the Sahyadris in Akole and plenty in the hilly parts of Sangamner, Rahuri, Shevgaon and Jamkhed, it is uncertain in other parts of the district. Nandurbar district lies in the North-western region of Maharashtra. The geographical location

is between 73°31'E to 74°32'E longitudes and 21°N to 22°03'N latitudes. The average rainfall is 552 mm. It is predominantly a tribal district, with 62% tribal population and 75% of the rural population belonging to various tribes [3].

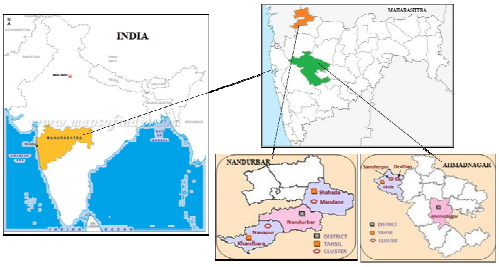

Fig. 1 Map showing location of study area

METHODOLOGY

An equal number (30) of small and marginal farmers were selected proportionately giving a total of 60 respondents from each cluster. Thus, total 240 small and marginal farmers (120 each) were selected proportionately from four clusters. Participatory Rural Appraisal (PRA) techniques such as secondary data review, semi-structured interviews and transect walk were used to ascertain the existing IFS in the study area. Agricultural inputs are the resources that are used in farm production such as chemicals, equipments, feed, seed, and energy. Services are intangible activities that can be exchanged for value to satisfy farmers' needs and wants. The responses to each item of inputs and services were obtained through structured interview schedule on a three-point continuums i.e. *most needed, needed* and*least needed*with weights assigned *2, 1,* and *0,* respectively. *Relevancy Coefficient*was calculated for each item by dividing the actual score obtained with the maximum possible score and based on these values, the needs of input supply and services were ranked.The constraints analysis under different integrated farming systems was carried out by employing PRA techniques such as focused group discussion and matrix ranking.

RESULTS AND DISCUSSION

Existing IFS in the Study Area

The results reveals that the Goatary (G)+Poultry (P) and Dairy (D)+G+P systems were practiced by the majority of landless farmers. In case of marginal and small farmers, Crop (C)+D+Forestry (F)+Horticulture (H)+P and C+G+H were found dominant IFS, respectively. The C+D+H system was practiced by medium and large farmers. This shows that the marginal land holders were more concern towards

integrating various enterprises on their farm in order to sustain their income. As present study related to smallholder farmers, C+D+H, C+G+H, C+D+G+H, C+D+F+H+P, C+F+G+H+P and C+D+F+G+H+P IFS practiced by them were considered for assessing the dimensions of their livelihood security.

In Samsherpur and Devthan clusters, C+D+H and C+D+G+H were major integrated farming systems. Onion, tomato, wheat, bajra and pomogranate were major crops in Samsherpur and Devthan clusters. The *Holstein f*risian and Jercy (Cross breds), Dangi (Desi cow), Sangamneri and Osmanabadi (Goat), Murrah (Buffalo), and Giriraj (Poultry) were major animal breeds in these clusters. In Mandane and Khandbara clusters, C+G+H &C+F+G+H+P, and C+G+H & C+D+G+H were major integrated farming systems, respectively. Cotton, Paddy, Wheat, Sorghum, Guava and Mango were major crops in these clusters. The local cows (Non-descript), Murrah and Surti (Buffalo), Osmanabadi (Goat) and Giriraj (Poultry) were major animal breeds in these clusters.

In case of forestry enterprise, majority of farmers was preferred Baboo and Tick for planting on field boundaries. The leaves of the bamboo used as the green fodder for the animals. Very few farmers had both local breeds and crossbreds in their herd. Goat farming was more popular in the study area as compared to dairy farming due to lack of highly productive milch animals at reasonable rate, costly feed and lack of milk procurement facilities. In milch animals, the average number of desi cows was more (3) followed by buffalo (0.75) and crossbreds (0.50). Almost all the respondents had two bullocks in their herd. In case of goatary and poultry, respondents had average 9 goats and 10 poultry birds in their herd. This reflects that the goat was dominant in animal holding of the respondents.

Nobody was commercial farmers and despite their small land holding, farmers in the study area earned a good income from farm due to integration of different farm enterprises. The substantial additional income can be generated and reduced migration by practicing different enterprise combinations based on farmer's capability and resource availability. Irrespective of farming systems, the farming system with more enterprise combination generated more income as compared to the farming systems with less enterprise combination. The

income generation was more in the C+G+H system as compared to C+D+H system in the study area. This might be due less productive milch animals and their cost of production was more. Goat farming was required less input and gave more income in the study area. The fodder requirement of goats was fulfilled through grazing on pasture land and leaves of forest trees which saved cost of feeding in the study area.

Needs of Input Supply and Services as Perceived by Smallholders

Table 1represents the needs of input supply perceived by smallholders practicing integrated farming systems. In crop farming, continuous electricity supply at reasonable rate (1.00) was the most perceived need by the farmers in the study area. This might be due to continuous electricity supply is necessary for irrigating crops and other farm operations. Similarly, the adequate supply of improved crop varieties at right time with reasonable price (0.96), timely and quality supply of fertilizers, herbicides and pesticides (0.96) and improved agricultural implements (0.83) were perceived needs of input supply by the farmers for sustaining crop farming. This might be due to the continuous supply of essential crop inputs be able to play important role in economic and agricultural security of small and marginal farmers. The use of improved agricultural implements can reduce drudgery in farm operations and increase efficiency of farmers in performing farm operations.

The dairy farming in the study area found under developed because of rearing of low yielding animals, shortage of green fodder throughout the year, costly feed and concentrates and lack of milk procurement system in the study area. Hence, availability of high yielding dairy animals at reasonable rate (1.00), improved fodder crop seeds and perennial grasses (0.94) and quality feed and concentrates at reasonable rate were the most perceived needs by the farmers for sustaining dairy farming.

The timely availability of multipurpose forest tree seedlings (0.92)is essential for sustaining forestry at the small holder's farm. The multipurpose forest trees can be planted on the borders of the field which helps to save land and increase cropping area. These trees provide green fodder, green manure, fuel and additional income from selling of wood, baskets and ropes.

The goat farming was more popular among the smallholder farmers of the study area because goat farming requires less input as compared to cow and buffalo rearing. Due to this, the resource poor farmers can easily reared goats and get regular income. Hence, the availability of improved goat breeds (0.96), development of pasture lands (0.92) and superior bucks for better progeny (0.90) were most perceived needs by the goat rearers in the study area in order to make goat farming more profitable.

The timely supply of improved vegetable varieties (0.96), and disease free seedlings of vegetable and fruit crops (0.96) were most perceived need by the horticultural farmers. This might be due to the fact that almost all the farmers had horticulture enterprise and used to take vegetable crops in summer and intercropping in fruit trees which provided additional income to the small and marginal farmers. The integration of vegetable and fruit trees with food grain crops ensured the food, nutritional and economic security of resource poor farmers.

The backyard poultry requires almost minimal input, and provides additional income and food security to the resource poor farmers. Hence, an improved breed of layers (0.90) and quality poultry feeds at reasonable rate (0.83) were most perceived needs by the poultry farmers in order to make small scale poultry farming more profitable.

Vermicomposting is the one of the great and less expensive option for recycling of animal and crop waste which reduce fertilizer requirement and keep surrounding clean. It is an income generating activity with less investment even for the landless. Hence, the availability of good species of earthworms for vermicomposting (0.96) was most perceived need by the farmers. This might be due to unavailability of earthworms and lack of know-how, farmers in the study area were not practicing vermicomposting on their farm.

Table 1 Enterprise wise needs of input supply as perceived by smallholders

Enterprises	Needs of input supply	Relevancy coefficient	Ranks
Crop	Continuous electricity supply at reasonable rate	1.00	I
	Adequate supply of improved crop varieties at right time with reasonable price	0.96	II
	Timely and quality supply of fertilizers, herbicides and pesticides	0.96	II
	Improved agricultural implements	0.83	III
Dairy	High yielding dairy animals at reasonable rate	1.00	I
	Improved fodder crop seeds and perennial grasses	0.94	II
	Quality feed and concentrates at reasonable rate	0.88	III
Forestry	Seedlings of multipurpose forest trees	0.92	I
Goatary	Improved goat breeds	0.96	I
	Pasture land developments for grazing goats	0.92	II
	Superior bucks for better progeny	0.90	III
Horticulture	Improved varieties of vegetable crops	0.96	I
	Disease free seedlings of vegetable and fruit crops	0.96	I
Poultry	Improved breeds of layers	0.90	I
	Quality poultry feeds at reasonable rate	0.83	II
Others	Earthworms for vermiculture	0.96	I
	Honey bee hives and Honey extractor	0.92	II
	Honey processing equipments ()	0.92	II
	Fish seeds	0.75	III
	Farm ponds through government subsidy	0.73	IV

Apiculture has good potential to provide substantial income within a short period to the resource poor farmers. As less input requirement and had fruit trees and flowers on their farm, majority of farmers in the study area had wished to integrate honey bee cultivation in the farm with other

enterprises as. Hence, honey bee hives and honey extractor (0.92) were most perceived needs by the farmers in order to start apiculture and generate additional income for sustaining their livelihood.

Fish farming was not popular in the study area. But, any how the farmers had major water source throughout the year, wished to start fish farming. Hence, supply of fish seeds (0.75) and government subsidy on farm pond construction (0.73) were most perceived needs by the farmers to start fish farming.

Table 2represents the needs of services perceived by smallholders practicing integrated farming systems. The services consist of information services, training, marketing services, credit services, veterinary services, etc. In crop farming, information on what, when and how to produce (1.00) and information on when and where to sell the produce (1.00) were most perceived needs by the farmers in the study area. This might be due to less productivity and less income due to lack of know-how. The study area had low access to the market facilities and poor infrastructure facilities. The farmers used to get fewer prices in the local market. Hence, the need for assured and remunerative price for the produce (0.96) was perceived by the farmers. Further need for demonstrations on intercropping systems (0.92) was also perceived by the farmers because they had realized the importance of intercropping. Hence, the demonstrations on profitable intercropping combination ensure sustainable income to the farmers. Awareness about subsidies on farm inputs (0.90) may also help farmers to reduce cost of cultivation which may be increase net income of the farmers. The paddy cultivators in the study area perceived need of easy access to farm machinery (Rice milling machine) and equipments at reasonable rate (0.83). This might be due to the fact that they used to travel long distance for milling of rice which consumed time, money and labour. Hence, the local availability of such machineries can reduce the farm drudgery and increase the farm efficiency.

The dairy farming was not potentially developed due to poor milk procurement system in the study area. Hence, the efficient milk procurement system (1.00) was the most perceived need by the farmers. The timely artificial insemination service (0.92) was another important need perceived

by the farmers. This might be due to the poor veterinary services in the study area. The majority of dairy farmers had wished to take part in training on improved dairy farming practices (0.90), fodder preservation practices (0.90) and farm waste management (0.79). This might be due they had realized the importance of commercial dairy farming for sustainable income. The training on fodder preservation practices can also help them during fodder shortage period. The farmers had realized the importance of farm waste management through biogas and vermicomposting in order to keep surrounding environment clean, but they didn't know know-how.

The assured market for the timber (0.92) from forest trees (Bamboo) was perceived need by the farmers who had forestry component in their integrated farming system. This might be due to the poor market facilities for the sale of timber in the study area.

The goat farming was dominant and more popular among the farmers in the study area. The farmers had felt that marketing of live goats should be on body weight basis (0.96) because of farmers didn't have the expertise in judging the weight of live goats; hence buyers were used to exploit them. The need for timely vaccination services (0.90) and access to veterinary doctors with experience of small ruminants (0.90) were also perceived by the goat rearers. This might be due to lack of veterinary services and unavailability of small ruminant's veterinary experts in the study area. Further it was also found that majority of farmers had wished to undergo training on scientific goat farming (0.83) to get more profit from goat farming because it required less input and gave more returns round the year.

Market for horticultural crops (1.00) was the major need perceived by the farmers who cultivated fruits and vegetables. This might be due to marketing of flowers, fruits and vegetables on small scale were difficult due to inefficient marketing system in the study area. The need for training on IPM in horticultural crops (0.92) was also perceived by the farmers who cultivated pomogranate. This might be due to heavy expenditure on major pests control in pomogranate which increased cost of cultivation in the study area. The farmers had realized the importance of proper grading and packaging of the horticultural crops help to get better price for produce in

the market. Hence, need of information on grading and packaging of fruits and vegetables (0.90) perceived by the farmers in the study area. The farmers interested in commercial poultry farming had perceived need for timely vaccination services (0.96) and training on scientific poultry farming (0.83) in order to obtain more profit from the poultry farming.

The timely credit supply is essential for smooth flow farming operations. Hence, timely credit supply at lower interest rate with minimum collateral security (1.00) was the most perceived need by the farmers. This might be due to lack of credit facilities with lower interest rate and minimum collateral security in the study area. The farmers had realized that integration of different enterprises on the farm gives sustainable income source and optimum resource utilization. But the proper selection and integration of enterprises is essential in order to avoid competition for resources among the enterprises. Hence, the need for training on integration of farm enterprises (0.96) was perceived by the majority of farmers. The establishment of service centers to provide technical knowledge, recommended inputs and market information (0.96) at village level provides 'single window system' for the farmers. The farmers in the study area were unable to store produce after harvesting due to lack of storage facilities. If proper storage facilities are available and less price for the produce in the market, then farmers can store their produce in hope of getting better price in future.

Table 2 Enterprise wise needs of services as perceived by smallholders

Enterprise	Needs of services	Relevancy Coefficient	Ranks
Crop	Information on what, when and how to produce	1.00	I
	Information on when and where to sell the produce	1.00	I
	Assured and remunerative price for the produce	0.96	II
	Demonstrations on intercropping systems	0.92	III
	Publicity of Governmental Subsidy schemes related to farm inputs	0.90	IV
	Access to farm machinery and equipments at reasonable	0.83	V

	rate		
Dairy	Milk procurement facilities	1.00	I
	Timely artificial insemination services	0.92	II
	Training on improved dairy farming practices	0.90	III
	Training on fodder preservation practices	0.90	III
	Training on farm waste management	0.79	IV
Forestry	Assured market for the timber	0.92	I
Goatary	Marketing of live goats on body weight basis	0.96	I
	Timely vaccination services	0.90	II
	Access to veterinary doctors with experience of small ruminants	0.90	II
	Training on scientific goat farming	0.83	III
Horticulture	Market for horticultural crops	1.00	I
	Training on IPM in horticultural crops	0.92	II
	Information on grading and packaging of produce	0.90	III
Poultry	Timely vaccination services	0.96	I
	Training on scientific poultry farming	0.83	II
Other	Timely credit supply at lower interest rate with minimum collateral security	1.00	I
	Training on integration of farm enterprises	0.96	II
	Service centers to provide technical knowledge, recommended inputs and market information	0.96	II
	Storage facilities at reasonable rate	0.92	III
	Provision of subsidy on micro-irrigation	0.88	IV
	Support for formation of farmer's groups	0.83	V
	Off-farm income generating options	0.83	V
	Training on bee keeping	0.80	VI
	Training on fish farming	0.80	VI

The stored produce can be the collateral security for farmers in getting loan for the next crop. Hence, the need for availability of storage facilities at reasonable rate (0.92) was most perceived by the farmers in the study area. The provision of subsidy on micro-irrigation (0.88) helps farmers in efficient use of available water and reduce the extent of water shortage. The farmers had realized that group has more credibility than individual. Hence, the need for support for formation of farmer's groups (0.83) was perceived by the farmers. The off-farm income generating options (0.83), training on bee keeping (0.80) and training on fish farming (0.80) were other perceived needs by the farmers for getting additional income and employment in order to sustain their livelihood.

Table 3: Constraints encountered by smallholders practicing different integrated farming systems

Constraints	Integrated farming systems						Overall
	C+D +H	C+D+ G+H	C+D+F +H+P	C+D+F+ G+H+P	C+F+G+ H+P	C+G +H	
Difficult to manage various enterprises simultaneously	**	***	****	*****	***	*	***
Nutritional insecurity to farm family	****	***	*	*	***	****	***
Less diversified income sources	*****	***	**	*	**	****	***
Crop residue recycling	**	***	****	*****	****	**	***
Difficulty in intercultural operations	**	**	***	****	***	**	***
Competition for resources (Water, nutrients, labour, etc.)	*	**	***	****	***	*	**
Effect of shade and defoliation on yield	*	**	****	*****	****	*	***
Long transition period in case of fruit and forest trees	***	***	****	****	****	***	****
Off season unemployment	****	**	**	*	**	***	**

Risk involvement	**	***	****	*****	****	**	***
High initial capital investment	**	***	****	*****	****	**	***
Weed problem	****	***	**	*	**	****	***
Fly nuisance	**	***	****	*****	***	**	***
Need for special infrastructure	**	***	***	*****	***	**	***
Dependency on external inputs	****	***	**	*	**	****	***
Polluting house environment	*	**	***	***	***	*	**
Increased labour cost	*	**	****	*****	****	**	***
Difficulty in animal care during peak crop season	***	****	****	*****	****	***	****
Water requirement	**	***	****	*****	****	**	***
Shortage of grazing lands	**	*****	***	*****	****	****	****
Damaging crops by animals	*	***	****	*****	****	***	***
Skill requirement of farm family	***	****	****	*****	****	***	****
Utilisation of waste land	**	***	****	*****	****	**	***

C- Crop; D- Dairy; F- Forestry; G- Goatary; H- Horticulture and P- Poultry

* Very low, ** Low, *** Medium, **** High and ***** Very high

Constraints Encountered in Practicing Integrated Farming Systems by Smallholders

The integrated farming systems with different enterprises combination practiced by farmers have some inherent advantages and constraints. The perusal of results presented in Table 3 reveals that the different types of farming systems were being characterised by interdependency of on and off farm activities, utilisation of family labour, multipurpose use of the products and by-products of each farm enterprise. In C+D+H and C+G+H systems, management was easy as inputs were readily available and control of unforeseen difficulties was possible whereas the management of C+D+F+H+P and C+D+F+G+H+P systems were difficult. This might be due to these IFS require more skill,

time, labour and other resources. The nutritional insecurity was more in C+D+H and C+G+H systems as compared to C+D+F+H+P and C+D+F+G+H+P systems. This might be due to dairy, poultry and horticulture enterprise combinations provide better nutritional diet to farm family. The farming system having more enterprise combination provided more diversified income like C+D+F+G+H+P system. The crop residue recycling was low in C+D+H and C+G+H systems might be due to less number of complementary enterprise combinations leads to less effective utilisation of farm resources. The difficulty in intercultural operations and effect of shade, and defoliation on yield were more in C+D+F+H+P, C+D+F+G+H+P and C+F+G+H+P systems might be due to forest and fruit trees planted in field as intercrop create difficulties in intercultural operations as well as shade and defoliation of trees reduce crop yield.

The competition for resources, risk involvement, high initial capital investment, increased labour cost and water requirement were high in the farming systems having more enterprise combination like C+D+F+H+P, C+D+F+G+H+P and C+F+G+H+P systems. The systems where risk was perceived to be high should consider seasonality, perishability, quality and variability of farm production. The off season unemployment was more in the farming systems having less enterprise combination like C+D+H system. The poultry and goatary provided better source of income and employment round the year especially during off season (Agricultural lean season). The farming systems having more animal integration created more fly nuisance, damage to crops by animals, polluting house environment and difficulty in animal care during peak crop season like poultry, dairy and goatary.

The need for special infrastructure and skill were more in the farming systems having more enterprise combination like C+D+F+H+P, C+D+F+G+H+P and C+F+G+H+P systems. This might be due to more integration require more skill and infrastructure for effective utilisation of available resources. The fruit and forest trees had long transition period which created short term indebtedness. Hence, the long transition period was one of the major constraints in horticulture and forestry enterprise integration. The utilization

of waste land was high in the farming systems having more enterprises integration such as C+D+F+H+P, C+D+F+G+H+P and C+F+G+H+P systems. The shortage of grazing land was the major constraint under the farming systems having goatary as a component such as C+D+G+H, C+D+F+H+P, C+D+F+G+H+P, C+F+G+H+P and C+G+H systems. The constraints analysis brought out certain important findings are as follows;

1) The choice of enterprise and crops in any combination should take into account the available resource base, crop geometry and environment.
2) The marketing channels for inputs and outputs for a particular enterprise combination should not be excessively risk-prone.
3) The particular enterprise combination can be successful once credit, information about know-how, market and other farm inputs are well established.

CONCLUSION

The timely availability of farm inputs and services is the need of hours for sustaining agricultural production as well as livelihood of smallholders. The integrated farming systems with different enterprises combination practiced by smallholders have some inherent advantages and constraints. These constraints affect adoption of IFS and are difficult to address through extension services. To address these constraints, policies and programs need to explore ways to connect IFS farmers to the wider input supply and marketing networks. Farming systems under small farm holders can only be made profitable if farmers adopt a conservative approach at all stages of farming. For this he has to utilize each and every inches of land for raising suitable field and plantation crops, select low cost viable enterprises for diversification, recycle all farm wastes and crop residues within the system itself and make productive use of farm boundaries and waste lands if any. Further, farmers are also advice to make use of renewable sources of energy such as solar and biogas etc. Potential improvements and increased productivity from the various enterprises can only come from a better understanding of the nature and extent of the interactions various enterprises and resources. Research on these aspects provides major challenges for sustainable agricultural

development through integrated farming systems in the future.

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RESEARCH ARTICLE

Effect of Polypropylene Non-Woven Fabric Row Covers for Improving Fruit Yield & reducing Pest and Disease Risk in Watermelon

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ABSTRACT

This on farm research study was aimed at evaluating new strategies in the use of plastic protective covers (Polypropylene non Woven Cover in field grown watermelon in order to improve the fruit quality and reducing pest risk in watermelon. Field trial were conducted in 2015-2016 and repeated in 2016-2017 on farmers field. Also another aim of present investigation was to give an overview about the effect of non-woven fabric on the yield and production characteristics of Watermelon. Non-woven Fabrics create a micro-climate providing uniform ventilation thereby encouraging early growth and end result of both improvement in quality and yield of Watermelon. They protect the plant from cold and frost.

Non-woven crop cover increased total yield, and low temperature and frost. Use of nonwoven fabric reduced insect pest's damage, and increases the yield of fruits per hectare. Due to use of PP non woven Crop cover in Watermelon after 10 days of plantation increases the fruit yield and reduces pest risk of watermelon only 2% pest incidence is observed.

Keywords: Protected agriculture; Row covers; Polypropylene Heat units, Non woven fabrics, row covers, Polythene mulch, Pollination, Watermelon

INTRODUCTION

Watermelon (Citrullus lanatus) is one of the important vegetable crops commercially grown in Maharashtra also in Pune district. India is the second largest producer of Vegetables in the world, next only to China. Baramati is drought prone area, where the average rainfall received is about 400-450 mm. As there are water scarcity and sucking pest infestation problems, most of the

farmers uses the drip irrigation systems to irrigation & Fertilizers application to crops. Also for controlling the attack of sucking pest on watermelon and reducing the cost of insecticides to control them this trial was carried out at Village-Boribel Tal-Daund Dist-Pune.

Polypropylene Non-woven Fabrics (Plant Crop cover) made from polypropylene an economical and environment friendly polymer by spinning the material into fine filaments and bonding them by heat without use of any binders. It has specialized UV absorbent incorporated in it which ensures protection against the sun's rays.

Non-woven Fabrics (protection paper) create a micro-climate providing uniform ventilation thereby encouraging early growth and development of the plant and/or crop with the valuable end result of both improvement in quality and yield. They protect the plant from cold and frost. Up-to 5 degrees C some circulating moisture is trapped by it and in the event of a frost this film freezes providing the plant with natural frost protection. It minimizes the dangers caused by hail, heavy rains and storms. This Non-woven Agricultural Fabrics is almost 80% transparent and water permeable.

MATERIAL & METHODS -

The trial on Effect of Poly Propylene Non-woven fabric for improving fruit quality reducing
Pest risk in Watermelon was conducted during 2015-2016, 2016-2017& 2017-2018 on 100 farmers field. The trials were conducted in summer on irrigated medium black soil. The annual rainfall is 461 mm with 31 rainy days. Before these trials farmers were planting Watermelon on Mulching paper but they do not use Poly propylene- Non Woven crop cover, due to this farmers practice there is attack of pest and disease on crops and requires maximum cost for control of sucking pest. So avoiding this problem, KVK decided to conduct trial on Use of Poly Propylene Non-woven crop covers for improving fruit quality & reducing Pest risk in Watermelon.

RESULTS & DISCUSSION

The results of this trial is given in the below table.

Table no.1 Details of observations recorded in the on farm trial

Title of Trial (OFT)	Treatment Details	Data on the Parameters
1	2	3
Effect of Poly Propylene Non-woven crop covers for improving fruit quality & reducing Pest risk in Watermelon.	**T1- Farmers Practice-** Planting on 30 microns silver black polyethylene mulching without use of PP Nonwoven crop covers.	**1.** Number of Sprays required - **11** 2. % attack of pest & disease-**28** 3. Additional Cost required – **Rs.0.00/-** 4. Yield obtained (Tones /ha)-**41.2 ton / ha.** **5.** Net Returns (Rs /ha)- **Rs.190064.4/-** 6. C :B Ratio -**1 :2.3**
	T2-Trial Treatment- Planting on 30 microns silver black polyethylene mulching with use of PP Nonwoven crop covers	**1.** Number of Sprays required - **03** 2. % attack of pest & disease-**02** 3. Additional Cost required – **Rs.12871/-** 4. Yield obtained (Tones /ha)-**58 ton / ha.** **5.** Net Returns (Rs /ha)- **Rs.313452.3/-** 6. C :B Ratio -**1 :3.8**

It was observed that the yield of watermelon was increased by 40.77% as compared to farmers practice with the good quality fruit production. The average yield obtained in trial plot was 58.00 ton/ha as compared to 41.2 tons/ha from farmers practice. 8 Chemical sprays were saved; percentage attack of pests is 26% less as compared to farmer practice. The net returns (Rs.3, 13,452.3/- per ha) and B: C (1: 3.8) ratio were also recorded highest in treatment plots as compared to local check net returns (Rs.1, 90,064.4/- per ha) and B: C (1: 2.3) ratio.

Comparisons were made with farmers practice. From the above trial it can be concluded that, Due to use of PP non woven Crop cover in Watermelon after 10 days of plantation increases the fruit yield and reduces pest risk of watermelon and only 2% pest incidence is observed. In addition to

this, there is early fruiting of Watermelon as compared to controlled plot. Also the farmers got maximum price 15 days earlier due to as compare to farmer practice. Planting of Watermelon on Mulching in summer season reduces crop water requirement and also weed population.

CONCLUSION

The effect of Poly Propylene Non-woven crop covers is useful for improving fruit quality & reducing Pest risk in Watermelon this technology is very useful to reducing pest risk at very minimum level only 2 % and for improving fruit quality and receiving maximum net returns to the farmers. This trial increases the yield of crop by 40.77 % with less additional cost for installation of plastic mulching & PP Non woven crop cover.

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RESEARCH ARTICLE

Women in Panchayat Raj: Factors Discriminating them with their Male Compeers

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ABSTRACT

Constitution of India was amended by way of 73rd amendment in 1992, wherein constitution and establishment of Panchayats was made mandatory and it was effected in the hope that it would lead to better governance and provide politicalspace to the disadvantage section of the society like schedule caste, schedule tribes and particularly women.The present study was carried out in order to examine the relative importance of different factors in discriminating between the male and female Panchayat Rajleaders. Sample consisted of 54 women and 118 male elected representatives from two districts Junagadh and Amreli of Gujarat state.Purposivesampling technique was adopted for selecting the sample from Village, Taluka and District. The tool used for obtaining informationwas a specially developed Interview Schedule. The data was kept for discriminant function analysis, mean and mean differences, tests of equality and the Wilk's Lambda, the F-values and their level of significance for each variable were calculated. The findings of the study revealed that female to female discrimination was 70.40 per cent and it was 29.60 per cent in case of female to male. On the other hand, the discriminant function between male to male was 72.90 per cent and it was 27.10 per cent between male to female.The reason for such variation in characteristics was inequality in the working environment; local power relations, gender differentials, and caste based divisions which influence the elected representatives.

INTRODUCTION

Panchyati Raj Institutions have always been considered as a means to good governance. Constitution of India was amended by way of 73rd amendment in 1992, wherein

constitution and establishment of Panchayats was made mandatory and it was effected in the hope that it would lead to better governance and provide political space to the disadvantage section of the societylike schedule caste, schedule tribes and particularly women.

The local self-government institutions are expected to plan and implement the programmes for rural, agriculture, horticulture and allied sectors. Heads elected to the various Panchayat Raj institutions are therefore very important because they are not only politically influential, but because they are direct carriers of knowledge of rural & agricultural development programmes and rural people are convinced to a greater extent by them. The panchayat raj institutions were intended to enhance the participation in governance ofdiverse groups of rural people, and to make a change in their living conditions, based on their own contributions to the functioning of the panchayats.

However, as several studies have shown, women have not had it easy to function in the panchayats, due to traditional views that hold that politics is notan appropriate activity for women, and also that their inexperience in politics would in any case bedetrimental to the functioning of the panchayats. Notwithstanding these hindrances, women have beenelected in large numbers to the panchayats to fill the reserved seats.

Gujarat today is ranked as one of the most developed states in India supported bywhat is claimed to be fairly effective governance.Gujarat has a golden history of the Panchayati Raj institutions. The quota for the women members in Gujarat is fifty per cent. It is true that a plethora of studies exist, regarding the various aspects of Panchayati Raj Institutions. But very few systematic studies have been conducted with specific reference toexamine the relative importance of different factors in discriminating between the male and female panchayat leaders.

METHODOLOGY

The present investigation was conducted in order to examine the relative importance of different factors in discriminating between the male and female panchayat leaders. Purposivesampling technique was

adopted for selecting the sample from Village, Taluka and District. Heads of Panchayat Raj institutions at three tiers were the respondents for the study. The total sample size was 172. Sample consisted of 54 women and 118 male elected representatives from two districts Junagadh and Amreli of Gujarat state.The tool used for obtaining informationwas a specially developed Interview Schedule. The data was kept for discriminant function analysis, mean and mean differences, tests of equality and the Wilk's Lambda, the F-values and their level of significance for each variable were calculated.

RESULT AND DISCUSSION

1. Characteristics that discriminates male and female Heads of Panchayat Raj institutions

In order to examine the relative importance of different factors in discriminating between the male and female respondents, the discriminate function analysis was carried out.

The co-efficient of the discriminate function measure the net effect of an individual variable when all other variables were taken as constant.

The discriminant function for the data was estimated as:

$$Z = -0.885(X_1) + 0.640(X_2) - 0.022(X_3) - 0.158(X_4) + 0.245(X_5) + 0.041(X_6) + 0.278(X_7) - 0.380(X_8) + 0.121(X_9) + 0.144(X_{10}) - 0.0320(X_{11}) - 0.113(X_{12}) + 0.162(X_{13}) + 0.239(X_{14}) + 0.008(X_{15})$$

The test of significance of discriminate function is a test of hypothesis that there is no difference in the mean values of the chosen characteristics in the two populations of male and female heads of panchayat raj institutions. The results presented in Table1 reflects that all the independent variables together could significantly discriminate the male and female leaders as revealed by the significant '$D^{2'}$ value tested for its significance using the corresponding 'F' value. It implies that, all the 15 variables all together were responsible for discriminating the male and female Heads of Panchayat Raj institutions

The results reflected that all the independent variables together could

significantly discriminate the male and female leaders as revealed by the significant 'D^2' value tested for its significance using the corresponding 'F' value, which implies that, all the 15 variables together were responsible for discriminating the male and female Heads of Panchayat Raj institutions. Relatively higher mean difference was observed in case age (7.09) extension contact (7.48), attitude towards agriculture (2.08), risk orientation (1.02), trainings received (0.58) and sociopolitical participation (0.58). The traditional bindings on the women limits their participation in various public activities reflecting difference in mean scores with extension contact (7.48), attitude towards agriculture (2.08), risk orientation (1.02), trainings received (0.58) and social participation (0.58) and it was concluded that, usually women agree with such an assessment, and let their husbands do their work asrepresentatives.

Table 1. Means and the mean differences in characteristics of Male Respondents and Female Respondents (n-172)

Sr. No.	Socio economic Characteristics	Mean Value			Mean difference
		Female	Male	Mean of mean values (both groups)	
1	Age	41.11	48.20	45.98	7.09
2	Education	7.52	7.92	7.80	0.41
3	Family type	1.30	1.36	1.34	0.07
4	Family Size	7.78	7.30	7.45	-0.48
5	Land holding	4.32	5.22	4.94	0.91
6	Annual income	1.48	1.72	1.65	0.24
7	Occupation	2.65	2.84	2.78	0.19
8	Political background	0.89	0.51	0.63	-0.38
9	Social participation	1.02	1.58	1.41	0.57

10	Training received	2.48	3.06	2.88	0.58
11	Extension participation	42.25	49.73	47.38	7.48
12	Attitude towards agriculture	34.31	36.39	35.74	2.08
13	Cosmopoliteness	21.06	21.88	21.62	0.83
14	Risk orientation	12.44	13.47	13.15	1.02
15	Self confidence	31.87	32.34	32.19	0.47

2. Contribution of the individual characteristics to the total distance measured

In order to know the relative importance of each characteristic in its power todiscriminate the two groups, the percentage of total distance was computed and it isshown in Table 2. The results revealed that the main variables that discriminate between the two populations of male and female heads of panchayat raj institutionswere age (0.885), education (0.640), land holding (0.245), and risk orientation (0.239) while family type (-0.022), family size (-0.158), political background (-0.380), attitude towards agriculture (-0.113) and extension contact (-0.032) were bringing them closer.

Table 2.Percentage contribution of the individual characteristics to the total distance measured

Sr. No	Socio-economic variable	Mean difference (ΔX_i)	Coefficient (L_i)	Co-efficient x Mean difference ($\Delta X_i \times L_i$)	Percentage to the total
1	Age	7.09	0.885	6.273336	88.37208
2	Education	0.41	0.640	0.259486	3.65535
3	Family type	0.07	-0.022	-0.00148	-0.02079

4	Family Size	-0.48	-0.158	0.076079	1.07172
5	Land holding	0.91	0.245	0.22238	3.13265
6	Annual income	0.24	0.041	0.009874	0.13909
7	Occupation	0.19	0.278	0.053145	0.74864
8	Political background	-0.38	-0.380	0.144416	2.03437
9	Social participation	0.57	0.121	0.068713	0.96794
10	Trainings undergone	0.58	0.144	0.083251	1.17275
11	Extension contact	7.48	-0.032	-0.23726	-3.34225
12	Attitude towards agriculture	2.08	-0.113	-0.23528	-3.31435
13	Cosmopoliteness	0.83	0.162	0.134104	1.88911
14	Risk orientation	1.02	0.239	0.244049	3.43790
15	Self confidence	0.47	0.008	0.003958	0.05576
				D^2 =7.098	100

As it could be observed from the Table, age, education, land holding and risk orientation were the major characteristics classifying the male and female respondents. Their respective contribution in discriminating the two groups were 88.37, 3.65, 3.13 and 3.43 per cent.

Though the women are seen through traditional patriarchal roles of being wivesand mothers, not as effective decision-makers in the public sphere and are still struggling in social and political avenues, this struggle for creating a new future for women encounters harsh opposition from patriarchal and feudal elements. In this back drop, the constitution amendment of Panchayat Raj Institutions(PRIs) making it mandatory for one half positions to be contested only by women,gave a legitimacy and respect to leading families motivating women to contest, takingthe new position as a point of entry for the family and not only for the individualwomen. This might be reason that most of the women respondents are young aged and mean difference of age between male and female respondents is 7.09 years.

Table 3. Tests of Equality of Group Means (172)

Sr. No	Socio-economic variable	Wilks' Lambda	F	df_1	df_2	Sig.
1	Age	.896	19.771**	1	170	.000
2	Education	.998	.408	1	170	.524
3	Family type	.996	.757	1	170	.385
4	Family Size	.993	1.234	1	170	.268
5	Land holding	.988	2.134	1	170	.146
6	Annual income	.990	1.697	1	170	.194
7	Occupation	.976	4.227*	1	170	.041
8	Political background	.971	5.097*	1	170	.025
9	Social participation	.978	3.770	1	170	.054
10	Trainings undergone	.970	5.230*	1	170	.023
11	Extension contact	.971	5.047*	1	170	.026
12	Attitude towards agriculture	.992	1.400	1	170	.238
13	Cosmopoliteness	.997	.581	1	170	.447
14	Risk orientation	.974	4.627*	1	170	.033
15	Self confidence	1.000	.070	1	170	.792

(* *Significant at 1%, * Significant at 5%)

The Wilk's Lambda, the F-values and their level of significance for each variable are presented in Table 3. The coefficients of different set of variable analyzed separately and their effect in determining the discrimination among two groups were subjected for level of significant.

If the value is close to zero indicates strong group differences or the data from each group are different and if the value close to one indicates no group differences or the data from each group are different. The results indicate that age is significant at $p \leq 0.01$, while occupation, political background, trainings undergone, extension contact and risk orientation are significant at $p \leq 0.05$.

Table 4. Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.774	41.385	15	.001

The value of chi square is 41.385 which is significant at 1 per cent level of significance.

3. Discriminant function classification Results

The results presented in Table 5 revealed that female to female discrimination was 70.40 per cent and it was 29.60 per cent in case of female to male. On the other hand, the Discriminant function between male to male was 72.90 per cent and it was 27.10 per cent between male to female discrimination.

Table 5. Discriminant Function Results

n = 172

Gender		Predicted group membership		Total
		Female	Male	
Count	Female	38	16	54
	Male	32	86	118
Per cent	Female	70.4	29.6	100.0
	Male	27.1	72.9	100.0

The reason for such variation in characteristics was inequality in the workingenvironment; local power relations, gender differentials, and caste based divisions, which influence the elected representatives.Anotherreason might be that one years of period was too short to make any assessment of therespondent's performance. They have to face difficulties and constraints and will faceeven in future but their learning phase has shown their potential and motivation forcontributing to a vibrant local democracy and development of local self governinginstitutions.

A close look at the table also reveals that although 29.60 per cent of the Heads of Panchayat raj institutions

were female, they were like their male counterparts as interpreted by the independent variables and about 27.10 per cent of the male respondent's were like a female head of institution.The above findings are supported by the findings of Belli (2008) and Khade (2014)

CONCLUSION

Results of the study regarding thepersonal and socio economic attributes as well as presence and performance of women respondents suggests that having women as representatives, and as executives, ina political institution such as the panchayats have a bearing on the overall position of women, in termsof providing more opportunities for women to function in a political institution. It is a fact that women are not lower than men in terms of intelligence, thinking, imagination, attitude, courage and activities. Even though women constitute half thehuman resources of a nation and playingpivotal role in the overall progress of thecountry, women continue to be seen through traditional patriarchal roles of being wivesand mothers, not as effective decision-makers in the public sphere and are still struggling in social and political avenues. These would also instillgreater possibilities to develop policies more beneficial to women and also enable women to have agreater control over their own lives.

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SHORT COMMUNICATION

Sustainable Solution for Vegetable Waste Generated at Navsari District- A Case Study

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The purpose of writing this script to know the current practices related to the various waste management initiatives taken in Gujarat, India by the farmers for their socio-economic development. In Navsari, especially Agriculture Produce Marketing Committees (APMC) yard tonnes of vegetable wastes produced every day. It adds to waste for market. These wastes are useless and produce unhygienic conditions in and around the city. But by processing in systematic way in an eco-friendly manner these vegetable waste materials can be converted to commercial viable products. Two youths in Navsari district left their job and started thinking about the agriculture especially, soil health and organic farming. Later they started collecting vegetable wastes and started bio-processing it and standardized their own decomposing procedure. In a month (30 days) they ended with the compost product. Surprisingly the end product didn't have foul smell which is not a problematic for labourer to grade/sieve it. **Physico-chemical characterization of the final product was analyzed at Navsari Agricultural University laboratory.** It stands better then the available product in the market. Product having PH: 7.95, EC-6.0,N-6.01, P-3.08,K-2.47, Moisture - 26.70% and Organic Matter 44.80. The young farmer in the village "Sarpore-pardi" has set confidence among the rural youths to take up an innovative venture as well as they protected the environment and food chain which is necessary.

In the present study, the area chosen was Agriculture Produce Marketing Committee (APMC), Navsari, Dist: Navsari, Gujarat. In market yard, large amount of biodegradable vegetable wastes are available such as-

Brinjal, Potato, Chilli, Tomato, Cauliflower, Cabbage, Okra, Little gourd, Pointed gourd, Bitter gourd, Bottle gourd, Spine gourd, Cucumber and Ridge gourd depending upon the season. These agro wastes are collected by two rural youths (Dist: Navsari) from APMC with the help of labours and transported at compost project site by local vehicle (Tractor).

Compost project site selection: Suitable site in the village "Sarpore-pardi" (Nearby Navsari) is selected to ease regular supply of agro wastes with the convenient utilities like roads for transport, availability of labours, communication facilities etc with sloped land for drainage purpose. While selecting a site, all necessary precautions have taken care.

Equipments required: Tractor, Waste Shredder, Rotavator, Spray pump and Separator. Shredding of vegetable waste are get shredded for reducing the size of bulky and leafy vegetables with the help of shredder. Rotavator: to rotate decomposed material for proper aeration. Separator: use of separator to separate the compost from pebbles and soil amendments (Photo plate 1).

Procedure followed for manure production:

Materials required for manure production are; APMC waste 1500 kg, cow dung 1500 kg and cow urine 200 liters. First, take 500 kg cow dung and uniform spreading on the ground in a height about 1ft. Next step: spread shredded vegetables 500 kg on the cow dung layer and repeat it for three times. Afterwards spray cow urine 200 liters on a prepared agriculture vegetable waste bed. Sprinkle the water regularly in order to maintain 75^0 C. During 30 days process rotate the vegetable waste with the help of rotavator three times in ten days interval. Subsequently in one month it turns into black colour. Later use the separator to separate the compost from pebbles and soil amendments. This compost is rich in nutrients used as organic fertilizer and soil amendment in farm.

Physico- chemical analysis of compost: matured compost samples were collected about 500 gm and kept in the polythene bag which is free from adventitious contaminations. Sample bag was labelled and sealed air tightly. The Physicochemical analysis of compost was conducted in laboratory of Navsari Agricultural University, Soil

Science Department Laborotary, Navsari Gujarat.

Physical parameters of compost: Particle size- particle size of sample which passed through the 4.0 mm IS sieve. Colour- The colour of compost sample is noted. Odour- The foul odour were observed in compost sample. Bulk density (g/cm3) – The bulk density was worked out and Moisture, percent by weight was recorded.

Chemical parameters of vermicompost total Nitrogen (as-N): The standard method of analysis of total nitrogen used as per fertilizer control order 1985**.** We estimated the amount of nitrogen in sample by using Kjeldahl‟s assembly. ***pH*****:** The pH meter was used to determine pH.

Moisture: 5 gm sample was taken in a weighed clean, dry petri dish. Then allowed to heat in an oven for about 5 hours at 650 ±10C to constant weight and cool in desiccators and weigh. Percentage loss in weigh indicated as moisture content.

Conductivity: The conductivity was measured with the help of conductivity meter which calibrated by using 0.01 M potassium chloride solution.

Phosphorus (P2O5) – The amount of phosphorus was analysed by gravimetric Quinoline molybdate method as described under Schedule-II, Part B, and 4(ii) of fertilizer (control) order 1985.

Physico-chemical characteristics of compost produced form the agro waste generated at APMC of Navsari are in table 1.

Colour: Dark black colour of compost indicated that the decomposition of agro waste successfully**.**

Particle size- Particle size of sample was 93.78% which passed through the 4.0 mm IS sieve.

Odour: Absence of foul odour indicated that all parameters required for composting process were present in optimum condition.

Bulk density: The bulk density of ready made compost is 0.8. Compost increased the porosity and bulk density of soil and improves the avaibility of nutrients to crop growth.

Moisture content: Moisture, percent by weight is 26.70. Compost addition caused a significant increase of moisture content due to the more porosity addition to the soil.

Particle size/porosity: The total porosity was improved by the use of compost.

pH and Conductivity: Chemical parameters like pH and electrical conductivity (EC) were determined by using digital pH and conductivity meters. Compost improves the pH of soil and makes available the nutrient for the crop yield.

Nitrogen: Conventional compost was higher ammonium, while the vermicompost tended to be higher in nitrates, which is the more available form of nitrogen.

Total Phosphorus (as P2O5): The compost product comprises of NPK in the ratio as N-6.01, P-3.08, K-2.47.

Advantages:

1. Cost saving comparably than the traditional methods
2. Volume of waste reduced in size
3. Transformation of Waste into usable energy
4. Economically feasible process

CONCLUSION

It is concluded that this is revolutionary technique for value added products with environmental protection through decentralized waste management. Composting, as sustainable transformation of potential wastes in organic fertilizers, tunes up with sustainable agriculture, and must be optimized and encouraged. Compost produced from the farm wastes is not only having beneficial effects on soil health and growth, quality and yield of crop but also playing vital role in eradication of pollution hazards. It helped to reduce volume of agro waste and to generate additional revenue for farmers. The Problem of disposing the agro waste may be solved by doing such the composting production units. The agro waste converted into compost like product which will earn economic benefits. No hazardous effluents are generated from a compost production unit using agro wastes. This compost like product can be used for all agricultural, horticultural, and ornamental and vegetables crops at any stage of the crop. It helps to create better environments, thus reduce ecological risk. In short, it is Wealth from Waste.

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Firstly, I would like to thank Mr. Nimeshbhai Patel. Village, Sarpore-pardi, Navsari district, inspired many rural youths and encouraged to take up

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Table 1: Physico-chemical Characteristics of compost

Sl. No	Parameters	Results/value
PHYSICAL CHARACTERISTICS		
1	Colour	Black
2	Odour	No odour
3	Particle size	93.78
4	Moisture	26.70
5	Bulk density (g/cm^3)	0.88
CHEMICAL CHARACTERICS		
1	pH	7.95
2	Electric conductivity (ms cm^{-1})	6.0
3	Total nitrogen	6.01
4	Total phosphorus (as P_2o5)	3.08
5	Potassium (K_2o)	2.47
6	Organic matter	44.80

All the parameter values are presented in percentage (%), except the electrical conductivity, pH and Bulk density.

PHOTO PLATE 1

Shredder Machine

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