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Indian Journal of Extension Education and Rural Development

FROM EDITOR'S DESK

It is indeed a matter of great pleasure for me to put forward before you the current issue of IJEE & RD for the year 2019. As many as 38 research papers on areas pertaining to significant contemporary issues of rural development are included. The issues related to Agriculture, Home Science, Management, Veterinary and Animal Husbandry, Development Projects and Rural Development in general forms the major content of this volume. I am highly grateful to the editorial board and executive editor Prof. Dhriti Solanki for their untiring and painstaking efforts to complete the task in time. Prof. F.L. Sharma on Editorial Board deserve special thanks for shouldering the responsibility of bringing this task to reality. I put on record the sincerity, hard work and initiative taken by Dr. Sharma without whose help and cooperation, it would not have been possible to get this issue published in time. We appreciate the cooperation and help extended by the president of the society Prof. P.N. Kalla and vice-presidents Prof. Archna Raj Singh & Prof. B.S. Bhimawat in bringing out this journal. We are grateful to Prof. N.K. Panjabi, Secretary of the society for his continuous help, guidance and free hand in completing the task well in time. The contributors of research papers are precious and highly valued members of the society, we are heartly thankful to them for their trust in the society and sharing the work and expect the similar type of cooperation in future too. We assure the contributors and members to continously come up to their expectations in the years to come. We are also thankful to Prof. Rajshree Upadhyay, Dept. of EECM, College of Community and Applied Sciences for her cooperation and concern in all matters related to this journal. Last but not the least Image Print Media deserves special appreciation and thanks for printing the journal in time.

Warm regards.

S.K. Sharma
Chief Editor

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FACTORS INFLUENCING MOTIVATION OF AGRI-PRENEURS TOWARDS AGRO BASED INDUSTRIES IN UPPER BRAHMAPUTRA VALLEY ZONE OF ASSAM

P. Baruati *, P. Mishra and P. Das*****

ABSTRACT

The study was undertaken to find out the factors motivating entrepreneurs towards Agro Based Industries in three districts, namely Jorhat, Golaghat and Dibrugarh of UBVZ of Assam. For the present study purposive and random sampling technique were followed. A total of one hundred and eighty six respondents were selected for conducting the study. The results revealed that majority (94.08%) of the respondents had medium level of entrepreneurial motivation, followed by 3.24 per cent respondents who had high level of entrepreneurial motivation and only 2.68 per cent respondents had low level of entrepreneurial motivation. The study revealed that a "sense of determination and hard work" (3.82) ranked first. Two factors, viz., "urge to earn extra income" and "become self sufficient" (3.81) ranked second. "Regard or fondness towards business" (3.41) was ranked third. "Responsibility towards family" (3.24) ranked fourth. "Attain a certain status in the society" (3.07) ranked fifth. The advantages received from government and other institutions by agri-preneurs were analyzed by using cumulative frequency and percentage. It was seen that "attending training under various institutions"; "credit facilities provided by cooperatives", "Public Private Partnership", "supply of animal feed at subsidized rate", "exposure visits", "Awareness campaign by KVKs and various other government and NGOs", "provision of farm machineries at subsidized rate" and "market assurance to entrepreneurs through regulated markets" were some of the advantages received as outlined by the respondents.

INTRODUCTION

With the increase in agricultural production, there is a need to have the proportionate growth in the agro-processing industry. It is that industry which does value addition to agricultural raw material through processing in order to produce marketable and usable products that help producers to draw profits from and also generate additional income.

To promote economic development in India, central and state Governments are pursuing growth and development policies that encourage entrepreneurship and self-employment. *Mohanty (2005)* regarded the entrepreneurs as the nation builders and wealth creators. They play a dominant role in accelerating the socio-economic development of the country.

Jesurajahan et al. (2011) argued that the entrepreneurs are a part of industrial society and as such, he/she should be considered as an asset. The entrepreneur is responsible for not only earning his/her own livelihood but also for creating avenues of employment for others and contributing to the gross national product. Since unemployment is undoubtedly one of the challenging socio-economic problems confronting the state of Assam which suggests that there must be a solution to meet this need.

The agro-entrepreneurs plays a significant role in not being themselves the establishers of new ventures but also provide employment to many by creating jobs. The term "agri-preneur" can be defined as an entrepreneur who undertakes agriculture and agriculture related activities as their main business.

This study had been aimed at understanding the entrepreneurial development among agro-entrepreneurs, highlights their existing status and the

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factors motivating agro entrepreneurs towards agro-based enterprises who are mainly engaged in agro-based enterprises and also advantages received by them from Government and different organizations.

RESEARCH METHODOLOGY

The present study was conducted in three districts of Assam namely Jorhat, Dibrugarh, Golaghat. A purposive and random sampling design was followed for selection of respondents. The selected districts have more number of registered Micro Small Medium Enterprise (MSME) units as compared to other districts in the upper Brahmaputra valley zone. So, it was felt that these districts are ideally suited for a study on entrepreneurship.

Thus, to obtain information and response for the present study, 186 Agri-preneurs were selected. In order to assess the factors of motivating, structured schedule was prepared. The responses to the questions were properly analyzed, coded and worked properly. The responses were ranked on the basis of frequency and percentage of the respondents.

RESULTS AND DISCUSSION

The present study revealed that 46.78 per cent of the agri-preneurs were between 36-50 years of age while 28.49 per cent were up to 35 years and 24.73 per cent of the agri-preneurs were above 50 years. This may be due to the fact that respondents of the age group between 36 to 50 years are more energetic to take up agro-based enterprises more as compared to the respondents belonging to 51 years and above. This also facilitates them to devote more time for their enterprise (Table 1).

The above findings are supported by the findings of Minniti and Bygrave (2003).It was found that 87.63 per cent respondents were male and rest 12.37 per cent were female. It is clear from the study that percentage of male agri-preneurs is more as compared to female ones. The possible reason behind this may be that females are less exposed to the agro-based enterprises as compared to males. Level of literacy builds the ability of an individual to seek knowledge, understand and utilize things better and hence assessment of respondents' literacy level was essential. The study revealed that 40.32 per cent respondents were class IX passed followed by 37.10 per cent were graduate degree holders, 17.75 were higher secondary passed and only 4.83 were H.S.L.C passed. It shows that majority of the agri-preneurs have atleast basic educational qualification as no respondent was found to be illiterate. It was important to have the formal kind of education at basic level (Table 1).

Majority (60.22 %) agri-preneurs had "51-75 per cent" contribution of the family, followed by 27.41 per cent agri-preneurs who had "76-100 per cent" contribution towards the family, 10.75 per cent agri-preneurs had "up to 25 per cent" and only 1.62 per cent agri-preneurs have "26 to 50 per cent" have supported the family. It indicates that a high amount of agri-preneurs have a fairly good per cent of contribution of the family and in turn, they are able to support their families through their ventures. This may be due to that fact that some of the respondents have moved to other places in search of new opportunities.

Entrepreneurial motivation of agri-preneurs

The study revealed that majority (94.08%) of the respondents had medium level of entrepreneurial motivation followed by 3.24 per cent respondents who had high level of entrepreneurial motivation and only 2.68 per cent respondents had low level of entrepreneurial motivation Table 2.

The entrepreneurial motivation of agri-preneurs comprised of 26 factors which are presented in the Table 3. The study revealed that a "sense of determination and hard work" (3.82) ranked first. This might be due to the reason that it is the inner drive that keeps an agri-preneur constantly working towards his/her goal and also there is no short cut for success. Two factors, *viz*., "urge to earn extra income" and "become self sufficient" (3.81) ranked second. "Regard or fondness towards business" (3.41) was ranked third and "Responsibility towards family" (3.24) ranked fourth. Similarly to "Attain a certain status in the society" (3.07) ranked fifth. "Getting satisfaction in providing employment to the

needy" (2.88) was ranked sixth. "Attain a kind of job security" (2.79) ranked seventh. "Prove something to others" (2.63) was ranked eighth. "Able to mobilize all resources including manpower" (2.24) ranked ninth. "Desire to improve agriculture in terms of quality keeping in view the concept of sustainable development" (2.09) ranked tenth. "Can be easily set up in the part of the house" (2.00) ranked eleventh. "Comparatively cheaper resources" (1.88) ranked twelfth. "Vision of challenge and adventure" (1.86) ranked thirteenth. "A part of family's tradition (1.81) ranked fourteenth. "Being unemployed" (1.60) ranked fifteenth. "Retirement from other jobs" (1.55) ranked sixteenth. "Contribution to the nation's economy" (1.46) ranked seventeenth. "Being socially more interactive" (1.45) ranked eighteenth. "Received education on the particular subject" (1.44) ranked nineteenth. "Sustaining the freedom of work" (1.47) ranked twentieth. "Better utilization of space" (1.32) ranked twenty first. "Receiving advice from family and friends" (1.25) ranked twenty second. "Influence of other agri-preneurs" (1.17) ranked twenty third. "Breaking the monotony of routine work" ranked twenty fourth (1.15). "Facing discrimination at present job" ranked twenty fifth (1.00). Thus, "a sense of determination and hard work" stood out to be most relevant factor amongst all the other factors according to the Agri-preneurs. This may be due to the reason that it is the inner

Table 1. Frequency and percentage distribution of the respondents according to their age, gender, literacy level and family and contribution towards the family

S.No.	Variable		Frequency	Percentage (%)
1	Age	(Up to 35)	53	28.49
		(36 to 50)	87	46.78
		(51 and above)	46	24.73
2	Gender	(Male)	163	87.63
		(Female)	23	12.37
3	Literacy level	(Up to class IX)	75	40.32
		(H.S.L.C Pass)	9	4.83
		(H. S Pass)	33	17.75
		(Degree and above)	69	37.10
4	Contribution of the family	(Up to 25)	20	10.75
		(26 to 50)	03	1.62
		(51 to 75)	112	60.22
		(76 to 100)	51	27.41

Table 2: Frequency and percentage distribution of the respondents according to their entrepreneurial motivation

(n=186)

S.No.	Category	Frequency	Percentage (%)
1	Low (< 49)	5	2.68
2	Medium (49 to 64)	175	94.08
3	High (>64)	6	3.24
	Total	186	100

drive that keeps an agri-preneur constantly working towards his/her goal and also there is no short cut for success.

Also other two factors namely, "urge to earn extra income" and "become self sufficient" were found to be second most relevant. This may be due to the fact that Agri-preneurs are always motivated by something which leads to earning extra income; they are innovators who do not want to depend on others rather they generate their own ideas and work upon them. Also, people continuously work upon raising their standard of living. Again, "Regard or fondness towards business" was ranked third. This might be due to the reason that Agri-preneurs were driven by their interest towards business in spite of the difficulties faced by them. "Responsibility towards family" ranked fourth; in order to meet the needs of the family individuals became agri-preneurs. "Attain a certain status in the society" ranked fifth and "getting satisfaction in providing employment to the needy" was ranked sixth respectively because they gained a sense of pride by doing in carrying out their business and standing as a source of employment to others as well.

Further, it was revealed from the study that "being unemployed" was observed to be in the

Table 3. Rank wise distribution of the factors of motivation of agri-preneurs towards Agro-based enterprise

S.No.	Statements	WMS	Ranking
1)	A sense of determination and hard work	3.82	I
2)	Become self sufficient	3.81	II
3)	Urge to earn extra income	3.81	II
4)	Regard or fondness towards business	3.41	III
5)	Responsibility towards family	3.24	IV
6)	Attain a certain status in the society	3.07	V
7)	Getting satisfaction in providing employment to the needy	2.88	VI
8)	Attain a kind of job security	2.79	VII
9)	Prove something to others	2.63	VIII
10)	Able to mobilize all resources including manpower	2.24	IX
11)	Desire to improve agriculture in terms of quality keeping in view the concept of sustainable development	2.09	X
12)	Can be easily set up in the part of the house	2.00	XI
13)	Comparatively cheaper resources	1.88	XII
14)	Vision of challenge and adventure	1.86	XIII
15)	A part of family's tradition	1.81	XIV
16)	Being unemployed	1.60	XV
17)	Retirement from other jobs	1.55	XVI
18)	Contribution to the nation's economy	1.46	XVII
19)	Being socially more interactive	1.45	XVIII
20)	Received education on the particular subject	1.44	XIX
21)	Sustaining the freedom of work	1.37	XX
22)	Better utilization of space	1.32	XXI
23)	Receiving advice from family and friends	1.25	XXII
24)	Influence of other Agri-preneurs	1.17	XXIII
25)	Breaking the monotony of routine work	1.15	XXIV
26)	Facing discrimination at present job	1.00	XXV

Table 4. Advantages received by agri-preneurs

S.No.	Statement	Cumulative Frequency	Percentage (%)
1	Attending training under various institutions	11	5.91
2	Credit facilities provided by co-operatives and other institutions	51	27.42
3	Public Private Partnership	26	13.97
4	Supply of animal feed at subsidized rate	86	46.24
5	Exposure visits	33	17.74
6	Awareness campaign by KVKs and various other government and NGOs	21	11.29
7	Provision of farm machineries at subsidized rate	45	24.19
8	Market assurance to entrepreneurs through regulated markets	34	18.27

fifteen position. This might be due to the fact that agri-preneurs were motivated as they were left with no other option but take up agri-business as their source of income. However, the factor "attain a kind of job security" ranked seventh showed that every individual needed a kind of security in life by earning money which was received through the agri-business. Individuals who have a "vision of challenge and adventure" would take up agri-business despite of the fact that there is a certain amount of risk involved in it. "Influence of other agri-preneurs" was ranked twenty third in order of relevance as a motivational factor due to reason that agri-preneurs were not followers. Therefore, they would rather follow their heart then by getting influenced by fellow agri-preneurs. "Sustaining the freedom of work" was ranked twentieth might be due to the reason that it gave flexibility to agri-preneurs in their work schedule and they could enjoy the profits from their own efforts. Also, "facing discrimination at present job" was ranked twenty fifth. This may be due to the reason that agri-preneurs start at an early age and they tend to do something on their own i.e., being your own boss.

The advantages received from government and other institutions by agri-preneurs shown in Table 4 were analyzed by using cumulative frequency and percentage. It was seen that "attending training under various institutions"; "credit facilities provided by cooperatives", "Public Private Partnership", "supply of animal feed at subsidized rate", "exposure visits", "Awareness campaign by KVKs and various other government and NGOs", "provision of farm machineries at subsidized rate" and "market assurance to entrepreneurs through regulated markets" were some of the advantages received as outlined by the respondents.

The findings showed that, "attending training under institutions" mainly comprised of the training provided by IIE, Guwahati; AAU, Jorhat, SIRD, DAO and DHO. "Awareness campaign by KVKs and various other government and NGOs" included awareness campaign on topics like vaccination of cattle, rearing of animals, processing of food, techniques of crop production, cropping patterns, etc. "Provision of farm machineries at subsidized rate" included machineries like power tillers. According to the data presented in Table 4, "supply of animal feed at subsidized rate" (46.24%) was the major advantage, followed by "credit facilities provided by co-operatives and other institutions" received by 27.42 per cent respondents. "Provision of farm machineries at subsidized rate" was received as an advantage by 24.19 per cent respondents, followed by 18.27 per cent respondents "receiving market assurance to entrepreneurs through regulated markets", "exposure visits" was an advantage for 17.74 per cent respondents. "Public Private Partnership" advantage was received by 13.97 per cent respondents. "Awareness campaign by KVKs and various other government and NGOs" was an advantage for 11.29 per cent respondents. "Attending training under various institutions" was advantageous for 5.91 per cent respondents.

CONCLUSION

It is expected that the present study will be helpful for the planner, policy maker, trainer and field functionaries in formulating and modifying policies for improvement and development of entrepreneurial motivation of the agri-preneurs of Assam. The entrepreneurial motivation is a combination of various factors which can be improved with the help of extension education. Factors like marketing orientation and management orientation are psychological terms which come under extension science. If the number of agri-preneur increases in the state, the production and productivity will surely increase. With more agro-based production there is a possibility to meet the increasing demand in the country. So, it is necessary to adopt more extension strategies for improvement of entrepreneurial motivation of agri-preneurs in Assam.

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SKILL GAP ANALYSIS FOR ENHANCING CORE COMPETENCIES OF TRAINERS: AN ANALYTICAL STUDY IN KERALA

S. Aiswarya*, Monika Wason, R.N. Padaria*** and D.U.M. Rao******

ABSTRACT

Competent extension personnel need to possess both process and technical skills equally. Training plays a significant role in enhancing core competencies of extension personnel. Training need can be defined as the condition having perceived difference between 'what is' and 'what should be' in terms of knowledge, core competency skills and attitudes so that these gaps or needs can be fulfilled, in order to enable the extension personnel to perform their roles more effectively in their work organizations. Three training institutions: Community Agrobiodiversity Center (working under an NGO), SAMETI (working under State Department) and CTI (under State Agricultural University) were chosen for the study. Purposive and Random Sampling were carried out for the study. The sample consisted of trainers from three different training institutes.Four different training programmes related to core competency development being organized during 2017-18 were selected purposively from each of the three training institutes. Five trainees for each training programmes were selected randomly with a sample size of twenty from each institute making sixty as total sample size. Questionnaire was developed for the study. Personal interview and focus group discussion methods were also used as techniques for data collection. Eight core competencies were chosen for this study viz., communication skills, subject matter expertise, professionalism, programme planning and implementation, leadership skills, resource mobilization, Information Communication Technologies (ICT), and managerial ability for developing the Training Need Index (TNI) and Skill gap analysis. ANOVA test revealed that there is significant difference between six core competencies in different training institutes- communication ability ,resource mobilisation , managerial ability, subject matter expertise, programme planning and implementation, to handle ICT's. Post Hoc test with Duncan revealed that there is significant difference between three competencies -communication ability, resource mobilisation and managerial ability .

INTRODUCTION

In India, pivotal role of agricultural extension in enhancing the agricultural production is understood by the increased investment. India's X^{th} and XI^{th} five-year plans accentuate agricultural extension as a solution for escalating agricultural growth by plummeting the yield gap in cultivators' field, and consequently intensify the call for reinforcing agricultural extension in India (Tabassi *et.al,* 2012). In order to strengthen agricultural extension services, extension personnel should be competent enough in disseminating scientific farming technologies and practices.

Training is the vital and incessant prerequisite for agricultural development. Training is considered as the course of acquiring definite skills to execute a task better. It is progressively being recognized as a chief device to build up competencies and to advance performance in diverse fields. Trainers at micro and macro level have been investing time and endeavour in exploring ways and means to improve its delivery. It helps citizens develop into experienced and dexterous in doing certain tasks as compared with the previous circumstances. Generally, an organization facilitates the workforce learning through training, so that their tailored behaviour

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contributes to the accomplishment of the organization's goals and objectives.

Yondeowei and Kwarteng (2006) defined training need as the difference between the required level of individual competence and his present level of competence. Allo (2001) pointed out that one of the main factors limiting the development of effective training programmes for agricultural professionals in developing countries is the inadequacy of information on the training needs of trainers. In this regard, there is also the need to rationalize training to minimize repetition of the same message, more exposure to relevant technology and communication techniques, more avenues for personal career development and frequent contact between various categories of trainers for making them competent. Hence, a systematic analysis was required to understand the training needs of the trainers in terms of the core competencies. In this context, the present investigation have been done with this objective so that the policy makers can be provided with this information regarding the need for training and also on how to carry out trainers training. The findings of this research will also bring to limelight, the areas of competence of trainers, and how to tap into the wealth of knowledge of training needs assessment towards better performance and improved productivity. For the trainers, the findings from this study will also spur them to develop themselves as it will help them identify areas of weakness and seek for training for improved performance.

RESEARCH METHODOLOGY

The study was conducted purposively in the state of Kerala. Three training institutions: Community Agrobiodiversity Center (working under an NGO), SAMETI (working under State Department) and CTI (under State Agricultural University) were chosen for the study. The sample consisted of trainers from the three different training institutes. Four different training programmes related to core competency development being organized during 2017-18 were selected purposively from each of the three training institutes. For each training programme, sample of 5 trainers were selected, totalling about 20 trainers for four training programmes from each training institute. Thus, the total sample size for the study was 60. The questionnaire was designed with due procedure and data collected through personal interview, questionnaire and focus group discussion.

Training Need Index was constructed using eight core competencies, including 'communication skills, subject matter expertise, professionalism, programme planning and implementation, leadership skills, resource mobilization, information communication technologies, and managerial ability'. The obtained scores of trainers on all the eight core competencies and their skill gap analysis, which helps the trainers to contribute to excellence in extension education programmes were also calculated.Formula for calculating Training Need Index (TNI) was formulated as below:

$$\textbf{TNI} = \frac{\text{Maximum score obtainable} - \text{Total score obtained}}{\text{Maximum score obtained}} \times 100$$

RESULTS AND DISCUSSION

Eight core competencies namely *viz.,* communication skills, subject matter expertise, professionalism, programme planning and implementation, leadership skills, resource mobilization, information communication technologies, and managerial ability for were identified for developing the Training Need Index (TNI). Table 1 indicates the mean and standard deviation of eight core competences and overall TNI scores of trainers for three institutes.

It is evident from Table 1 that mean value of TNI score for eight core competencies in CAbC is highest for 'ability to handle ICT's' (54.91) and lowest for 'Professionalism' (15.33). The mean value of TNI score for eight core competencies in CTI is highest for 'ability to handle ICT's' (54.91) and lowest for 'Professionalism' (24.58). In case of SAMETI, the mean value is highest for 'ability to handle ICT's'(23.5) and lowest for 'Leadership Skills' (18.25). The Overall TNI score is highest for CTI (36.61),followed by CAbC (36.53) and SAMETI (20.32). This indicates that trainers from SAMETI are highly competent compared to CTI and CAbC.

Result from Table 2 indicates that TNI of trainers of CAbC (50%) and CTI (70%) were in high range (>24.75) wheareas trainers of SAMETI (90%) were in low category (<17.52) for TNI. Majority (85%) of the trainers are found to be highly competent (>23.31) in case of CAbC, whereas in case of CTI majority (50%) of the trainers were moderately competent (15.01-23.31) with respect to communication skills . Trainers of SAMETI (85%) were found to be least competent (<15.01) in communication skills. It is evident that majority of the trainers of CAbC (50%), CTI (75%) and SAMETI (80%) were moderately competent (7.52-22.48) in terms of subject matter expertise for all the three institutions. Results revealed that 100% of the trainers of the CTI, 65% of CAbC and 85% of SAMETI were moderately competent (4.71-15.45) in case of professionalism. It can be noticed from the table that majority of the trainers from CAbC (70%) and CTI (60%) were moderately competent (12.2-29.6) whereas trainers of SAMETI were least competent (55%) in Programme Planning and Implementation. It is evident from the table that majority of the trainers from CAbC (40%), CTI (75%) and SAMETI (80%) were moderately competent (13.89-38.44) in leadership skills. The results show that majority of the trainers from CAbC (65%), CTI (60%) and SAMETI (70%) were moderately competent (10.82-26.73) in resource mobilization. Majority of trainers of CAbC (45%) were moderately competent (20.55-41.3) whereas majority of the trainers of CTI (65%) were highly competent (>41.3) and trainers of SAMETI (80%) were least competent (<20.55) in handling ICT's. Results reveal that majority of the trainers (60%) of CAbC were highly competent (>38.62) whereas majority of the trainers of CTI (75%) were moderately competent (17.54- 38.62) in managerial ability. Most of the trainers of SAMETI (60%) were found to less competent (<17.54) in managerial ability.

Analysis of Variances (ANOVA) was carried out to know whether there was any difference between six parameters in different institutes.

Significant F-test ($p<0.01$) showed that there was significant difference between means of three training institutes in case of six core competencies, *i.e.* Communication Skills, subject matter expertise, programme planning and implementation, resource mobilization, ability to handle information communication technologies (ICT's), and managerial ability of trainees. ANOVA test revealed that there is no significant difference between three institutes in case of two core competencies-professionalism and leadership skills.

Post Hoc tests were carried out to explore which means are significantly different from each other.

Post-hoc test (Table 4) showed that there was

Table 1. Mean and Standard Deviation of Trainers for Eight Core Competencies based on TNI scores

S.No.	Core Competency	CAbC		CTI		SAMETI	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
1	Communication skills	34.583	7.20	38.45	5.62	21.08	6.89
2	Subject Matter Expertise	42.4	11.14	39.73	7.99	18.6	7.20
3	Professionalism	15.33	6.69	24.58	8.14	19.66	6.81
4	Programme Planning and Implementation	22.58	7.89	38.33	7.84	18.33	8.31
5	Leadership Skills	28.91	12.38	34.25	10.92	18.25	7.46
6	Resource Mobilization	35.66	8.03	33.22	8.45	20	7.15
7	Ability to handle ICT's	54.91	8.90	54.91	8.90	23.5	8.09
8	Managerial Ability	57.91	6.12	29.41	12.62	23.41	8.31
9	**Overall TNI**	**36.53**	**4.09**	**36.61**	**5.03**	**20.35**	**4.72**

Table 2. Distribution of Trainers According to their Core Competencies

S.No.	Core Competency	Level of Competency	CAbC		CTISAMETI			
			f(n=20)	%	f(n=20)	%	f(n=20)	%
1.	Communication skills	Less competent (<15.01)	0	0	9	45	17	85
		Moderately competent (15.01-23.31)	3	15	10	50	3	15
		Highly competent (>23.31)	17	85	1	5	0	0
2.	Subject matter expertise	Less competent (< 7.52)	3	15	0	0	4	20
		Moderately competent (7.52-22.48)	10	50	15	75	16	80
		Highly competent (>22.48226)	7	35	5	25	0	0
3.	Professionalism	Less competent (<4.71)	3	15	0	0	2	10
		Moderately competent (4.71-15.45)	13	65	20	100	17	85
		Highly competent (>15.45)	4	20	0	0	1	5
4.	Programme Planning and Implementation	Less competent (<12.2)	1	5	0	0	11	55
		Moderately competent(12.2-29.6)	14	70	12	60	7	35
		Highly competent (>29.6)	5	25	8	40	2	10
5.	Leadership Skill	Less competent (<10.82)	5	25	0	0	6	30
		Moderately competent (10.82-26.73)	13	65	12	60	14	70
		Highly competent (>26.73)	2	10	8	40	0	0
6.	Resource Mobilization	Less competent (<10.82)	5	25	0	0	6	30
		Moderately competent (10.82-26.73)	13	65	12	60	14	70
		Highly competent (>26.73)	2	10	8	40	0	0
7.	Ability To Handle ICT	Less competent (<20.55)	6	30	0	0	16	80
		Moderately competent (20.55-41.3)	9	45	7	35	4	20
		Highly competent (>41.3)	5	25	13	65	0	0
8.	Managerial Ability	Less competent (<17.54)	4	20	0	0	12	60
		Moderately competent (17.54-38.62)	4	20	15	75	8	40
		Highly competent (>38.62)	12	60	5	25	0	0
9.	**Overall TNI**	Low (<17.52)	5	25	0	0	18	90
		Medium (17.52-24.75)	5	25	6	30	2	10
		High (>24.75)	10	50	14	70	0	0

Table 3. ANOVA for Training Need for Six Core Competencies of Trainers

Core Competency	Mean Square		F	Significance
	Between Institutes	Within Institutes		
Communication skills	3.68	0.04	85.09	<0.01
Subject Matter Expertise	.97	0.14	6.56	
Programme Planning and Implementation	1.92	0.19	9.68	
Resource Mobilization	2.569	0.16	15.18	
Ability to handle ICT's	6.51	0.35	18.34	
Managerial Ability	13.03	0.30	42.15	

Table 4: Post Hoc Test for Training Need for Three Core competencies of Trainers

Core Competency	Subset for alpha = 0.05		
	CAbC	CTI	SAMETI
Communication Skills	3.56	4.15	4.40
Resource Mobilisation	3.87	3.08	4.08
Managerial Ability	2.62	3.50	4.23
Significance	**1**	**1**	**1**

Table 5: Post Hoc Test for Training Need for three Core Competencies of Trainers

Core Competency	Subset for alpha=0.05		
	CAbC	CTI	SAMETI
Subject Matter Expertise	4.08	4.17	4.5
Programme Planning and Implementation	3.70	3.86	4.30
Ability to Handle ICT's	3.70	3.86	4.30
Significance	**0.09**		**1**

significant difference between means CTI, CAbC and SAMETI in case of these five core competencies ,i.e., Communication Skills, Resource Mobilization and Managerial Ability.

Post-hoc test (Table 5) shows that there is no significant difference between CTI and CAbC institutes but they differ significantly from SAMETI in case of three core competencies *,i.e.* Subject Matter Expertise ,Programme Planning and Implementation and Ability to handle ICT's.

CONCLUSION

Training is the vital and incessant prerequisite for agricultural development. Considering the importance of training for capacity building of trainer, their preferred area of perceived training need was identified. Training need of trainers is found to be highest in CAbC followed by CTI and very low in case of SAMETI. This indicates that trainers of CAbC and CTI are less competent compared to trainers at SAMETI. From the study, it has been

concluded that majority of the trainers were less competent in terms of their "ability to handle ICT's and Communication skills". Hence an emphasis should be made to strengthen the above competencies , which helps in building competent trainers.

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CONSTRAINT ANALYSIS OF COCONUT GROWERS OF RATNAGIRI DISTRICT

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ABSTRACT

The study was conducted in four tehsils of Ratnagiri district of Konkan region having maximum area under coconut. More than three fifth (61.00 per cent) were from 'medium' adoption group, while 26.00 and 13.00 per cent were from 'high' and 'low' adoption group respectively. At overall level it can be said that 'high labour charges, lack of information on all aspects of coconut development board', 'Coconut harvesting is difficult', 'Lack of skilled labouers for coconut harvesting were the major constraints faced by the coconut growers.

The major suggestions like 'information about schemes of Coconut Development Board should be given to extension personnel who are working at grass root level', 'campaign of improved coconut cultivation be organized', 'input supplying agencies should be promoted to run on co-operative basis within villages', 'co-operative movement in coconut should be strengthened by NGO and also by Government' made by the coconut growers. Joint efforts of Department of Agriculture of Maharashtra state and Coconut Development Board should be done for transfer of technology campaign. The role of Dr. Balasaheb Sawant Konkar Krishi Vidyapeeth, Dapoli is of paramount importance for solving the problems of coconut growers.

INTRODUCTION

In Konkan region, the plantation of coconut has been increasing day by day due to favorable policies of Government financial institutions and Coconut Development Board. However, the average productivity of coconut is found to be low as compared to potential yield. This is due to some constraints faced by the coconut growers. With a view to understand constraints of coconut growers, the present study was conducted.

1. To know the adoption of technologies of coconut recommended by DBSKKV, Dapoli by the coconut growers.
2. To analyze the constraints faced by the coconut growers in coconut cultivation.
3. To obtain the suggestions of the coconut growers to overcome the constraints in coconut cultivation.

RESEARCH METHODOLOGY

The study was conducted in Ratnagiri district of Konkan region because this district is having maximum area under coconut. Four tehsils namely Ratnagiri, Chiplun, Guhaghar and Dapoli having highest area under coconut among all tehsils were purposively selected. From these four tehsils, five villages were selected randomly and from each selected village, five coconut growers were selected. Thus the sample consisted of 100 practicing coconut growers having minimum 20 bearing coconut trees. The data were collected from respondents by personal interview method by schedule. The data collected were analyzed and tabulated suitably.

RESULTS AND DISCUSSION

The findings of the present study are presented hereunder.

1. Adoption of recommended technologies of coconut developed by DBSKKV, Dapoli by the coconut growers

Adoption level of the respondents was studied for recommended technologies of coconut crop. The observation on adoption of recommended

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technologies are presented and discussed here under.

1.1 Overall adoption : The result of the present investigation in respect of overall adoption level of recommended technologies are presented in Table 1.

Table 1. Adoption of recommended technologies of coconut developed by DBSKKV, Dapoli by the coconut growers

S. No.	Adoption group (score)	Respondents (n=100)	
		Number	%
1.	Low (up to 6)	13	13.00
2.	Medium (7 to 18)	61	61.00
3.	High (19 and above)	26	26.00
	Average (score) : 12.56		
	Total	**100**	**100.00**

More than three fifth (61.00 per cent) were from 'medium' adoption group, while 26.00 and 13.00 per cent were from 'high' and 'low' adoption group respectively. The average adoption score was 12.56 indicates medium adoption.

1.2 Practice wise adoption of recommended technologies of coconut: The practice wise adoption of recommended technologies of coconut is presented in the Table 2.

It is seen that the adoption level was more in case of 'use of Banavali variety' (100.00 per cent), harvesting (91.00 per cent), ' intercropping during first three years' (79.00 per cent), pit size (62.00 per cent), ' water management for first three years (48.00 per cent), 'spacing' (46.00 per cent), 'water management for full grown palm' (42.00 per cent). Regarding the adoption of recommended practices of plant protection, it was found to be in range of 11.00 per cent to 32.00 per cent. The adoption of recommended practices of fertilizer application was found to be in the range of 19.00 per cent to 26.00 per cent.

2. Constraints faced by the coconut growers

Table 2. Practice wise adoption of recommen-ded coconut cultivation practices by the growers

S.No.	Recommended Practice	Adopter's Percentage
A.	**Recommended / released varieties**	
1.	Banavali	100.00
2.	Pratap	2.00
3.	T x D	19.00
4.	Lakshdwip ordinary	3.00
5	Phillippines ordinary	-
B.	**Spacing**	
1.	7.5 x 7.5 m (175 trees / ha.)	46.00
C.	**Planting**	
1.	Pit size : 1 x 1 x 1 m	62.00
2.	Application of 10 kg compost / cow dung and 2 kg. SSP per pit	31.00
D.	**Fertilizers**	
1.	Application of 5 ghamelis cow dung, 2.250 kg urea , 3 kg SSP and 2kg MOP from 5 years old trees and onward.	19.00
2.	Application of cow dung and SSP in one dose in June, while dose of Urea and MOP in three split doses in June , September and February.	26.00

E.	**Water management**	
1.	For first three years, irrigating the palms at 6- 7 days' interval in winter and 3–4 days' interval in summer.	48.00
2.	Irrigate full grown palm at 5- 10 days' interval	42.00
3.	Use of dry grass and black plastic for mulching	20.00
F.	**Inter and mix cropping**	
1.	Intercropping during first three years of fruits crops like pineapple, papaya and banana, and vegetable and flowers on home scale like.	79.00
2.	Growing spices in well-developed orchard.	36.00
3.	Use of additional fertilizers and water for inter and mix crops	10.00
G.	**Plant Protection**	
	Rhinoceros beetle	
1.	Pouring water soluble Carbarylpowder in cow dung pit once in two months. (10 lit. water + 20 gmCarbaryl powder)	12.00
2.	Beetles removed out by using hook from the tip sprout of infected coconut tree and mixture of 10 % Carbaryl powder 25 gm or 4 % Endosulphan powder or Methyl parathion powder 2 gm. + the same amount of sand used for filling infected part.	19.00
	Red palm weevil	
1.	Holes to be sealed with 10 % Carbaryl powder and sand	31.00
2.	Removing the caterpillar from trunk by sickle	11.00
	Rat	
1.	Fixing the aluminum sheet of 40 cm width at 2 m height from the ground level.	21.00
2.	Keeping the poison bait prepared out of one part of Zink phosphide and 50 part of wheat floor in the crown.	19.00
	Black headed caterpillar	
1.	Spraying 20 gm of Carbaryl (50 %) or 16 ml Dimethoate (30 %) mixed in 10 lit. of water.	11.00
	Eriophide mite	
1.	Application of 5 % Nimazol (7.5 ml) or Econeem plus (10 ml) mixed with same quantity . of water through roots, three times during April-May, October – November and January and February	22.00
2.	Application of 50 kg compost, 10 kg neem cake and micro-nutrients zinc, boron, molybdenum and copper 200 gm/ palm /yr.	29.00
3.	Spraying 1 % Nimazol (10000 ppm Azadiractin) mixed with 4 lit. of water.	32.00
4.	Infected fruits be removed from the tree.	10.00
	Diseases	
	Root rot , fruit drop and blight	
1.	Application of 1 % Bordeaux mixture as per need	20.00
2.	Removing the infested part and apply the Bordeaux paste on the same	28.00
H.	**Harvesting**	
1.	Harvesting the coconut 7 –12 months after fruit set	91.00

in coconut cultivation

The result of the present investigation in respect of constraints perceived by the coconut growers in coconut cultivation are presented in Table 3.

It is seen from Table 3 that major economic constraints like 'high labour charges', fertilizer application, plant protection measure are costly', 'insufficient loan and subsidy' and 'loan and subsidy did not get in time' were faced by the coconut growers in coconut cultivation. 'No co-operative society is available in village' is the major social constraints faced by the coconut growers. The social constraints like 'lack of co-operative society is available in village', 'lack of co-operation from neighbouring coconut growers in plant protection; 'lack of interest of local leaders' and 'groupism in villages' were faced by the coconut growers, while major technical constrains like 'coconut harvesting is difficult', 'application of fertilizers is delay due to irregular and heavy rainfall was faced to coconut growers' and 'Complicated technology in control of Eriophide mite' were faced.

Constraints related to facilities faced by the coconut growers were 'lack of system which provide information on all aspects of Coconut Developing Board', 'lack of agril. inputs supplying agencies' and 'less contact of extension worker'. 'Damage due to monkey and wild animals', 'lack of skilled labourers for coconut harvesting' 'less water holding capacity of land', 'Very difficult to take benefits of schemes due to many partners in revenue record' and scarcity of water' were the major situational constraints. The main market oriented constraints were 'menace of middlemen', 'price

Table 3.Constraints faced by the coconut growers in coconut cultivation

S. No.	Constraints	% Coconut growers (n=100)	Severity More severe	Severe	Less severe	Index	Rank as per index
A.	**Economic**						
1.	High labour charges	82.00	65.00	11.00	6.00	**2.23**	**I**
2.	Fertilizer application, plant protection measure are costly.	61.00	50.00	6.00	5.00	**1.67**	**II**
3.	Insufficient loan and subsidy	62.00	41.00	12.00	9.00	**1.5**	**III**
4.	Loan and subsidy did not get in time	51.00	39.00	6.00	6.00	**1.35**	**IV**
B.	**Social**						
1.	Co-operative society is not present in village	69.00	59.00	10.00	-	**1.97**	**I**
2.	Lack of co-operation from neighbouring coconut growers in plant protection.	46.00	40.00	6.00	-	**1.32**	**II**
3.	Lack of interest of local leaders	41.00	23.00	10.00	9.00	**0.98**	**III**
4	Groupism in villagers	32.00	25.00	4.00	3.00	**0.86**	**IV**
C.	**Technical**						
1.	Coconut harvesting is difficult.	72.00	57.00	6.00	6.00	1.89	**I**
2.	Application of fertilizers is delayed due to irregular and heavy rainfall.	42.00	21.00	13.00	8.00	1.13	**II**
3.	Complicated technology in control of Eriophide mite	33.00	29.00	4.00	-	**0.95**	**III**

D.	**Facilities available**						
1.	Lack of system which provide information on all aspects of Coconut Development Board.	78.00	56.00	13.00	9.00	**2.03**	**I**
2.	Lack of agril. inputs supplying agencies.	57.00	41.00	13.00	3.00	**1.58**	**II**
3	Less contact of extension worker	50.00	43.00	7.00	-	**1.43**	**III**
4.	Lack of agencies in villages for providing irrigation appliances.	41.00	34.00	8.00	-	**1.18**	**IV**
E.	**Situational**						
1.	Damage due to monkey and wild animals	61.00	59.00	2.00	-	**1.81**	**I**
2.	Lack of skilled labouers for coconut harvesting	72.00	50.00	12.00	-	**1.74**	**II**
3.	Less water holding capacity of land	39.00	31.00	6.00	2.00	**1.07**	**III**
4.	Very difficult to take benefits of schemes due to many partners in revenue record	22.00	19.00	3.00	-	**0.63**	**IV**
5.	Scarcity of water	24.00	8.00	16.00	-	**0.56**	**V**
F.	**Market oriented constraints**						
1.	Menace of middlemen	65.00	56.00	9.00	-	**1.86**	**I**
2.	Price fluctuation in market	69.00	52.00	10.00	7.00	**1.83**	**II**
3.	Market is far away from village	54.00	40.00	14.00	-	**1.48**	**III**
4.	Fetch less price for coconut PHT products	41.00	29.00	6.00	6.00	**1.04**	**IV**
G.	**Input related constraints**						
1.	Untimely availability of inputs	57.00	34.00	10.00	13.00	**1.35**	**I**
2.	Less availability of recommended inputs in market.	46.00	23.00	12.00	11.00	**1.04**	**II**
H.	**Government schemes**						
1.	Complicated procedure of taking benefits of Governmental schemes.	69.00	56.00	13.00	-	**1.94**	**I**
2.	Less knowledge about coconut board schemes to extension worker.	62.00	46.00	9.00	7.00	**1.63**	**III**
3.	Less information of Govt. Scheme is available.	41.00	29.00	6.00	6.00	**1.05**	**IV**

fluctuation in market', 'market is far away from village' and 'fetch less price for coconut PHT products' faced by the coconut growers. Input related problems like 'untimely availability of inputs' and 'less availability of recommended inputs in market' were major constraints faced by the coconut growers. Constraints related to governmental scheme like 'complicated procedure of taking benefits of Governmental schemes', 'less knowledge about coconut board schemes to extension worker' were faced by coconut growers.

At overall level it can be said that 'high labour charges, lack of information on all aspects of coconut development board', 'Coconut harvesting is difficult', 'Lack of skilled labouers for coconut harvesting were the major constraints faced by the

coconut growers.

3. Suggestions to overcome the constraints in coconut cultivation

The results of the present investigation in respect of Suggestions to overcome the constraints in coconut cultivation are presented in Table 4.

The major suggestions like 'information about schemes of Coconut Development Board should be given to extension personnel who are working at grass root level', 'campaign of improved coconut cultivation be organized', 'input supplying agencies should be promoted to run on co-operative basis within villages', 'co-operative movement in coconut should be strengthened by NGO and also by Government', 'rules and regulations on loan, subsidy, crop insurance should be location specific', 'marketing systems should be revitalized through co-operative movement' , 'loan policies should be made smooth', 'value added industry should be developed by the NGOs with the help of coconut growers', 'training should be given to the concern labourers about the various technologies' and 'campaign of coconut harvesting ladder be organized' were made by the coconut growers.

CONCLUSION

Intensive campaigning on plant protection measures in coconut needs to be taken by the concerned development agencies.The study has brought out major constraints like complicated procedure for getting loan, high labour charges and

Table 4. Suggestions to overcome the constraints in coconut cultivation

S.	Suggestions	Most Important	Important	Less Important	Index	Rank
1	Information about schemes of Coconut Development Board should be given to extension personnel who are working at grassroot level.	84.00	16.00	-	**2.84**	**I**
2.	Campaign of improved coconut cultivation be organized.	79.00	21.00	-	**2.79**	**II**
3.	Input supplying agencies should be promoted to run on co-operative basis within villages.	74.00	26.00	-	**2.74**	**III**
4.	Co-operative movement in coconut should be strengthened by NGO and also by Govt.	72.00	28.00	-	**2.72**	**IV**
5.	Rules and regulations on loan, subsidy, crop insurance should be location specific.	69.00	23.00	8.00	**2.61**	**V**
6.	Marketing systems should be revitalized through co-operative movement.	66.00	25.00	9.00	**2.57**	**VI**
7.	Loan policies should be made smooth.	62.00	28.00	10.00	**2.52**	**VII**
8.	Value added industry should be developed by the NGOs with the help of coconut growers.	53.00	41.00	6.00	**2.47**	**VIII**
9.	Campaign of coconut harvesting ladder be oraganised	52.00	31.00	17.00	**2.35**	**IX**
10.	Training should be given to the concern labourers about the various technologies.	49.00	41.00	10.00	**2.39**	**X**
11.	Campaign of insurance schemes of . coconut should be organised	41.00	23.00	36.00	**2.05**	**XI**

lack of information faced by the coconut growers. Concerned development agencies may take suitable strategies to overcome such constraints.The study revealed important suggestions of coconut growers. Those can be incorporated in planning strategies by the Department of Agriculture, Coconut Development Board and DBSKKV.

Department of Agriculture of Maharashtra state and Coconut Development Board should jointly organize the transfer of technology campaign with the help of DBSKKV, Dapoli for solving the problems of coconut growers.

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ACTIVITY ANALYSIS OF VEGETABLE GROWERS IN THE HOMESTEADS OF KOLLAM DISTRICT

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ABSTRACT

Gender roles are roles that are played by both men and women which are not determined by biological factors but by the socio-economic and cultural environment or situation. The magnitude of gender participation in different activities relating to vegetable cultivation varied from one activity to the other. The present investigation was therefore,carried out with an objective to identify and specify gender tasks and roles in vegetable production in the homesteads of Kollam district. This study was conducted in 120 homesteads randomly selected fom 6 panchayaths having higher vegetable production in Kollam district of Kerala. On the analysis of the data thus collected it was found that even though there are some men and women dominated operations in homestead vegetable cultivation,both the gender had a significant participation in most of the activities. There was not a single homestead where the agricultural activities is done by male partner alone.

INTRODUCTION

Gender relates to socially assigned roles and behaviors attributed to men and women. Gender analysis is part and parcel of social analysis and the study of social diversity. It provides a focused examination of the differences in the asset bases, livelihood strategies and vulnerabilities between women and men, as well as the reasons for and implications of these differences. Gender roles are roles that are played by both men and women which are not determined by biological factors but by the socio-economic and cultural environment or situation. The magnitude of gender participation in different activities relating to vegetable cultivation varied from one activity to the other. While some activities are predominantly performed by male others by female yet some activities are performed jointly by both male and female partners of the family. Women play a critical role in all aspects of agriculture, but invariably their intellectual role and managerial skills remain unrecognized, unreached and untouched by the developmental efforts. Homestead vegetable production not only provide safe to eat vegetables but also help to shape the lives of rural women through their technical, infrastructural and financial support in collaboration with other line departments. On this view this study was conducted to identify and specify gender tasks and roles in vegetable production in the homesteads of Kollam district with ultimate goal of better targeting the resources in agricultural sector. The study provides information about the gender gaps that exists in agricultural sector. Thus,it would help the extension workers to take measures to bridge the gaps that exist.

RESEARCH METHODOLOGY

The present study was conducted in randomly selected 120 homesteads of Kollam district during 2017-2018.Ex post facto research design was used in this study. Two Agro Ecological Units of Kollam district were selected based on maximum vegetable production. From each AEZs, 3 panchayaths were selected and 20 homesteads were selected randomly from each panchayaths. Thus the total sample size is 120 homesteads. The selected panchayats were namely: Nedumpana, Veliyam and Ummannoor panchayath from AEU 9(South Central Laterites) and Kadakkal, Chithara and Piravanthur panchayat from AEU 12(Southern and Central Foot Hills).

To determine the gender roles in vegetable cultivation under homesteads a suitable structured schedule was developed. Two major aspects of

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activity analysis viz, agricultural activity and household activity were denoted in the schedule. Selected major aspects were further divided in to sub activities for identifying the role performed by respondents in homestead vegetable cultivation. The response of the respondents was recorded on a three point continuum viz, women,men and both for identifying their roles in each activity. Based on the percentage obtained the activity is categorized in to male dominated and female dominated activities.

RESULTS AND DISCUSSION

To get an overall view of the respondents with respect to their roles in vegetable cultivation in homesteads, activity analysis was conducted. This analysis enables us to identify the gender roles in doing various activities. The activity analysis was conducted in two sections namely agricultural activity analysis and house hold activity analysis.

1. Agricultural Activity Analysis

Here the gender roles for various agricultural activities were identified with the help of percentage analysis.

Table 1 shows the distribution of respondents based on agricultural activity analysis. The data shows that 74 per cent of women were engaged in post-harvest operations followed by livestock and poultry activities (67%). In case of men, 74 per cent of the respondents were engaged in plant protection activities, 61 per cent involved in fertilizer application, 60 per cent of were involved in land preparation and 42 per cent for collection and arrangements of inputs.

This was expected since it is the males of the family who mainly carry out the land preparation and plant protection activities. Male domination in land preparations and plant protections activities might be due to the fact that these activities were very tedious hence the involvement of women was found to be minimum.

In some cases, where women were involved, they worked as a helper to the male members in the activities due to the lack of skill and scientific knowledge. Forty three percent of the total respondents reported that both men and women were engaged in harvesting of produce. Other activities in which both men and women had a significant role were mulching (63%), planting (62%), weeding (61%), stalking (58%)and sowing (48%). There were no activities which were done

Table 1. Distribution of respondents based on agricultural activity analysis

n=120

S.No.	Activities	Women		Men		Jointly involved	
		f	%	f	%	f	%
a	Land preparation	5	4	72	60	43	36
b	Collection and arrangements of inputs	33	27	50	42	37	31
c	Sowing	39	32	24	20	57	48
d	Planting	18	15	28	23	74	62
e	Weeding	27	23	20	16	73	61
f	Mulching	20	16	25	21	75	63
g	Stalking	21	17	30	25	69	58
h	Fertilizer application	20	16	73	61	27	23
i	Plant protection	8	7	89	74	23	19
j	Harvesting	48	40	21	17	51	43
k	Post-harvest operations	89	74	12	10	19	16
l	Livestock and poultry activities	80	67	12	10	28	23

by men or women alone.

It can be concluded that among all the agricultural activities, major women oriented activities were post-harvest operations and livestock and poultry activities. The results were in line with that of Jain and Singhal (2012) who reported that most of the works related to livestock management are looked after by women more than their counterpart and have proved that they work in livestock management in a better way than men since they had more affection and care with livestock. The major men oriented activities were land preparation, plant protection, collection and arrangements of inputs and fertilizer application.

The activities in which both men and women had significant role were harvesting, planting, weeding, stalking, mulching and sowing. This indicates that in homesteads vegetable production is not gender exclusive but certain activities where mostly carried out by the male partner. Similar results were also reported by Kalash *et al*.(2012).

From the study, it can be concluded that although men dominated in some operations of vegetable cultivation but in totality both the gender had a significant participation in most of the activities. This indicates that the farm women can manage the agriculture in similar fashion to men, even without any formal training, but their skill can be enhanced further by giving proper scientific guidance related to agriculture. The role of women in certain cases was supportive in nature while the dominative role was performed by men.

There is a need that the policy maker, extensive workers, voluntary organization and other agencies should give more attention towards rural women for better development of agriculture. It is suggested that projects and programmes which aims to increase vegetable production should be designed such a way that it must address the complementary roles that men and women farmers play. This result is on par with that of Mofeke *et al.*(2003).

2. House hold activity analysis

This study was conducted to identify the roles of men and women in house hold activities. The selected household activities for studying the roles are enlisted in Table 2. Percentage analysis was used to reach out the result.

From Table 2 it is clear that food preparation activity was 100 per cent women oriented and 77 per cent of childcare activity were carried out by women of the family. Other women oriented activities were elderly care (68%), collection of water (67%) and cleaning activities (66%). Women were also engaged in off farm and house activities such as daily wage labourers (14%). Among household activities there were no men dominant activities in particular.

According to the data it can be concluded that all the house hold activities were women oriented.

Table 2. Distribution of respondents based on household activity analysis

n=120

S.No.	Activities	Women		Men		Jointly involved	
		f	%	f	%	f	%
1	Food preparation	120	100	0	0	0	0
2	Child care	93	77	0	0	27	23
3	Elderly care	82	68	0	0	38	32
4	Cleaning activities	80	66	12	10	28	24
5	Collection of water	81	67	9	8	30	25
6	Daily wage labourers	17	14	2	1	0	0

Combined activities to some extent were noticed in case of elderly care (32%), collection of water (25%), cleaning activity (24%) and childcare (23%). These results are in line with that of Dhanusha (2017).

Scrutiny of the activity analysis showed that most of the agricultural activities were gender exclusive and house hold activities were gender inclusive. That means in case of household activities, all activities were women oriented. Women in the general population still spend more time on parenting and housework than men. It may be driven by deeper socio cultural barriers to changes in traditional gender roles, Breen and Cooke (2005). Rural women play an eminent role in both inside and outside the home as a partner in the man's profession. She is the central figure in the family, who influencing and serving the social, economic, and cultural standards of the family.

CONCLUSION

By conducting activity analysis, we can conclude that even though there are some men dominated and women dominated operations of vegetable cultivation but in totality both the gender had a significant participation in most of the activities. There was not a single homestead where the agricultural activities are done by male partner alone. This implies that women have a significant contribution in agricultural activities. They can become a great resource in the development process if they are properly mobilized and organized. The poor rural women need to be more self reliant by encouraging them to engage in economically productive activities.

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CONSTRAINTS IN ADOPTION OF RECOMMENDED RAPESEED MUSTARD PRODUCTION TECHNOLOGY IN SUB-TROPICAL AND TEMPERATE REGION OF J&K

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ABSTRACT

The present research pursuit was undertaken to assess different constraints faced by the farmers in adoption of recommended rapeseed mustard production and protection technologies. The present study was conducted in 04 districts falling under sub-tropical and temperate region of Jammu division with a sample size of randomly selected 200 farmers. The study revealed that lack of irrigation facilities (55%), problem of aphid attack (45%) and lack of quality seeds (29%) were the main constraints reported by the farmers in adoption of recommended rapeseed mustard production technology in both sub-tropical and temperate region of Jammu division. However problem of untimely snowfall and hailstorms were the major constraints faced by the rapeseed mustard growers in temperate hilly zones of Jammu division.

INTRODUCTION

Rapeseed mustard is an important Rabi oilseed crop of India. Rapeseed mustard group mainly consists of toria *(Brassica rapa)*, raya *(Brassica juncea)* and gobhi sarson*(Brassica napus)*. In India, it contributes nearly 80% of the total *rabi* oilseed production. Area under rapeseed mustard is 6.3 million ha with a production of 7.4 metric tonnes and productivity of 11.76 q/ha. (Directorate of Rapeseed Mustard Research, 2013). In terms of rapeseed mustard productivity, global ranking of India is 28th (Bhardwaj, 2013). There is variation in the production and productivity of rapeseed mustard in different states. In Jammu & Kashmir (J&K) state, rapeseed mustard production scenario is not very encouraging despite its paramount importance for human beings and animals. The productivity of rapeseed mustard in J&K is 6.98 q/ha (DSE, 2013) which is far less than the national average. Earlier research studies conducted till date show that majority of farmers are still lagging behind in the adoption of modern rapeseed mustard production technology. Therefore in order to assess different constraints faced by the farmers, present research pursuit was undertaken in subtropical and temperate zone of the Jammu division.

RESEARCH METHODOLOGY

Stratified random sampling technique was employed for selection of districts for the present study. At first stage, all the ten districts of Jammu division were divided into two strata. First strata include districts having overall maximum area falling under sub-tropical zone and second strata include districts having maximum area under temperate zone. From sub-tropical zone, Jammu & Samba district, whereas from temperate zone, Reasi & Doda were purposively selected on the basis of maximum area under rapeseed mustard crop in these districts. Based on the maximum area under rapeseed mustard crop, two blocks from each district were selected purposively. R.S. Pura & Bishnah blocks from Jammu district, Purmandal &Vijaypur blocks from Samba district, Mahore & Arnas blocks from Reasi district and Bhaderwah and Marmat blocks from Doda district were selected purposively. A list of rapeseed mustard growers for each of the selected block was prepared with the help of concerned agencies. From a total list of 1177 rapeseed mustard growers in the selected blocks, 25 rapeseed mustard growers from each block

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were selected by random sampling method making a total sample size of 200 rapeseed mustard growers for assessing different constraints faced by the rapeseed mustard growers in adoption of recommended production technology.

RESULTS AND DISCUSSION

Table 1 shows the socioeconomic characteristics of rapeseed mustard farmers interviewed. Overall average age in all the four study districts was 49.02 years (±13.09). Majority of rapeseed mustard growers (51.00 per cent) belonged to middle age group (43-60 years) followed by 32.00 per cent in 18-42 years group and 17.00 per cent in 61-85 years group. The average overall formal education was8.00 years (±4.00).The data in Table 1 indicate that in case of rapeseed mustard growers in Samba district, 84 per cent had nuclear families followed by 80.00 per cent in Doda, 76.00 per cent in Reasi and 70.00 per cent in Jammu district. The percentage of joint families of rapeseed mustard growers was 16.00, 30.00, 24.00 and 20.00 in Samba, Jammu, Reasi and Doda districts respectively. With respect to categorization of family size done by 'Singh's Cube root method (1975) overall 71 per cent of the mustard growers had a family size of 2 to 7 members followed by 24 per cent growers who had family size of 8 to 11 members and only 5 per cent growers had family size between 12 to 22 members per family (Table 1).Overall average operational land holding of mustard growers in the study area was 1.64hectare

Table 1. Socio-economic profile of rapeseed mustard farmers

Parameter	Samba (n=50)	Jammu (n=50)	Reasi (n=50)	Doda (n=50)	Overall percentage N=200
Average age	51.20 ±14.37	51.10 ±11.35	46.64 ±11.24	47.14±13.09	**49.02±13.09**
Age categories (per cent farmers)					
18-42yrs	32	18	36	40	**32**
43-60yrs	42	64	54	46	**51**
61-85yrs	26	18	10	14	**17**
Education (per cent farmers)					
Illiterate	16	14	38	10	**20**
Below primary	02	00	02	00	**01**
Primary	14	02	8	10	**08**
Middle	24	18	26	26	**24**
Matric	32	38	16	38	**31**
10+2	08	18	04	12	**10**
Graduate and above	04	10	06	04	**06**
Average education (formal no. of schooling years completed)	7.47±4.04	9.34±4.07	5.66±5.00	8.42±3.55	**7.79±4.39**
Avg family size	6±2.65	7±3.12	7±2.45	7±3.85	**7±3.08**

Type of farm households (per cent farmers)					
Joint	16	30	24	20	**23**
Nuclear	84	70	76	80	**77**
Size of farm households (per cent farmers)					
2-7 members	80	72	64	68	**71**
8-11 members	18	22	34	20	**24**
12-22 members	02	06	02	12	**05**
Land holding (in ha)					
Avg. operational land holding (S.D)	1.81(±2.12)	1.61(±1.31)	2.10(±1.72)	1.08±.96)	**1.64(±1.63)**
Average irrigated land holding(ha)	1.22 ±2.20	1.57 ±1.32	0.18 ±3.40	0.11 ±0.32	**0.77±1.44**
Average un irrigated land holding	0.59 ±1.01	0.04 ±0.14	1.91±1.58	0.97 ±.96	**0.88±1.25**
Categories of farmers (% farmers)					
Marginal(<1ha)	44	34	30	56	**41**
Small(1-2ha)	22	32	24	28	**26**
Semi-medium (2-4ha)	22	26	30	12	**23**
Medium (4-10ha)	10	08	16	04	**09**
Large (>10ha)	02	00	00	00	**01**
Average farming experience (years)	29.84±12.99	27.00±10.29	25.00±10.29	23.48±12.36	**26.33±11.63**
Average distance from (in km)					
Agri office	3.68±2.45	3.72±2.93	10.04±9.68	11.39±7.55	**7.21± 7.30**
Seed store	3.68±2.45	3.42± 2.72	9.32± 9.37	7.29±3.97	**5.93± 5.92**
Fertilizer store	2.12± 2.10	2.76± 2.30	9.32± 9.37	7.29±3.97	**5.37± 6.09**
Pesticide store	2.12±2.10	2.76± 2.29	9.49± 9.39	7.29±3.97	**5.39± 6.09**
Market	3.96 ±3.33	3.80 ±2.78	9.64±9.38	7.69±3.79	**6.22±6.06**
Social participation (%age)					
Membership of an organization		6	4	12	08**10**
Extension contacts with different agencies(%age)					
Yes	60	52	40	50	**51**

which was higher than state average land holding size of 0.67 hectare. (DSE, 2007)

Data presented in Table 1 show that in case of rapeseed mustard growers overall 41 per cent were in the category of marginal farmers (<1ha) followed by 26 per cent small farmers (1-2ha),23 per cent semi-medium farmers(2-4ha), 9 per cent medium farmers(4-10ha) and only 1 per cent were in large farmers category having land holding size greater than 10 hectares. The figures given in Table 1 depict that average farming experience of rapeseed mustard growers was 26.33 years (±11.63). Data presented in table 1 regarding distance show that overall average distance from the nearby market and seed store in case of rapeseed mustard growers was 6.00 km from their place of residence and an equal distance of 5.00 km in case of pesticide and fertilizer sale center. The overall average distance of the Department of Agriculture was 7.00 km. A close look at Table 1 indicates that overall only 10 per cent mustard growers had membership in some social organizations. With regard to extension contacts of the respondent farmers, overall only 51 per cent growers had contact with different field extension functionaries.

2. Constraints hindering farmers in adoption of recommended rapeseed mustard production technology

Different constraints which hinder the successful cultivation of rapeseed mustard cultivation have been explained in Table 2. Overall lack of irrigation at critical stages was the main constraint ranked first by the rapeseed mustard growers in study area followed by problem of aphid attack (IInd rank), lack of quality seeds (IIIrd rank), problem of hailstorms mainly in Reasi and Doda district & untimely rainfall (IVth rank), unavailability of inputs at right time (Vth rank), untimely snowfall mainly in

Table 2: Constraints hindering farmers in adoption of recommended rapeseed mustard production technology crop n=200*

Constraints	Samba (n=50)	Jammu (n=50)	Reasi (n=50)	Doda (n=50)	Overall percentage N=200	Rank
Lack of irrigation at critical stages	48	16	96	60	55	I
Lack of quality seeds	20	20	54	24	29	III
Problem of Aphid	34	60	34	52	45	II
Unavailability of inputs at right time	4	2	26	14	11	V
Untimely snowfall	0	0	14	28	10	VI
Problem of hailstorm	0	0	48	26	18	IV
Weed infestation	2	0	0	8	2	IX
Manual harvesting and threshing is difficult	14	10	0	0	6	VIII
Lack of knowledge about recommendations	6	4	14	2	6	VIII
Untimely rainfall	16	24	12	20	18	IV
Wild animal destroy the crop	16	0	0	0	9	VII
Strong winds at ripening time damage crop	0	10	0	0	2	IX

***Multiple responses**

Reasi and Doda district (VIth rank), destruction of crop by wild animal (VIIth rank), lack of information regarding recommendations & difficult manual harvesting and threshing (VIIIth rank), weed infestation and strong winds at ripening time damage the mustard crop also ranked IXth by the mustard growers in Jammu district only. The present findings got support from the study conducted by Singh *et al*. (2013) on oilseeds at Central Agricultural University, Imphal in collaboration with DRMR, Bharatpur, Rajasthan in which it is reported that scarcity of irrigation at critical stages and high incidence of pest and diseases is the major constraint in oilseed cultivation. However study conducted by Sharma *et al.* (2013) reported different set of constraints in rapeseed mustard cultivation such as non-availability of pure seeds at sowing time, inadequate supply of fertilizers, poor fertility of soil, lack of technological know-how, and lack of visit by extension personnel to the village.

CONCLUSION

On the basis of results it is concluded that sampled rapeseed mustard growers of sub-tropical districts i.e. Jammu & Samba reported different constraints as compared to that of temperate blocks of Reasi and Doda districts. Lack of irrigation facilities especially in hilly areas were reported as major constraint because like other crops rapeseed mustard crop is also raised as rain-fed crop in hilly region and sometimes due to erratic rainfall their rapeseed mustard crop gets badly affected as reported by respondent farmers. Attack of aphid insect mainly at the flowering stage was the second most important constraint reported by the sampled mustard growers especially in sub-tropical area of the study and in the absence of its proper control it reduces the productivity to a large extent. In the hilly districts of study area climate change has started showing its ill-effect on the crops because untimely snowfall and hailstorms is a serious concern in successful cultivation of rapeseed mustard crop as reported by the respondent farmers. Late snowfall results in rise in temperature which in turn leads to early flowering in mustard crop and if snowfall occurs after flowering period then it badly damages the flowering parts due to which productivity of mustard crop drastically reduces and same phenomenon affected the productivity of mustard crop in sampled temperate zone blocks of study area to a large extent and that was one of the main reasons for lower productivity of mustard crop in area in study blocks falling under temperate zone. Field extension functionaries should try to overcome these constraints which are within their control to improve the adoption status of recommended rapeseed mustard production technology.

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AN EVALUATIVE STUDY OF THE AGRICULTURAL PROGRAMMES TELECASTED BY DOORDARSHAN KENDRA, GUWAHATI, ASSAM

P. Bordoloi*, P. Mishra and P. Das*****

ABSTRACT

The objective of communication of the agricultural information to farmers is not only to create awareness among them but also to impart new ideas that change their behavior and mode of farming. So, with this background, the present study was conducted to find out the effectiveness of agricultural programme telecasted through Doordarshan Kendra Guwahati, Assam. A total of 120 farmers were selected as respondents for the study. The study included 6 parameters which represent some selected characteristics of the agricultural programme viewers (respondents) and 10 other parameters which represent the effectiveness of the agricultural programme in terms of format used in the telecasted agricultural programmes. Regarding the responses of the agricultural programme viewers about the format used in the telecasted agricultural programmes, it was found that more than half of the respondents (53%) had mentioned that the coverage of information was complete, majority (63.33%) had mentioned satisfactory response to the accuracy of information, 49.16 percent had mentioned that the speed of presentation was normal, majority (63.33%) told that the pictures were relevant, 35 percent of the viewers had mentioned that the picture quality was fair etc.

INTRODUCTION

Mass media are the channels of communication which can expose to large numbers of people with the same information at the same time and within a short space of time. These may include media which pass on information through the use of sound, moving pictures or print.

The expansion of Indian television in recent years has influenced our people mainly in two ways. Firstly, those who are living in the remote corners of the country have been pulled out of their so called age-old "Packet of isolation" and merged into the national mainstream. Secondly, television has contributed to an unprecedented explosion of information. The age-old social barriers have shut down just because of television. Thus, television has played, is playing and will be playing a vital role in social change.

The electronic media has a central role in facilitating the exposure of farmers to a variety of information. So during the X^{th} year plan, a scheme called "mass media support to agriculture extension" has been launched for revamping the extension services in the country by using electronic media.

Under this scheme, the existing infrastructure of Doordarshan is being utilized to produce and telecast programmes covering a wide spectrum of topics in agriculture and allied field for bringing the latest information and knowledge to the farming community. The basic objective of Doordarshan Regional Programme is to address information/ knowledge needs of farmers throughout the region in the regional language.

However, all these efforts will be in vain until and unless these are actually utilized by the farmers as their source of information. So in view of the above fact, the present study was designed with an objective to measure the effectiveness of agricultural programme telecasted through Doordarshan Kendra Guwahati among the farming community at Jorhat district of Assam.

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RESEARCH METHODOLOGY

The present study was conducted in the Jorhat district of Assam. Two agricultural sub-divisions i.e Jorhat and Majuli were selected purposively. From each of the sampled sub-division, three A.E.O. circles were selected randomly and from each of the A.E.O. circle, one VLEW eleka was selected randomly. Thus, from each VLEW eleka, 20 farmers were selected randomly and ultimately 120 nos. of farmers were selected as respondents for the study.

The study included 6 parameters which represent some selected characteristics of the agricultural programme viewers viz. age, educational level, income, source of information, T.V. ownership and T.V. viewership. The frequency and percentage (where it is applicable) were calculated to examine the distribution of the agricultural programme viewers on the above said parameters and the effectiveness of agricultural programme was studied in terms of format of the agricultural programme telecasted through Doordarshan Kendra Guwahati.

RESULTS AND DISCUSSIONS

It can be from Table 1 that 45.00 percent of the agricultural programme viewers belonged to the age group of 36-50 years. The age groups of 36-50 years were consisted of those farmer viewers who were young, energetic and involved themselves in farming as a profession, so in this range of age group the respondents were found to be somewhat more.

Forty percent of the respondents were XII passed (Table 1). Reddy (1979) found that the lack of formal education did not come in the way of utilization of Doordarshan for farm instruction programmes and the findings from this study also resembled with the finding of Reddy.

It is evident from the Table 1 that 40.00 percent of respondents earned in range of Rs. 52,000-77,000 per annum. So, it can be understood from the table that almost all the respondents within the study area were hardly able to reap the benefit of the farming profession though most of them were farmers by profession and possessed the optimum level of operational land holding.

Data in Table 1 that 40.00 percent of the respondents most often got their farm information from T.V followed by 31.66 percent who often used TV as their source of information. There were 15.00 percent of the respondents sometimes used TV as their source of information and rest 13.34 percent never used TV as their farm information source.

Radio as source of information was never used by more than half of the respondents (51.66%) followed by 25.00 percent who used it sometimes, then 17.50 percent often used radio as their source of information and the rest 5.83 percent most often used radio.

More than half of the respondents (54.18%) never used newspaper as their source of information followed by 25.83 percent who used it sometimes, then often used by 18.33 percent and most often used by 1.66 percent.

Again Table 1 shows that 62.50 percent of the respondents had their own T.V., constituted the majority followed by 29.16 percent who do not own T.V whereas, 8.34 percent had community T.V in their village. Normally community T.V having respondents were seen in Jhengrai A.E.O. circle of Majuli sub-division but that was seldom used by them because the local leaders and president normally used to close the clubs and kept the key with themselves which created disturbances for them for viewing the agricultural programme telecasted though Doordarshan Kendra Guwahati though they were very good farmers. Pillia *et al.,* (1987) mentioned that most of the respondents (80.00%) were viewing farm telecast in public places where the government has installed the television sets. Only 17.00 percent of the television viewers were having their own television sets, which didn't resembled with the findings of the present study since 62.50 percent of the respondents had their own T.V. and they viewed it on their own T.V.

The parameter i.e. T.V viewership was purely based on frequency of viewing and attention paid to the telecasted agricultural programme. It is

Table 1. Frequency and percentage distribution of the respondents according to their socio-economic and personal characteristics

(n=120)

S.No.	Variable		Frequency	Percentage (%)
1	Age	Up to 35	39	32.50
		36 to 50	54	45.00
		51 and above	27	22.50
2	Educational level	Illiterate.	1	0.83
		Able to read and write.	2	1.66
		Primary school passed.	3	2.50
		Middle school passed.	21	17.50
		High school passed.	40	33.33
		XII/H.S.	48	40.00
		Graduate and above.	5	4.18
3	Income level	Below Rs. 25,000.	25	20.83
		Rs. 25,000-51,000.	37	30.83
		Rs. 52,000-77,000.	48	40.00
		Rs. 78,000 and above.	10	8.34
4	Source of information			
	T.V	Most often	48	40.00
		Often	38	31.66
		Sometimes	18	15.00
		Never	16	13.34
	Radio	Most often	7	5.84
		Often	21	17.50
		Sometimes	30	25.00
		Never	62	51.66
	Newspaper	Most often	2	1.66
		Often	22	18.33
		Sometimes	31	25.83
		Never	65	54.18
5	T.V. ownership	Own T.V	75	62.50
		Don't own T.V	35	29.16
		Community T.V	10	8.34
6	T.V Viewership	**Frequency of viewing**		
		Regularly	67	55.83
		Three to four times a week	14	11.66
		One to two times a week	22	18.33
		Once in a fortnight	17	14.18
		Attention Paid		
		Fully	74	61.67
		Partially	34	28.33
		Little	12	10.00

evident from Table 1 that 55.83 percent of the respondents were viewing agricultural programme telecasted through Doordarshan Kendra Guwahati regularly which constituted the majority followed by 18.33 percent who viewed it 1-2 times a week, 14.18 percent viewed it once in a fortnight and 11.66 percent viewed the programme 3-4 times a week. During the interview, farmers expressed that they could not watch the programme regularly in spite of their interest, as they sometimes could not return home by that time, from their farm work or other outside house hold work and since some of the respondents didn't own T.V that also made them irregular in viewing the programme. Pillia *et al.*, (1987) found that only 11.00 percent of respondents watched the farm telecast rarely while more than half of the respondents (54.00%) viewed the farm telecast frequently. However, more than one third of the respondents viewed the farm telecast daily and the findings were quite resembled with the findings of Pillia *et al.*

As observed from Table 1, majority (61.67 %) of the respondents viewed the programme with "Full attention" followed by "partial attention" (28.33%) and "little attention" (10.00%). This partial and little attention might be due to feeling of tiredness at that time after returning home from farm activities or viewing of T.V in some noisy circumstances or liked to view some other programmes such as music, movies etc.

The effectiveness of agricultural programme telecasted was studied in terms of format used in the telecasted agricultural programmes through Doordarshan. The findings and relevant discussions on each subject are presented in the following sub heads.

Coverage of information in the telecasted agricultural programme through Doordarshan

It is an evident in Table 2 that the coverage of information in the telecasted agricultural programme were "complete" as mentioned by 53.33 per cent of the respondents followed by 24.17 percent of the respondents mentioned that information covered were "incomplete". However, 22.50 percent of the respondents were of the opinion that the information covered was "partially complete". This might be due to insufficient duration of the telecasted agricultural programme as it was clearly mentioned by the respondents during the process of interview.

Table 2. Frequency and percentage distribution of the respondents according to the coverage of information in the telecasted agricultural programme through Doordarshan

S. No.	Coverage of information	f	%
1	Complete	64	53.33
2	Partially complete	27	22.50
3	Incomplete	29	24.17

Accuracy of information in the telecasted agricultural programme through Doordarshan

Table 3 clearly shows that majority of the respondents (63.33%) opined that it was "satisfactory" in regard to the accuracy of information, followed by 17.50 percent of the respondents who were mostly satisfied with the accuracy of the information in the telecasted agricultural programme. However, 16.66 percent viewed it as "less satisfactory" and the rest 2.51 percent had mentioned that the telecasted agricultural programme's accuracy of information was "inadequate". During interview it was asked and found that the inadequacy of information was because of short duration of the telecasted agricultural program, lack of seasonability and lack of practical utility.

Speed of presentation in the telecasted agricultural programme through Doordarshan

As observed from the Table 4 that 49.16 per cent of the respondents viewed the speed of the presentation as "normal", followed by 40.00 per cent of the respondents put in the picture that the speed of the presentation was "fast" and the rest 10.84 percent had enlightened it as "slow". During the interview it was cleared that the fast speed of the presentation might be due to lack of adequate

Table 3. Frequency and percentage distribution of the respondents according to the accuracy of information in the telecasted agricultural programme through Doordarshan

S. No.	Accuracy of information	f	%
1	Most satisfactory	21	17.50
2	Satisfactory	76	63.33
3	Less satisfactory	20	16.66
4	Inadequate	3	2.51

duration of the programme and slow presentation lead to incompletion of the programme which broke the respondents' interest and couldn't cover the necessary information in time.

Table 4. Frequency and percentage distribution of the respondents according to the speed of presentation in the telecasted agricultural programme telecasted through Doordarshan.

S. No.	Speed of presentation	f	%
1	Fast	48	40.00
2	Normal	59	49.16
3	Slow	13	10.84

Relevancy of the pictures in the telecasted agricultural programme through Doordarshan

Table 5 showed that 63.33 percent i.e., majority of the respondents mentioned that the pictures were relevant followed by 30.00 percent opined it as somewhat relevant and 6.67 percent spoke out it as not relevant. During interview it was clearly asked and the reason of non relevancy as well as somewhat relevancy was because of the speed of the presentation. Fast speed of the presentation sometimes lead to quick flow of the pictures not matching to the conversations at the same time or vice versa as well as sometimes different farming cultures were shown that were not prevailing to their own agro-climatic condition.

Table 5. Frequency and percentage distribution of the respondents according to the relevancy of the pictures in the telecasted agricultural programme through Doordarshan.

S. No.	Relevancy of pictures	f	%
1	Relevant	76	63.33
2	Somewhat relevant	36	30.00
3	Not relevant	8	6.67

Quality of pictures in the telecasted agricultural programme through Doordarshan

It was observed from the Table 6 that 35.00 percent of the agricultural programme viewers mentioned that the quality of the pictures were "fair" followed by 33.33 percent mentioning it as "poor" quality and the rest 31.67 percent pointed out that the quality of the pictures were "good". During interviewing process, it was found that the pictures were not too much clear and some of the necessary parts were not zoom out which lead to barriers in viewing.

Table 6. Frequency and percentage distribution of the respondents according to the quality of the pictures in the telecasted agricultural programme through Doordarshan

S. No.	Quality of pictures	f	%
1	Good	38	31.67
2	Fair	42	35.00
3	Poor	40	33.33

Quality of sound in the telecasted agricultural programme through Doordarshan.

According to Table 7 it was seen that 47.50 percent of the respondents expressed that the sound quality of the programme was "good", while 36.66 percent mentioned it as "fair" and 15.84 percent opined it as "poor". Most of the respondents opined that sound were not clearly audible so it was of

poor quality.

Table 7. Frequency and percentage distribution of the respondents according to the quality of the sound in the telecasted agricultural programme through Doordarshan.

S. No.	Quality of sound	f	%
1	Good	57	47.50
2	Fair	44	36.66
3	Poor	19	15.84

Motivation of the respondents from the telecasted agricultural programme through Doordarshan

Table 8 showed that majority (54.16%) of the viewers were motivated by the programme, 41.66 percent were "somewhat motivated", whereas 4.18 percent were not at all motivated. During interview the reason of not motivation was asked and it was mentioned that sometimes the programme was not farmers centric and whatever was shown in the programme that was not favourable for the farmers to practice due to some problems like cost, electricity, non- availability of timely resources etc.

Table 8. Frequency and percentage distribution of the respondents according to their motivation from the telecasted agricultural programme through Doordarshan

S. No.	Motivation	f	%
1	Motivating	65	54.16
2	Somewhat motivating	50	41.66
3	Not motivating	5	4.18

Modes of presentation in the telecasted agricultural programme through Doordarshan

It can be viewed from the Table 9 that discussion modes of presentation was mostly preferred by 15.83 percent, somewhat preferred by 44.17 percent and not preferred by 40.00 percent of the viewers while drama modes of presentation was mostly preferred by 21.67 percent, somewhat preferred by 28.33 percent and not preferred by 50.00 percent (majority) of the viewers, regarding the question/answer modes of presentation, it was preferred mostly by 40.83 percent, somewhat preferred by 22.50 percent and not preferred by 36.67 percent whereas lecture was mostly preferred by 17.51 percent, somewhat preferred by 30.83 percent followed by majority (51.66%) not preferred the lecture mode. Debates were preferred mostly by 13.34 percent, somewhat preferred by 21.66 percent and not preferred by majority (65.00%). Interview was mostly preferred by 81.66 percent i.e., majority, somewhat preferred by 16.66 percent and not at all preferred by 1.68 percent of the viewers and regarding the phone-in program it was mostly preferred by 87.50 percent, somewhat preferred by 6.66 percent and not at all preferred by 5.84 percent of the viewers. These interview and phone-in program modes of presentation were mostly preferred by majority because it used to provide plenty of opportunities and scope for the farmer viewers to interact with the scientists, concerned resource persons and fellow farmers. Manandhar and Srinivasmurthy (1989) pointed out that farmers preferred the dramatized dialogue mode of presentation of message followed by discussion and clarifying doubts through question-answer rather than the straight talk mode of presentation. But the present study findings were not matched with the findings of the mentioned study, here straight talk mode of presentation was preferred by majority followed by clarifying doubts through question-answer as compared to the dramatized and discussion mode of presentation.

Language used in the telecasted agricultural programme through Doordarshan

It is evident from Table 10 that majority (69.16%) of the viewers could easily understand the language of the programme, whereas 29.16 percent understood it but not too much while 1.68 percent were not at all able to understand the language. During interview the reason of not understanding was raised and it was addressed that

Table 9. Frequency and percentage distribution of the respondents according to the modes of presentation followed in the telecasted agricultural programme through Doordarshan.

S.No.	Modes of presentation	Most preferred		Somewhat preferred		Not preferred	
		f	%	f	%	f	%
1	Discussion	19	15.83	53	44.17	48	40.00
2	Dramatized	26	21.67	34	28.33	60	50.00
3	Question/Answer	49	40.83	27	22.50	44	36.67
4	Lecture	21	17.51	37	30.83	62	51.66
5	Debates	16	13.34	26	21.66	78	65.00
6	Interview	98	81.66	20	16.66	2	1.68
7	Phone-in program	105	87.50	8	6.66	7	5.84

the programmes were sometimes not meant for the farmers. Also, sometimes many scientific words were used which was difficult to understand. Pillia *et al.,* (1987) observed that only 4.00 percent of rural television viewers expressed the farm telecast as neither easy nor difficult to understand and it was almost resembled with the findings of the present study.

Table 10. Frequency and percentage distribution of the respondents according to the language used in the telecasted agricultural programme through Doordarshan

S. No.	Language	f	%
1	Easily understandable	83	69.16
2	Understandable	35	29.16
3	Not understandable	2	1.68

Matching of the videography in the telecasted agricultural programme through Doordarshan with the local condition

Table 11 that majority (71.66%) of the viewers were in the favour of the matching of the video graph of the programme with the local condition followed by 16.66 percent who spoke out it as "somewhat matching" while 11.68 percent were not at all in the favour of the matching of the video graph of the programme with the local condition. During interview the reason was asked and it was opined that the programme sometimes used to show some videos or pictures which were not at all practiced in their agro-climatic region commercially.

Table 11. Frequency and percentage distribution of the respondents according to the matching of the video graphy in the telecasted agricultural programme through Doordarshan

S. No.	Matching of the video graph	f	%
1	Very much matching	86	71.66
2	Somewhat matching	20	16.66
3	Not matching	14	11.68

CONCLUSION

From the present study, it was found that the agricultural programme telecasted through Doordarshan Kendra Guwahati was running successfully in the study area, because farmer is the centre of focus for the development in the programme and majority of the selected farmers were developed by the concerned programme and it was found to be effective.

The findings of the present investigation had a number of implications for the extension workers from different agencies, agricultural scientists,

programme executing agency, planners and administrators. Some of the important implications were given below:

1. The findings on effectiveness of the telecasted agricultural programme revealed that the relevancy of the telecasted agricultural programme for the farmers was found to be effective. Moreover, modes of presentation such as interview and phone in programme were mostly preferred as compared to others such as drama, discussion, question/answer etc. So, to make the programme more effective among the farmers these modes of presentation should also be developed and made interesting and interactive.
2. Higher proportions of the respondents were not benefitted by the television programme so far duration and suitability of the time of telecasting is concerned. This needs the attention of programme makers and makes necessary modifications.

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EMPLOYMENT GENERATION BY PROCESSING OF GUAR IN BIKANER DISTRICT OF RAJASTHAN

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ABSTRACT

Present research study is an attempt to determine the functioning of guar processing units regarding inflow of guar and outflow of its proceed products, the costs and margin of processor, the employment generated and the constraints faced by the small, medium and large size processing units. Guar has to be processed for gum, guar churi and korma, so the processing has an important bearing on the interest of producers and consumers. The major guar producing states are Rajasthan, Haryana and Gujrat while minor states are Punjab, Arunachal Pradash, Madhya Pradash and Maharastra. In Rajasthan, Bikaner is the leading district in area, production and productivity of the guar. Bikaner district has maximum number of guar processing units in the state. Most of the quantity was purchased, processed, stored and sold in peak season (October-January) and then decreases up to lean season (June-September). The total average purchase of guar by small, medium and large processing size units was 3600.00, 8,500.00 and 18,500 quintals, respectively.

The recovery of gum, guar churi and korma from processing of guar was almost same on all the three type of processing units. The difference in size of processing units has no influence on recovering of gum, guar churi and korma. The cost of processing per quintal guar was Rs. 573.66, 515.89 and 500.14 for small, medium and large processing size units, respectively. The Processing margin per quintal earned by small, medium and large size processing units was Rs. 656.95, 681.20 and 616.04, respectively. The medium size units earned higher margin of profit due to scale of economies as compared to small and large size units. The per rupee value addition was much higher on medium size processing unit (Rs. 1.18) as compared to small (Rs. 1.16) and large (Rs. 1.16)) size processing units probably due to better management and economies to scale. The break- even point quantity of small, medium and large size processing units was 189.34, 432.85 and 699.40 quintals, respectively. The profit of processing units wok the increase in the crushing quantity of unit.

INTRODUCTION

Guar or cluster bean (*Cyamopsistetragonoloba*) is believed to have originated from Africa but it has been grown throughout southern Asia. India and Pakistan have distinct advantage of agro-climatic conditions for the cultivation of guar though, it is also successfully grown in USA, South Africa, Australia, Brazil, Zaire and Sudan. The estimated annual area, production, and productivity guar in India was during the year (Agricultural Statistics at a Glance- 2015) 5962.5 lakh ha, 3587.9 tonnes and 602 kg/ha respectively. The major guar producing states are Rajasthan, Haryana and Gujarat while minor states are Punjab, Arunachal Pradash, Madhya Pradesh and Maharastra. India's production 1,05,214 million tonnes of guar gum valued of Rs. 751 crores during the year 2016-17, while the production of guar increased up to 1,78,119 million tonnes valued of Rs. 1442 crores during the year 2017-18. (Source : DGCIS Principal commodities data April – July 2017-18). Rajasthan occupies first position in India both in area and production of guar. India accounts for almost 80 per cent of the total guar production in the world and 70 per cent production in Rajasthan. Haryana and Gujrat has second and third position respectively. Area, Production and productivity of guar in Rajasthan had 46.25 lakh hectares, 27,43,968 metric tonnes and 593 Kg/ha, (Rajasthan

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Agricultural Statistics at a Glance- 2014-15). In Rajasthan guar is mainly grown in Barmer, Churu, Shiriganganger, Nagor, Jalore, Sikar, Jaisalmer, Bikaner, Jaipur, Jhunjhunu and Alwar districts. Guar gum is an important ingredient in producing food emulsifier, food additive, food thickener and other guar gum products. India is the largest producer of guar gum products.The future of guar industry is for specialized applications and derivatives. Now average yield of guar in Rajasthan is below potential yield. The low yield of guar of crop mainly due to recurrent drought, without or with little fertilization, lack of knowledge about advance technology, poor market support, non-availability of credit, high rate of illiteracy, poor socio-economic conditions, lack of risk bearing ability, poor communication network, poor extension work and mono-cropping. Guar production and productivity is less in India as compared to other countries. India doesn't have proper industrialization of guar meals.Demand for natural gas shows no sign of slowing down, and the International Energy Outlook 2013 predicts global natural gas demand to rise 1.5% annually through 2040. As with many new opportunities, producers still have limited production. Harvest and marketing knowledge related to cluster bean. The multi utility nature of the crop has generated a lot of interest for the crop among different stakeholders. So, seeking all these aspects and potential of cluster bean for low input cost and high yield, it can encourage farmers to adopt it, as an alternate crop in tribal areas also. Although cluster bean growing areas are spread throughout the state, but steep increase in the prices have resulted in production expanding from traditional parts to new areas within Rajasthan and in other parts of country also. Thus, in order to understand the scope and potential of crop of guar specially in western parts of Rajasthan present paper attempts to study the capacity utilization of processing units and processing of guar by different units.

RESEARCH METHODOLOGY

Bikaner district occupies first place in terms of area and production of guar in Rajasthan. Therefore, this district has been selected purposively. Similarly guar processing units were maximum in Bikaner district of Rajasthan.

The processing units has been selected on the basis of processing capacity of industry. Three types of processing units has been selected looking to time limit of the study i.e.

Small Units - 250 to 500 qtls/ month, Medium units- 500 to 750 qtls/ month and Large- above 750 qtls/ month. Primary data for the study were collected from each category of processing units through personal interview method.Secondary data pertaining to area and production of guar crop in Rajasthan state had been taken from published records. These data were collected from published records of state and central government of India and Rajasthan, i.e. Report of the Directorate of Economics and Statistics (G.O.I) New Dehli and Report of Directorate of Economics and Statistics (G.O.R) Jaipur.

The tabular analysis had been done to find out the quantity purchased, processed, recovery cost of processing and employment generation by deferent size of selected processing units..

RESULTS & DISCUSSION

Employment generated by different size processing units:

In this section, the results related to employment generated by the different size processing units of guar are presented.

i. Employment generated by small size processing units: Employment generated by small size processing unit has been shown in Table 1 Small size processing unit generates on an average 8,759.00 mandays employment during a year. The employment generated by processing of one quintal of guar was calculated as 2.43 mandays.

The causal employment has been calculated 7,915.00 mandays contributing 90.69 per cent of total work generated. Crushing operation of seed in the processing plant generates highest employment (3960.00 mandays) among all operations of processing work during the year which accounts

45.21 per cent of the total work generated by this unit. Cleaning, drying and sieving products generates 1325.00 mandays employment during processing of guar by small size units accounts 15.12 per cent employment of the total employment generated by the units. Employment generated from different activities for processing of guar, unloading of guar contributes 950.00 mandays (10.84%), loading of the product provides 755.00 mandays (8.61%), packing of guar churi and korma accounts 545.00 mandays (6.22%) of the total employment, and packing of gum products contributed 380.00 mandays (4.33% of the employment) employment during the year.

The sub total of the permanent employment is 844.00 mandays (9.64%). The employment available for supervision was 339.00 mandays (8.87%), watchman 385.00 mandays (4.39%) and mechanic 120.00 mandays (1.37%). These work was is permanent nature in the processing plant while work done for loading and unloading, cleaning, drying, sieving, crushing and packing are of done through casual labors.

ii. Employment generated by medium size processing units: Employment generated by medium size processing unit has been shown in Table 2 Medium size processing units generates on an average 12,809.00 man days employment during a year. The employment generated by processing of one quintal of guar was calculated as 1.50 man days.

The causal employment has been generated by medium size processing unit has been calculated as 11,616.00 man days (90.69%), out of which crushing operation of seed in the processing plant generates highest employment of 4768.00 man days among all operation of processing work during the year which accounts 37.22 per cent of the total work generated by this unit. Cleaning, drying and sieving products generates 1762.00 man days employment during processing, which accounts 13.75 per cent employment of the total employment

Table 1. Employment generated by small size processing units

S.No.	Particulars	Employment generated by small size processing units	
		Man days	**Percentage**
A. Causal Employment			
1	Unloading of guar	950.00	10.84
2	Loading of product	755.00	8.61
3	Cleaning, drying and sieving	1325.00	15.12
4	Crushing the grains	3960.00	45.21
5	Packaging (gum)	380.00	4.33
6	Packaging (guar churi and korma)	545.00	6.22
Sub total		**7915.00**	**90.36**
B. Permanent Employment			
7	Supervisor	339.00	8.87
8	Watchman	385.00	4.39
9	Mechanic	120.00	1.37
Sub total		**844.00**	**9.64**
C. Total (A+B)		**8759.00**	**100.00**
Employment generated by one quintal of guar processing		**2.43**	

generated by the units. Employment generated from different activities for processing of guar, unloading of guar contributes 1750.00 mandays (13.66%), loading of the guar product 1436.00 mandays (11.21%), packing of guar churi and korma accounts 1200.00 mandays (9.36%) of the total employment, packing of gum products generated 700.00 mandays (5.46% of the employment), mechanic gets 200.00 mandays (1.56%) work while accounts services gets provided 120.00 mandays (0.93%) employment among the whole work generated during the year.

The sub total of the permanent employment generated by medium size processing units has been calculated as 1193.00 mandays (9.31%). The employment available for accounts work, supervision, watchman and mechanical work was categorized as permanent nature in the processing plant while work done for loading and unloading, cleaning, drying, sieving, crushing and packing are done through casual labors. Medium size units generates 90.69 per cent employment to casual worker while only 9.31 per cent work was available for permanent workers. The permanent worker like supervisor, accountant, watchman and mechanic generates 120.00, 450.00, 423.00 and 200.00 mandays employment respectively, which was 0.93, 3.51, 3.30 and 1.56 per cent of total employment generated by medium size units, respectively.

iii. Employment generated by large size processing units: Employment generated by large size processing unit has been shown in Table 3. Large size processing units generates on an average 21,870.0 mandays employment during a year. The employment generated by processing of one quintal of guar was calculated as 1.38 mandays.

The causal employment generated by large size processing units has been calculated as 18,660.00 mandays (85.32%) during the year. Crushing

Table 2. Employment generated by medium processing unit

S.No.	Particulars	Employment generated by medium size processing units	
		Man days	**Percentage**
A. Casual employment			
1.	Unloading of guar	1750.00	13.66
2.	Loading of product	1436.00	11.21
3.	Cleaning, drying and sieving	1762.00	13.75
4.	Crushing the grains	4768.00	37.22
5.	Packaging (gum)	700.00	5.46
6.	Packaging (guar churi and korma)	1200.00	9.36
	Sub total	**11,616.00**	**90.69**
B. Permanent labour			
7.	Accountant	120.00	0.93
8.	Supervisor	450.00	3.51
9.	Watchman	423.00	3.30
10.	Mechanic	200.00	1.56
	Sub total	**1193.00**	**9.31**
C.	**Total (A+B)**	**12,809**	**100**
	Employment generated by one quintal of guar processing	**1.50**	

operation of grains in the processing plant generates highest employment (6730.00 mandays) among all operation of processing work during the year which accounts 30.77 per cent of the total work generated by this unit. Cleaning, drying and sieving products generates 3480.00 mandays employment during processing of guar by large size units accounts 15.91 per cent employment of the total employment generated by the units. Employment generated from different activities for processing of guar in which unloading of guar contributes 2550.00 mandays (11.65%), loading of the products of guar 2300.00 mandays (10.51%), packing of guar churi and korma accounts 2100.00 mandays (9.60%) of the total employment and packing of gum products 1500.00 mandays (6.85% of the employment) among the whole work generated during the year.

Similarly processing unit need permanent workers to run the plant. Large size processing plant provide employment to permanent worker for 3210.00 mandays (14.68%). The employment available for accountant has been calculated as 400.00 mandays (1.82%), supervision 820.00 mandays (3.74%), watchman 840.00 mandays (3.84%), mechanic 550.00 mandays (2.51%) and security 600.00 mandays (2.74%), during processing of given quantity by large size processing units.

iv. Season wise employment generated by different size processing units: The employment generated by processing unit depends upon the quantity processed during the year. The processed quantity of guar varied from season to season Hence, the employment generated also varied from season to season.

Season wise employment generated by the small size processors has been presented in table 4.20. It is evident from the table that the total employment

Table 3. Employment generated by large size processing units

S.No.	Particulars	Employment generated by large size processing units	
		Man days	**Percentage**
A.	**Casual employment**		
1.	Unloading of guar	2550.00	11.65
2.	Loading of product	2300.00	10.51
3.	Cleaning, drying and sieving	3480.00	15.91
4.	Crushing the grains	6730.00	30.77
5.	Packaging (gum)	1500.00	6.85
6.	Packaging (guar churi and korma)	2100.0	9.60
	Sub total	**18,660.00**	**85.32**
B.	**Permanent labor**		
7.	Accountant	400.00	1.82
8.	Supervisor	820.00	3.74
9.	Watchman	840.00	3.84
10.	Mechanic	550.00	2.51
11.	Security	600.00	2.74
	Sub total	**3,210.00**	**14.68**
C.	**Total (A+B)**	**21,870**	**100.00**
	Employment generated by one quintal of guar processing	**1.38**	

generated was 8759.00 mandays for processing of 3600.00 quintals of guar by small size processing units. In peak season, 2100.00 quintals of guar was crushed and generated 5109.12 mandays of employment which was 58.33 per cent of total employment during the study period. In mid season, 1100.00 quintals of guar was processed and generated 2658.35 mandays of employment which accounts 30.35 per cent of total employment.

In case of lean season 400.00 quintals of guar was crushed, which generates only 973.12 mandays (11.11%) employment. Thus, more than 50 per cent of employment was generated in peak season from October to January by small size processing units. Particularly in lean season average should be trace out to engage permanent labors and increase the labor use efficiency.

Employment generated by medium size processing unit has been shown in Table 4. Medium size processing units generates on an average 12.809.00 mandays employment during a year. The quantity processed was calculated as 8,500.00 quintal of guar. In peak season, 4650.00 quintals (54.70%) of guar was crushed and generated 7007.00 mandays of employment which was 54.70 per cent of total employment during the study period. In mid season, 2600.00 quintals of guar was processed and generated 3919.00 mandays of employment accounts was 30.60 per cent of total employment. In case of lean season 1250.00 quintals of guar was crushed, which generates only 1883.00 mandays (14.70%) employment.

More than fifty per cent processing of guar has been done only in the month of October to January (peak season) while remains eight months of the year, from February to September only 45.30 per cent raw material has been processed. The quantity of guar processed is directly proportional to employment generation. More raw material processed in particular period generates more employment and vice versa. Very low quantity of guar is processed during the month of June to September (4 months) i.e. 14.70 per cent. The owners of guar processing unit should find out the alternative ways to engage the permanent worker of unit in other work in lean season to reduce the per unit cost of processing. The ideal permanent labors can be engaged in manufacturing of animal feed for dairy animals in the area as western Rajasthan is hub of Rathi breed of cow and milk production, which needs animal feed regularly.

Season wise employment generated by the large size processing units has been depicted in table 4.22. It is evident from the table that the total employment generated was 21,870.00 mandays by processing of 15,800.00 quintals of guar. Out of the total employment, 10,060.20 mandays employment was generated in peak season which was 46.00 per cent of total employment. Employment generated by crushing of the 7200.00 quintals of guar. In mid season, 4,500.00 quintals was processed and generated 6123.00 mandays of employment which was 28.00 per cent of total employment,

While in lean season 4100.00 quintals of guar was crushed, provided 5686.20 mandays of employment.

Total quantity processed by large size processing units was more or less equally distributed in all three seasons. Thus, the employment generated at large processing unit was also more or less equally distributed in all three seasons.

Season wise employment generated by small, medium and large size processing units of guar has been presented in Table 4. Table shows table comparative employment by all three units of guar processing.

It is very clear from the table that large size units remain in functioning during lean season for longer period as compared to small (11.11%) and medium size (14.70%) plants. Although all the three units remained in functioning (26.00%) more or less same period during mid season. Table further indicates that small size processing units generates more employment (58.73%) as compared to medium (54.57%) and large (46%) size units during peak season. Thus, it can be calculated that small size units processed more raw material in peak season

and remain ideal during lean season while large size processing units remain in functioning for less period in peak season but variation between inter season is less as compared to small and medium size processing units. Therefore, it is suggested for small and medium size units to generates more employment for permanent as well as casual labours either from existing units or migrating the power in another enterprises so that processing cost of guar can be reduced.

v. Season wise number of days employment generated by all size guar processing units: Season wise number of days employment generated by small, medium and large size processing units of guar has been presented in Table 4. Table shows comparative employment by all three units of guar processing. It is very clear from the table that large size units producing more employment (5686.20 mandays) as compared to small (973.12 days) and medium size (1921.35 days) . Although all time the three units providing employment of 2658.35 days, 3842.70 days and 6123.60 days by small, medium and large size plants, respectively. Table further indicates that small size processing units generates more employment (2,658.35) as compared to medium (3842.70) and large (6123.60) size units during mid season. The large size units creates employment higher (10060.20 days), than medium (7044.95 days) and small size (5109.12 days) processing plant. Thus, it can be concluded that small size units processed more raw material in peak season and remains ideal during lean season while large size processing units remains in functioning for less period in peak season but variation between inter season is less as compared to small and medium size processing units. Therefore, it is suggested for small and medium size units to generated more employment for permanent as well as casual labor either from existing units or migrating the power in another enterprises so that processing cost can be reduced.

2. Constraints faced by processors:

In this section, an attempt has been made to assess the different constraints faced by the different categories of processing units in processing of guar. The processors in the study area were asked to rank the constraints which affect the processing of guar and the same was analyzed by using Garrett's technique. The constraints faced by the processors in processing of guar were mainly irregular supply of electricity, unavailability of skilled labor, lack of finance/credit, inadequate supply of water, lack of improved machinery, inadequate availability of raw material, low demand for processed guar products, lack of marketing facilities of products & lack of transportation facilities and Government interference. Constraints faced by the different size processors in processing of guar are listed in the following sub sections with Garrett's scores as well as the ranks.

Constraints faced by Small,Medium and Large size processing units:

Constraints faced by small size processing units are presented in Table 4.24. Nine major constraints has been identified for small size processing units in processing of guar as depicted in table with their scores as well as ranks. The analysis revealed that

Table 4. Season wise (number of days) employment generated by differentsize guar processing units

Seasons	Quantity processed (Qtls.)			Employment generated (mandays)		
	Small	Medium	Large	Small	Medium	Large
Peak Season (Oct-Jan.)	2100.00	4650.00	7,200.00	5,109.12	7,044.95	1,0060.20
Mid Season (Feb-March)	1100.00	2600.00	4,500.00	2,658.35	3,842.70	6,123.60
Lean Season (June-Sept.)	400.00	1250.00	4,100.00	973.12	1,921.35	5,686.20
Total	**3600.00**	**8,500.00**	**15,800.00**	**8,759.00**	**12,809.00**	**21,870.00**

the first and foremost constraint in processing of guar was lack of finance throughout the year (Garrett score 81.00). Lack of finance directly hit the efficiency of the processing unit. Finance is a major constraints for small size processing units because the capacity of small size unit holders against repayment to credit institutions is less. Lack of transportation of raw material is an another constrain in vast desert area of Bikaner district ranks at second position. Irregular supply of electricity for all processing units has a major problem in Nokha town of Bikaner district asit as and tehsil headquarter. Small processor given it as a third major constrain while large processor ranked it to second major constraint, because quantity processed by large units are more. Availability of labor ranked as fourth constraint for small processor. Lack of demand for guar ranked at fifth position for both small and medium size processing units while it ranks at sixth stage for large size units. Marketing of guar products is ranked as last constraints in small size processing units. Inadequate availability of raw material, unavailability of labour, lack of demand of guar products, lack of improved machinery, lack of marketing of guar products, were found to be second, third, fourth, fifth, sixth, seventh, eighth and ninth rank.

Other constraints was ranked last constraint with Garrett's score 20.00 among small processing unit.

Constraints faced by medium size processing units are presented in table 4.25. Nine major constraints has been identified for medium size processing units in processing of guar as depicted in table with their scores as well as ranks. The analysis revealed that the first and foremost constraint in processing of guar was lack of finance throughout the year (Garrett's score 81.00). Lack of finance directly hit the efficiency of the processing unit. Finance is a major constraints for medium size processing units because the capacity of medium size unit holders against repayment to credit institution is less. Lack of transportation of raw material is an another constrain in vast desert area of Bikaner district ranks at second position. Irregular supply of electricity for all processing units has a major problem in Nokha town of Bikaner district as it as and tehsil headquarter. Small processor given it as a fourth major constrain while large processor ranked it to second major constraint, because quantity processed by large units are more. Lack of demand for guar ranked at fifth position for both small and medium size processing units while it ranks at sixth stage for large size units. Marketing of guar products. Unavailability of labour, Inadequate availability of raw material, unavailability of labour, lack of demand of guar products, lack of improved machinery, lack of marketing of guar products, were found to be second, third, fourth, fifth, sixth, seventh, eighth and ninth rank.

Table 5. Constraints faced by small, medium and large size processing units

S.No.	Constraints	S		M		L	
		Garrett's Score	Rank	Garrett's Score	Rank	Garrett's Score	Rank
1.	Unavailability of labor	81.00	IV	69.00	II	62.00	III
2.	Irregular supply of electricity	62.00	III	56.00	IV	69.00	II
3.	Lack of transportation facility	69.00	II	38.00	VII	31.00	VIII
4.	Lack of finance	81.00	I	81.00	I	81.00	I
5.	Lack of demand of guar products	50.00	V	50.00	V	39.00	VI
6.	Lack of improved machinery	39.00	VI	31.00	VIII	38.00	VII
7.	Unavailability of raw guar	38.00	VII	62.00	III	56.00	IV
8.	Lack of marketing of guar products	31.00	VIII	39.00	VI	39.00	VI
9.	Other	20.00	IX	20.00	IX	20.00	IX

Other constraints was ranked last constraints with Garrett score 20.00 among medium size processing unit. This might be due to easy by processing unit.

Major constraints of processing of guar faced by large size processors are presented in table 4.26 with their scores as well as ranks. The overall analysis revealed that, the first and most serious constraint with Garrett's score 81.00 in guar processing was lack of finance. This might be due to insufficient supply of guar to meet the demand of large area of units in the study area as their requirement is high as compared to small and medium size processing units. Irregular supply of electricity was ranked second most important constraint with Garrett score of 69.00 by large processor because these processing units were facing the short supply of electricity. Unavailability of labour was found the third major constraint with Garrett's score of 62.00 faced by these processors, unavailability of skilled labor at the time of peak marketing season it become scarce, because rural people are engaged in their own agriculture and allied activities.

Lack of raw material, lack of marketing of guar products, lack of demand of guar products, lack of improved machinery and lack of transportation facilities were ranked fourth, fifth, sixth, seventh and eighth position, respectively. Other factors like inadequate water supply were found last rank among all constraintsfaced by large size processing units.

CONCLUSION

It can be concluded that the major constraints faced by small, medium and large size processing units were irregular supply of electricity, inadequate availability of raw material and unavailability of labor. The extent of the problems was more or less same on all the three categories of guar processing units.

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INCLINATION TOWARDS REDESIGNING OF POST CONSUMER TEXTILE WASTE

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ABSTRACT

The clothing is discarded for various reasons. Many researches stated that the amount of household fabric waste is increasing every year due to fast fashion. Post-consumer textile waste (PCTW) is a largely unexplored commodity with strong reuse and recycling potential. It is an efficient resource to explore and develop innovative skills. It has huge potential to generate economic empowerment and has the power to convert trash to treasure. Utilizing waste by reducing, reusing and recycling are the most powerful way by which individuals, households, institutions and businesses can protect their communities and the environment. Women are the one who designs and sews clothing material into value added articles or finished product. Through tailoring skill to make creative, stylish and contemporary designs as per the market demands by using post consumer textile waste. Thirty respondents engaged in stitching of women wears and ready to give responses for the present study were selected purposively from Udaipur city to collect information on type of articles and designing skill used for utilization of post consumer textile waste i.e.types of textile waste available, type of articles developed and types of skill used for decoration of articles. The information was collected using self-structured interview schedule and by observations. Post consumer textile waste are low cost raw materials and many Indian craft enterprises are also adapting traditional skills to create eco products, by reclaiming waste, recycling it and extending the life of a material, and object. It can be used by women entrepreneurs to start a small scale business.

INTRODUCTION

In the present day scenario two W's (Women and Waste) are about to change the 3rd W (World). So the present research undertakes women who have the power to convert waste into potential resource to save our world. Post-consumer textile waste i.e. the textile waste released from every household withholds huge potential to be recycled and reutilized.

Production of textiles involves a huge amount of resources and with the increasing demand it might further increase the burden on our environment. Moreover coping up with the changing fashion trends is also an economic pressure for the society. In present life style we cannot limit the production but we can find out infinite alternative ways of recycling to reduce the burden on nature. These Eco friendly ways are very important not only to save nature but to secure our future generations and only mankind could bring an end to it. It is our responsibility to get the abundance under control and eliminate it as soon as possible (Morgan, L. R., & Birtwistle, G. 2009).

Reusing and recycling is a process that affects many entities. It avoids the punitive costs of landfill, provides employment, helps charity, and moves clothing to areas of the world where it is needed (Hawley 2006). Effective waste management of post consumer textile waste is essential for preventing environmental degradation Reuse refer to use an item more than once, this is a way without reprocessing, which help save time, money, energy and resource. By saving old clothes and adding value to them into something else like hair bands, bracelets, necklace, belts, hats, scarf, gloves, quilts, rags, rugs, bandages, ruffles, scallops, bows, flowers and color-blocked panels and many other household items are some of the uses from old fabric (Anon 2011. Additional design considerations include

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creating fabric appliqués or transferring select zippers, buckles and buttons from otherwise uninspiring fashions onto clothing that deserves a second chance in the spotlight (Anon 2010).

Value addition can be financially rewarding, people can receive money for turning old used garments to new products. Reusing creates jobs. The method can also give opportunities for small or family business. Reusing builds community. People band together and build communities around environmental issue as a common cause.

The researchers in the field of sustainability are thus talking about responsible consumption, value addition and reusing or upcycling of used materials. By reusing and up cycling of such used apparels by involving minimum processing and value addition technique, it is possible that once again, such products can be put into useful purpose. The present research work addresses this issue of converting once used clothing by reusing and value addition.

OBJECTIVES

- To study the preferences of various types of post-consumer textile waste (PCTW) items for re-utilization.
- To study the preferences for various types of articles developed from post-consumer textile waste (PCTW)
- To study the preferences of techniques for re-designing of post-consumer textile waste (PCTW)

RESEARCH METHODOLOGY

For the purpose of study thirty women engaged in stitching of women wears were selected from Udaipur city from purposive random sampling technique. Self structured interview schedule on 'type of articles and designing skill used for utilization of Post-Consumer Textile Waste' was used for data collection. Collected data were analyzed using frequency, percentage and mean percent scores.

RESULTS AND DISCUSSION

General information of the respondents: Table 1 concludes that the group of respondents was heterogeneous in terms of age, education and occupation and was homogenous in terms of income.

Age: Table no. 1, shows that majority of respondents were found in the age range of '41-45' years i.e.33.33percent of the respondents. Rest of the respondents i.e. 13.33, 23.33, 30.00 percent, belonged to the age group '25-30' years, '31 – 35' years, 36- 40 years, respectively.

Education: Regarding education, 46.67percent of respondents were 'metric to graduated educated', other 30percent were 'graduated and above' and the rest 23.33percent were educated up to metric level.

Occupation: Results regarding occupation of the respondents showed that majority of the respondents i.e. 30 percent were 'housewives' and 70 percent were 'working'.

Monthly income of the family: Respondents were evenly distributed with regard to monthly income of the family. It was observed that 33.33percent of respondents were present in each range of monthly income of families i.e. 'below ₹ 20,000', '₹ 20,001-30,000' and 'above ₹ 30,000'.

Type of work: The analysis of facts collected during the interview also showcase that, type of work done by women, equal percentage (50%) respondents were doing stitching work and all type of work related to garment stitching respectively, nearly 37 percent respondents were involved each in embellishment work and 20 percent involved in alteration/repairing work (Table 1).

Selection preference for types of PCTW items for re-utilization: Tables (2) depicts the percentage distribution and mean scores for types of PCTW items, which are useful for redesigning, repurposing and reusing. On analyzing the data it was found that 90, 73.33, 66.67 and 6.67percent of responders believed that, 'female', 'male', 'home furnishing' and 'kids clothing' were always useful for reutilization. About 10 percent of respondents thought that 'male clothing items' were 'rarely' or 'sometimes' useful. Data depicted that as per 83.33

Table 1. General information of respondents

n=30

S.No.	Background variables	No. of respondents (f)	Percentage of respondents (%)
1	**Age (years)**		
	25-30	4	13.33
	31-35	7	23.33
	36-40	9	30
	41-45	10	33.33
2	**Education**		
	Up to matric	7	23.33
	Above metric to graduate	14	46.67
	Graduate and above	9	30
3	**Occupation of the respondents**		
	Service	21	70.00
	Housewife	9	30.00
4	**Monthly income of family (in rupees)**		
	Below 20,000	10	33.33
	20,001-30,000	10	33.33
	above -30,000	10	33.33
5	**Type of work (Multiple Response)**		
	Stitching	15	50
	Embellishment work	11	36.7
	Alteration/repair	6	20
	All types of work related to garment stitching	15	50

Table 2. Types of PCTW items used for re-utilization

n=30

S.No.	PCTW items	Always%	Often%	Sometimes%	Rarely%
1.	Male clothing items	73.33	6.67	10.00	10.00
2.	Female clothing items	90.00	6.67	3.33	0.00
3.	Kids clothing items	6.67	83.33	3.33	6.67
4.	Home furnishing textiles	66.67	26.67	3.33	3.33
	Mean percent score	**59.50**	**30.88**	**5.25**	**4.38**

percent responders, kid's clothing items were 'often' useful for 'repurposing' and 'redesigning'. Very few answerers believed (3.33 percent, 3.33 percent) that Home furnishing textiles were 'rarely' or 'sometimes' useful. Similarly just 3.33 and 6.67 percent responders respectively, said that kid's clothing items were 'rarely' and 'sometimes' useful for 'reusing' and 'redesigning'.

From the table (2) it is clear that most of the respondents realized the potential of reusing textiles. Data also reflects the Indian custom of waste utilization and minimization. It was observed that most respondents were confident that female clothing items were 'always' put to reusing and repurposing. Researchers also asked about type of items prepared and information collected is as fellows

Male clothing items	Kids clothing items	Home furnishing textiles
• *Bags*	• *Dusters*	• *Table covers*
• *Dusters*	• *Quilt making*	• *Napkins*
		• *Duster cloth*
		• *Pillow cover*

Selection preferences of respondents for various types of articles developed from Female clothing items: Table (3) demonstrates the percentage distribution for reusing of female clothing items. It was clear from the table that 43.33 respondents said that decorative patch on Sari was 'always' developed by them from PCTW. Further, 23.33 percent responders responded that 'shirts' and 'trousers' were 'sometimes' developed. Similarly 100, 96.67 and 60percent responders said that 'Tops', 'Salwar & Churidar' and 'party dresses' were 'rarely' repurposed. All respondents reported that they never reconstructed 'party wear dresses' and were the least frequently developed clothing items

Selection preference of techniques for re-designing of PCTW: Respondents were asked to give their view about how frequently type of techniques of designing used for re-designing of PCTW. The table (4) analyzes the redesigning

Table 3. Selection preferences for various types of articles developed from PCTW

n=30

S.No.	Clothing items	Always%	Often%	Sometimes%	Rarely%
1.	Tops	10.00	6.67	0.00	83.33
2.	T-Shirt	13.33	10.00	33.33	43.33
3.	Shirt	3.33	13.33	23.33	60.00
4.	Kurta	3.33	10.00	26.67	60.00
5.	Dupatta	16.67	23.33	10.00	50.00
6.	Odhna	33.33	30.00	36.67	0.00
7.	Scarfs	16.67	13.33	13.33	56.67
8.	Skirt	20.00	13.33	3.33	63.33
9.	Capri	43.33	23.33	16.67	16.67
10.	Ghagra / Lehanga	26.67	6.67	16.67	50.00
11.	Salwar & Churidar	0.00	6.67	6.67	86.67
12.	Trousers	6.67	10.00	23.33	60.00
13.	Jeans	0.00	16.67	16.67	66.67
14.	Pajama or other lower garments	6.67	6.67	16.67	70.00
15.	Sari	43.33	13.33	6.67	36.67
16.	Party wear dresses	13.33	6.67	3.33	76.67
17.	One piece dress	16.67	13.33	10.00	60.00
	Mean percent score	13.33	11.06	12.58	63.03

Table 4. Preferred PCTW re-designing techniques

n=30

S.No.	Techniques for redesigning	Always%	Often%	Sometimes%	Rarely%
1.	Repairing/Mending	3.33	13.33	16.67	66.67
2.	Patching	6.67	13.33	3.33	76.67
3.	Retailoring	70.00	13.33	10.00	6.67
4.	Repurposing	3.33	13.33	6.67	76.67
5.	Value addition	10.00	13.33	10.00	66.67
	Mean percent score	6.5	6.00	13.33	9.33

techniques through which disposed clothing are rejuvenated by the responders.

Data states that maximum respondents (66.67, 76.67, 70, 76.67 and 66.67 percent) 'rarely' performed activities like 'repairing', 'mending', 'patching', 'retailoring', 'repurposing' and 'value addition' on PCTW. It was also noted that 10 percent responders 'always' preferred 'value addition', 6.67 percent responders 'always' preferred' patching', 70 percent responders 'always' preferred 're-tailoring', 3.33 percent responders 'always' preferred 'repurposing' and 3.33 percent responders 'always' preferred 'repairing or mending' for redesigning PCTW. It was evident that 13.33 percent responders said that they 'often' preferred 'value addition' and 'patching' for redesigning PCTW.

CONCLUSION

The roots of the current research are embedded in the traditions of Indian culture and religion. Thus it is an inevitable tool to revive the past practices of optimal utilization, reutilization and recycling of post-consumer textile waste. On exploring the data base further it was found that very few respondents mostly made kurtas, frocks/ one piece dresses and shopping bags out of saris. Jeans were also reused by few respondents to make bags. Examining further it was found that respondents were limited in the ways they recycle, as just 70 percent responders 'always' preferred 're-tailoring'. There was lack of skill, knowledge and innovation which was required for more robust utilization. Respondents used the traditional ways for reutilization and there was a huge scope to utilize PCTW in a more effective manner.

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KNOWLEDGE LEVEL OF TRIBAL FARM WOMEN ABOUT HORTICULTURAL INTERVENTIONS UNDER NAIP

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ABSTRACT

The present study was conducted in purposely selected Udaipur district of Southern Rajasthan. The NAIP was implemented in four districts of Southern Rajasthan viz- Banswara, Dungarpur, Sirohi and Udaipur. Out of these, two districts i.e. Banswara and Dungarpur were selected for present investigation on the basis of maximum concentration of tribal population. To have an equal representation of survey area, all the 25 villages in which the NAIP programme implemented were included in the proposed study. Ten respondents were drawn from each village with the help of random sampling technique. Thus, a sample of 250 tribal farm women who belonged to beneficiary farm families were selected as respondents for the present study. On the basis of overall knowledge derived on horticultural interventions under NAIP, respondents were categories in to three groups *viz.,* low (<16.8), medium (16.9-20.7) and high (>20.7) level of knowledge on horticultural interventions under NAIP. The results shows that out of 250 sample respondents, 46.80 per cent tribal farm women were having medium level of knowledge on horticultural interventions under NAIP followed by 30.80 per cent with low and 22.40 per cent farm women with high level of knowledge on horticultural interventions under NAIP.

INTRODUCTION

Women are one of the major productive work forces in Indian economy. Nearly 84.00 per cent of all economically active women in India are engaged in agricultural and allied activities. In Indian agriculture, women contribute equally in number of farm operations with men. As per 2011 census, 23.30 per cent women were working as cultivators and 10.04 per cent as agriculture labourers. Women form an important sector of our society. They constitute about half of the population of the country. Rural areas encompass 80.00 per cent of the total women population. Women perform multiple roles, both in agriculture and home. They perform almost 60.00 per cent of all working hours, receive 10.00 per cent of the word's income and own even less than 1 per cent of the world's property. Socio-cultural roles have cast women in a secondary role for a long time. Women's work remains outside the cash sector. She works from dawn to dusk but she has to depend on her male counterpart for meeting out her financial requirement. The ever–increasing price line and the needs of the family have necessitated women to take up gainful employment. Empowerment of women could be in any sphere of life i.e. legal, social, political and economic, but economic empowerment is the ladder for all the other empowerment.

As women are being increasingly seen as an important index for the development of nation, it is necessary to develop entrepreneurship among women and encourage them to take up independent income generating activities so that the significant work force of the country may be utilized more efficiently in the progress of the country.

A six year ambitious agricultural research programme was launched in India on 6th July, 2006, which was named as National Agricultural Innovation Project (NAIP). The project focused on innovations in agricultural technology. It was expected that project would facilitate an accelerated and sustainable transformation of the Indian agriculture so that it can support poverty alleviation and income generation. This was achieved through

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collaborative development and application of agricultural innovations by the public organizations in partnership with farmers' groups, the private sector and other stakeholders. It is seemed as a prestigious World Bank assisted project which helped in making Indian Agriculture a profitable venture.

RESEARCH METHODOLOGY

The NAIP was *viz.* implemented in four districts of Southern Rajasthan *viz*-Banswara, Dungarpur, Sirohi and Udaipur. Out of these four districts, two districts i.e. Banswara and Dungarpur were selected for present investigation on the basis of maximum concentration of tribal population. There were total four clusters, two in Banswara and two in Dungarpur where NAIP was implemented. All these four clusters were included in the present research study. In all, there were twenty five villages in which the NAIP programme was running. To have an equal representation of survey area, all the 25 villages were included in the proposed study. Sample of tribal farm women was drawn from these beneficiary families. Ten respondents were drawn from each village with the help of random sampling technique. Thus, a sample of 250 tribal farm women who belonged to beneficiary farm families was selected as respondents for the present study. To measure the knowledge of the respondents about recommended horticultural interventions under NAIP, a knowledge test was developed. Total twenty four interventions regarding horticulture were included in the schedule.

To determine the extent of knowledge of respondents about each aspect, mean per cent score was worked out and ranked accordingly. To find out the difference in knowledge between respondents of Banswara and Dungarpur districts, 'Z' test was applied.

RESULTS AND DISCUSSION

To classify the respondents on the basis of their overall knowledge derived on horticultural interventions under NAIP, three categories were formulated viz., low (<16.8), medium (16.9-20.7) and high (>20.7) level of knowledge on horticultural interventions under NAIP. The results as presented in Table 1 shows that out of 250 sample respondents, 46.80 per cent tribal farm women were having medium level of knowledge on horticultural interventions under NAIP followed by 30.80 per cent with low and 22.40 per cent farm women with high level of knowledge on horticultural interventions under NAIP.

District-wise analysis given in Table 1 also shows that about 15.33, 64.67 and 20.00 per cent of farm women in Dungarpur district and 54.00, 20.00 and 26.00 per cent of tribal farm women in Banswara district were having low (<16.8), medium (16.9-20.7) and high (>20.7) level of knowledge on horticultural interventions under NAIP, respectively. From the data, it can be concluded that majority of respondents (46.80 %) were fell under category of medium level of knowledge on horticultural interventions under NAIP.

Table 1. Knowledge level of tribal farm women in horticultural interventions under NAIP

n=250

S.No.	Categories	Dungarpur		Banswara		Overall	
		f	%	f	%	f	%
1.	Low (<16.8)	23	15.33	54	54	77	30.80
2.	Medium(16.9-20.7)	97	64.67	20	20	117	46.80
3.	High (>20.7)	30	20.00	26	26	56	22.40
	Total	**150**	**100**	**100**	**100**	**250**	**100**

f = Frequency, % = per cent

Aspect-wise knowledge about horticultural interventions

A perusal of data presented Table 2 on various horticultural interventions of knowledge reveals that in rank hierarchy knowledge on 'cultivation of vegetables' was ranked first by the majority of respondents with the mean per cent score of 89.20 per cent, followed by 'inter cropping', 'integrated pest management' and 'grading of produce' with mean per cent score of 87.60, 87.60, and 87.2, respectively and ranked second, third and fourth, respectively. Data also shows that respondents have least knowledge on horticultural interventions viz. 'grafting & cutting' and 'mechanization' with 58.00 and 57.00, respectively and ranked 23rd and 24th rank.

In the Dungarpur district respondents have high knowledge about weed management (91.33 MPS), inter cropping (88.33 MPS), kitchen garden (88.00%), marketing process (87.34 MPS) and

Table 2. Aspect wise knowledge about horticultural interventions

n=250

S.No.	Horticultural interventions	Dungarpur		Banswara		Overall	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Establishment of orchard	79.33	11	82.00	13	80.4	11
2.	Cultivation of vegetables	87.33	5	86.50	5	89.2	1
3.	Grafting & cutting	58.00	24	57.00	24	58.0	23
4.	Nursery raising of vegetables in poly house	77.33	14	82.00	13	79.2	14
5.	Kitchen garden	88.00	3	85.00	8	86	7
6.	Inter cropping	88.33	2	87.00	4	87.6	2
7.	Seed replacement	80.00	10	83.00	11	81.2	10
8.	Improved agricultural equipments	83.33	6	88.00	3	85.2	8
9.	Sprayer	79.33	11	84.00	10	80.0	13
10.	Duster	69.33	21	81.00	15	70.4	18
11.	Fertilizer broadcaster	80.66	8	86.00	6	59.4	22
12.	Soil test based fertilizer application	64.66	23	72.00	21	67.6	19
13.	Integrated nutrient management	64.00	22	58.00	23	61.6	20
14.	Farm mechanization	75.33	16	90.00	1	57	24
15.	Integrated pest management	72.66	19	73.00	20	87.6	2
16.	Weed Management	91.33	1	85.00	8	86.8	5
17.	Seed production	73.33	18	74.00	19	61.6	20
18.	Improved harvesting implements	82.66	7	89.00	2	84.2	9
19.	Installation of drip unit	75.34	15	76.00	18	75.6	16
20.	Installation of PVC pipelines	79.33	11	83.00	11	80.2	12
21.	Nutrigarden	74.00	17	71.00	22	73.2	17
22.	Post-harvest technologies	80.66	8	77.00	17	78.8	15
23.	Grading of produce	72.00	20	78.00	16	87.2	4
24.	Marketing Process	87.34	4	86.00	6	86.8	5

MPS=mean per cent score

cultivation of vegetable (87.33 MPS) and therefore, these aspects were ranked at 1st, 2nd, 3rd , 4th and 5th position, respectively. Data revealed that respondents have low knowledge about integrated nutrient management (64.00 MPS), soil test based fertilizer application (64.66 MPS) and grafting & cutting (58.00 MPS) and accordingly these aspects of knowledge were ranked 22nd, 23rd and 24th, respectively.

In the Banswara district respondents have high knowledge about farm mechanization (90.00 MPS), improved harvesting implements (89.00 MPS), improved agricultural equipments (88.00 MPS), inter cropping (87.00 MPS) and cultivation of vegetables (86.50 MPS) and therefore, these aspects were ranked at 1st, 2nd, 3rd, 4th and 5th rank, respectively. Data revealed that respondents have low knowledge about nutrigarden (71.00 MPS), integrated nutrient management (58.00 MPS) and grafting & cutting (57.00 MPS) and accordingly these knowledge aspects were ranked 22nd, 23rd, and 24th, respectively.

Difference in knowledge level of respondents of Banswara and Dungarpur districts

Table 3 revealed that the calculated 'Z' value was found to be more than its tabulated value. It reveals that there was significant difference in knowledge between respondents of Dungarpur and Banswara districts about horticultural interventions under NAIP. The mean value further indicates that respondents of Dungarpur district have higher knowledge than respondents of Banswara district about Horticultural interventions under NAIP. This difference in the level of knowledge of respondents of two districts might be due to the reason that female literacy rate of Dungarpur district is little higher (43.96 %) than the female literacy rate of Banswara district (43.06 %) as per the census of 2011. Similarly, as per the distribution of respondents on the basis of their education, extension contact, social participation, more number of tribal farm women of Dungarpur district had higher education i.e. secondary and above graduation, more extension contact, high participation and more mass media exposure as compared to tribal farm women of Banswara district. .

Table 3. Difference in knowledge level of respondents of Banswara and Dungarpur districts

n=250

S. No.	Respondents	Mean	S.D.	'Z' value
1.	Banswara district	18.63	2.01	2.82**
2.	Dungarpur district	19.11	1.87	

** = Significant at 1 per cent level of significance

CONCLUSION

The results shows that out of 250 sample respondents, 46.80 per cent tribal farm women were having medium level of knowledge on Horticultural interventions under NAIP followed by 30.80 per cent with low and 22.40 per cent farm women with high level of knowledge on horticultural interventions under NAIP. District-wise analysis shows that about 15.33, 64.67 and 20.00 per cent of farm women in Dungarpur district and 54.00, 20.00 and 26.00 per cent of tribal farm women in Banswara district were having low (<16.8), medium (16.9-20.7) and high (>20.7) level of knowledge on horticultural interventions under NAIP, respectively. From the data, it can be concluded that majority of respondents (46.80 %) fell under category of medium level of knowledge on horticultural interventions under NAIP. A significant difference in knowledge level of respondents of Dungarpur and Banswara districts was observed about horticultural interventions under NAIP

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TECHNOLOGICAL KNOWLEDGE OF GARLIC GROWERS IN KOTA REGION OF RAJASTHAN

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ABSTRACT

The present study was conducted in Kota region of Rajasthan. Kota region consist of four districts, out of which two districts namely Baran and Kota were selected on the basis of maximum area under garlic cultivation. Two tehsils from each identified district were selected and five villages from each identified tehsil were identified on the basis of maximum area under garlic cultivation. From each village four marginal, four small and four large garlic growers were selected randomly. Thus, in all 240 farmers (80 marginal, 80 small and 80 large farmers) were included in the sample of study. The study revealed that 56.67 per cent respondents had medium level of knowledge about garlic production technology. Whereas, 28.75 per cent respondents were observed in high knowledge group and 14.58 per cent of the total respondents had low knowledge regarding improved garlic production technology.

INTRODUCTION

Garlic (*Allium sativum* L.) is the second most important bulb crop after onion. It is very hardy vegetable crop and is grown throughout India and consumed by most of the people. It has long been recognized all over the world as a valuable spice for foods and a popular remedy for various ailments and physiological disorders. Garlic has been considered as a rich source of carbohydrates (29 %), proteins (6.3 %) and phosphorus (310 mg/ 100gm). Ascorbic acid content was very high in green garlic as reported by Pradan*et al.* (1977). The uninjured bulbcontains a colourless, odourless water-soluble amino acid "alliin". Garlic contains about 0.1 per cent volatile oil. The chief constituents of the oil are: diallyldisulphide (60%), diallyltrisulfide (20 %), allyl-propyl disulfide (6 %), a small quantity of diethyl disulfide and probably diallyl polysulfide.

In Rajasthan garlic is cultivated in 107976 hectares area with production about 727496 tonnes (Anonymous, 2016-17). It is cultivated in almost all districts of Rajasthan but the important garlic producing districts are Baran, Kota, Jhalawar, Pratapgarh, Bundi and chittorgarh. Majority of these garlic producting districts comes under Kota region of Rajasthan. The soil and climatic condition of Kota region are most suitable for garlic cultivation, while the production and productivity is far below as compared to potential. This may be due to lack of knowledge. Keeping this in view, the present study entitled "knowledge of farmers about garlic production technology was conducted in Kota region of Rajasthan".

RESEARCH METHODOLOGY

The present study was conducted in Kota region of Rajasthan. Kota region consist of four districts, out of which two districts namely Baran and Kota were selected on the basis of maximum area under garlic cultivation. Two tehsils from each identified district were selected and five villages from each identified tehsil were identified on the basis of maximum area under garlic cultivation. From each village four marginal, four small and four large garlic growers were selected randomly. Thus, in all 240 farmers (80 marginal, 80 small and 80 large farmers) were included in the sample of study.To know the extent of knowledge of garlic growers, a knowledge test was developed for this study. Data were collected by perseued interview technique. Thereafter data were analysed, tabulated and results were discussed in the light of the study.

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RESULTS AND DISCUSSION

Knowledge about garlic cultivation technology is one of the important components of behavioural aspects of farmers and plays an important role in the adoption of an innovation of garlic. On this ground, it is imperative to know the extent of knowledge of farmers about improved garlic cultivation technology. The results have been presented under following heads:

1. Distribution of farmers on the basis their existing knowledge about improved garlic production technology:

To distribute the farmers on the basis of their existing knowledge level about garlic production technology, three categories viz. low, medium and high level of knowledge were made by using mean score and standard deviation of the obtained knowledge score by the garlic growers.

Table 1 reveals that 10.00, 16.25 and 17.50 of the large, small and marginal farmers were found in low level of knowledge about garlic production technology respectively. While, 51.25, 57.50 and 61.25 per cent of the large, small and marginal farmers possessed medium level of knowledge. Only 38.75, 26.25 and 21.25 per cent of the large farmers, small farmers and marginal farmers respectively possessed high level of knowledge about garlic production technology respectively.

In overall distribution of garlic growers according to their knowledge level, it was found that majority (56.67 %) of the garlic growers were from medium level of knowledge, followed by high level (28.75 %) and low level (14.58 %) of knowledge about improved garlic production technology.

It can be concluded that more than fifty per cent of the respondents have medium knowledge about garlic production technology. The knowledge level of large and small farmers was higher due to big size of land holding, more income level, active social participation, more cosmopolitan in nature and more prone to change than marginal farmers.

The present findings are in accordance with the findings of Angadi*et al*. (1992) who revealed that majority of farmers (58%) possessed medium knowledge of cultivation practices of garlic. Similar findings are also reported by Jat (1999) and Meena (2001) and Kumari (2006).

2. Aspect wise knowledge level of garlic growers:

Aspect-wise knowledge of respondents was calculated in terms of Mean Percent Score and presented in Table 2.

Analysis of Table 2 reveals that the knowledge regarding "Irrigation management" was accorded first rank by all the three categories of garlic grower viz., large farmers, small farmers and marginal farmers with the extent of MPS 96.66, 92.08 and 90.83 respectively. Knowledge about "Harvesting methods" was perceived with the extent of 93.75, 90.83 and 82.91 MPS by large, small and marginal garlic growers respectively and it was ranked second by all the three categories of farmers. This

Table 1. Frequency distribution of respondents on the basis of their existing knowledge level towards garlic cultivation technology

n = 240

S. No.	Level of knowledge	Large farmers		Small farmers		Marginal farmers		Overall	
		F	%	F	%	F	%	F	%
1.	Low(< 59)	08	10.00	13	16.25	14	17.50	35	14.58
2.	Medium(59 – 67)	41	51.25	46	57.50	49	61.25	136	56.67
3.	High(> 67)	31	38.75	21	26.25	17	21.25	69	28.75
	Total	**80**	**100.00**	**80**	**100.00**	**80**	**100.00**	**240**	**100.00**

F = Frequency, % = Per cent

was followed by the knowledge about "Improved varieties of garlic" which was accorded third rank by large and marginal farmers with the extent of 93.75 and 78.68 MPS respectively, while it was accorded fourth rank by small farmers with the extent of 80.33 MPS.

Further analysis of Table 2 show that knowledge about "Field preparation" was assigned third rank by small farmers (82.00 MPS), fourth rank by large farmers (88.00 MPS) and sixth rank by marginal farmers (75.00 MPS). Knowledge about "Planting time and method" was accorded fourth rank by marginal farmers with the extent of 75.97 MPS and on fifth rank by bothlarge and small farmers with extent of 86.25 and 79.02 MPS respectively. The knowledge related to "Weed management" was placed at fifth rank by marginal farmers (75.28 MPS), while it was assigned sixth rank by both large farmers (83.36 MPS) and small farmers (78.46 MPS).

Table 2 further show that knowledge of "Seed rate and spacing" was given seventh rank by large farmers with the extent of 82.50 MPS and eighth rank by small and marginal farmers with the extent of 76.25 and 72.18 MPS. The knowledge regarding "Post harvest technology and marketing" was accorded seventh rank by both small and marginal farmers with the extent of 77.25 and 73.25 MPS respectively and eighth rank by large farmers with the extent of 81.00 MPS.

It is apparent from Table 2 that the extent of knowledge about 'Soil treatment' was 78.75, 76.00 and 67.50 per cent among the large, small and marginal farmers respectively and assigned ninth rank by both large and small farmers respectively and tenth rank by marginal farmers. The knowledge about "Manures and fertilizers application" was accordedninth rank by marginal farmers with 67.60 MPS and it was put on tenth rank by both large and small farmers with 74.06 and 70.00 MPS respectively. It was also indicated that large, small and marginal farmers have knowledge about 'Vegetative propagation' with the extent of 70.31, 64.37 and 64.06 MPS respectively and given eleventh rank by both large and small farmers and twelfth rank by marginal farmers. The knowledge regarding 'Plant protection measures' was 65.85, 61.01 and 64.60 MPS among large, small and marginal farmers and it was assigned eleventh rank by marginal farmers and twelfth rank by both large

Table 2. Extent of knowledge of farmers regarding improved garlic cultivation practices

n = 240

S. No.	Improved Practices	large farmers		Small farmers		Marginal farmers		Overall	
		MPS	RANK	MPS	RANK	MPS	RANK	MPS	RANK
1.	Improved varieties of garlic	93.75	III	80.33	IV	78.68	III	84.25	III
2.	Soil treatment	78.75	IX	76.00	IX	67.50	X	74.08	IX
3.	Field preparation	88.00	IV	82.00	III	75.00	VI	81.66	IV
4.	Seed rate and spacing	82.50	VII	76.25	VIII	72.18	VIII	76.03	VIII
5.	Vegetative propagation	70.31	XI	64.37	XI	64.06	XII	66.24	XI
6.	Planting time and method	86.25	V	79.02	V	75.97	IV	80.41	V
7.	Manures and fertilizers application	74.06	X	70.00	X	67.60	IX	70.55	X
8.	Irrigation management	96.66	I	92.08	I	90.83	I	93.19	I
9.	Weed management	83.36	VI	78.46	VI	75.28	V	76.97	VII
10.	Plant protection measures	65.85	XII	61.01	XII	64.60	XI	63.82	XII
11.	Harvesting methods	93.76	II	90.83	II	82.91	II	89.16	II
12.	Post harvest technology and marketing	81.00	VIII	77.25	VII	73.25	VII	77.16	VI

MPS = Mean Per cent Score

Table 3. Significance of difference of knowledge about garlic production technology among the farmers

n = 240

S.No.	Source of variation	d.f.	S.S.	M.S.S.	'F'
1.	Between the category of farmers	2	4358.02	2179.01	122.30**
2.	Error	237	4222.53	17.81	
	Total	**239**	**8580.563**		

**= Significant at 1 per cent level of Significance

and small farmers.

3. Comparison of knowledge of garlic growers regarding improved garlic production technology:

Analysis of variance ('F' test) was applied to find out the significance of variation among large, small and marginal farmers about knowledge of improved garlic cultivation technology. The results of ANOVA computed for this purpose are presented in Table 3.

Hypotheses:

NH_{01} : There is no difference among large, small and marginal farmers regarding knowledge of improved garlic cultivation technology.

RH_1 : There is difference among large, small and marginal farmers regarding knowledge of improved garlic cultivation technology.

Table 3 reveals that the calculated 'F' value (122.30) is more than the tabulated value at 1 per cent level of significance and 2 degrees of freedom. Thus, the null hypothesis (NH_1) was accepted. "there is no difference among large, small and marginal farmers regarding knowledge of improved garlic cultivation practices" was rejected and research hypothesis (RH_1) was accepted. It infers that there was no significant difference among large, small and marginal farmers with regard to knowledge about improved garlic production practices. It means that all three categories of farmers possessing knowledge about garlic production technology at different level in the study area.

Similar results were reported by Meena (2001)who found that there was significant difference in level of knowledge regarding improved production practices of groundnut among big, small and marginal category of farmers.

CONCLUSION

From the above results it can be concluded that 56.67 per cent respondents had medium level of knowledge about garlic production technology. Whereas, 28.75 per cent respondents were observed in high knowledge and 14.58 per cent of the total respondents had low knowledge regarding improved garlic production technology. It indicate that there is a still need to enhance the technological knowledge among the garlic growers in Kota region of Rajasthan.

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EXTENT OF ADOPTION OF RECOMMENDED GUAVA CULTIVATION PRACTICES BY THE GUAVA GROWERS

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ABSTRACT

The present study was conducted in Sawai-Madhopur district of Rajasthan. The Sawai-Madhopur district was purposively selected for the present investigation. The present research was conducted in one panchayat samiti of Sawai-Madhopur district i.e. Sawai-Madhopur panchayat samiti. The criteria for selecting this panchayat samiti was the maximum area under guava fruits among all the seven panchayat samities of the district.Total six villages were selected on the basis of maximum area under the guava cultivation in Sawai-Madhopur panchayat samiti. The number of guava growers was decided for each villages by proportionate sampling method. The farmers of each village were selected by simple random technique used for this purpose. In this way a sample of 54 small and 66 big guava growers was selected. Thus, the total study samples consisted of 120 respondents from all the six selected villages of Sawai-Madhopur panchayat samiti. The findings of study revealed that Majority of guava growers (63.33%) had medium level of adoption of recommended guava cultivation practices followed by low adopters (20.00%) and high adopters(16.67%) respectively. Maximum adoption gap was found in irrigation system and vegetative propagation of recommended guava production technology. whereas,minimum adoption gap was reported in cultural and planting practices of recommended guava production technology.

INTRODUCTION

Rajasthan is considered as the most important guava producing state of India and Bharatpur region has reputation of growing the best quality of guava in the state. Bharatpur division (Alwar, Dholphur, Bharatpur, Sawai-Madhopur and Karauli) is well known for its area and production.

The Department of Horticulture (Govt. of Rajasthan), Krishi Vigyan Kendra (ICAR, New Delhi) and a number of agencies are working in the Sawai-Madhopur district for transfer of improved fruit production technology to the farmers. They are imparting technological knowhow to needy farmers even then the guava production is less than the potential.

The requirement of fruit in India is rapidly increasing because of increasing population pressure and higher standard of living of the people. Though the area and production of fruits in India has increased but the per capita availability of fruits is very low in India. Hence increasing fruits production is an important component of agriculture production programme. Generally there is also a technological gap between the technology generated and its adoption. A number of agencies like Department of Horticulture, Krishi Vigyan Kendra and Regional Research Station are working on fruits are located at Sawai Madhopur District. Thus, these organizations are mostly utilized by the guava growers for transfer of improved guava production technology. They are imparting technological know now to the needly farmers even then the guava production is less than the potential.

Adoption gap refers to the difference between the practice recommended and the actual adoption that the farmers had at the time of interview about the improved practices of guava cultivation. Effective transfer of farm innovations and their practices application to the field situation is the key to the economic development of India. Extension service in the country has a huge net work of professional extension workers at national, state, district, block and village levels. Several programmes which are helping the farmers in adoption of new technologies are in operation throughout the country, still exists a

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wide gap between technology available with the researchers and its adoption at farmers field particularly in guava.

Keeping this view in mind, an effort has been made in this study to find out the extent of adoption of recommended guava cultivation practices by the guava growers.

RESEARCH METHODOLOGY

The present study was conducted in purposively selected Sawai Madhopur district of Rajasthan. In Sawai-Madhopur district only one panchayat samiti i.e. Sawai-Madhopur panchayat samiti was selected. The criteria for selecting this panchayat samiti were the maximum area under guava fruits among all the seven panchayat samities of this district.

A list of all the guava growing villages was prepared in consultation with tehsil personnel's and with the help of Department of Horticulture (Government of Rajasthan). From the list six villages were selected for the research study on the basis of maximum area under guava cultivation in Sawai Madhopur panchayat samiti. Comprehensive lists of all guava growers of the selected villages were prepared in consultation with the patwari and agricultural supervisors of the concerned villages. The numbers of guava growers were decided for each village by proportionate sampling method. The farmers of each village were selected by simple random sampling techniques. In this way a sample of fifty-four small and sixty six big guava growers were selected. Thus, the total study sample consisted of 120 respondents from all the six selected villages of Sawai-Madhopur Panchayat Samiti.

The responses of the respondents were recorded on a three point continuum score i.e. fully adopted, partialy adopted and not adopted with score 2, 1 and 0 respectively. Maximum possible obtainable score by the respondents was score to find out the difference in the extent of adoption between small and big guava growers and 'Z' test was applied.

RESULTS AND DISCUSSION

1. Extent of adoption among small and big guava growers about IGCP:

A package of eight major recommended practices of guava cultivation was used to find out the extent of adoption. The respondents were cautioned to provide the information about the practices, which were actually adopted by them in their orchards. A three point continuum scale was prepared and used to measure the extent of adoption of recommended guava cultivation practices.

1.1 Distribution of respondents according to their extent of adoption about IGCP: The respondents (guava growers) were grouped into three categories based on the extent of adoption of recommended guava cultivation practices. The categories of adoption for guava growers were formed on the basis of calculated mean and standard deviation. The results have been presented in table 1.

Table 1. Distribution of respondents according to their extent of adoption about improved guava cultivation practices

S.No.	Adoption categories	Small guava growers (n = 54)		Big guava growers (n =66)		Total (n = 120)	
		F	%	F	%	F	%
1.	Low (< 53)	24	44.44	00	00.00	24	20.00
2.	Medium (53 to 64)	30	55.56	46	69.70	76	63.33
3.	High (> 64)	00	00.00	20	30.30	20	16.67
	Total	**54**	**100.00**	**66**	**100.00**	**120**	**100.00**

The data in Table 1 reveal that 76 (63.33%) guava growers had medium level of adoption of recommended guava cultivation practices. This was followed by 24 (20.00%) low adopters and 20 (16.67%) high adopters. On the whole, it was calculated that more than half of the total respondents had medium level of adoption of improved guava production technology in the study area.

These findings are similar in line with the findings of Bhople *et al*. (1996) who found that 62 per cent of orange growers had adopted recommended cultivation practices of orange to medium extent. Only 16 per cent of them were found to be higher adopters. It was also noted that 22 per cent of orange growers were found to be low adopters.

2. Adoption gap among small and big guava growers with regard to improved guava cultivation practices:

To find out the adoption gap among the guava growers about recommended practices of guava cultivation, it was felt imperative to calculate the extent of adoption among the guava growers. For this purpose, the mean per cent score of each eight major practices was reported separately as under;

The data presented in Table 2 indicate that there exists a tremendous adoption gap among the guava growers. The highest adoption gap was found in irrigation system (44.44%) and vegetative propagation (43.83%). The medium adoption gap was reported in harvesting & marketing (40.68%), plant protection measures (33.82%), improved varieties (32.00%) and manure & fertilizers (26.11%). It was further noted that lowest adoption gap was observed in cultural practices (4.58%) and planting practices (10.67%) among the guava growers. The over all adoption gap (29.52%) was calculated among the guava growers in the study area.

These findings are similar in line with the findings of Mohammad (1997), who found that maximum adoption of Mandarin production technology was found in varieties (100%). It was followed by cultural practices (96.44%), harvesting and marketing (91.81%), planting practices (88.14%) and plant protection measures (77.77%), comparatively less adoption was reported in propagation practice (64.44%).

3. Significant difference between small and big guava growers with respect to their adoption about improved guava cultivation practices

Table 2. Adoption gap among small and big guava growers regarding improved guava cultivation practices

S.No.	Major practices	Small guava growers (n = 54)		Big guava growers (n =66)		Total (n = 120)	
		MPS	AG	MPS	AG	MPS	AG
1.	Improved varieties	52.78	47.22	80.45	19.55	68.00	32.00
2.	Vegetative propagation	49.63	50.37	61.52	38.48	56.17	43.83
3.	Planting practices	87.78	12.22	90.61	9.39	89.33	10.67
4.	Irrigation system	50.00	50.00	60.10	39.90	55.56	44.44
5.	Manure & fertilizers	69.44	30.56	77.52	22.48	73.89	26.11
6.	Cultural practices	90.74	9.26	99.24	0.76	95.42	4.58
7.	Plant protection measures	62.65	37.35	69.06	30.94	66.18	33.82
8.	Harvesting & marketing	53.36	46.64	64.20	35.80	59.32	40.68
	Over all	**64.55**	**35.45**	**75.34**	**24.66**	**70.48**	**29.52**

MPS = Mean per cent score; AG = Adoption Gap

Table 3. Significant difference between small and big guava growers with respect to their extent of adoption about improved guava cultivation practices

S.No.	Major practices	Max. obtainable score	Mean score obtained		Mean diffi.	'Z' value
			Small growers (n=54)	Big growers (n=66)		
1.	Improved varieties	10	5.28	8.04	2.76	13.79*
2.	Vegetative propagation	10	4.96	6.15	1.19	8.78*
3.	Planting practices	10	8.78	9.06	0.28	3.22*
4.	Irrigation system	6	3.00	3.62	0.62	7.23*
5.	Manure of fertilizers	12	8.33	9.30	0.97	6.06*
6.	Cultural practices	8	7.28	7.94	0.66	4.69*
7.	Plant protection measures	12	7.52	8.29	0.77	4.91*
8.	Harvesting & marketing	16	8.54	10.27	1.73	12.06*

*Significant at 5% level of significance

The difference of adoption was analyzed with the help of 'Z' test. The obtained results have been presented in Table 3.

It is clear from Table 3 that calculated 'Z' value is greater than the tabulated 'Z' value at 5 per cent level of significance for all the practices of guava cultivation, this calls for rejection of null hypothesis, leading to a conclusion that there existed a significant difference between small and big guava growers regarding adoption of all the eight major improved practices of guava cultivation recommended in the study area. Thus, this is evidently proved that the adoption of recommended guava production technology was more among the big guava growers as compared to small orchard growers.

It may be due to the large size of land holding, more cosmopolite orientation, resource availability and higher socio-economic status of the big orchard growers, which might have enabled them to adopt the recommended practices in their orchard. On the other hand the small growers were deprived of such attributes there by resulting into the poor adoption of guava cultivation.

These findings are similar to the findings of Poonia (2002), where he found significant difference between small and big kinnow orchard owners regarding adoption of all the five major practices of improved kinnow cultivation recommended in the study area.

CONCLUSION

It was reveals that out of 120 respondents, 76 (63.33%) guava growers were reported in medium category of adoption. This was followed by 24 (20.00%) low and 20 (16.67%) having high level of adoption of recommended guava cultivation practices (Table 1).

Out of eight aspects of recommended guava production technology, the maximum adoption gap was found in irrigation system (44.44%) and vegetative propagation (43.83%). Where as, medium adoption gap was observed in harvesting & marketing (40.68%), plant protection measures (33.82%), improved varieties (32.00%) and manure & fertilizers (26.11%). The minimum adoption gap was reported in cultural practices (4.58%) and planting practices (10.67%). The overall adoption gap was calculated 29.52 per cent among the guava growers of the study area (Table 2).

The significant difference was found between small and big guava growers with regard to extent of adoption of all the eight major practices of recommended guava production technology namely, improved varieties, vegetative propagation, planting practices, irrigation system, manure & fertilizers, cultural practices, plant protection measures, harvesting & marketing (Table 3).

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ROLE PERFORMANCE OF TRAINING ELEMENTS IN INSTITUTIONAL TRAINING ORGANIZED FOR FOREST GUARDS OF UDAIPUR DISTRICT

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ABSTRACT

Training is concerned with developing particular skills to a desired standard through instructions and practice. Training is highly useful tool that bring an employee into a position where they can do their job correctly, effectively, and with time and energy efficiency. The study was conducted at C.V.A.S Navania, Udaipur. As many as in which 30 Forest Guards from different forest units of Udaipur district were selected as respondents. The objective of the study was to know the extent to which the training elements performed and played their role in the institutional training program. Findings show that majority of the forest guards were satisfied with the planning of training sessions and extent feedback during training sessions. It was noted that training content was relevant to the job of trainees and training aids selected were quite appropriate. The respondents were satisfied with training facilities during the training programme. Thus it can be concluded that the training elements i.e. trainer, trainees, training content, training facilities and trainer played their role effectively so as to reach the training objective.

INTRODUCTION

Training is considered to be a valuable input for human resource development. It is concerned with developing particular skills to a desired standard through instructions and practice. Training of employees and managers are absolutely essential in the changing environment due to technological advancement. Training gives a lot of benefits to the employees; it develops self-confidence and assists everyone in self-management. The stability and progress of the organization to a great extent depends on the trained human resource working in the organization.

The Forest Guards of Udaipur districts are sharing multifaceted responsibilities including protecting and conserving forest, wild animals, plantation and other govt. property. These employees (forest guards) undergo different types of training to learn skills and develop competencies to do the assigned job with desired standards in the field. Hardly very few studies are focused on the perception of forest guards about the role performance of training elements and their effectiveness during training sessions.

Reckon with importance of training elements viz. trainer, trainees, training aids, training contents and training facilities, a study was conducted at College of Veterinary & Animal Science, Navania (Udaipur) to find out the opinion of trainees (forest guards) about effectiveness of training elements during the training programme.

RESEARCH METHODOLOGY

A three days institutional training program was held at C.V.A.S Navania, Udaipur in which 30 Forest Guards from different forest units of Udaipur district participated. The skills were imparted on almost all the crucial and significant aspect of wild life and forest management by the experts of relevant fields. All the 30 forest guards were interviewed with the

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help of semi structured interview schedule. The questions pertaining to each training element depicting effectiveness in role performance were formulated. The responses were recorded on a three point continuum and converted into percentage and then ranks were accorded accordingly.

RESULTS AND DISSCUSSION

Role performances of five significant elements of training during training sessions were assessed. The results are presented in tables from 1 to 5.

1.1 Performance of trainer

The data in Table 1 indicate that the fair majority of the forest guards were satisfied with the planning of training sessions (MPS 95.55), it was ranked first in the rank order. Similarly a majority of respondents were satisfied with the level of knowledge possessed by the trainer. It was found that majority of the total forest guards (MPS 88.88) were satisfied with the friendly approach of trainer during training sessions. It is encouraging to observe good performance of trainer in the training activity as perceived by the trainees.

The respondents (MPS 86.67) opined that the trainers were clear in their mind about objective of training. Further they stated that (MPS 84.44) trainer was well organized during training sessions. Interestingly the respondents (MPS 82.22) were satisfied with the explanation of trainer on queries. Further the subjects expressed that language used by the trainer was understandable (MPS 80.00) and he answered the questions to the satisfaction level of trainees (MPS 77.78). Similarly the trainer was reported to be skilled enough in handling training aids (MPS75.55).

1.2 Performance of trainees:

The data in Table 2 clearly show that majority of the respondents provided active feedback during training sessions (MPS 95.55) and ranked first in the rank order. Similarly a very high number of respondents (MPS 93.33) were found to be self motivated for new learning. It was also observed that a fair majority of trainees were cooperative during training sessions (MPS 91.11). Further the data indicate that trainees were interested in training content (MPS 88.89), they were really interested to learn (MPS 86.66) and have shared their experience during the training sessions (MPS 84.44). It is interesting to note that trainees were found to be interactive (MPS 80.00) during sessions and their technical competence enhanced through training intervention (MPS 77.80).

1.3 Suitability of training content:

Table 3 depict the perception of respondents regarding suitability of training content used in the training programme. It was noted that training content was found to be relevant to the job of trainees (MPS 95.55). The content was latest and up to date (MPS 93.33) and it was presented logically by the trainer (MPS 91.11) which were accorded 1st, 2nd and 3rd rank respectively. It was encouraging to note that the training content was simple and interesting to the respondents (MPS 86.66) and was taught at trainee's intellectual level (MPS 86.66) which was placed at 4th and 5th rank in the rank order. Training content used had a good blend of both education and entertainment as reported by majority of respondents (MPS 84.44) which was ranked sixth in the rank order. On the whole it can be said that the training content was specific to the specific to thejob requirement and needs of the trainees and up to date. That has aroused interest among trainees about new learning.

Table 1: **Performance of trainer in handling training sessions as perceived by respondents**

S. No.	Performance indicators	MPS	RANK
1	Objectives of training were clear in the mind of trainer	86.67	IV
2	Language of the trainer was understandable	80.00	VII
3	Trainer was full of know-ledge about subject matter	91.11	II
4	Trainer was well organized	84.44	V

5	Training sessions were planned effectively	95.55	I
6	Trainer was skilled enough in handling aids	75.55	IX
7	Trainer was friendly with the trainees	88.88	III
8	Queries were satisfactorily explained by the trainer	82.22	VI
9	Questions raised by trainees were satisfactory answered by trainer	77.78	VIII
10	Overall performance of trainer	73.33	X

Table 2: Performance of trainees during training sessions as perceived by the respondents

S. No.	Performance indicators	MPS	RANK
1.	Trainees were interested in the training content	88.89	IV
2.	Trainees shared their experience	84.44	VI
3.	Trainees were self motivated	93.33	II
4.	Trainees were interactive during sessions	80	VII
5.	Technical competence enhance through training	77.78	VIII
6.	Trainees provided feed back	95.55	I
7.	Trainees were interested to learn	86.66	V
8.	Trainees were cooperative	91.11	III

Table 3: Suitability of training content as perceived by respondents

S. No.	Performance indicators	MPS	RANK
1	Training content was relevant to job of trainees	95.55	I
2	Training content was simple and interesting	88.89	IV
3	Training content was latest and up to date	93.33	II
4	The training content was presented logically	91.11	III
5	The training content was taught at trainees intellectual level of trainees	86.66	V
6	Training content combine both education and entertainment	84.44	VI

Table 4: Performance of training aids as perceived by the respondents

S. No.	Performance indicators	MPS	RANK
1	The training aids were in line with the training content	91.11	III
2	The training aid handled by the trainer skillfully	95.55	II
3	Trainer was able to select the appropriate aid according to the content	97.77	I
4	Training aids were functional	84.44	V
5	Training aids aroused interest for learning	86.66	IV

1.4 Performance of training aids

The data in Table 4 explain the performance of training aids during training sessions as perceived by the respondents. A fair majority of respondents (MPS 97.77) opined that training aids selected were quite appropriate and as such was ranked first by the respondents. Interestingly it was reported that training aids were handled skillfully by the trainer (MPS 95.55), and they were in line with the training content selected (MPS 91.11). The respondents expressed that the training aids aroused interest for learning among trainees (MPS 86.66) and all the aids used were operational and functional during the training sessions. On the whole it can be concluded that training aids selected for training

programme were appropriate, in line with the training content and the trainer was skilled enough in handling the aids in the training sessions.

1.5 Status of training facilities

Table 5: Status of training facilities as perceived by the respondents

S. No.	Performance indicators	MPS	RANK
1	Physical facilities during the training program were appropriate	97.77	I
2	Overall training environment was satisfactory	95.55	II
3	All training facilities were available in the institution	93.33	III
4	Hospitality and stay arrangement by the institution during training was satisfactory	91.11	IV
5	Training schedule and manuals were supplied in time	88.89	V

Table 5 accommodates the data regarding training facilities as perceived by the respondents. Majority of respondents were satisfied with training facilities during the training programme (MPS 97.77). Further the respondents were happy with the overall training environment created by the training institution (MPS 95.55). All the training facilities were available in the institution (MPS 93.33), Hospitality and stay arrangement of trainees by the institution during training programme was reported to be satisfactory (MPS 91.11). Likewise the training schedule and manuals were supplied to trainees in advance (MPS 88.89).

CONCLUSION

Looking to the results pertaining to the performance of elements of training, it can be concluded that the institutional training programme at the campus was organized very effectively in which all the elements i.e. trainer, trainees, training content, training facilities and trainer contributed to the maximum so as to reach the training objectives and therefore it is recommended that similar training programmes for forest guards of the adjoining districts be organized so that they can protect and conserve the national precious resource of our country.

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CONSTRAINTS PERCEIVED BY THE VEGETABLE GROWERS IN ADOPTION OF ECO-FRIENDLY TECHNOLOGIES

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ABSTRACT

Green revolution and rapid dissemination of modern agricultural technologies has led to the adverse effects on the ecosystem. Research conducted in various farming communities all over the world found that people exposed to certain pesticides have higher potential to cancer risk. Vegetables consumes large amount of pesticides next to cotton. Therefore it is quiet advisable to search the natural farming and other alternate methods of farming. The present study was conducted in four Tehsils of Udaipur district of Rajasthan. From each Tehsil, five villages were taken and 12 respondents from each village were selected randomly for the study. Thus 240 respondents were selected for the study. It was observed that investment required for eco-friendly cultivation coupled with low production of organic produce, non-availability of bio-pesticides and lack of knowledge about preparing bio-insecticides were major constraints faced by the vegetable growers in adoption of eco-friendly technology.

INTRODUCTION

Vegetable cultivation is gaining importance from day by day. Increasing human population demanded more and more production of food crops to ensure food security. Hence, high yielding varieties, use of chemical fertilizers, extension of irrigated areas, increase in cropping intensity, etc. are utilized for increase in production as well as productivity. But adverse effects of modern agricultural practices not only on the farm but also on the health of all living things and thus on the environment have been well documented all over the world. Application of technology, particularly in terms of the use of chemical fertilizers and pesticides all around us has persuaded people to think aloud. Such concerns and problems possessed by modern-day agriculture gave birth to new concepts in farming, such as organic farming, natural farming, biodynamic agriculture, do nothing agriculture, eco-farming, etc.

Eco-friendly farming is the process of producing crops naturally. It is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes, the use of management practices in preference to the use of off–farm inputs, taking into account that regional conditions require locally adapted systems. The methods of ecological agriculture are based on modern ecological science combined with time-tested indigenous knowledge, giving emphasis on the mode of cultivation through Integrated Crop Management (ICM), which providing Integrated Farming System (IFS), Integrated Pest Management (IPM) for crop production (Mishra, 2013). With this background in view, the present study entitled " Constraints Perceived by the Vegetable Growers in Adoption of Eco-Friendly Technologies in Udaipur district of Rajasthan" was undertaken.

RESEARCH METHODOLOGY

The study was conducted in four Tehsils of Udaipur district of Rajasthan namely, Girwa, Badgaon, Mavali and Sarada. The Tehsils were selected considering the maximum area of vegetable cultivation. From each Tehsil, 5 villages were selected for the investigation purpose.

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Comprehensive lists of farm families were selected with the help of Agriculture supervisor and Patwari of respective village. Thus, total of 240 respondents were selected for the study.

Data was collected by the investigator through personal interview technique with the help of semi structured interview schedule and the collected data were tabulated and inferences were drawn by using appropriate statistical measures. Constraints in the present investigation may be defined as the impediments, obstacle or bottlenecks which "put shackles on" in the adoption of recommended eco-friendly practices in vegetable cultivation. The degrees of constraints as perceived by the vegetable growers were analyzed by taking a 3 point continuum i.e, severe, moderately severe and not severe. In order to find out the priority area of constraints in various areas related to getting information, the mean score (MS) and Mean Percent Score (MPS) for each constraint were calculated.

RESULTS AND DISCUSSION

a) Input constraints

The data accommodated in Table 1 indicates that 'Non-availability of bio-pesticides' was perceived major input constraint faced by the vegetable growers of the study area. Further it was noted 'Non-availability of recommended weedicides' and 'Non availability of green manure crops' with 80.13 MPS and 72.63 MPS ranked second and third respectively.The other significant constraints were 'Dealers interest in selling of chemical pesticides', 'less availability of organic manures' and 'high cost for improved varieties' with MPS of 72.63, 71.81 and 66.53 ranked fourth, fifth and sixth, respectively.

Among the input constraints, difficulty in handling the organic manures with MPS of 64.16 ranked seventh and 'Lack of availability of good quality seeds' ranked eighth. Whereas, 'Poor water resources' and 'Lack of irrigation facilities' with 48.89MPS and 45.70 MPS were the least important input constraints which ranked ninth and tenth.

Findings of the present study are consistent with the findings of Jagannathan (2004) who reported that non-availability of inputs and good quality seeds were major constraints faced by the farmers for adoption of organic practices in vegetable cultivation. Findings of Namdev *et al.* (2011) and Naik *et al.* (2018) are also in similar to the present findings of this study in which it was mentioned to provide sufficient quantity of organic inputs and bio-

Table 1. Input constraints faced by the vegetable growers in adoption of eco-friendly technologies

n=240

S.No.	Statements	M.P.S	Rank
1.	Less availability of organic manures	66.53	V
2.	Difficulty in handling the organic manures	64.16	VII
3.	Non availability of green manuring crops	72.63	III
4.	Dealers interest in selling of chemical pesticides	71.81	IV
5.	Lack of availability of good quality seeds	61.11	VIII
6.	Poor water resources for raising green manuring crops	48.89	IX
7.	High cost for improved varieties	64.44	VI
8.	Non-availability of bio-pesticides	80.33	I
9.	Lack of irrigation facilities	45.70	X
10.	Non-availability of recommended weedicides	80.139	II

MPS=Mean Per cent Score

fertilizers to enhance the productivity level. Findings are also in line with the results of Shehrawat *et al.* (2016) who reported that lack of knowledge and demand of bio pesticides (90.8%) was major constraint among input constraints in adoption of organic farming.

b) Technical constraints

Data in the Table 2 reveal that lack of knowledge about preparing bio-insecticides with MPS 82.64 ranked first in rank hierarchy. It can be observed that lack of proper guidance and Lack of knowledge about value grading and quality certification with the MPS 80.00 and 79.16 ranked second and third respectively. The next significant constraints perceived by the farmers were Lack of knowledge about eco-friendly practices, Non-availability of package of practices about eco-friendly pest management in vegetables and Lack of knowledge about preparation of vermicompost with the MPS 77.22, 76.39 and 75.97 ranked fourth, fifth and sixth respectively.

The findings are in line with the findings of Shehrawat *et al.* (2016) who reported that lack of knowledge and demand of bio pesticides (90.8%) was ranked first in input constraints in adoption of organic farming.

c) General Constraints

An overview of the data presented in the Table 3 shows that high investment required for eco-friendly cultivation (93.33 MPS) coupled with low production of organic produce (88.89 MPS) acted as major hindrances in adoption of eco-friendly technology in vegetable cultivation. The results are anticipated due to ground reality that majority of the vegetable growers believes that for eco-friendly practices, it requires high amount of investment and production will be low as compared to conventional agriculture where chemical fertilizers and pesticides are used. Similarly, small and scattered land holding (67.917), Lack of credit facilities for eco-friendly cultivation (MPS 56.25) were also perceived as important constraints faced by vegetable growers in adoption of eco-friendly technologies in vegetable cultivation and these were ranked fourth and fifth by the respondents. Further analysis of table reveals

Table 2: Technical Constraints faced by the vegetable growers in adoption of eco-friendly technologies

n=240

S.No.	Statements	M.P.S	Rank
1.	Lack of knowledge about eco-friendly practices	77.22	IV
2.	Lack o knowledge regarding bio-fertilizer	74.58	VIII
3.	Lack of knowledge about preparation of vermicompost	75.97	VI
4.	Lack of knowledge about eco-friendly pest management in vegetables	75.55	VII
5.	Non-availability of package of practices about eco-friendly pest management in vegetables	76.39	V
6.	Lack of proper guidance	80.00	II
7.	Lack of knowledge about value grading and quality certification	79.16	III
8.	Lack of knowledge about preparing bio-insecticides	82.64	I
9.	Non availability of soil testing facilities	55.28	IX
10.	Lack of knowledge regarding critical stage of irrigation	47.78	X

MPS=Mean Per cent Score

Table 3. General Constraints faced by the vegetable growers in adoption of eco-friendly technologies

n=240

S.No.	Statements	M.P.S	Rank
1.	High investment required for eco-friendly cultivation	93.333	I
2.	Low production of organic produce	88.889	II
3.	Small and scattered land holding	67.917	III
4.	Lack of irrigation facility	49.722	V
5.	Lack of storage facility	36.11	IX
6.	Lack of infrastructure	37.22	VIII
7.	Lack of proper marketing channel	39.44	VII
8.	Lack of credit facilities for eco-friendly cultivation	56.25	IV
9.	Soil quality is not favoring eco-friendly cultivation	42.917	VI
10.	Non-availability of labour	33.611	X

MPS=Mean Per cent Score

that soil quality is not favoring eco-friendly cultivation, lack of proper marketing channel and lack of infrastructure were also opinioned by the farmers as constraints with 42.91 MPS, 39.44 MPS and 37.22 MPS were ranked sixth, seventh and eighth respectively. Likewise, the constraint namely 'lack of storage facility' and 'non-availability of labour' were perceived as least felt constraint in adoption of eco-friendly vegetable cultivation.

Similar findings were also reported by the Kokate and Kharade (2007) who reported that fear of drop in productivity and income was the major constraint faced by the respondents. Also with the findings of Sharma and Maheswari (2014) who reported that tribal women were facing lack of risk bearing capacity to adopt organic farming.

CONCLUSION

It can be concluded that high investment required for eco-friendly cultivation ranked first in general constraint along with low production of organic produce, small and scattered land holding whereas in Input constraints non-availability of bio-pesticides, non-availability of recommended weedicides and Non availability of green manuring crops. Lack of knowledge about preparing bio-insecticides, Lack of proper guidance and Lack of knowledge about value grading and quality certification were the major technical constraints. there is a need of collective efforts of different extension and developmental agencies to promote eco-friendly vegetable cultivation among the farmers and equip them with the latest knowledge of natural farming and other eco-friendly practices for vegetable cultivation. With the proper awareness and training on different alternative farming techniques can improve human as well as environmental health without compromising food security.

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ADOPTION OF PRATAP URD-1 VARIETY OF URDBEAN CROP IN AGRO-CLIMATIC ZONE-V OF RAJASTHAN

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ABSTRACT

Present study has been conducted to assess the actual spreading of this new variety in terms of area, production and productivity in comparison to existing varieties. The Pratap Urd-1 (KPU 07-08) is a high yielding cultivar of urdbean. It was released from Agriculture Research Station, Kota for rainfed conditions of Rajasthan and notified in the year 2013. The area under urdbean in the agro-climatic zone v was increased from 0.065 mha in kharif 2014 to 0.439 mha in kharif 2017 and the decreasing trend was observed during kharif 2018 (0.391 mha). The same trend was found in production and productivity of urdbean crop. The annual growth rate of urdbean productivity in Kota zone and Rajasthan were worked out as -0.34, 0.50, 0.07 and -0.28 per cent as against of -0.30, 0.66,-0.02 and 0.58 per cent in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. The area under improved variety Pratap urd-1 was continuously increased from 10 hectare to 38175 hectare in kharif 2014 to 2018. The study clearly indicated that the Pratap urd-1 variety was cultivated on 9.74 per cent area (Kharif 2018) of the total urdbean area in Kota zone of Rajasthan. The characteristic of Pratap urd-1 which scored highest among producers was tolerance to yellow mosaic virus, reported by 89.16 per cent of producers depending on the variety and assigned Ist rank in their choice.

INTRODUCTION

The productivity of pulses in India continues to be quite low (622 q/ha) on account of several biotic and abiotic stresses besides unavailability of quality seeds of improved varieties in time and poor crop management due to unawareness and non-adoption of recommended production and plant protection technologies. India is the world's largest producer as well as consumer of black gram. It produces about 1.5 to 1.9 million tons of urdbean annually from about 3.5 million hectares of area, with an average productivity of 500kg per hectare. Urdbean crop is also gaining momentum since 2015-16 and there has been phenomenal increase in its coverage. During 2017-18 the crop was cultivated over an area of more than 50 Lakh hectares. More than 90 per cent of uradbean production comes from nine states of Madhya Pradesh, Rajasthan, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Maharashtra, Jharkhand, Gujarat and West Bengal (Roy *et al.,* 2017).

The variety is the pivot around which entire production system revolves. Therefore, scientific black gram cultivation must be start with selection of appropriate variety for the agro-climatic zone, soil type and season concerned. New varieties are continuously evolved by the research system all over India. Hope fully, outcome of this research in kind of new black gram varieties capable for producing economic importance and help to improve the economic conditions of blackgram growers. The Pratap Urd-1 (KPU 07-08) is a high yielding cultivar having seed yield potential of 9-10 q/ha, matures in 72-78 days moderately resistant against MYMV, leaf crinkle, web blight and powdery mildew and resistant to anthracnose & bacterial leaf spot diseases. This variety is semi-spreading, determinate growth habit, ovate shape of terminal leaflet, hairy and long pods having 6-9 seeds/pod and bold seed size (4.5g/100 seed). It is also tolerant to stem fly and white fly. It was released for rain fed conditions for Rajasthan and notified in the year 2013 vide notification No. 2817(E) dated 19.9.13.

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The spread of the newer varieties replacing the older varieties need to be closely monitored to take advantage of the superior characters of these newer varieties released by various research Institutions. This will help to break the yield plateau that has been experiencing in pulses crops in the recent past and to increase the production and productivity of the crop. Though a number of steps are being taken by the Government to popularize these varieties like Frontline Demonstration, minikit supply, organizing training programmes for farmers, farm women, seed growers, seed production personnel of public and private seed agencies, extension functionaries of state departments of agriculture, officials of state agricultural universities and NGOs, there is no concrete data to prove that the newer variety Pratap urd-1 of urdbean are spreading faster and replacing the older ones. However, there has been no systematic monitoring of the adoption of these varieties, and economic impacts on producers were not evaluated. Key socio-economic research questions remain unanswered; especially whether this improved variety have effectively contributed to achieving their intended impacts. Therefore, present study has been conducted to assess the actual spreading of this new variety in terms of area, production, productivity and total income generated in comparison to existing varieties. This study was aimed to analysis the determinants of varietal uptake and the socio-economic impact of this variety on black gram growers with the following specific objectives.

1. To document the trends of urdbean production in the agro-climatic zone-v of Rajasthan.
2. To assess the extent of adoption of improved urdbean variety Pratap urd-1 in the area.

RESEACH METHODOLOGY

The present investigation was conducted in agro-climatic zone-V of Rajasthan. The study was based on both secondary and primary data. Secondary data relating to area, production and productivity of urdbean were collected from government publications and web sites to arrive at the trends in area, production and productivity. The approach used for this investigation was to gathered information or data from both adopting and non adopting farmers so that the impact of variety can be measure by comparing with and without technology. A survey was carried out in all four districts of Kota zone in Rajasthan during April-May 2019. An exploratory survey was conducted by a team of researchers along with local partners to acquire a broad overview of the adoption process and pattern in the area. The data were collected through personal contacts with the help of well structured interview schedule. The team was test the instruments with the farmers and adjusted the interview schedule based on the lesson leant from field testing. The structured interview schedule/ questionnaire used for the survey was also designed to generate information on socio-economic characteristics of farmers, farmers' preference towards the traits of the variety, crop input, crop outputs, production costs, gross and net return.

The multistage stratified random sampling was used to select the respondents. The each district area was classified in to different strata based upon estimated adoption levels observed during exploratory survey. The proportion of each of the selected district's urdbean area to the total urdbean area of the entire selected region was considered as a criterion to decide number of villages and sample size from each district. The villages from each block/strata were randomly selected as to ensure representativeness of the sample with respect to landholding size, crop yield etc. After discussion with key informants in the selected village, 5 urdbean growing households were selected from each village for collecting the required and relevant information. The sampling framework for the collection of primary data was shown in Table 1. The gathered data were processed, tabulated, classified and analyzed in terms of suitable statistics in the light of objectives of the study.

RESULTS AND DISCUSSION

Trends of urdbean production in Kota zone of Rajasthan:- The trend of urdbean during the year kharif 2014 -2018 in agro-climatic zone-V (Kota

Table 1. Sampling framework for collection of primary data

District	Urdbean Area ('000ha)	No. of Strata / Block	No. of villages	Households sample		
				Adopting	Non-adopting	Total
Kota	99	2	5	30	15	45
Bundi	139	2	7	40	20	60
Baran	104	2	5	30	15	45
Jhalawar	50	2	3	20	10	30
Total	**392**	**8**	**20**	**120**	**60**	**180**

Table 2. Trend in area, production and yield of urdbean in Kota zone of Rajasthan

Year	Kota zone			Share of Kota zone in Rajasthnan		Rajasthan		
	Area (Mha)	Production (MT)	Yield (Kg/ha)	Area (%)	Production (%)	Area (Mha)	Production (MT)	Yield (Kg/ha)
2014	0.065	0.047	720	32.33	42.19	0.201	0.112	556
2015	0.122	0.050	471	40.93	44.21	0.298	0.114	384
2016	0.223	0.158	708	46.84	51.91	0.476	0.305	641
2017	0.439	0.330	758	52.32	63.21	0.839	0.523	624
2018*	0.392	0.211	539	52.26	28.55	0.750	0.741	988

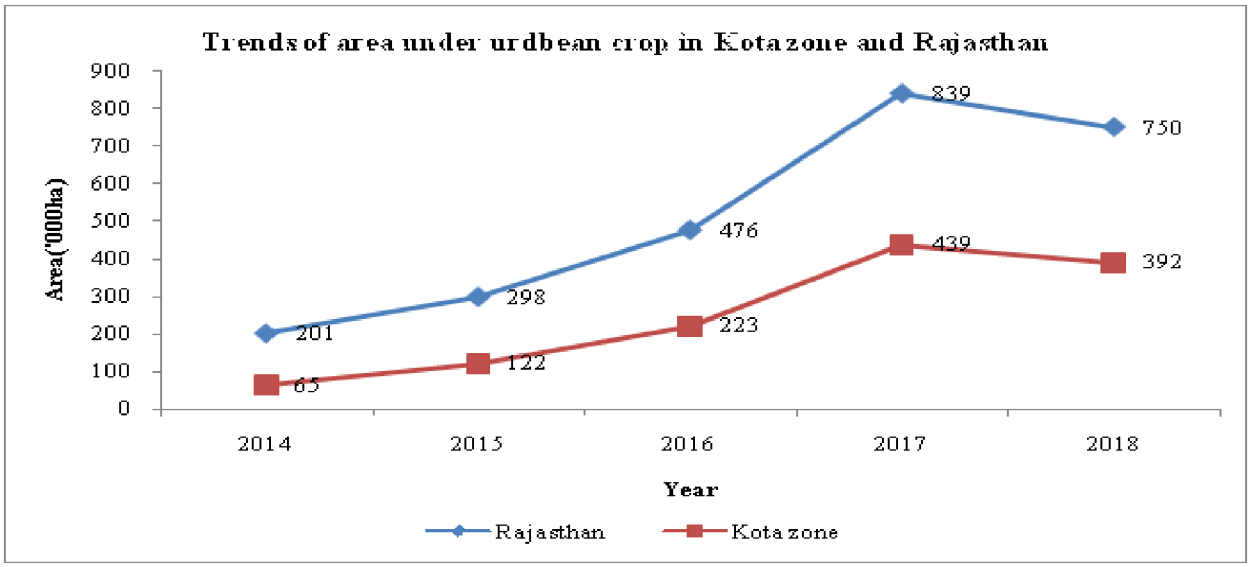
Source:- Source:-*www.krishi.rajasthan.gov.in* **Joint Director(Agriculture)Kota,Raj., (Mha=Million hectare, MT=Million Tons)*

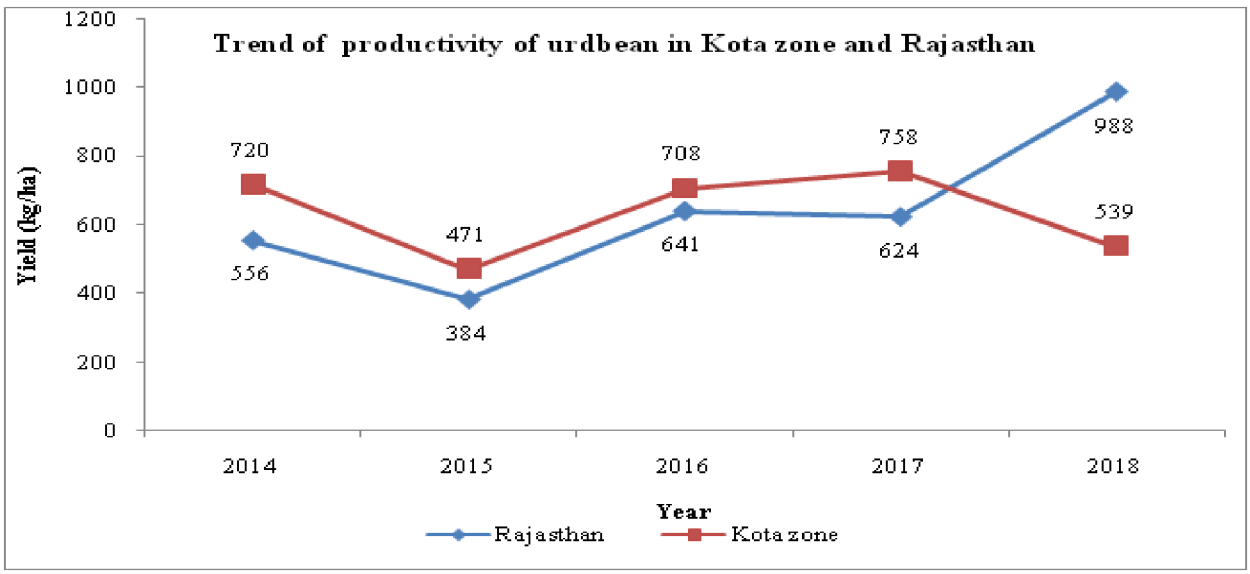
zone) and its comparison to Rajasthan has been analyzed. The Table 2 indicated that the share of area in Kota zone to area of Rajasthan was increased from 32.33 to 52.26 per cent during the year 2014 to 2018. The area under urdbean in the agro-climatic zone-V was increased from 0.065 mha in *kharif* 2014 to 0.439 mha in kharif 2017 and the decreasing trend was observed during kharif 2018 (0.392 mha). The same trend was found in production and share of Kota zone to production of Rajasthan was increased from 42.19 to 63.21 percent from kharif 2014 to *kharif* 2017 and it was also decreased during kharif 2018 (28.55%). The production of urdbean in the zone was increased from 0.047 MT in *kharif* 2014 to 0.330 MT in *kharif* 2017 and it was decreased during the year 2018 (0.211MT). The productivity of urdbean in Kota zone was higher as compared to Rajasthan state during the year 2014 to 2017 and it was low (539 kg/ha) as compared to Rajasthan (988 kg/ha) during the year 2018.

The annual growth rates of urdbean area in Kota zone and its comparison to Rajasthan were worked out. The Table 3 depicted that the percent growth rate of urdbean area of Kota region were 0.87, 0.82, 0.96 and -0.10 percent as against of 0.48, 0.59, 0.76 and -0.10 percent in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. The annual growth rates of urdbean production in Kota zone and its comparison to Rajasthan were also worked out as 0.06, 2.16, 1.08 and -0.36 percent as against of 0.01, 1.67, 0.71 and 0.41 percent in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. The annual growth rate of urdbean productivity in Kota zone and Rajasthan were worked out as -0.34, 0.50, 0.07 and -0.28 per cent as against of -0.30, 0.66,-

Table 3. Growth rate of urdbean area, production and yield in Kota zone of Rajasthan

Year	Area (%)		Production (%)		Yield (%)	
	Kota zone	Rajasthan	Kota zone	Rajasthan	Kota zone	Rajasthan
2014	-	-	-	-	-	-
2015	0.87	0.48	0.06	0.01	-0.34	-0.30
2016	0.82	0.59	2.16	1.67	0.50	0.66
2017	0.96	0.76	1.08	0.71	0.07	-0.02
2018	-0.10	-0.10	-0.36	0.41	-0.28	0.58





0.02 and 0.58 per cent in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. It might be due to the fact that the rainfall and weather conditions at the time pod formation and maturity stage of urdbean crop.

Adoption of Pratap urd-1 variety of urdbean in the Agro-climatic zone v of Rajasthan: The estimated data regarding horizontal spread of

improved variety Pratap Urd-1 in the agro-climatic zone v of Rajasthan is presented in Table 4. It was observed that the area under improved variety pratap Urd-1 was estimated only 10 ha during the year 2014 which was horizontally spread out and estimated 52 ha in kharif 2015, 490 ha (2016), 5120 ha (2017) and 38175 ha (2018) respectively. It was clearly shows that the horizontal spread of Pratap Urd-1 was from about 52 ha during 2015 to 38175 ha during the year 2018. The Pratap Urd-1 variety of urdbean was introduced during the year kharif 2014 in the kota region and share only 0.01% area of total urdbean cultivated area. In aggregate, the Pratap Urd-1 was cultivated on 0.04% (2015), 0.22% (2016), 1.17% (2017) and 9.74% (2018) of total area of urdbean, respectively. The study clearly indicated that the Pratap Urd-1 variety was cultivated on 9.74% of total urdbean area in Kota zone of Rajasthan within five years of its introduction in this agro-climatic zone. It was low adoption due to unavailability of Pratap Urd-1 seed in the area but it was superior in term of productivity, bold seeded, early maturity and tolerance to MYMV and fetches good marketing value as compared to T-9, Krishna and existing old varieties in the zone.

Reasons for preferring the pratap urd-1variety by adopting farmers:-Producers' preferences for certain characteristics are critical for variety adoption. Therefore, understanding the criteria used by producers to evaluate new crop varieties allow breeders to effectively set priorities and target different breeding strategies to different communities. Producers' evaluations of new varieties are also useful to determine whether they have maintained their intrinsic characteristics, and if their agronomic as well as quality and price performances are satisfactory from the view of the end users. The characteristic which scored highest among producers was tolerance to yellow mosaic virus, reported by 89.16 per cent of producers depending on the variety and assigned Ist rank in their choice (Table 7). Other characteristics also scored highly among producers was short duration (85.83%), better in yield (84.66%), bold seeded (77.50%), good in market prices (75.00%) and less insect attack due to hairy pods (72.50%) respectively and assigned II, III, IV, V and VI rank, respectively.

Table 4. Area under Pratap urd-1 improved variety of urdbean in Kota zone of Rajasthan

Year	Area under Urdbean (000'ha)	Area under Pratap urd-1 variety (ha)	% area under Pratap urd-1
2014	65	10	0.01
2015	122	52	0.04
2016	223	490	0.22
2017	439	5120	1.17
2018	391	38175	9.74

Source:- Study survey 2019

Table 5: Characteristics of Pratap urd 1 variety preferred by adopting farmers

Traits	No. of urdbean grower	% of urdbean grower	Rank
Better in yield	101	84.66	III
Matures in 72-78 day	103	85.83	II
Tolerance to MYMV	107	89.16	I
Bold seeded	93	77.50	IV
Less insect due hairy pods	87	72.50	VI
Good in market price	90	75.00	V

CONCLUSION

Present study has been conducted in agro-climatic zone-V of Rajasthan to assess the actual spreading of this new variety in terms of area, production and productivity in comparison to existing varieties. The productivity of urdbean in Kota zone was higher as compared to Rajasthan state during the year 2014 to 2017 and it was estimates low as compared to Rajasthan during the year 2018. The area under urdbean in the agro-climatic zone-V was increased from 0.065 mha in kharif 2014 to 0.439 mha in kharif 2017 and the decreasing trend was observed during kharif 2018 (0.392 mha). The area under improved variety Pratap Urd-1 was continuously increased from 10 hectare to 38175 hectare from the year kharif 2014 to 2018. The study clearly indicated that the pratap urd-1 variety was cultivated on 9.74 per cent area (Kharif 2018) of total urdbean area in Kota zone of Rajasthan. The characteristic which scored highest among producers was tolerance to yellow mosaic virus, reported by 89.16 per cent of producers depending on the variety and assigned I rank in their choice.

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A DEVELOPED KNOWLEDGE TEST TO MEASURE THE KNOWLEDGE LEVEL OF ICT TOOLS AMONG THE TRIBAL FARMERS

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ABSTRACT

Agriculture is one of the most important sectors in India which could be promoted tremendously with quick application of ICTs, therefore extensive use of modern information technologies need to be promoted at farm level for the transfer of technologies and information among farmers community. The focus of this study was to develop a knowledge test to measure the knowledge level of tribal farmers about ICT tools used for seeking agricultural information. The test was developed by following the procedure used by Sagar (1983). Two criteria viz., item difficulty index and item discrimination index were considered for selection of items in the final format of the knowledge test. The preliminary scale was consisted of 43 statements, out of which 36 statements were finally selected for the study. The scale was then standardized and tested for measuring the knowledge level of the tribal farmers about ICT for seeking agricultural information.

INTRODUCTION

Information and communication technologies for seeking information are in use for many years, and they have played an important role in promoting agricultural and rural development during the last several decades. The role of T.V. and radio in rural education and extension services has been well documented in many developing countries. The ICTs will continue to play a important role in the developing world.

Lack of timely informated prevent quality decisions and thus lower the efficiency of production systems among farmers. Differences in decisions about what crops to grow can be attributed to differences in resources, levels of knowledge, environment, approaches concerning uncertainty and other factors (Ma Corazon et at., 1998). In this connection Arokoyo (2005) reported that a strong agricultural extension linkage complimented by information flow enhanced by the effective use of information and communication technologies (ICTs) will significantly boost agricultural production and improve rural livelihoods in developing countries. Davison et al., (2005) (cited in Balaji et al., 2007) mentioned that from the perspective of agricultural knowledge and information systems (AKIS) ICTs can be seen as useful tools in improving linkages between the research and agricultural extension systems. The experience of rural telecenters in developing countries shows that ICT can help in enabling rural development workers to gather, store, retrieve, adapt, localize and disseminate a broad range of information needed by rural families.

RESEARCH METHODOLOGY

Knowledge test was developed to assess the status of knowledge of respondents about commonly used information and communication technology tools. For this purpose, all possible questions related to knowledge of selected information & communication technology tools were formulated with the help of relevant literature, experts of ICT, ICT users and experienced extension workers. These knowledge items were again discussed with the concerned subject matter specialists and ICT users to ensure that no important aspects of

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knowledge are left out.

Knowledge test was developed for commonly used four ICT tools *viz.* Cell phone, Touch screen computer, Information kiosk and Kisan Call Center. The schedule consisted of 43 questions covering all the selected ICT tools. The total maximum possible score of the schedule was 126. The questions included in the schedule were mostly in the objective form. The knowledge test so developed was pre-tested with 30 respondents not included in the sample for clarity of language and coverage of the knowledge dimensions.

The procedure followed in developing knowledge test is as under:

a) Collection of items: The content of knowledge test consisted of questions called items. The items/statements were prepared with the help of relevant literature, field extension personnel, experts of ICT and researcher's own experience related to knowledge of ICTs.

b) Initial selection of items: The selection of items for knowledge test was done by keeping the following two criteria in view;

Firstly item should promote thinking rather than simply wrote (mechanical) and memorization. Secondly the item should differentiate the well-informed farmers from poorly informed ones and should have a certain difficulty value.

Based on the above criteria, 43 items were initially selected encompassing major areas of selected ICTs. A schedule was prepared with these 43 items and administered among the farmers group similar to target group for item analysis to screen out non-relevant and weak items. Correct replies for the items were ascertained in consultation with specialists and experts to prepare a key. The items were in alternative form. The procedure followed in selection of the test items were in line with the procedure used by Sagar (1983).

c) Administration of knowledge test to selected sample: The knowledge test so prepared was administered to 30 farmers. The responses were quantified by giving a score of one to the correct answer and zero to the incorrect answer or do not know reply. Thus, the total number of correct answers rendered by an individual was considered as knowledge score for him. Thus, the range of obtainable score was 0-126.

d) Item analysis: The item analysis of a test usually yields two kinds of information *i.e.* item difficulty and item discrimination. The index of item difficulty reveals how difficult an item is?, whereas, the index of discrimination indicates the extent to which an item discriminates the well-informed respondents from the poorly informed ones.

Having computed the scores obtained by 30 respondents, the scores were arranged from highest to lowest in magnitude. These 30 respondents were then divided into six equal groups, each having 5 respondents and were arranged in descending order of total scores obtained by them. These groups were named as G_1, G_2, G_3, G_4, G_5 and G_6 respectively. For item analysis, the middle two groups *i.e.* G_3 and G_4 were eliminated. Only four groups with high and low scores were considered for computation of item difficulty and item discrimination indexes. The range of scores (out of maximum 126) obtained by the respondents of the six groups were as follows:

G_1 = 98 to 108	G_4 = 62 to 77
G_2 = 88 to 96	G_5 = 56 to 61
G_3 = 78 to 87	G_6 = 47 to 55

i) Calculation of difficulty index: The next step was to determine the item difficulty index. The index of item difficulty indicates the extent to which an item is difficult. An item should not be so easy that all can pass it nor it should be so difficult that none can pass it. The item difficulty as worked out in the present study was P_i *i.e.* the percentage of respondents answering an item correctly.

This was calculated by the formula:

$$P_i = \frac{n_i}{N_i} \times 100$$

Table 1. Calculations of difficulty and discrimination indices of knowledge items

S.No.	Items/ Statements	Total freq. of correct answers $S_1+S_2+S_3+S_4+S_5+S_6$ (30)	Percentage of respondents giving correct answers (P_i)	$E^{1/3}$ (Discrimination \ Index)
1	What is ICT?	15	50.00	0.4
2	Name the uses of ICT tools	114	76.00	0.7
3	Name of common ICT tools used by the farmers for seeking agriculture information	36	60.00	0.4
4	Advantages of ICT tools	21	70.00	0.6
5	Name the ICT centres	94	78.33	0.5
6	Based on ease of operation, put the ICT tools used by you in a sequence	83	55.33	0.4
7	What is cell phone?	73	48.66	0.5
8	The possible uses of cell phone	99	82.50	0.4
9	The basic requirement to buy a SIM card	117	78.00	0.5
10	Type of cell phone connections available in the market	73	48.66	0.8
11	Advantages of cell phone	74	61.66	0.8
12	Name the important manufacturer companies of mobile phones	74	61.66	0.7
13	Limitations of cell phone	78	52.00	0.7
14	Difference between a ordinary mobile phone and smart phone (multimedia)	35	58.33	0.7
15	What is touch screen computer?	31	51.66	0.5
16	Which type of information can be obtained through touch screen computer?	21	70.00	0.4

17	Advantages of touch screen computer	78	52.00	0.7
18	Common problems encountered by farmers in using touch screen computer	83	69.16	0.6
19	Limitations of touch screen computer	87	58.00	0.8
20	What is information kiosk ?	24	80.00	0.3
21	What kind of information that can be obtained from information kiosks ?	19	63.33	0.7
22	Advantages of information kiosks	73	48.66	0.5
23	Limitations of information kiosks	59	49.16	0.6
24	Name the locations of information kiosk in the vicinity of your area	82	54.66	0.6
25	Problems encountered by farmers in getting information from information kiosks	38	63.33	0.4
26	The steps for getting information from information kiosks	94	62.66	0.7
27	What are the official working hours of information kiosks?	18	60.00	0.4
28	What is KCC?	55	61.11	0.7
29	Toll free number of KCC	20	66.66	0.3
30	The official timings for calling on KCC	17	56.66	0.5
31	Uses of KCC	61	50.83	0.8
32	Advantages of KCC	78	65.00	0.7
33	Limitations of KCC	17	56.66	0.5
34	Language is used by experts for farmer's enquiry	55	61.11	0.7
35	Problems encountered by farmers in getting information from KCC	69	57.50	0.8
36	The mode of service to the farmers by KCC	89	59.33	0.7

Where,

P_i = Difficulty index in percentage of the i^{th} item

n_i = Number of respondents giving correct answer to i^{th}item

N_i = Total number of respondents to whom the i^{th} item was administered *i.e.* 30 in the present case.

ii) Calculation of discrimination index: Item discrimination index indicates the ability of the item to differentiate the well-informed respondents from the poorly informed ones. The $E^{1/3}$ formula was used in the present study for calculating the discrimination index. The formula used was as follows:

$$E^{1/3} = \frac{(S_1 + S_2) - (S_5 + S_6)}{N/3}$$

Where,

$\mathbf{E^{1/3}}$ = Discrimination index of an item

$\mathbf{S_1, S_2, S_5, S_6}$ = the frequencies of correct answers in groups G_1, G_2, G_5 and G_6, respectively

N = Total numbers of respondents in the sample of item analysis; here it was 30.

e) Final selection of items for test: Two criteria *viz.,* item difficulty index and item discrimination index were considered for selection of items in the final format of the knowledge test. When a respondent passed an item, it was assumed, as Coombs (1950) described, that the item was less difficult than the individual's ability to cope up with it. For the purpose of the present study, the items with difficulty index ranging from 48.66 to 82.5 and discrimination index ranging from 0.3 to 0.8 were retained for final selection for inclusion in the knowledge test.

f) Reliability of the test: According to Anastasi (1968) "Reliability refers to the consistency of scores obtained by the same individuals when re-examined with the test on different occasions or with different sets of equivalent items or under other variable examining conditions."

To know the reliability of knowledge test, the split half method was used. The format of the test consisting 36 items was splitted into two equal halves on the basis of odd and even number of items, and was administered to 30 farmers. Thus, two sets of scores were obtained and then these scores were correlated with each other by product moment correlation. The product moment correlation coefficient for two sets of scores was found to be 0.83. Thus, it is that product moment correlation coefficient that produces reliability coefficient of half the test. This coefficient underestimates the reliability of the full length measure which provides a larger sample of the content domain and also tends to produce a wider range of scores, both of which have the effect of raising the reliability estimates. Hence, the above coefficient needed to be corrected to give the stepped- up reliability of the whole measure or to give the reliability of the full length test. The correction factor used for full length reliability coefficient according to Spearman – Brown prophecy formula is as under:

Spearman – Brown prophecy formula:

$$R_{tt} = \frac{2r^{1/2 1/1}}{1 + r^{1/2 1/1}}$$

Where :

r_{tt} = The reliability coefficient of the whole test

$r^{1/2 1/1}$ = The reliability coefficient of the half test

The equation may also be written as follows:

Reliability of whole test =

$$= \frac{2 \times \text{reliability of the half test}}{1 + \text{reliability of the half test}}$$

The value of r_{tt} came to be 0.90, testifying the internal consistency of the knowledge test.

g) Test of validity: To test the validity of the knowledge test, content validity of the tool was examined. Point-biserial correlation coefficient (rp-bis) was also estimated for establishing

internal validity of test. Point-biserial correlation coefficient is considered only when items are scored simply as 1 if correct and 0 for incorrect. Keeping this in view, with the help of formula used by Brown (1988), the significance of the point-biserial correlation for each of the items was calculated and tested by using the formula given by Brown (1988).

To calculate the rpbi for each item, following formula was used

Point - biserial correlation (rpbis)

$$= \frac{M_p - M_q}{S^t}\sqrt{pq}$$

Where,

rpbis= Point-biserial correlation coefficient

Mp = whole-test mean for respondents answering item correctly (i.e., those coded as 1s)

Mq = whole-test mean for respondents answering item incorrectly (i.e., those coded as 0s)

St= standard deviation for whole test

p = Proportion of cases in correctly (i.e. those coded as 1s)

q = Proportion of cases in incorrectly (i.e. those coded as 0s)

RESULTS AND DISCUSSION

The item analysis of a test usually yields two kinds of information *i.e.* item difficulty and item discrimination. The index of item difficulty reveals how difficult an item is?, whereas, the index of discrimination indicates the extent to which an item discriminates the well-informed respondents from the poorly informed ones. Two criteria *viz.,* item difficulty index and item discrimination index were considered for selection of items in the final format of the knowledge test. When a respondent passed an item, it was assumed, as Coombs (1950) described, that the item was less difficult than the individual's ability to cope up with it. For the purpose of the present study, the items with difficulty index ranging from 48.66 to 82.5 and discrimination index ranging from 0.3 to 0.8 were retained for final selection for inclusion in the knowledge test. The list of final knowledge statements with 'difficulty index and discrimination index' value is given in Table 1.

CONCLUSION

The reliability and validity of the knowledge test indicated the precision and consistency of the results. This scale can be used to measure the farmers' knowledge of the Information and Communication Technology (ICT) tools for seeking agricultural information in beyond the study area with suitable modifications.

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PARTICIPATION OF FARM WOMEN IN Bt. COTTON CULTIVATION

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ABSTRACT

The present study was conducted in Rajsamand and Railmagra tehsil of Rajsamand district of Rajasthan to ascertain women participation in Bt. Cotton cultivation practices.Total 120 respondents were randomly selected for data collection. The data were collected personally through structured interview schedule. The study revealed that farm women involved in various operations of Bt. cotton cultivation such as irrigation management, land preparation, intercultural operations, sowing practices and harvesting and marketing with the extent of 93.13, 82.61, 82.00, 72.91 and 72.61 per cent, respectively.

INTRODUCTION

Women play a significant role in agriculture. In the world, about 70 per cent of the agricultural workers, 80 per cent of the food producers and 10 per cent of those who process basic food stuffs are women and they also undertake 60 to 90 per cent of the rural marketing, thus making up more than two-third of the work force in agricultural production.The scenario of agriculture has completely changed with change in time but from centuries one thing that didn't change is the visualization of women as key labour in this industry. Agriculture sector as a whole has developed and emerged immensely with the infusion of science and technology, but this latest emergence is not capable of plummeting the ignorance of women labour as an integral part of this industry. In female work force but fails to developing countries like India, agriculture continues to absorb and work force but fails to employ 2/3rd of the female give them recognition of employed labour. The Female labour force in developing nations still faces the oppressive status of being majorly responsible for family and household maintenance. Efforts were put to collate and categorize the states of identical behaviour in Indian agriculture by hierarchical clustering of economically active female in agriculture. Looking to the importance of farm women in agriculture. The present study entitled "Participation of farm women in Bt. cotton cultivation" was undertaken in Rajsamand district of Rajasthan.

RESEARCH METHODOLOGY

The present study was conducted in purposely selected Rajsamand district of Rajasthan. Rajsamand district consists of seven tehsils, out of which two tehsils namely Rajsamand and Railmagra tehsil were selected on the basis of the highest area and production under Bt. cotton cultivation and from these two tehsils 10 villages were selected on the basis of highest area and production of the Bt. cotton. From each selected village, 12 farm women were identified on the basis of random sampling technique. Thus, total 120 respondents were selected for present investigation. Data were collected through pre-structured interview schedule. Thereafter, data were analysed and results were interpreted, in the light of the present study.

RESULTS AND DISCUSSION

To get on overview of the participation level, the farm women were classified into three categories *i.e.* low, medium and high on the basis of mean and standard deviation of the obtained score by the respondents. The results of the same have been presented in Table 1.

Table 1 depicts that 67.50 per cent of farm women belonged to medium level of participation

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group, followed by 16.67 and 15.83 per cent of farm women belonged to low and high level of participation group, respectively.

Table 1 further indicates that 44 (73.33%) farm women of Rajsamand tehsil and 37 (61.67%) farm women of Railmagra tehsil belonged to medium level of participation, whereas, 15 (25.00%) and 5 (8.33%) farm women of Rajsamand and Railmagra tehsil belonged to low level of participation group, respectively. Likewise, the representation of farm women of Rajsamand and Railmagra tehsil in high level of participation was 01 (1.67%) and 18 (30.0%), respectively. Thus, it may be concluded that more than 60.00 per cent farm women of both the tehsils participating at medium level in Bt. cotton cultivation.

Aspect-wise participation of farm women in Bt. cotton cultivation was worked out and Mean percent score (MPS) were calculated. The results of the same have been presented in Table 2.

Data presented in Table 2 reveal that the extent of participation of farm women in irrigation management in Bt. cotton cultivation was 93.19 MPS and ranked first by the respondents. The extent of participation of farm women in land preparation for Bt. cotton cultivation was 82.61 per cent and ranked this aspect on second priority. Further analysis of table shows that the involvement of farm women in various intercultural operations was 82.00 percent and this aspect was putted on third rank by the respondents.

Table 2 further indicates that the extent of participation of farm women in sowing practices was noted to be 72.91 MPS and ranked fourth by the respondents. Regarding harvesting and marketing of produce, the extent of participation of farm

Table 1. Category-wise participation of farm women in Bt. cotton cultivation practices

n=120

S.No.	Category	Rajsamand tehsil		Railmagra tehsil		Total	
		f	%	f	%	f	%
1.	Low Level of participation (<82.08)	15	25.00	5	8.33	20	16.67
2.	Medium Level of Participation (82.08 to 104.98)	44	73.33	37	61.67	81	67.50
3.	High Level of Participation (>104.98)	1	1.67	18	30.00	18	15.83
	Total	60	100	60	100	120	100

f= frequency, % = per cent

Table 2. Extent of participation of farm women in Bt. Cotton cultivation practices

n=120

S.No.	Aspect	Rajsamand tehsil		Railmagra tehsil		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Land preparation	82.00	II	83.22	II	82.61	II
2.	Sowing practices	70.50	V	75.33	IV	72.91	IV
3.	Fertilizer application	60.33	VI	64.22	VI	62.27	VI
4.	Crop protection measures	41.19	VIII	51.90	VIII	46.54	VIII
5.	Irrigation management	92.22	I	94.16	I	93.19	I
6.	Intercultural operations	81.66	III	82.33	III	82.00	III
7.	Harvesting and marketing	71.44	IV	73.77	V	72.61	V
8.	Policy matter	43.05	VII	55.00	VII	49.02	VII

MPS= Mean percent score

Table 3: Comparison between farm women of Rajsamand and Railmagra tehsil regarding participation in Bt. Cotton cultivation practices

n=120

S. No.	Category of respondents	Mean value	S.D.	Size of sample	'Z' value
1.	Respondents of Rajsamand tehsil	90.13	9.48	60	3.41**
2.	Respondents of Railmagra tehsil	96.93	12.21	60	

**Significant at 1 per cent level of significance

women was recorded to be 72.61 per cent and same was prioritized on fifth position by the respondents. It was observed that extent of participation of farm women in fertilizer application in successful cultivation of Bt. cotton was 62.27 per cent and ranked sixth by respondents of both the tehsils.

Analysis of Table 2 further reveals that the extent of involvement of farm women in policy matter for cultivation of Bt. cotton was nearly fifty per cent. It means that males are dominated in policy matter activities of Bt. cotton cultivation. It was observed that the participation of farm women in crop protection measures was 46.54 MPS and ranked last by the respondents.

From the above discussion, it can be concluded that farm women were playing active role in caring out most of the activities of Bt. cotton cultivation. It was further noted that the extent of participation of farm women of Rajsamand tehsil was 41.19 to 92.22 per cent, while in case of farm women of Railmagra tehsil the extent of participation was 51.90 to 94.16 per cent in all the aspects about Bt. cotton cultivation in the study area.

Table 3 shows that the calculated value of 'Z' (3.41) is more than its tabulated value at 1 per cent level of significance. So it may be concluded that there was significant difference between farm women of both selected tehsils with respect to participation in Bt. cotton cultivation practices. Similar finding are reported by Vaghasiya (2018)

CONCLUSION

From the above results it can be concluded that the women play a very determining role in the Bt. cotton cultivation in the area of Rajsamand district. Bt. cotton cultivation practices performed by women were Land preparation, Ploughing, sowing, Manure application, weeding, Harvesting, irrigation and marketing.It is recommended that Govt. and NGO's shall launch programs such as adult education in order to enable this large flock to read and understand the relevant published literature and broadcast informations. More efforts are needed to encourage women and to raise women's Knowledge of efficient management practices of Bt. cotton cultivation. Women organizations should be encouraged to streamline marketing activities and save marketing cost. Generally the women are unable to get any reward for their work, therefore, policy should be devised in this issue.

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ASSESSMENT OF NAIP WITH SPECIAL REFERENCE TO LEVEL OF ADOPTION OF HYV OF WHEAT (RAJ-4037) CULTIVATION IN BANSWARA DISTRICT OF RAJASTHAN

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ABSTRACT

National Agricultural Innovation Project (NAIP) focuses on four components which aimed at ICAR as the catalyzing agent for the management of change in the Indian National Agricultural Research System; Research on Sustainable Rural Livelihood Security; and Basic & Strategic Research in Frontier Areas of Agricultural Sciences, multiple technology options in holistic and integrated manner in order to increase their productivity and profitability. In Rajasthan, consortia NAIP were in operation in four tribal populated districts namely, Udaipur, Banswara, Dungarpur and Sirohi. Therefore, district Banswara was selected for present investigation based on maximum households covered under the project. Out of Talwara and Garhi. Panchayat Samiti, Talwara was selected for the study. After having drawn sample of 19 respondents (beneficiaries) each from every beneficiary village, similar size of sample of non-beneficiaries (19) from each of the non-beneficiary villages was drawn with the help of random sampling procedure. Total size of sample was of 152 respondents, combining beneficiaries and non - beneficiaries.

The findings revealed that majority of the respondents i.e. 97 (63.89 per cent) were observed to be in the high adoption level of interventions relating to Raj-4037 of wheat crop. It is surprising to notice from the table that beneficiary and NAIP were sometime similar in number viz, 50 (65.79 per cent) and 47 (61.84 per cent) respectively, as far as their adoption level as high. This aspect was ranked as second with MPS 70.70 in comparison to non-beneficiaries who rank it first (MPS 81.40 per cent). At the same time, the adoption level with respect to seed rate of Raj-4037 was more among as beneficiaries comprised to non-beneficiaries, as they ranked first (MPS 79.60 per cent). The adoption level was finding to be comparatively slightly higher among the non-beneficiaries regarding row to row spacing as ranked as third with its MPS 71.20.

INTRODUCTION

Shri Sharad Pawar, Union Agriculture Minister, on July 2006, launched a 6 year ambitious agricultural research Programme, National Agricultural Innovation Project (NAIP), which focuses on innovations in agricultural technology. It would facilitate an accelerated and sustainable transformation of the Indian Agriculture so that it can support poverty alleviation and income generation. The total budget of NAIP was of US $ 250 million; the World Bank has funded US $ 200 million as credit, mostly interest free and a part with negligible interest, and US $ 50 million was borne by the Government of India. The recently concluded National Agricultural Technology Project (NATP) led by the ICAR, aimed to implement the shared understanding of the Government of India and the World Bank on technology- led - pro - poor growth, and it facilitated the public sector reform process for accelerating the flow of agricultural technologies. A key lesson from the NATP is that deliberate investments in partnership building and shared governance are required to speed up technology adaptation and dissemination. Various Agricultural Universities in India have been provided with sufficient fund by the ICAR to implement different programmes for increasing income and nutrition through adoption of economically viable integrated farming system.

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Under component 3 of NAIP, Maharana Pratap University of Agriculture and Technology, Udaipur had also been sanctioned a consortia project entitled "Livelihood and nutritional security of Tribal dominated areas through integrated farming system and technology modules". Good efforts under the project are being made to replace local seeds of wheat with High Yielding Varieties, along with important interventions, such as Integrated Nutrient Management (INM), Integrated Pest Management (IPM) and Integrated Water Management (IWM). So far no evaluation study in the operational area of the project has been conducted regarding the response of farmers about HYV of Raj-4037 of wheat under NAIP. With this background, present study was conducted with the objective to determine the knowledge level of beneficiaries and non-beneficiaries with regards to HYV of wheat crop. The comparison between two sets of respondents depicts the evaluation of NAIP with special reference to HYV of Raj-4037.

RESEARCH METHODOLOGY

The investigation was conducted in Talwara Panchayat Samiti of Banswara district of southern Rajasthan. With the specific objective to evaluate the NAIP with special reference to HYV (Raj-4037) of Wheat cultivation. It was performed based on comparison of beneficiaries with those of non-beneficiaries with regard to their adoption level of HYV (Raj-4037) of Wheat cultivation. Out of total 52 Gram Panchayats under Talwara Panchayat Samiti, four Gram Panchayats viz. Masotiya, Devlia, Sageta and Jhalo ka Gada (Nokla) were covered under NAIP. Therefore, as such, these four Gram Panchayats were included in the present investigation. Two sets of villages were selected for the present study. These were (a) Beneficiary villages and (b) Non- Beneficiary villages. Headquarters (villages) of Gram Panchayats were treated as selected villages for the study. Hence, Masotiya, Devlia, Sageta and Jhalo ka Gada (Nokla) were the villages where from required sample size of respondents (beneficiaries) was drawn. Since the adoption level of HYV (Raj-4037) practices in wheat crop had to be compared between beneficiaries and non – beneficiaries of NAIP, a controlled sample of villages was also drawn. Therefore, four villages nearer to the beneficiary villages were selected; where from non – beneficiary farmers were interviewed. Seventy six beneficiaries and non-beneficiaries (19 from each village) were selected for the present study. Total size of sample was of 152 respondents, combining beneficiaries and non – beneficiaries. Relevant data were collected from the selected respondents with the help of constructed interview schedule. Face -to -face interview technique was employed for collecting the data from the respondents. Thereafter, data were analyzed and results were interpreted in the light of the objective of study.

RESULTS AND DISCUSSION

1. Adoption level of HYV of wheat variety (Raj-4037): The respondents regarding their adoption level about HYV of wheat (Raj-4037) were classified into three categories *viz.,* high, medium and low, on the basis of calculated mean per cent score obtained by them.

Distribution of the respondents according to their level of adoption regarding wheat variety (Raj-4037)

HYV of wheat (Raj-4037) was being recommended as an intervention of HYVs under NAIP. The levels of adoption of this variety were studied and the results are being given in the subsequent tables. First, the level of adoption was determined; the data are here under in Table 1. Table 1 shows that majority of the respondents i.e. 97 (63.89 per cent) were observed to be in the high adoption level of interventions relating to Raj-4037 of wheat crop. It is surprising to notice from the table that beneficiary and NAIP were sometime similar in number *viz*, 50 (65.79 per cent) and 47 (61.84 per cent) respectively, as far as their adoption level as high. This similarity may be due to the cause that other extension agencies are also functioning in persuading both the categories of farmers for adopting the improved package of practices of wheat. But, at the same time, it is clear that beneficiaries were as bit forward in adopting the

Table 1. Distribution of the respondents according to their level of adoption regarding wheat variety Raj-4037

n =152

S.No.	Adoption level	Beneficiaries (n_1)	Non-beneficiaries (n_2)	Total
1	Low(MPS below 33)	21(27.63)	19(25)	40(26.31)
2	Medium(MPS 34-66)	5(6.58)	10(13.16)	15(9.87)
3	High(MPS above 66)	50(65.79)	47(61.84)	97(63.82)
	Total	**76(100)**	**76(100)**	**152(100)**

MPS=Mean per cent score, figures within the parentheses are percentage to the total, $n=n_1 + n_2$, n_1=Size of sample for beneficiaries, n_2= Size of sample for non- beneficiaries

Table 2. Aspects wise adoption of the respondents regarding of HYV wheat Raj-4037

n =152

S.No.	Aspect	Beneficiaries (n_1)		Non-beneficiaries (n_2)		Total	
		MPS	**Rank**	**MPS**	**Rank**	**MPS**	**Rank**
1.	Second fortnight of November to last week November as the sowing time	70.70	II	81.40	I	76.05	I
2.	100-120 kg/ha seed rate	79.60	I	66.30	III	72.95	II
3.	22.5cm row- to -row spacing	68.10	III	71.20	II	69.65	III

MPS= mean percent score, $n=n_1 + n_2$, n_1=Size of sample for beneficiaries, n_2= Size of sample for non-beneficiaries

interventions of Raj-4037 variety.

It is concluded that the level of adoption of beneficiaries was found to be slightly high in comparison of comparing with those of Non-beneficiaries regarding interventions of Raj- 4037. Non- beneficiaries are also following the Beneficiaries, they were not far lagging behind. The results indicate fruitful impact of NAIP, but not satisfactory as desired because there is little differentiation between beneficiaries and non-beneficiaries.

The present findings were contradictory with the findings of Sharma and Sharma (2003), Desai and Thakar. (1996), Goyal (2006) and Gaur (1996). On the basis of findings, it is recommended and suggested that Raj-4037 may be continued to be used by the farmers of the study area along with its latest interventions introduced under NAIP. It can be also recommended for the similar climatic conditions.

Aspects wise adoption of the respondents regarding HYV wheat Raj-4037

It was discouraging to not that the beneficiaries of NAIP did not adopt the recommended intervention namely sowing time of Raj- 4037. Because this aspect was ranked as second with MPS 70.70 in comparison to non-beneficiaries who rank it first (MPS 81.40 per cent). At the same time, the adoption level with respect to seed rate of Raj-4037 was more among as beneficiaries comprised to non-beneficiaries, as they ranked first (MPS 79.60 per cent). The adoption level was finding to be comparatively slightly higher among the non-beneficiaries regarding row to row spacing as ranked as third with its MPS 71.20.

As per the results it was inferred that non-beneficiaries were superior than those of beneficiaries as far as adoption of interventions related to variety Raj-4037. The results were against the speculations of the project in study, the results show advised facts of NAIP in the relation to sub-aspects for adoption of Raj-4037.

In line with the findings it was suggested and advocated that the project personnel should learn the lesson regarding low adoption of beneficiaries about specific interventions of Raj-4037 and gauge their further line of action for perusing the farmers for adoption of recommended intervention of wheat variety Raj-4037.

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RELATIONSHIP BETWEEN THE SELECTED CHARACTERISTICS OF MILK PRODUCERS WITH THEIR MANAGEMENT EFFICIENCY

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ABSTRACT

The study was conducted in purposely selected two talukas- Mansa and Kalol of Gandhinagar district of Gujarat. A sample of 120 respondents was drawn from ten selected village randomly for the study. Majority of the milk producers (65.83 per cent) had medium management efficiency regarding improved dairy farming practices, followed by 17.50 per cent and 16.67 per cent of the milk producers had high and low management efficiency regarding improved dairy farming practices. The independent variables like, education, experience, land holding, annual income, number of milch animals, social participation, extension contact, mass media exposure, scientific orientation, risk orientation, economic motivation, cosmopolites and knowledge had positive and highly significant correlation with management efficiency of milk producers. The variables like age and size of family showed non-significant relationship with management efficiency of milk producers.

INTRODUCTION

India occupies the foremost position among the countries of the world in respect of livestock. It's contributing nearly about one fourth of world's total bovine population. India maintained its position as largest producers of milk, with achievement of around 121.8 million tonnes during 2010-11. (Anonymous, 2011) However, there is large population of milk producing animals; the milk production is very low as compared to other countries.

According to animal census conducted by the statistical cell, Directorate of Animal Husbandry, Gujarat State, there was 7,975,724 numbers of cattle and 8,773,569 buffaloes in 2007. In Gandhinagar district, cattle and buffalo population were 148,468 and 364,040, respectively. (Anonymous, 2007). Livestock sector had among the few growth sectors in rural India over the past five decades and its contribution to the GDP has 3.93 per cent share in 2009-10. (Anonymous, 2011).

In Gujarat, the Gandhinagar District Co-operative Milk Producers Union Ltd., popularly known as MOTHER Dairy and its affiliated village level milk producer's co-operative societies have demonstrated their utility in the rural development. The formation of the milk co-operatives is the best way for desired development of dairy industry and organized with a view for providing effective marketing facilities for the milk produced in the villages.

In the dairy development map of India, Gujarat occupies a place of pride. This is mainly due to the impressive stride which has taken in organizing a chain of cooperative dairies in many parts of state. The unity dairy cooperative societies, veterinary colleges and state department of animal husbandry offer on opportunity where by the gain of the white revolution can flow to the producers and generate a self sustaining and processing accelerating momentum.

This situation raises the question why milk producers not yet able to reach expected level of satisfaction? To answer this, study was conducted on Management efficiency of milk producers in

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Gandhinagar district of Gujarat state. Hense this study was undertaken an objective to know.

1. To study the management efficiency of milk producers.
2. To explore the relationship of personal, socio-economic, communication and psychological characteristics of milk producers with their management efficiency.

RESEARCH METHODOLOGY

The present study was purposively undertaken in the two talukas *viz., Mansa* and *Kalol* talukas of Gandhinagar district of Gujarat state. Five villages from each taluka were selected by random sampling method. Thus, total ten villages were selected. From each selected village, 12 farmers were selected randomly by making a sample of 120 respondents who had minimum 3 years of experience in dairy farming. The data were collected with the help of well-structured, pre-tested interview scheduled through personal contact and data were compiled, tabulated and analyzed to get proper answers for objectives of the study. A simple ranking technique was applied to measure the constraints faced by milk producers. The statistical tools used were percentage, mean score, standard deviation and coefficient of correlation.

RESULTS AND DISCUSSION

Management efficiency of milk producers:

It is the degree to which a milk producer acquires and adopts effectiveness of factors in milk production to reach higher level of performance. It means proper management of dairy farm through improved dairy by milk producers. It is rigidly stated that improved package of practices is an instrument for making dairy a better and more profitable enterprise. In this context it is also stressed that taking scientific knowledge to the door of sixty million farm families in India is possible only through intensive training of milk producers, both in package of practices and specialized technique of clean milk production. The data regarding management efficiency of milk producers are given in Table 1 and diagrammatically depicted in Fig. 1.

Table 1. Distribution of milk producers according to their management efficiency

n = 120

S.No.	Management efficiency	f	%
1.	Low (up to 55.02 score)	20	16.67
2.	Medium (55.03 to 70.96 score)	79	65.83
3.	High (above 70.96 score)	21	17.50
	Total:	120	100.00

Mean= 62.99; S.D. = 7.97

The majority of the milk producers (65.83 per cent) had medium management efficiency regarding improved dairy farming practices, followed by 17.50 per cent and 16.67 per cent of the milk producers had high and low management efficiency regarding improved dairy farming practices, respectively. This finding is in the line with the findings reported by Vyas and Patel (2002), Patel (2005) and Manivannanan and Tripathi (2007).

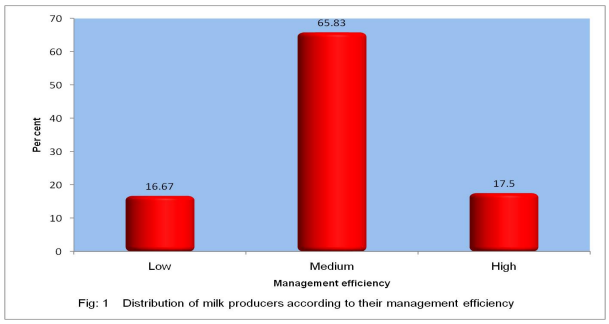

Fig: 1 Distribution of milk producers according to their management efficiency

Relationship between the selected characteristics of milk producers with their management efficiency:

The important of these characteristics and review of past research studies, an attempt has been made in this investigation to ascertain the relationship if any, between personal, socio-economic, communication and psychological characteristics of the milk producers and their management efficiency. This was determined and tested with help of Karl Pearson's coefficient correlation test and results obtained is presented in Table 2 and depicted in Fig. 2.

Table 2. Correlation coefficient values between the characteristics of milk producers and their management efficiency

n=120

S. No.	Independent Variables	Correlation Coefficient ('r' value)
1	Age	-0.1926 (NS)
2	Education	0.3481**
3	Experience in dairy farming	0.3333**
4	Size of family	-0.0322 (NS)
5	Social participation	0.3552**
6	Land holding	0.2812**
7	Annual income	0.3065**
8	No. of milch animals	0.5052**
9	Extension contact	0.3568**
10	Mass media exposure	0.3315**
11	Cosmopoliteness	0.3583**
12	Knowledge level	0.5227**
13	Economic motivation	0.3880**
14	Scientific orientation	0.3235**
15	Risk orientation	0.3069**

NS = not significant at 0.05 level; * =significant at 0.05 level; ** =significant at 0.01 level

Personal variables

Age and management efficiency : It is apparent from the data presented in the Table: 2 and graphically depicted in Fig. 2 that age had negative and non-significant correlation (r = - 0. 1926) with the management efficiency regarding dairy farming by the milk producers. This finding is in the line with result of Manivannanan and Tripathi (2007).

Education and management efficiency: The data presented in Table: 2 and graphically depicted in Fig. 2 reflect that management efficiency of the milk producers regarding dairy farming had positive and highly significant (r = 0.3481) correlation with their level of education, which indicate that education play an important role in influencing the management efficiency of milk producers. This finding has been supported by findings of Ramegowda (1991).

Experience in dairy farming and management efficiency: As reveal from data presented in Table 2 and graphically depicted in Fig. 2 that there was highly significant relationship (r = 0.3333) between experience of milk producers in dairy farming and management efficiency. This result is in line with result of Vyas and Patel (2002) and Patel (2005).

Socio-economic variables

Size of family and management efficiency: As reveal from data presented in Table 2 and graphically depicted in Fig. 2 that there was negative and non-significant association (r = - 0.0322) between size of family and management efficiency of the milk producers. This shows that size of family is not an important variable which influence on management efficiency of milk producers regarding dairy farming.

Social participation and management efficiency: The data presented in Table 2 and graphically depicted in Fig. 2 clearly indicate that social participation of the milk producers had positive and highly significant correlation (r = 0.3552) with their management efficiency.

Size of land holding and management efficiency: The data presented in Table 2 and graphically depicted in Fig. 2 clearly indicate that size of land holding of the milk producers had positive and highly significant association (r = 0.2812) with their management efficiency. The finding derives support from the findings of Ramegowda (1991) and Vyas and Patel (2002).

Annual income and management efficiency: It is apparent from the data presented in the Table 2 and graphically depicted in Fig. 2 that annual income of the milk producers had positive and highly significant correlation (r = 0.3065) with their management efficiency. This finding supported by the findings of Vyas and Patel (2002) and Patel

(2005).

Number of milch animals and management efficiency: As reveal from data presented in Table 2 and graphically depicted in Fig. 2 that there was highly significant association (r = 0.5052) between number of milch animals and management efficiency of the milk producers. It means that management of dairy farming practices increased with increase in number of milch animals possessed by milk producers.

Communication variables

Extension contact and management efficiency: The data presented in Table 2 and graphically depicted in Fig. 2 clearly indicate that extension contact of the milk producers had positive and highly significant correlation (r = 0.3568) with their management efficiency. This finding is in line with the findings of Ramegowda (1991) and Vyas and Patel (2002).

Mass media exposure and management efficiency: The data presented in Table 2 and graphically depicted in Fig. 2 clearly indicate that mass media exposure of the milk producers had positive and highly significant correlation (r = 0.3315) with management efficiency. This finding is similar to findings reported by Vyas and Patel (2002) and Patel (2005).

Cosmopoliteness and management efficiency: It is apparent from the data presented in the Table 2 and graphically depicted in Fig. 2 that cosmopoliteness of the milk producers had positive and highly significant correlation (r = 0.3583) with their management efficiency. Similar trends were observed in the findings of Ramegowda (1991) and Patel (2005).

Psychological variables

Knowledge and management efficiency: It is obvious from the data presented in Table 2 and diagrammatically depicted in Fig. 2 that the management efficiency of milk producers had positive and highly significant correlation (r = 0.5227) with their knowledge level. It indicates that as knowledge level of milk producers increases, the management increases. This finding is in line with the findings Manivannanan and Tripathi (2007).

Economic motivation and management efficiency: The data presented in Table 2 and graphically depicted in Fig. 2 reflect that management efficiency had positive and highly significant correlation (r = 0.3880) with milk producer's economic motivation tends to lead the rejection of null hypothesis (H_{13}) that "There is no relationship between economic motivation of the milk producers and their management efficiency".

Scientific orientation and management efficiency: It is apparent from the data presented in Table 22 and graphically depicted in Fig. 2 that scientific orientation of the milk producers had positive and highly significant correlation (r = 0.3235) with management efficiency which indicate that scientific orientation had positive influence on management efficiency of milk producers.

Risk orientation and management efficiency: The data presented in Table 2 and graphically depicted in Fig. 2 clearly indicate that risk orientation of the milk producers had positive and highly significant correlation (r = 0.3069) with their management efficiency. This finding is in line with the findings of Vyas and Patel (2002), and Patel (2005).

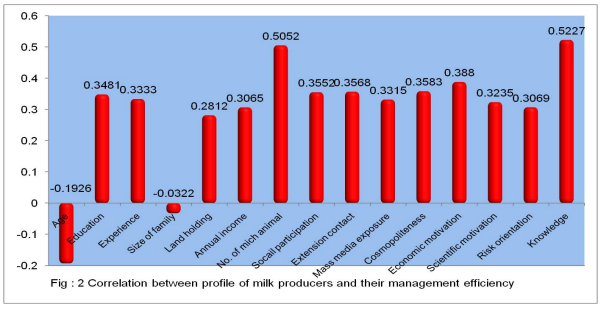

Fig : 2 Correlation between profile of milk producers and their management efficiency

CONCLUSION

Majority of the milk producers (65.83 per cent) had medium management efficiency regarding improved dairy farming practices, followed by 17.50 per cent and 16.67 per cent of the milk producers had high and low management efficiency regarding improved dairy farming practices.

The independent variables like, education, experience, land holding, annual income, number of milch animals, social participation, extension contact, mass media exposure, scientific orientation, risk orientation, economic motivation, cosmopolites and knowledge had positive and highly significant correlation with management efficiency of milk producers. The variables like age and size of family showed non-significant relationship with management efficiency of milk producers.

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SOCIO-ECONOMIC PROFILE AND SUGGESTIONS FOR IMPROVING JOB SATISFACTION OF TEACHERS OF MPUAT, UDAIPUR

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ABSTRACT

The present study was an attempt to study the socio-economic profile of teachers and to explore suggestions for improving job satisfaction of teachers of MPUAT, Udaipur. The present study was conducted in purposely selected state agriculture university MPUAT, Udaipur. It was planned to have a sample of 160 teachers for this study. Data were collected through tailor made questionnaire. The study discloses that out of 160 teachers most of them 85 (53.13%) teachers belonged to medium age group i.e. 42 - 57 years, 80.00 per cent were male teachers, 97.50 per cent were married, 50.63 per cent teachers were working as Professor, most of the teachers 41.88 per cent having their salary between Rs. 82000 to Rs. 1, 94000, 106 (66.25%) teachers were having medium service experience between 11years to 30 years, 154 teachers were possessing Ph. D. degree, 56.30 per cent teachers belonged to the urban area and 85 (53.10%) teachers were living in nuclear family. The study revealed that the suggestion 'opportunity of recognition and rewards for every employee of the university' was given by majority i.e. 31 (19.37%) teachers and it was ranked first.

INTRODUCTION

The present study was conducted to study the socio economic profile of teachers and to explore the suggestion for improving job satisfaction of teachers of MPUAT, Udaipur. Job satisfaction is a qualitative aspect and not understandable in strict qualitative terms. Job satisfaction is a psychological and intangible concept. The job satisfaction of the teachers is the most important factor in agriculture universities. If the productivity and effectiveness of the academic community and system are to be enhanced, then one must analyze what factors affect the job satisfaction of the teachers working in a university.

RESEARCH METHODOLOGY

The present study was conducted in purposely selected state agriculture university MPUAT, Udaipur. A complete list of the in position faculty teachers was prepared for each Colleges, KVKs, ARSs, ARSSs and DFRS from the records available at University. From the list so prepared, Respondents were selected randomly. It was planned to have a sample of 160 teachers for this study. Data were collected through tailor made questionnaire. The questionnaire was constructed to record the personal characteristics of the teachers and to collect the suggestions to enhance the job satisfaction of the teachers. Suitable suggestions were sought, frequency and percentage were calculated for personal profile and suggestions. Suggestions were ranked according to their percentage.

RESULTS AND DISCUSSION

1. Personal profile of the teachers:

The allocation of personal profile of the teachers has been presented in the Table 1. Table shows results that most of the teachers belonged to medium age group i.e. 42 – 57 years. The medium age group constitutes 85 (53.13%) of total teachers. Out of 160 teachers, total 38 (23.75%) teachers fell in high age group and 37 (23.13%) teachers were found in low age group, male teachers were in majority

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by 80.00 per cent. Male staff was 128 in number out of the total 160 teachers of university. Only 32 female teaching staff was working in the university which was only 20.00 per cent of the total teachers, most of the teachers (97.50 %) were married i.e. 156 in numbers and 4 teachers were unmarried in the university which was only 2.50 per cent of the total number of teachers, majority of the teachers (50.63%) were working as Professor in the university. Teachers working as Assistant Professor were 40.63 per cent and 08.75 per cent teachers were working as Associate Professor. Further analysis of the table indicates that out of total 160 teachers, 81 teachers were Professor, 65 were Assistant Professor and 14 were Associate Professor in the university, most of the teachers (41.88 %) were drawing salary between Rs. 82000 to Rs. 1, 94000. The teachers having salary more than Rs. 1, 94000 and less than Rs. 82000 were 30.00 per cent and 28.13 per cent among 160 teachers, respectively.

It was noted that out of 160 teachers, 67 teachers were getting salary between Rs. 82000 to Rs. 1, 94000, 48 teachers were getting more than Rs. 1, 94000 and 45 teachers were getting salary lower than Rs. 82000. In service experience, 106 (66.25 %) teachers were having medium service experience between 11 years to 30 years. In low service experience group, a number of 30 (18.75%) teachers were counted who were having service experience less than 11 years. Remaining 24 (15.00%) teachers were categorized under high service experience group who were having service experience of more than 30 years in the university.

Table 1 further gives detailed view of the educational qualification of the teachers that majority of the teachers i.e. 154 were possessing Ph. D. degree in the university. Only 6 teachers were having degree of M. Sc. out of total 160 teachers. In percentage terms, it was 96.25 per cent teachers who possessed degree of Doctor of Philosophy (Ph.D.) and remaining 3.75 per cent teachers were having Master of Science (M.Sc.) degree in the university, most of the teachers (56.30 %) belonged to the urban area or they were living in the urban area and 43.80 per cent teachers belonged to rural area. In numbers, out of 160 teachers, 90 teachers were from urban area and 70 teachers were from rural area, out of total 160 teachers 85 (53.10%) teachers were living in nuclear family or they were living with their wife and children only and 75 (46.90 %) teachers were living in joint family or they were living with their parents also.

2. Suggestions from teachers to enhance their job satisfaction:

To explore the suggestions given by teachers to enhance their job satisfaction, 15 important statements were considered. Frequency and percentage were calculated and rank was assigned according to their percentage.

Table 2 shows that suggestion 'opportunity of recognition and rewards for every employee of the university' was given by majority i.e. 31 (19.37%) teachers and it was ranked first. The statements 'Timely availability of pension fund for retired faculty members', 'Fulfillment of vacant seats of technical and supportive staff for efficient work progress', 'Recruitment of teachers and scientists for reducing work load of present faculty' and 'More clear and transparent university policies for promotion and skill orientation' were given by 28 (17.50%), 26 (16.25%), 24 (15.00%) and 21 (13.12%) teachers and rank second, third, fourth and fifth was assigned, respectively.

Table 2 further shows that the statement 'Subordinate staff should be strictly instructed to be cooperative with teacher and scientists' and 'Need of Providing LTC to faculty members' were given by 17 (10.62%) teachers and both were ranked sixth. About 14 (8.75%) teachers gave suggestion that 'Motivation from higher authority to bring the latest efficient projects and to complete it timely' and this suggestion was ranked eighth. The statement 'Conduct Carrier Advancement Scheme at regular intervals for promotion to next level' was given by 12 (7.50%) teachers and ninth rank was assigned to this suggestion. About 9 (5.62%) teachers gave suggestion 'Needs to provide improved Laboratory facilities with technical staff'

Table 1. Allotment of teachers according to their personal profile

n= 160

S. No.	Age (in years)	F	%
1.	Low age group (<42 years)	37	23.13
2.	Medium age group (42 – 57 years)	85	53.13
3.	High age group (> 57 Years)	38	23.75
	Total	160	100.00
S. No.	**Gender**	**F**	**%**
1.	Male	128	80.00
2.	Female	32	20.00
	Total	160	100
S. No.	**Marital Status**	**F**	**%**
1.	Married	156	97.50
2.	Unmarried	4	2.50
	Total	160	100
S. No.	**Designation**	**F**	**%**
1.	Professor	81	50.63
2.	Associate Professor	14	08.75
3.	Assistant Professor	65	40.63
	Total	160	100.00
S. No.	**Salary**	**F**	**%**
1.	< Rs. 82000	45	28.13
2.	Rs. 82000 to Rs. 1,94000	67	41.88
3.	> Rs. 1,94000	48	30.00
	Total	160	100.00
S. No.	**Service experience**	**F**	**%**
1.	Low service experience (< 11 years)	30	18.75
2.	Medium service experience (11 years to 30 years)	106	66.25
3.	High service experience (> 30 Years)	24	15.00
	Total	160	100
S. No.	**Education qualification**	**F**	**%**
1.	Master of Science (M.Sc.)	6	3.75
2.	Doctor of Philosophy (Ph.D.)	154	96.25
	Total	160	100
S. No.	**Background**	**F**	**%**
1.	Rural	70	43.80
2.	Urban	90	56.30
	Total	160	100
S. No.	**Family**	**F**	**%**
1.	Nuclear	85	53.10
2.	Joint	75	46.90
	Total	160	100

F= frequency, % = per cent, n = total number of the respondents

Table 2. Suggestions from teachers to enhance their job satisfaction

n = 160

S.No.	Suggestions	F	%	Rank
1.	Conduct Carrier Advancement Scheme at regular intervals for promotion to next level.	12	07.50	IX
2.	Sufficient budget for NRC/contingency for timely completion of projects.	08	05.00	XI
3.	Timely availability of pension fund for retired faculty members.	28	17.50	II
4.	Motivation from higher authority to bring the latest efficient projects and to complete it timely.	14	08.75	VIII
5.	Improvement in monitoring and supervision system of the university.	07	04.37	XII
6.	More clear and transparent university policies for promotion and skill orientation.	21	13.12	V
7.	Transparency in transfer policy (once in 5 years).	04	02.50	XV
8.	Appointment of higher authority like DEE, DR and DPR etc. from their relevant field.	06	03.75	XIV
9.	Proper exposure at international level to all cadres of employees through university support system.	07	04.37	XII
10.	Opportunities of recognition and rewards for every employee of the university.	31	19.37	I
11.	Fulfillment of vacant seats of technical and supportive staff for efficient work progress.	26	16.25	III
12.	Subordinate staff should be strictly instructed to be cooperative with teacher and scientists.	17	10.62	VI
13.	Recruitment of teachers and scientists for reducing work load of present faculty.	24	15.00	IV
14.	Need of Providing LTC to faculty members	17	10.62	VI
15.	Needs to provide improved Laboratory facilities with technical staff.	09	05.62	X
	Total	160	100	

F = Frequency, % = Per cent

and 8 (5.00%) teachers gave suggestion 'Sufficient budget for NRC/contingency for timely completion of projects', and rank was assigned tenth and eleventh to the suggestions, respectively.

The suggestions 'Improvement in monitoring and supervision system of the university' and 'Proper exposure at international level to all cadres of employees through university support system' were given by 7 (4.37%) teachers and both were ranked twelfth. The suggestion 'Appointment of higher authority like DEE, DR and DPR etc. from their relevant field' was given by 6 (3.75%) teachers and this suggestion was ranked fourteenth. About 4 (2.50%) teachers were gave suggestion 'Transparency in transfer policy (once in 5 years) and this suggestion was ranked fifteenth.

CONCLUSION

Regarding personal profile, it can be concluded that out of 160 teachers most of them belonged to medium age group i.e. 42 – 57 years. The medium

age group constitutes 85 (53.13%) of total teachers, 80.00 per cent were male teachers, most of the teachers 97.50 per cent were married, 50.63 per cent majority of the teachers were working as Professor, most of the teachers 41.88 per cent having their salary between Rs. 82000 to Rs. 1, 94000, more than half 106 (66.25%) teachers were having medium service experience between 11years to 30 years, majority of teachers 154 were possessing Ph. D. degree, 56.30 per cent teachers belonged to the urban area and 85 (53.10%) teachers were living in nuclear family.

Regarding suggestions to enhance the job satisfaction of the teachers it may be concluded that the suggestion 'opportunity of recognition and rewards for every employee of the university' was given by majority i.e. 31 (19.37%) teachers and it was ranked first. The statement 'Timely availability of pension fund for retired faculty members' was given by 28 (17.50%) teachers and was ranked second

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PROFILE OF FARM WOMEN AND CONSTRAINTS FACED BY THEM IN PARTICIPATION IN DECISION MAKING RELATED TO AGRICULTURAL ACTIVITIES

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ABSTRACT

A study was conducted in Udaipur District of Rajasthan state. The purpose was to know profile of farm women and constraints faced by them in participation in agricultural activities in Udaipur District of Rajasthan. The diagnostic study was confined to 2 Tehsil of Udaipur District and from these two Tehsils 10 Villages were selected for study. The findings of the study revealed that majority of farm women were from middle age group, most of them were illiterate, 5 to 6 members in family size and more than half had average working condition, majority had low level of social participation and majority had low level of extension participation and medium level of source of information. And it was also found that majority of farm women faced constraints in participation in decision making related to agricultural activity like " Male dominated family and society" (WMS 1.929) ranked first.

INTRODUCTION

Women constitute almost half of the work force engaged in agriculture. Rural women constitute the most important productive work force in the Indian economy. In rural India, the percentage of women who depend on agriculture for their livelihood is as high as 84.00 per cent. Agriculture in India contributes about 18.00 per cent GDP and is predominantly a female activity.The rural women participate in a broad range of agricultural activities such as production, processing, preservation and utilization of food. They play a key role in the entire food system starting from the selection of seed, sowing, manuring, weeding, drying, stacking storing and feeding the family from the harvested produce. Further, they play a major in the decision making process at household level.

RESEARCH METHODOLOGY

The present study was conducted in Udaipur district of Rajasthan State. For this study, two tehsils namely Girwa and Vallabhnagar were purposively selected on the basis of the maximum female population in the district, from each tehsil 5 villages were selected on the basis of maximum female population so, total 10 villages from both tehsils were selected and from each tehsil 10 respondents were randomly selected. Total 100 respondents selected from villages, they were interviewed, personally to collect the data with the help of pre structured interview schedule. Thereafter, data were tabulated, analysed and inferences were drawn in light of the objective.

REASULTS AND DISCUSSION

In this, results related to personal profile of respondents *viz.* age, education, family size,working condition, social participation, extension participation, source of information, have been presented in subsequent tables. These variables are explained one by one as follows.

Age

Age denotes the chronologically completed calendar years by farm women. Age influences behavior of an individual farm woman by exposing to varied situations number of times. Therefore, age of farm women was considered as an essential aspect in this investigation.

The age categories of all respondents were made on the basis of their mean age and standard deviation. Thus, three categories were formed *i.e.*

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young (<25 years), middle (25 to 45 years) and old (>45 years). The distribution of respondents with respect to their age has been presented in Table 6.

Table 1 shows that majority of respondents belonged to middle age group *i.e.* 25 to 45 years of age. This age group alone constituted 80 per cent of total sample. The respondents in old and young age group were found to be 11 per cent and 09 per cent, respectively.

Table 1 also indicate that 41 (82.00 %) farm women of Girwa tehsil and 39 (78.00%) farm women of Vallabhnagr tehsil belonged to middle age group, whereas, 3 (06.00%) and 6 (12.00%) respondents belonged to young age group, respectively. Likewise, the representation of farm women of Girwa and Vallabhnagar tehsil in old age group was 6 (12.00%) and 5 (10.00%), respectively. It is therefore, concluded that majority of farm women were of the age between 25 to 45 years.

The observed findings might be due to the fact that generally in the rural social system the head of the families, who in the majority of the cases belonged to middle to old age group and take decision for their farming activities. Besides this, still today joint family system is prevailing in rural areas might be one of the reasons of observed findings. It is reflected in above findings.

Education

Education is essential for brining desirable change in human behaviour. Formal education of farm women plays an important role in determining perception power and which in turn reflect into decision making and thereby in their role performance. Considering these aspects, the formal education of farm women was studied. The information about formal education was collected from farm women and data are presented in Table

Table 1. Distribution of the respondents according to their age

(n = 100)

S.No	Age groups	Tehsil Girwa		Tehsil Vallabhnagar		Total	
		f	%	f	%	F	%
1.	Young (< 25 years)	03	06.00	06	12.00	09	09.00
2.	Middle (25 to 45 years)	41	82.00	39	78.00	80	80.00
3.	Old (> 45 years)	06	12.00	05	10.00	11	11.00
	Total	**50**	**100.00**	**50**	**100.00**	**100**	**100.00**

f= frequency, % = per cent ,Mean=35 , S.D. = 10.52901

Table 2: Distribution of respondents according to their education

(n=100)

S.No	Education level	Tehsil Girwa		Tehsil Vallabhnagar		Total	
		f	%	f	%	F	%
1.	Illiterate	30	60.00	21	42.00	51	51.00
2.	Up to primary	10	20.00	13	26.00	23	23.00
3.	Up to higher secondary	08	16.00	11	22.00	19	19.00
4.	Above higher secondary	02	04.00	05	10.00	07	07.00
	Total	**50**	**100.00**	**50**	**100.00**	**100**	**100.00**

f= frequency, % = per cent

2.

Selected respondents, they were classified into four categories *viz.,* illiterate, up to primary, up to higher secondary and above higher secondary. The frequency were counted and converted into percentage for drawing results. The results have been presented in Table 2.

A close observation of Table 2 indicated that maximum 51.00 per cent respondents were Illiterate, of which 30 (60.00%) respondents from Girwa tehsil and 21 (42.00%) respondents from Vallabhnagar tehsil, respectively. On the other hand, 23.00 per cent respondents were educated up to primary level, of which 10 (20.00%) and 13 (26.00%) respondents from Girwa and Vallabhnagar tehsil respectively. About, 19.00 per cent of respondents were studied up to higher secondary, of which 8 (16.00%) and 11 (22.00%) respondents from Girwa and Vallabhnagar tehsils respectively. Likewise, 07.00 per cent of respondents were educate above higher secondary, of which representation of farm women of Girwa and Vallabhnage tehsil was 2 (04.00%) and 5 (10.00%) respectively.

It is therefore concluded that majority of respondents were uneducated.

Family size

The family is a single entity which influences thoughts and actions of the individual members in farming occupation on a large scale. Generally, the difficulty to arrive at a decision regarding the farming occupation as level of interaction among the family members is assumed to be high in large family as compare to small size of family. Hence, size of family might have influence on the participation and decision making of farm women and hence, size of family of farm women was studied and the data in this regard are presented in Table 3.

Family size was categorized into 2 groups *viz.* small size and large size. The frequency and percentage of the result were represented in Table 3.

The data represented in Table 3 indicates that majority i.e.62.00 per cent of respondents were from small size having up to 5 members in family

Table 3: Distribution of respondents according to their family size

(n= 100)

S.No	Family size	Tehsil Girwa		Tehsil Vallabhnagar		Total	
		f	%	f	%	F	%
1.	Small (up to 5 members)	27	54.00	35	70.00	62	62.00
2.	Large (above 5 members)	23	46.00	15	30.00	38	38.00
	Total	**50**	**100.00**	**50**	**100.00**	**100**	**100.00**

f= frequency, % = per cent

Table 4: Distribution of respondents according to their working condition

(n = 100)

S.No	Working condition	Tehsil Girwa		Tehsil Vallabhnagar		Total	
		f	%	f	%	F	%
1.	Poor(< 3 score)	11	22.00	04	08.00	15	15.00
2.	Average(3 to 4 score)	24	48.00	30	60.00	54	54.00
3.	Good(> 4 score)	15	30.00	16	32.00	31	31.00
	Total	**50**	**100.00**	**50**	**100.00**	**100**	**100.00**

f= frequency, % = per cent

and 38.00 per cent respondents were from large size having above 5 members in family.

The further analysis of data in Table 3 also reveals that 27 (54.00%) farm women of Girwa tehsil and 35 (70.00%) respondents of Vallabhnagar tehsil were from small family having up to 5 members. On the other hand 23 (46.00%) and 15 (30.00%) farm women were from large size having above 5 members in family.

From the above analysis of Table 3, it may be concluded that majority of respondents were from small family having up to 5 members in family.

Working condition

Farm women were categorized in to three group *viz.* poor, average and good working condition on the basis of their working environment. The frequency and percentage wise result have been presented in Table 4.

The data of Table 4 visualizes that majority of respondents (54.00 %) expressed average level of satisfaction about working condition, followed by 15.00 per cent respondents who expressed poor and 31.00 per cent of respondents expressed good level of working condition.

The data of Table 4 also revealed that majority 24 (48.00%) respondents of Girwa tehsil and 30 (60.00%) respondents of Vallabhnagar tehsil expressed average level of working condition. Whereas, 15 (30.00%) respondents of Girwa tehsil and 16 (32.00%) respondents of Vallabhnagar tehsil expressed good level of working condition. Likewise, 11 (22.00%) and 4 (08.00%) respondents of Girwa and Vallabhnagar tehsil expressed poor level of working condition respectively.

The findings are concluded that majority of respondents felt average level of working condition.

Social participation

Social participation denotes the extent to which an individual is actively involved in the affairs of the

Table 5. Distribution of respondents according to their social participation

(n = 100)

S.No.	Social Participation	Tehsil Girwa		Tehsil Vallabhnagar		Total	
		f	%	f	%	F	%
1.	Low(<3.78 score)	07	14.00	05	10.00	12	12.00
2.	Medium(3.78 to 6.27 score)	37	74.00	38	76.00	75	75.00
3.	High(> 6.27 score)	06	12.00	07	14.00	13	13.00
	Total	**50**	**100.00**	**50**	**100.00**	**100**	**100.00**

f= frequency, % = per cent

Table 6. Distribution of respondents according to their participation in extension programme

(n = 100)

S.No.	Extension Participation	Tehsil Girwa		Tehsil Vallabhnagar		Total	
		f	%	f	%	F	%
1.	Low(< 2 score)	08	16.00	13	26.00	21	21.00
2.	Medium(2 to3 score)	35	70.00	26	52.00	61	61.00
3.	High(>3 score)	07	14.00	11	22.00	18	18.00
	Total	**50**	**100.00**	**50**	**100.00**	**100**	**100.00**

f= frequency, % = per cent

community activities. Membership in any social organizations provide platform to farm women to exchange their views and feelings. Participation in different social activities definitely influences way of thinking, acting and behaving of farm women. It is believed that more social participation by women in family has greater influence on decision-making. Thus, to know the social participation of women in various organizations the information was gathered and classified as shown in Table 5.

The data in the above Table 5 reveal that majority of respondents (75.00%) had medium social participation followed by 12.00 per cent of respondents had low social participation and only 13.00 per cent had high social participation.

Table 6 further indicates that majority 37 (74.00%) respondents of Girwa tehsil and 38 (76.00%) respondents of Vallabhnagar tehsil had medium social participation. Likewise, 07 (14.00%) and 5 (10.00%) respondents of Girwa and Vallabhnagar tehsil had low social participation respectively. Whereas, 06 (12.00%) and 07 (14.00%) respondents of Girwa and Vallabhnager tehsil had high social participation respectively.

It was observed during survey that medium level farm women were members in co-operative society as well as in informal association including bhajan mandali, self help groups, women's circle *etc.*,

Participation in extension education activities

Participation in extension education activities helps farm women to acquire knowledge about their business, scientific practices in agriculture, animal husbandry and household activities to solve their problems with the help of extension personnel. To understand the influence of extension education activities participation of farm women in agricultural practices and decision making, this character of farm women was studied and data are stratified in Table 6.

The data regarding extension education activity participation reveal that majority (61.00 per cent) farm women had medium participation in extension education activities followed by 21.00 per cent of respondents had low level of participation and only 18.00 per cent had high level of participation in extension activities.

Table 6 also revealed that more than half 35 (70.00%) respondents of Girwa and 26 (52.00%) respondents of Vallbhnagar tehsil had medium extension education activity participation. Whereas, 8 (16.00%) and 7 (14.00%) respondents of Girwa tehsil had low and high extension education activity participation respectively. Likewise, 13 (26.00%) and 11 (22.00%) respondents of Vallabhnagar tehsil had low and high extension education activity participation respectively.

Source of information

Farm women utilize different sources of information for getting latest information about the agricultural technology and practices, package of practices, *etc.* Source of information utilized by farm women was studied as an independent variable because it affects the level of participation in decision making related to agricultural activities.

The data represent in Table 7 reveal that majority (81.00 per cent) of respondents were using medium level utilization source of information followed by 10.00 per cent respondents who were using more source of information and 09.00 per cent of respondents were using less source of information.

The data also represented that more than half 47 (94.00%) respondents of Girwa tehsil and 34 (68.00%) respondents of Vallbhnagar tehsil were using medium utilization source of information. On the other had only 2 (04.00%) and 8 (16.00%) respondents of Girwa and Vallabhnagar tehsil were using more source of information respectively. Likewise, only 1 (02.00%) and 8 (16.00%) respondents from Girwa and Vallabhnagr tehsil were using less source of information respectively.

This might be due to the fact that the modern means of mass communication were being used by farm women and related to the latest information of agriculture.

Table 7. Distribution of respondents according to their source of information utilization pattern

(n=100)

S.No.	Utilization of Source of Information	Tehsil Girwa		Tehsil Vallabhnagar		Total	
		f	%	f	%	F	%
1.	Less(< 9.80score)	01	02.00	08	16.00	09	09.00
2.	Medium(9.80to15.36 (score)	47	94.00	34	68.00	81	81.00
3.	More(> 15.36 score)	02	04.00	08	16.00	10	10.00
	Total	**50**	**100.00**	**50**	**100.00**	**100**	**100.00**

f= frequency, % = per cent

Table 8. Constraints faced by farm women in participation in decision making related to agricultural activities

(n= 100)

S.No.	Constraints	Mean Score	Rank
1	Lack of female extension staff for guidance in agricultural activities	1.093	X
2	Prescribed roles of women in society	1.527	VII
3	Lack of confidence	1.744	IV
4	Lack of technical know-how	1.647	V
5	Lower participation in some of agricultural activities	0.468	XV
6	Male dominated families and society	1.929	I
7	Poor purchasing power of women	0.668	XII
8	Traditional belief system	1.476	VIII
9	Lack of experience of farming	0.523	XIV
10	Poor educational background	1.864	II
11	Lack of knowledge about farm accounting	1.818	III
12	Lack of information about solutions for problems	0.735	XI
13	No permission to take decisions due to younger age	1.602	VI
14	Lack of information about government schemes	0.586	XIII
15	Lack of support and guidance from family members for taking decisions	1.294	IX
16	Distribution of powers to take decisions	0.396	XVI

Constraints faced by farm women in participation in decision making

The overall participation of farm women was observed medium in decision making related to agricultural activities. Then also, they were facing various constraints in participation in decision making related to agricultural activities at different extent. Therefore, farm women were asked to mention the constraints faced by them in participation in decision making related to agricultural activities. They were asked on three-point rating on mostly, some times and never faced the constraints in participation in decision making related to agricultural activities and accordingly scores were given as 2, 1, and 0, respectively.

The data presented in Table 8 revealed that farm women experienced some constraints atmajor level. These constraints were: "male dominated families and society" ranked first with weightage mean score 1.929 followed by "poor educational background" with rank second (WMS 1.864) and "lack of knowledge about farm acconting" with rank third (WMS 1.818).

Farm women faced the constraints on moderate level were i.e. "lack of confidence" with rank fourth and weightage mean score 1.744 followed by "lack of technical know how" (WMS 1.647), " No permission to take decisions due to younger age" (WMS 1.602), "prescribed roles of women in society" (WMS 1.527), and "traditional belief system" (WMS 1.476) with rank fifth, sixth, seventh and eighth, respectively.

The constraints which were less experienced by farm women were: " lack of support and guidance from family members for taking decision" with rank ninth and WMS 1.294 followed by "lack of female extension staff for guidance in agricultural matters"(WMS 1.093),"lack of information about solutions for problems" (WMS 0.735) and "poor purchasing power" (WMS 0.668)with the rank tenth, eleventh and twelfth, respectively.

The constraints which were least experience by farm women were "lack of information about government schemes" with rank thirteenth and weightage mean score 0.586 followed by "lack of more experience of farming" (WMS 0.523), "lower participation in some of agricultural activities" (WMS 0.468) and "distribution of powers to take decisions" (WMS 0.396) with the rank fourteenth, fifteenth and sixteenth, respectively.

CONCLUSION

It can be concluded that majority of respondents belongs to middle age group i.e. 25 to 45 years of age.More than half (51.00 %) of respondents were illiterate. Majory 65.00 per cent of respondents were belong to category of 5 to 6 members. Majority of respondents (65.00 %) expressed average level of satisfaction about working condition.Majority of respondents (76.00%) had low social participation. Majority 71.00 per cent had low extension. Majority 81.00 per cent of respondents were using source of information at medium level.

Out of 16 constraints identified in participation in decision making, the most important constraints faced by farm women were:

1. Male dominated families and society
2. Poor educational background
3. Lack of knowledge about farm accounting
4. Lack of confidence
5. Lack of technical know-how
6. No permission to take decisions due to younger age
7. Prescribed roles of women in society
8. Traditional belief system

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EFFECT OF DIFFERENT TYPES OF LOOSE HOUSING SYSTEM ON MILK YIELD AND COMPOSITION OF CROSSBRED COWS DURING SUMMER SEASON

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ABSTRACT

The study was conducted on twenty lactating crossbred cows (½ Holstein Friestan × ½ Tharparkar) were randomly divided in to 4 groups of 5 animals each and they were reared four housing conditions viz., (T1) loose house, (T2) loose house (LH) + mud plaster roof house, (T3) LH + thatch roof house and (T4) conventional barn. The maximum ambient temperature in T1, T2, T3 and T4 shed was 38.74 ± 0.35, 37.33 ± 0.32, 37.01 ± 0.28 and 38.60 ± 0.47 °C, respectively. The maximum temperature, relative humidity (RH) and THI was significantly low ($P < 0.01$) in T2 and T3 than T1 and T4 houses. The daily intake of DM, DCP, TDN and water intake was significantly influenced ($P < 0.01$) by shelter management. The daily DMI was more ($P < 0.01$) in T2 (12.31 kg) and T3 (12.02 kg) groups as compared to T1 (11.46 kg) and T4 (10.94 kg) groups lactating cows. The daily DCP intake was significantly ($P < 0.01$) higher is T2 (857.27 g) as compared to T3, T4 and T1 groups cows. Similarly, T3 group consumed more DCP as compared to T4 and T1 groups. However, there was no significant difference observed between T3 and T1 groups. The TDN intake was 6.41 ± 0.16, 7.31 ± 0.10, 6.94 ± 0.22 and 5.94 ± 0.15 kg in T1, T2, T3 and T4 respectively. The daily TDN intake was significantly ($P < 0.05$) higher in T2 and T3 groups as compared to T4 and T1 groups cows. While, no significant differences were observed between T4 and T1 groups. The milk yield was significantly ($P < 0.05$) higher in T2 as compared to T1, T3 and T4 groups. The average daily milk yield was 9.84 ± 0.17, 11.64 ± 0.21, 10.37 ± 0.16 and 8.86 ± 0.12 kg in T1, T2, T3 and T4 groups. The milk yield was significantly ($P < 0.05$) higher in T2, than T3 than T1 as compared to T4 groups. Similarly, the 4 percent FCM yield of 9.95 ± 0.40, 12.03 ± 0.26, 10.55 ± 0.21 and 8.83 ± 0.17 kg was observed in T1, T2, T3 and T4, respectively. The FCM yield was significantly ($P < 0.01$) higher in T2 group as compared to T3, T1 and T4 groups. Therefore, it is concluded that the cooling through mud plaster roof house cows in summer season, was beneficial in term of body comfort of the animals as well as increasing the milk yield and feed intake.

INTRODUCTION

Crossbred cows are the first most important dairy species in the world. Crossbred cows are more prone to physical distress when exposed to heat stress as compared to indigenous cows and buffalo because of the poor heat tolerance capacity (Thirumurugan and Saseendran 2008). Heat stress leads to increase rectal temperature and subsequent decrease in feed and energy intake and the average effects on milk production, milk composition and reproduction (Al Saied *et al.*, 2000). Summer heat stress in dairy animals is a major problem faced by the farmer in tropical countries crossbred cows may prefer a particular housing system, which may have covered space, open area, tree shade or any other modifications. In the state of Rajasthan, climate is hot and dry during summers. The average maximum daily temperature during summer is more than 40 °C and average maximum daily relative humidity is 40-50% (Shekhawat and Chaudhary, 2006). It is well documented fact that high ambient temperature during summer season affects the daily dry matter

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intake (DMI) and reduces the milk yield in crossbred cows. So the heat stress can be reduced by physical modification of the environment. Several management practices, such as showers or water sprinklers, cold drinking water, cool hours feeding and roof modification have been used with varying success rates to ameliorate heat stress in lactating animals (Singh and Mehla, 1999). In India not much of attention has been paid so far to this aspect. Different types of animal's houses are constructed without any careful planning and designing. Thomas and Sastry (1991) reported that shelter system not only fulfill its principal functions but also providing to health sustaining and comfortable environmental to animals. However, if lactating animals are fed with sufficient feed and water and comfort housing the effect of dry season on milk production can be minimized. Keeping this in views, the present investigation was carried out to see the effect of mud plaster roof and thatch roof house on daily intake, utilization of nutrients and milk production in lactation crossbred cows during summer season.

RESEARCH METHODOLOGY

The study was undertaken at instructional dairy farm of MPUAT, Udaipur. Udaipur is surrounded geographically by Aravali hills of southern Rajasthan. Udaipur is situated at 24.3°N latitude and 74.3°E longitude at an elevation of 579.5 meters above sea level. This region comes under agro-climatic zone IV-A sub humid south plain and Aravali hills has a typical sub tropical climate characterized by mild winter and summer. Twenty lactating crossbred cows were randomly selected for study. The cows were divided into four groups of 5 animals each on the basis of milk yield (12.10 kg) and body weight (432.10 kg). The cows were randomly allotted to 4 housing conditions/treatments as follows:-

T_1: Control (Loose house): House having covered area with roof of cement and concrete and open area with concrete floor surrounded by 1.5 meter high wall from three sides.

T_2: Mud plaster roof house: The roof as detailed in T_1 was plastered with wheat straw (20%), cow dung (30%) and loam soil (50%) and thoroughly mixed with sufficient amount of water and kept for a day to make it as semi-solid plaster of about 10 cm thickness.

T_3: Thatch roof house: Approximately 20 cm thick layer of maize stover (*Zea mays* L.) was put on the cement concrete roof of loose house (as detailed above in T_1 was used as modification).

T_4: Conventional house: Closed barn with a completely closed structure having windows (75 × 105 cm) for proper ventilation was used.

The maximum, minimum temperature, wet and dry bulb temperature was recorded in each house daily in the morning at 8.00 a.m. and in the afternoon at 2.00 p.m. The temperature and humidity index (THI) was calculated by the method given by McDowell (1972). The data on feed and water intake was taken fortnightly on two consecutive days. 20 kg green maize (*Zea mays* L.) fodder and *ad lib* wheat straw was used as roughage. The concentrate mixture consisted of GNC (27%), wheat bran (30%), barley (15%), de oiled rice polish (25%), mineral mixture (2%) and common salt (1%) and contained 19.65% CP and 70.18% TDN. The concentrate mixture was offered to animals in the morning and evening as per their requirement (Ranjhan, 1998). The lactation studies were conducted for a period of 90 days. Water was offered *ad lib* after each milking. Dry matter intake (DMI), and milk yield for individual animals were recorded daily throughout the experimental period. Fortnightly adjustment in feed supply was done with the change in body weight, average daily milk yield and fat percent of the cows. Average daily DCP and TDN intake of the animals was calculated bared on reported DCP and TDN values (Ranjhan, 1998).

The proximate principles were determined in samples of feeds and residues (AOAC, 1995). The representative samples of milk of individual cows were analysed for fat by Gerger's methods (IS: 1224, 1977) and total solids were determined by gravimetric method as per IS Bulletin (Anonymous, 1972). Solid not fat (SNF) percentage was determined by subtracting fat percent from total

Table 1. Average temperature (°C), relatively humidity (RH%), temperature humidity index (THI) in different houses during summer season

Climatic variables	T_1 (Loose house)	T_2 (LH + Mud plaster)	T_3 (LH + Thatch)	T_4 (Barn house)
Maximum temperatures (°C)				
Morning	$38.03^{a} \pm 0.45$ (34.14 – 39.44)	$36.62^{b} \pm 0.33$ (34.71 – 38.40)	$36.78^{b} \pm 0.26$ (35.25 – 38.67)	$38.22^{a} \pm 0.45$ (34.16 – 40.14)
Evening	$39.46^{a} \pm 0.33$ (34.14 – 44.43)	$38.04^{ab} \pm 0.31$ (34.71 ± 42.29)	$37.24^{b} \pm 0.35$ (32.86 – 39.43)	$38.98^{a} \pm 0.51$ (37.35 – 40.50)
Mean	**$38.74^{a} \pm 0.35$ (36.47 ± 40.59)**	**$37.33^{b} \pm 0.32$ (35.31 – 39.05)**	**$37.01^{b} \pm 0.28$ (35.66 – 38.90)**	**$38.60^{a} \pm 0.47$ (34.58 – 40.92)**
Minimum temperature (°C)				
Morning	$29.57^{a} \pm 0.26$ (27.91 ± 31.20)	$28.14^{ab} \pm 0.40$ (26.40 – 30.45)	$27.17^{b} \pm 0.69$ (20.14 – 27.17)	$29.16^{a} \pm 0.38$ (26.41 – 30.71)
Evening	$31.09^{a} \pm 0.30$ (29.76 – 32.86)	$29.18^{c} \pm 0.25$ (27.71 – 31.40)	$30.15^{b} \pm 0.33$ (28.00 – 32.28)	$31.25^{a} \pm 0.33$ (28.99 – 32.86)
Mean	**$30.33^{a} \pm 0.21$ (29.36 – 31.79)**	**$28.66^{b} \pm 0.28$ (27.11 – 29.65)**	**$28.66^{b} \pm 0.42$ (25.00 – 30.94)**	**$30.21^{a} \pm 0.23$ (29.20 – 31.50)**
Relative humidity (RH%)				
Morning	$53.10^{a} \pm 6.75$ (24.71 – 93.14)	$48.25^{a} \pm 5.60$ (21.29 – 79.86)	$46.83^{a} \pm 5.52$ (21.43 – 77.86)	$42.83^{ab} \pm 4.43$ (21.29 – 66.86)
Evening	$37.24^{a} \pm 4.53$ (20.14 – 64.71)	$31.67^{b} \pm 2.96$ (19.14 ± 52.14)	$30.51^{b} \pm 2.70$ (19.71 – 49.14)	$27.69^{b} \pm 2.44$ (19.29 – 44.14)
Mean	$45.17^{a} \pm 5.54$ (25.43 – 77.93)	$39.96^{b} \pm 4.04$ (21.79 – 66.00)	$38.67^{b} \pm 3.86$ (21.93 – 63.50)	$35.26^{b} \pm 3.09$ (21.07 – 53.21)
Temperature humidity index (THI)				
Morning	$89.27^{a} \pm 0.31$ (86.49 – 90.80)	$87.23^{b} \pm 0.26$ (84.93 – 88.13)	$86.64^{b} \pm 0.44$ (82.46 – 89.03)	$89.12^{a} \pm 0.37$ (87.16 – 90.96)
Evening	$91.39^{a} \pm 0.29$ (89.57 – 93.59)	$89.00^{b} \pm 0.25$ (87.53 – 90.86)	$89.12^{b} \pm 0.28$ (87.23 – 90.64)	$91.17^{a} \pm 0.36$ (88.84 – 93.64)
Mean	$90.33^{a} \pm 0.24$ (89.21 – 92.20)	$88.11^{b} \pm 0.22$ (86.23 – 89.45)	$87.88^{b} \pm 0.26$ (86.37 – 89.77)	$90.14^{a} \pm 0.29$ (88.00 – 91.50)

Mean having a, b, c superscripts differ significantly ($P<0.05$) and ($P<0.01$). Figures in parenthesis are range of weekly mean of climatic variables.

Figures in parenthesis are range of weekly mean of climatic variables

solids percent. Four percent fat corrected milk (4% FCM) was calculated by the equation of Gaines (1928).

$$FCM\ (kg) = 0.4M + 15\ F$$

Where,

M = Milk yield in kg

F = Weight of fat contained in milk

Solid corrected milk (SCM) yield was determined by the method of Tyrell and Reid (1965). Using the following equation:

Table 2. Proximate composition (% DM basis) of concentrate mixtures and fodders offered to lactating crossbred cows in summer season

Attributes	Green maize	Wheat straw	Concentrate mixture
DM	24.60	91.00	91.20
OM	90.33	90.60	87.44
CP	6.52	3.30	19.65
CF	36.10	36.44	10.12
EE	2.00	1.55	8.12
NFE	45.71	49.31	49.55
TA	9.67	9.40	12.56

Table 3. Average daily milk yield and composition

Attributes	Treatments				
	T_1	T_2	T_3	T_4	CD at 5%
Milk yield (kg)	$9.84^{c} \pm 0.17$	$11.64^{a} \pm 0.21$	$10.37^{b} \pm 0.16$	$8.86^{d} \pm 0.12$	0.48
FCM yield (kg)	$9.95^{b} \pm 0.40$	$12.03^{a} \pm 0.26$	$10.55^{b} \pm 0.21$	$8.83^{c} \pm 0.17$	0.81
SCM yield (kg)	$10.27^{c} \pm 0.31$	$12.63^{a} \pm 0.25$	$11.08^{b} \pm 0.22$	$9.27^{d} \pm 0.16$	0.70
Fat %	4.06 ± 0.11	4.22 ± 0.04	4.12 ± 0.04	3.98 ± 0.07	NS
SNF %	9.43 ± 0.11	9.77 ± 0.13	9.72 ± 0.06	9.64 ± 0.07	NS
TS %	$13.49^{b} \pm 0.02$	$13.99^{a} \pm 0.11$	$13.84^{a} \pm 0.05$	$13.62^{b} \pm 0.07$	0.21

Table 4. Average intake of DM, CP and TDN per kg 4% FCM produced by lactating crossbred cows summer season

Attributes	Treatments				
	T_1	T_2	T_3	T_4	CD at 5%
DM (kg)	$1.15^{b} \pm 0.03$	$1.02^{c} \pm 0.01$	$1.14^{b} \pm 0.01$	$1.24^{a} \pm 0.02$	0.062
CP (g)	$113.89^{b} \pm 3.34$	$99.00^{c} \pm 2.83$	$111.58^{b} \pm 3.02$	$129.69^{a} \pm 3.27$	9.36
TDN (kg)	0.64 ± 0.02	0.61 ± 0.01	0.66 ± 0.02	0.67 ± 0.02	NS

NS = Non-significant; Values in a particular row bearing different superscripts differed significantly ($P<0.01$) among themselves

Table 5. Average daily nutrient intake (kg) and water intake

Attributes	Treatments				
	T_1	T_2	T_3	T_4	CD at 5%
Dry matter intake (DMI)	$11.46^{b} \pm 0.73$	$12.31^{a} \pm 0.73$	$12.02^{a} \pm 0.18$	$10.94^{b} \pm 0.41$	0.75
DMI/100 kg/B. wt. (kg)	$2.59^{b} \pm 0.13$	$2.76^{a} \pm 0.08$	$2.70^{a} \pm 0.14$	$2.48^{b} \pm 0.14$	0.17
DMI/kg $W^{0.75}$ (g)	118.98 ± 7.53	126.87 ± 7.30	124.19 ± 5.79	113.69 ± 9.80	NS
Digestible crude protein intake (DCPI)					
DCPI per day (g)	$717.15^{c} \pm 20.46$	$857.27^{a} \pm 10.56$	$793.19^{b} \pm 5.32$	$721.58^{c} \pm 12.61$	40.14
DCPI per 100 kg B.Wt. (g)	$164.40^{b} \pm 5.07$	$188.42^{a} \pm 2.92$	$178.87^{a} \pm 3.72$	$163.65^{b} \pm 2.82$	11.22
DCPI per kg $W^{0.75}$ (g)	$7.50^{b} \pm 0.28$	$8.67^{a} \pm 0.07$	$8.21^{a} \pm 0.13$	$7.51^{b} \pm 0.13$	0.52
Total digestibility nutrient intake					
TDNI per day (kg)	$6.41^{b} \pm 0.16$	$7.31^{a} \pm 0.10$	$6.94^{a} \pm 0.22$	$5.94^{b} \pm 0.15$	0.501
TDNI per 100 kg/ B. wt. (kg)	$1.45^{b} \pm 0.02$	$1.64^{a} \pm 0.04$	$1.56^{a} \pm 0.4$	$1.35^{c} \pm 0.03$	0.10
TDNI/ $W^{0.75}$ (g)	$66.70^{b} \pm 1.65$	$75.34^{a} \pm 0.78$	$71.75^{a} \pm 0.83$	$61.77^{c} \pm 2.19$	4.46
Water intake					
Voluntary water intake (L.)	$44.30^{a} \pm 1.32$	$40.30^{b} \pm 0.77$	$40.20^{b} \pm 0.62$	$38.60^{b} \pm 0.93$	2.84
WI through feeds and fodders (L.)	15.60 ± 0.08	15.80 ± 0.02	15.78 ± 0.01	15.68 ± 0.07	NS
Total WI (L.)	$59.99^{a} \pm 1.32$	$56.10^{b} \pm 0.76$	$55.97^{b} \pm 0.63$	$54.27^{b} \pm 0.93$	2.84
Voluntary WI/kg DMI (L.)	$3.88^{a} \pm 0.14$	$3.29^{b} \pm 0.08$	$3.34^{b} \pm 0.04$	$3.81^{a} \pm 0.17$	0.36
Total WI/kg DMI (L.)	$5.25^{a} \pm 0.17$	$4.57^{b} \pm 0.09$	$4.66^{b} \pm 0.04$	$4.89^{ab} \pm 0.14$	0.36
Voluntary WI/kg milk yield (L.)	4.08 ± 0.26	3.19 ± 0.29	4.29 ± 0.30	4.35 ± 0.34	NS
Total WI/kg mild yield (L.)	5.65 ± 0.47	4.44 ± 0.36	5.97 ± 0.39	6.12 ± 0.52	NS

abc: Values in a particular row in different superscripts differed significantly ($P<0.05$) among treatments

SCM (kg) = 12.3F + 6.56 SNF – 0.0752 M

Where, 'F', 'SNF' and 'M' were expressed on kg of fat, kg of SNF and kg of milk, respectively.

The data were analyzed statistically as per the procedure of Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

Micro-climate in different experimental houses

The mean values of meteorological data recorded under different housing conditions are presented ($P < 0.05$) in T_1 and T_4 as compared to T_2 and T_3

treatments. There was no significant difference in maximum temperature both in the morning and evening between T_1 and T_4 at one hand and T_2 and T_3 on other. Similarly, the minimum temperature was also low ($P < 0.01$) in mud plaster roof and thatch roof houses, both in the morning and evening than loose and barn houses. However, the THI values were also lower ($P < 0.01$) in mud plaster house than loose and barn house. The THI values were lower in the morning than evening irrespective of treatments. The THI is commonly used method to know the degree of heat stress in animals (Fuquay, 1981). The higher THI in loose and barn houses indicated that animals in these houses were relatively under thermal stress as low maximum temperature and low THI in mud plaster roof house and thatch house created better micro environment because mud and thatch houses did not allow the solar radiation to penetrate in side the shed (Jat *et al.*, 2005).

Nutrient Intake

The chemical composition of green maize, wheat straw and concentrate mixture fed to lactating crossbred cows during the experimental period is presented in Table 2. The chemical composition of green maize, wheat straw was in agreement with the reported values (Ranjhan, 1998). The average daily DM intake was significantly ($P < 0.01$) higher in T_2 and T_3 groups as compared to T_1 and T_4 groups. The lactating cows reared under mud plaster roof intake (12.31 kg DMI) and thatch roof (12.02 kg DMI) consumed more dry matter per day than those reared in loose house (11.46 kg DMI) and conventional barn (10.94 kg DMI) house. Similar trend was also observed in DMI/100 kg. B. Wt. The higher daily DMI in mud plaster and thatch roof group animals might be due to better physical environment as evident from low maximum temperature and low temperature humidity index (Table 1). Results are in agreement with the finding of Jat *et al.* (2005) and Yazdani and Gupta (2000) in cattle and buffaloes, reared under mud plaster and thatch roof houses have been reported during summer.

Milk yield and composition

The average weekly milk yield and milk composition are given in Table 3. The average daily milk yield was 9.84 ± 0.17, 11.64 ± 0.21, 10.37 ± 0.16 and 8.86 ± 0.12 kg in T_1, T_2, T_3 and T_4 groups, respectively. The average daily milk yield was significantly ($P < 0.01$) influenced by various housing systems. These results are in close agreement with the findings of Sharma and Singh (2003) who observed highest milk yield in modified housing as compare to control group. The significant observations were might be due to climatic stress and quantity of available feeds and fodders in the diets. Similar results are also observed by Jadhav (1979) in crossbred cows and buffaloes.

The 4 per cent FCM yield of 9.95 ± 0.40, 12.03 ± 0.26, 10.55 ± 0.21 and 8.83 ± 0.17 kg was observed in T_1, T_2, T_3 and T_4 groups, respectively. The FCM yield was significantly ($P < 0.01$) higher in T_2 group as compared to T_3, T_1 and T_4 groups (Table 3), respectively. Similarly, T_3 and T_1 groups produced FCM yield significantly ($P < 0.01$) more as compared to T_4 group. However, there was no significant difference in the daily FCM yield between T_3 and T_1 groups.

The SCM yield was 10.27 ± 0.31, 12.63 ± 0.25, 11.08 ± 0.22 and 9.27 ± 0.16 kg in T_1, T_2, T_3 and T_4 groups, respectively. The SCM yield was significantly ($P < 0.01$) influenced by various treatments. These results are in close agreement with Armstrong *et al.* (1986) and Singh *et al.* (2003) they reported that milk yield of cow could be maintained by providing the proper shelter. Similarly, Sharma and Singh (2003) also reported that the crossbred cows produce FCM yield more in central shaded loose house as compared to loose house and closed house. A positive and significant correlation between milk yield and ambient temperature observed in present study agreed with the findings of Shekhawat and Chaudhary (2006) on crossbred cows. The trend of association of milk yield and ambient temperature observed in present study might be due to simultaneous reduction in ambient temperature and milk yield from the

beginning to the end of experiment.

Milk composition

The mean fat percentage in milk was 4.06, 4.22, 4.12 and 3.98 in T_1, T_2, T_3 and T_4 groups, respectively (Table 3). The trend in fat content was not affected by treatments. These results are in agreement with the findings to Armstrong *et al.* (1986), Mihina *et al.* (1988), Muller and Both (1995) also did not find any significant effect of shelter on milk composition. While Puhac *et al.* (1969), Levein (1995) and Jagoda *et al.* (2015) found higher milk fat percentage in loose house cows and buffalo as compared to other houses. The mean percent solid not fat (SNF) in milk was 9.30, 9.77, 9.72 and 9.64 in T_1, T_2, T_3 and T_4 groups, respectively. These results are in close agreement with the finding of Armstrong *et al.* (1986), Muller and Both (1995) and Jagoda *et al.* (2015) who also did not observed any significant ($P < 0.05$) different in SNF content of milk among the treatments.

Feed conversion efficiency (FCE)

The average DMI and CPI per kg 4 per cent FCM yield were significantly ($P < 0.01$) influenced by various housing systems. The relatively less feed intake in T_2 animals was observed in mud plaster roof housing. The same trends were also observed in respect of CP intake per kg 4 per cent FCM yield. Thiagrajan and Thomas (1991) have observed significant effects of shelter on feed conversion efficiency present results are with in the range reported by above workers. The relatively intake of TDN per kg 4 percent FCM yield was non significant affected by shelter system TDN intake might be due to the fact that cows were able to with stand stress without affecting feed efficiency. Osterggard *et al.* (1989) also reported non-significant effect of shelter on feed conversion efficiency. The milk production efficiency and feed conversion efficiency mostly depends upon the ability of animals to consent the nutrients into end product.

CONCLUSION

It showed that mud plaster house reduced the heat stress due to comfort environment in mud house and favors to increase milk yield and significantly increased fat percentage and increased dry matter intake in crossbred cows during summer season. Thus results suggested that during the summer season, provision of mud plaster house and thatch house may be practiced to reduced heat stress, increase feed intake and favours to increased milk yield and fat percentage in crossbred cows. Therefore, it is concluded that the cooling through mud plaster or thatch house on crossbred cows in summer season was beneficial in term of body comport of the animals as well as increasing the milk fat percent, milk yield and increase feed intake.

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STANDARDIZED SCALE TO MEASURE ATTITUDE OF BENEFICIARY FARMERS TOWARDS RKVY

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ABSTRACT

Due to the non-availability of a proper scale for measuring the attitude of beneficiary farmers towards RKVY in Udaipur district of Rajasthan. It was thought necessary to construct a attitude scale for measuring the attitude of beneficiary farmers towards RKVY. Keeping this in view, an attempt has been made to develop a scale for measuring the attitude of beneficiary farmers towards RKVY. Method of summated rating technique was used for construction of attitude scale for beneficiary farmers towards RKVY. Finally twenty six statements were selected from thirty eight statements for which "t" values were worked out.

INTRODUCTION

The National Development Council (NDC), in its meeting held on 29th May, 2007 resolved that a special Additional Central Assistance Scheme (RKVY) be launched. The NDC resolved that agricultural development strategies must be reoriented to meet the needs of farmers and called upon the Central and State governments to evolve a strategy to rejuvenate agriculture. The NDC reaffirmed its commitment to achieve 4 per cent annual growth in the agricultural sector during the 11th five year plan. The Resolution with respect to the Additional Central Assistance scheme reads as below:

Introduce a new Additional Central Assistance scheme to incentivize States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating livestock, poultry and fisheries more fully. This will involve a new scheme for Additional Central Assistance to State Plans, administered by the Union Ministry of Agriculture over and above its existing Centrally Sponsored schemes, to supplement the State-specific strategies including special schemes for beneficiaries of land reforms. The newly created National Rainfed Area Authority will on request assist States in planning for rainfed areas.

The Department of Agriculture, in compliance of the above resolution and in consultation with the Planning Commission, has prepared the guidelines for the RKVY scheme, i. e. to be known as **National Agriculture Development Programme** (RKVY).

The scheme seeks to provide the States and Territories of India with the autonomy to draw up plans for increased public investment in agriculture by incorporating information on local requirements, geographical/climatic conditions, available natural resources/ technology and cropping patterns in their districts so as to significantly increase the productivity of agriculture and its allied sectors and eventually maximize the returns of farmers in agriculture and its allied sectors. Looking to the importance and even after implementation of this scheme, it is high time to measure the attitude of beneficiary farmers about RKVY. Therefore, an attitude scale is constructed to measure the attitude of beneficiary farmers.

RESEARCH METODOLOGY

Attitude in the present study is defined as "the degree of positive or negative feelings, opinion, belief and action associated with the RKVY programme for wheat and maize production technologies, where people can differ in varying degrees."

There are several techniques available for

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constructing attitude scale but all of them are not equally useful for the present study. While looking into the need of present study and effectiveness of the available techniques of constructing scales Likert's summated rating scale was considered most appropriate, as it requires less number of items and no judges to start with. It is as relatively less time consuming as compared to other techniques. The steps followed for scale construction are as follows:

(a) Collection of items

The first step in the construction of attitude scale was to obtain statements reflecting the views about the beneficiary farmers of RKVY. Hence, the statements were collected based on review of literature, books, journals, discussions with experts as well as office bearers related with the RKVY programme and field functionaries.

(b) Editing of items:

The statements were carefully edited following the criteria given by Likert (1932) and Edwards (1957). The statements which were ambiguous, irrelevant and not conforming to the suggested criteria were deleted. At this stage, the number of statements got reduced to 34. Again the statements were rewritten in the light of comments of experts. After editing, the total number of statements left were 34, it was ensured that equal number of positive and negative statements were selected.

(c) Selection of items:

The statements were found in such a way that they expressed the positive or negative and neutral attitude. In order to get a five point continuum, five alternative response categories ranging from strongly agree to strongly disagree were assigned to each statement. After editing, the total number of 34 statements was retained, it was ensured to select equal number of positive and negative statements.

(d) Item Analysis

For item analysis, the items were first administered to a proportionate random sample of 32 farmers of the study area. These were those who were not included into targeted respondents. The responses from them were elicited on a five point continuum, *viz.* strongly agree (A), agree (A), undecided (US), disagree (DA) and strongly disagree (SDA), If the item was positive (Favorable to the subject under study), SA, A, UD, DA and SDA were given the numerical values of 5, 4, 3, 2 and 1 respectively. Reverse scores were assigned for negative statements. The score for each individual on the scale was computed by summating the weights of individual's item response.

Considering the total score earned by the each respondent, they were arranged in descending order. Then, 25 per cent of the subject with the highest total score and also 25 per cent of the subjects with the lowest total score were selected. These two groups provided the criterion groups as "high" and "low" groups to evaluate the individual item. The critical ratio (t- value) for each item was worked out by the formula given by Edwards (1957).

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum\left(X_H - \bar{X}_H\right)^2 + \sum\left(X_L - \bar{X}_L\right)^2}{n(n-1)}}}$$

Where :

$$\Sigma(X_H - X_H)^2 = X_H^2 - \frac{\left(\Sigma X_H\right)^2}{n}$$

and

$$\Sigma(X_L - X_L)^2 = \Sigma X_L^2 - \frac{\left(\Sigma X_L\right)^2}{n}$$

where,

ΣX_H^2 = Sum of the squares of the individual scores in the high groups.

ΣX_L^2 = Sum of the squares of the individual scores in low groups.

$\bar{X}_H$ = The mean score on a given statement for the high group.

$\bar{X}_L$ = The mean score on a given statement

for the low group.

n = Number of subjects (respondents) in each group.

The 't' value is a measure of the extent to which a given item differentiates between the high group from the low group.

(d) Final selection:

The items having 't' value greater than 1.75 were selected for inclusion in the final format of the scale. Through this procedure, 26 items retained and included in final format of attitude scale.

(e) Reliability of test:

According to Kerlinger (1973) " Reliability is the accuracy and precision of measurement." The format of the scale consisting 26 items was split into two equal halves on the basis of odd & even numbers of items and was administered to 32 farmers of RKVY programme. Thus, two sets of scores were obtained and then scores were correlated with each other. The correlation coefficient for two sets of scores was 0.86. Thus, it inferred that product moment correlation coefficient produces reliability coefficient of half the test. This coefficient underestimates the reliability of the full

Table 1. Statements selected for attitude scale

S.No.	Statement	"t" value
1.	I can go for any agricultural operations with the help of RKVY (+)	2.58
2.	My economic condition does not improve due to RKVY (-)	4.09
3.	Only big farmers are getting benefits from RKVY (+)	2.34
4.	Many farmers have not availed RKVY benefits due to lack of proper publicity (-)	6.77
5.	Benefit under RKVY are reaching the concerned target group (+)	2.96
6.	RKVY helps to improve economic condition of the rural people. (+)	3.73
7.	RKVY is nothing but the source of livelihood of farmers (-)	3.55
8.	Sufficient seed minikits are not provided to the farmers under RKVY (-)	9.84
9.	There is a little of work one and more of its propaganda made in the RKVY (-)	3.55
10.	RKVY personnel properly and timely visit the farmers field (+)	2.69
11.	There is active participation of AAOs/extension workers in conducting demonstrations (+)	4.56
12.	Extension workers are not aware of the methodology of conducting demonstration (-)	2.26
13.	Good number of demonstrations and farm trials under RKVY has helped to established local proof of the new technology (+)	4.34
14.	RKVY has nothing new to offer for better extension work (-)	2.43
15.	RKVY is an innovative scheme (+)	5.75
16.	Adoption of recommended new technology is not possible for the poor farmers (-)	3.43
17.	Adoption of new agricultural technology of cereal crops provided under RKVY being simple, any farmer can practice it without much difficulty (+)	1.79
18.	RKVY Provide economically viable technology (+)	2.22
19.	The technology are not viable to the poor farmers (-)	3.77
20.	Agricultural implements provided under RKVY are useful (+)	7.35
21.	The crop production reduced due to the project activities (-)	2.07
22.	RKVY provides services and advice to the farmers (+)	4.90
23.	RKVY is less helpful to increase the agricultural production of farmers (-)	3.30
24.	There is no change in farming due to RKVY (-)	5.00
25.	Productivity of cereal crops variety provided under RKVY is high as compared to traditional variety (+)	3.35
26.	The fertilizer and chemical for plant protection not provided timely under RKVY (-)	2.50

length scale which provides a larger sample of the content domain and also tends to produce a wider range of scores, both of which have the effect of raising the reliability estimate. Hence, the above coefficient needs to be corrected to give the stepped- up reliability of the whole measure or to give the reliability of the full length test. The correction factor used for full length reliability coefficient according to Spearman – Brown prophecy formula is as under;

Spearman-Brown prophecy formula:

$$r_{tt} = \frac{2r^{1/2 1/1}}{1 + r^{1/2 1/1}}$$

Where,

r_{tt} = The reliability coefficient of the whole test.

$r\ 1/2\ 1/11$ = The reliability coefficient of the half test.

The equation may also be written as follows:

Reliability of the whole test =

$$\frac{2 \times \text{reliability of the half test}}{1 + \text{reliability of the half test}}$$

The value of r_{tt} came to be 0.92 indicating reliability of the scale.

(F) Validity of the scale:

To test the validity of the scale, content and paired 't' test for validity of the tool were examined. The process used was same as in validity of involvement test. The result of paired 't' test, which was greater than critical value at the 0.05 level of significance ('t'-value 2.52). Thus, test was found to be significant at 0.05 level of significance and used in the study as valid tool.

(g) Administration

The attitude scale was incorporated in the final format of the interview schedule for administration to the sampled respondents' of RKVY. The scale consisted of 26 items, out of which 13 were positive and 13 were negative. The scale for administration was provided with five response categories viz. "strongly agree" "agree" "undecided", "disagree" and 'strongly disagree". with scores 5, 4, 3, 2 and 1 for positive statements and reverse for the negative statements. The statements selected for attitude scale are given in Table 1.

CONCLUSION

It can be concluded that total 26 statements were finally selected through "t" value, which was significant. It was assumed that developed scale was reliable and valid for measuring the attitude of beneficiary farmers towards RKVY and hence, it was administered for its final use.

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ASSESSMENT OF PRATAPDHAN POULTRY STRAIN UNDER BACKYARD FARMING SYSTEM IN BHILWARA DISTRICT OF RAJASTHAN

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ABSTRACT

Backyard poultry plays an important role in livelihoods of Indian farmers. Research and Development efforts on developing improved strains to enhance productivity have doubled farmers income. Scaling up of improved strains is based on adaptive trials conducted by extension agencies for location specificity and feasibility. The present study carried out on the performance of newly released Pratapdhan poultry in the backyard production system through an on farm trial by Krishi Vigyan Kendra-Bhilwara. Pratapdhan birds have characteristic features like multicolour, low early chick and laying mortality, excellent flock uniformity, early sexual maturity, withstanding predators, laying brown colour eggs etc. The participatory trial was organised at 30 farmer's fields administering participatory approach by providing 600 chicks to the farmers. The biggest gain of Pratapdhan poultry in the trial was the body weight, which was recorded to be 3800 gm in male and 2500 gm in female birds at the end of 12 months study period compared to the 1800 gm and 1450 gm, respectively with the local strains. Pratapdhan chicks exhibited superiority in their liveability with a mortality rate of 15% during the critical period of the first 10 weeks of their life compared to the most popular backyard improved strain Nirbheek in which it is up to 22% in the backyard system. Majority of the farmers perceived that this strain can withstand predation which scores better than the other improved strains. The study concluded that Pratapdhan is suitable for backyard farming system and is highly profitable. Attempts were taken in 2016 to link the results of the strain assessment to the mainstream extension at the district for larger adoption by rural communities.

INTRODUCTION

Today in India poultry is one of the fastest growing sectors that support protein requirements for millions. Trends in the poultry sector provide a striking example of how sector growth does not necessarily go hand in hand with poverty reduction (Samanta et al., 2015; Patra and Singh, 2016). Family poultry which is based almost entirely on native birds, has been by-passed by the poultry revolution, all the growth virtually occurring in the large-scale. By contrast, traditional poultry keeping appears to be a stagnant low-productive subsector. Livestock and poultry rearing is an imperative factor for improving the nutritional security of the rural poor in India. Rural farmers usually rear desi type chicken having low egg and meat production potential. Most of the backyard poultry production comprises of rearing indigenous birds with poor production performances (Pathak and Nath, 2013; Chakravarthi et al., 2014; Reetha et al., 2016; Patra and Singh, 2016). However, over the period of time improved strains have been introduced by extension and development agencies. It is a choice dual purpose coloured bird and has significantly contributed to the overall economy of the rural people in terms of eggs and meat (Bhattacharya et al., 2005). The potentiality of indigenous birds in terms of egg production is only 50 to 60 eggs/ bird/ year and meat production is also very low (Patra and Singh, 2016). However, the backyard poultry production can be enhanced by adopting improved strains of chicken that can promise better production of meat and egg.

The KVK, Bhilwara has been working on its mandatory activities like On-Farm Trials (OFT), Cluster Front Line Demonstrations (CFLD) and

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vocational trainings for the animal growers on the latest technologies and improved practices (Ananth et al., 2016) . The KVK has successfully assessed and demonstrated backyard poultry strains viz., Desi, Nirbheek, BNR, BN. RNR, Pratapdhan. In addition to that KVK also works on feed management in dairy, mineral supplementation, popularisation of azolla farming and many other technologies relevant to dairy, sheep, goat and poultry farming (Ananth et al., 2016). In 2015 and 2016, KVK identified a new poultry strain Pratapdhan from AICRPP on Poultry Breeding, Department of Animal Production, RCA,MPUAT, Udaipur. The colour pattern of this bird is multicolour with single comb and yellow colour shank and skin. These birds have characteristic features like low early chick and laying mortality, excellent flock uniformity, early sexual maturity, withstanding predators, laying brown colour eggs etc. The above characteristics might have been reported from the studies under the intensive (confined) poultry production system. However, by understanding the potentiality of the strain KVK conducted an OFT in 2015 and 2016 to assess its suitability and performance in the backyard farming system to feed into the mainstream extension.The study was conducted in 2015 and 2016 with the financial assistance from ICAR, New Delhi, India.

RESEARCH METHODOLOGY

The present OFT was conducted in Mandel block of Bhilwara district Rajasthan involving 30 farmers from one village. The sample size of the study was 20 chicks/unit comprising of 600 chicks for the study. The creation system for this study was normally due to low egg production from native birds and other improved strains and most importantly due to high predation in the backyard system. Hence, look out for a new strain was a demand from farmer's perspective. The sanity of animals was taken care and there were no issues pertaining to the community within which it was promoted. The farmers under the study were randomly selected and were approved by KVK-Bhilwara for conducting the study. In the whole process of the study a Animal scientist of KVK-Bhilwara was responsible to undertake the study from designing and to implement. Farmers who are progressive and innovators, possessing land and traditional poultry units were selected to try out the strain. The trial was conducted with farmer's rearing practice of traditional strains (T1) and recommended practice of improved strain Pratapdhan (T2). Six weeks old chicks were supplied to the farmers free of cost along with initial chick feed, vitamins and vaccines. A pre tested interview schedule was used to collect data on mortality rate, age at sexual maturity, vaccination schedule, disease incidence, body weight, eggs laid and income. Simple percentage analysis was employed to analyse the data pertaining to egg production and body weight gain.

RESULTS AND DISCUSSION

The need for an on farm trial was well conceived by KVK as poultry growers in the district used to get less egg production and low economic returns from local strains and high mortality in native strain and the popularised improved Pratapdhan strain. The new strain Pratapdhan was trialled out in 30 units at farmer's field (T2) compared with the local strain (T1). Each unit comprised of 20 chicks assuming 4 male and 16 female, totalling to 600 chicks. The six week old chicks were procured from AICRPP on Poultry Breeding, Department of Animal Production, RCA,MPUAT, Udaipur and distributed to the selected farmers who are in the practice of rearing local poultry in their backyard. Among the participating farmers, those having recently hatched chicks of local strain were formed into control (T1) groups comprising of 20 chicks/ unit for the comparison. Before the trial was initiated, the livelihood status of participant farmers were collected which formed the basis of selection and they were trained on various aspects of care and management of chicks in early life, required medication, feed supplementation, vaccination etc. In addition to that the participatory approach of the trial was also elucidated towards successful accomplishment. Upon implementation of the trial the KVK scientists regularly visited the units in intervals, recorded the observations on each parameter, provided further guidance and

demonstrated vaccination technique etc. to them for further use. The trial continued for a period of 12 months and appreciably farmers accepted the vaccination and adopted the practice. The results of the trial are presented in Table 2. The biggest gain of Pratapdhan poultry in the trial was the body weight, which was recorded to be 2575 gm in male and 2150 gm in female birds at the end of the 12 months study period compared to the 1850 gm and 1300 gm respectively in the local strains. Studies from many states of India indicates that the improved strains had significantly higher achievement than the local chicken in terms of body weight, egg weight, egg production and age at sexual maturity (Vetrivel and Chandrakumarmangalam**,** 2013**;** Mohanty and Nayak, 2011; Yadhav and Khan, 2011; Padhi, 2016). Pratapdhan chicks exhibited superiority in their liveability in the backyard system with a mortality rate of 16 per cent during the critical period of first 10 weeks of their life compared to the most popular backyard improved.The other principal gain was with egg production which was 160 eggs/ bird/ year in case of Pratapdhan compared to the 45 eggs of local strains. The trial concluded that Pratapdhan was found to be the best strain to be popularised in the district in comparison to the analyses of different trials conducted over the years by the KVK as reflected in table 3. The mortality up to 10 weeks was found to be 16 per cent in Pratapdhan compared to 8 per cent of local strain which exhibits superiority of Pratapdhan over local strain. Similarly Pratapdhan birds attained sexual maturity (age at 1st lay) at an average age of 175 days compared to 192 days of local strains respectively. Although the achievement in body weight gain was little less in Pratapdhan, average being 3000 g compared to the average 1600 g of local brids, still it scores much better in terms of egg and meat production, income generation and farmers preference. Moreover, this dual purpose bird proves to be viable with its superior egg laying capacity (160 eggs/bird/year) compared to 45eggs of local strains. The comparative analysis infers that Pratapdhan is a suitable strain and can be promoted in large scale in the backyard poultry farming system.

Farmer's preference and feedback on the strain

About 86.6 per cent of farmers perceived that Pratapdhan experienced low incidence of diseases compared to the local strains and this may be due to the reason that farmers seldom vaccinate their local strains against some infectious diseases which account for high mortality rate during disease outbreaks. However, it is a fact that the indigenous birds although low in productivity, they are better resistant to diseases, adaptable to adverse climatic conditions and able to produce even under low input systems (Roy, 2006). About 80.0 per cent of the farmers perceived that Pratapdhan has low mortality rate which reflects its superiority over other

Table 1. Characteristic features of Pratapdhan poultry

S.No.	Characteristics	Values
1.	Day old Body weight	35g
2.	Body weight at 8 weeks of age	681-718 g
3.	Body weight at 20 weeks of age in male	2309 g
4.	Body weight at 20 weeks of age in female	1734 g
5.	Age at sexual maturity	170d
6.	Annual egg production	161
7.	Egg weight	50g
8.	Feed consumed/bird/day	110g
9.	Liveability	92%

Table 2. Results of the trial on Pratapdhan in backyard poultry system

S.No.	Parameters	Results	
		Farmers Practices (T1)	Recommended Practices (T2)
1	Chicks/Unit (No.)	20	20
2	Male-Female Ratio	4:16	4:16
3	Liveability (%)	91	85
4	Body weight (M/F) at sexual maturity (g)	925/750	2250/1800
5	Body weight (M/F) in 12 months (g)	1850/1300	2575/2150
6	Age at sexual maturity (days)	192	175
7	Monthly egg production/bird (nos.)	5	13
8	Annual egg production/unit	45	160
9	Colour of Egg	Brown	Brown

Table 3. Comparative performance of Pratapdhan and local poultry strains under backyard farming system

Parameters	Performance of strains	
	Pratapdhan	Local strain
Mortality up to 10 weeks (%)	16	8
Mortality up to 20 weeks (%)	18	10
Annual Mortality Rate (%)	17	10
Predation losses (%)	6.5	3.5
Loss due to diseases (%)	2.5	5
Loss due to cold temperature (%)	10	-
Average age at first lay (days)	175	192
Average body weight at sexual maturity (20-24 weeks) in (g)	2000	850
Average annual body weight (g)	3000	1600
Average annual egg production (numbers)	160	45
Colour of egg	Brown	Brown
Average Egg weight at 40th weeks (g)	54	48-50

Table 4. Poultry farmer's Perception on the Strain Pratapdhan

(n=30)

S.No.	Perception	f	%
1.	Low chick mortality	24	80.0
2.	Low incidence of diseases	26	86.6
3.	Strain is capable to withstand predation	28	93.3
4.	Suitable for backyard	30	100
5.	High gain with eggs	30	100
6.	High gain in body weight	30	100

improved strains. Majority of the farmers perceived that Pratapdhan is a suitable strain and will be a suitable candidate for the backyard farming system. The reason for this perception may due to its high potential for egg production, fast growth rate and other characteristic features which were visible in the trial and hence there was a high response. About 93.3 per cent of the farmers perceived that Pratapdhan is capable to withstand predators. In the backyard system predation is one of the frequently occurring incidences which incur huge loss to the farmers. The reason may be that the farmers who had reared other improved strains before this trial would have experienced high predation rate and heavy loss. However, local poultry birds have the capability of saving themselves from predators. Predators accounted for up to 88 per cent of mortality and that coloured birds had a higher survival rate than white birds (Wickramenratne et al., 1994).

CONCLUSION

Overall results of this on farm trial confirm that the poultry strain Pratapdhan has a united advantage over the other strains in terms of production and escaping predation. The result highlighting the striking factor on this strain is its capability to withstand predators. This will fetch a better score for it than the other strains for further uptake as predation is the major cause of loss in backyard poultry system. On the other hand the pratapdhan rearing under backyard show a positive trend that will be beneficial for the farmers compared to the native strains. Hence, extension efforts needs to be intensified towards promoting this strain for larger adoption with large scale demonstrations and other extension methods. KVK has planned to work on this strain for a few years more to make farmers aware of this strain and also to promote through the state schemes. Hence, it could be concluded that pratapdhan is a superior strain and can be promoted in backyards of rural Rajasthan and in other parts of India. It may be conluded that Pratapdhan provides better income to the rural poultry keepers and helps in augmenting the production of nutritious food products from rural poultry sector.

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GROWTH AND INSTABILITY OF CLUSTER BEAN IN UDAIPUR DISTRICT OF RAJASTHAN

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ABSTRACT

Cluster bean is a drought tolerant deep rooted summer annual legume of high social and economic significance. Looking at the agricultural and industrial importance of this marginalized crop in Rajasthan, particularly realizing the potential in southern parts of the state, the present study attempted to analyse the present scenario of the area, production, productivity & instability analysis of cluster bean crop in Udaipur district of the state. The area, production and productivity of cluster bean in Udaipur registered positive growth rates of 19.48, 25.97 per cent per annum, respectively. Production under cluster bean crop was significantly increased in Udaipur district as well as state as a whole during study period. The coefficient of variation for area, production and productivity in Udaipur were 62.32, 87.58 & 55.46 per cent respectively. The value of CV was high for production and yield, indicating high instability. The instability in area was more in Udaipur district compared to the state as a whole. The coefficient of variation for the area is low at state level comparatively to Udaipur district.

INTRODUCTION

Cluster bean (*Cyamposis tetragonoloba* L.) is a native to the Indian subcontinent. India has the distinction of being largest cluster bean producing country of the world. Cluster bean gum has emerged as India's top export commodity overtaking traditional heavyweights rice and cotton and looks set to power into the league of top 10 shipments from the country, due to increasing demand from the US oil and gas industry. The increased demand has resulted in a strong escalation of the prices of guar beans and its products during recent past. There has been a rapid growth in area, production and value over a decade from the year 2002 to 2012. The instability in area, production and productivity causes the excessive demand and supply gap in the economy which leads to unstable income to the farmers. Cluster bean is a very important crop for the economy of Rajasthan, suitably cultivated in the dry climate and economically feasible proposition for the farmers. In present study, an attempt has been made to analyse the present scenario of the production of cluster bean crop in Udaipur district of the state and changes in area, production and productivity, trend & growth pattern and magnitude of instability over time.

RESEARCH METHODOLOGY

The primary data were collected for the year 2013-14. Udaipur district was purposively selected for the present study. Salumbar tehsil in Udaipur was selected on the basis of highest acreage under the cluster bean cultivation among all tehsils of Udaipur district. Two villages i.e. *Jhallara* and *Methuri* in Salumbar tehsil of Udaipur district were finally selected. A sample of 20 farmers in each village was selected randomly.

To examine the changes in area, production and productivity of cluster bean in southern Rajasthan for the period of 20 years (i.e. from 1993-94 to 2012-13), compound growth rates were worked out for selected district and state as a whole. The compound growth rates were computed by fitting exponential function of the following form.

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$$Y_t = ab^t . e^{Ut} \quad \text{... (i)}$$

Where, Y_t is area/production/productivity of cluster bean crop in time period t,

t is time element that takes the values 1, 2, 3, ……. n,

a and b are parameters to be estimated, and

e^{Ut} is the error term.

Where, b = (1 + r); and 'r' is compound growth rate

Thus, equation (i) can be rewritten as

$$Y_t = a\,(1 + r)^t . U_t \quad \text{... (ii)}$$

On logarithmic transformation of equation (ii) we get:

$$\text{Log } Y_t = \log a + t \log (1 + r) + \log U_t \text{ ...(iii)}$$

The compound growth rate (r) was obtained as

$$r = [(\text{Antilog of b}) - 1] \times 100$$

Instability analysis

The instability in area, production and productivity of cluster bean in Udaipur district of Rajasthan for the period of 20 years i.e. from 1993-94 to 2012- 13 was worked out through following measures (Purbia 2002):

(i) Instability Index 1 (I_1)

$$= \frac{SD}{AM} \times 100 \text{ or } \frac{\sigma}{\overline{X}} \times 100$$

Where, σ = Standard deviation of area, production and productivity of the crop for specified period

$\overline{X}$ = Arithmetic mean of area, production and productivity of the crop for specified period

(ii) Instability Index 2 (I_2)

$$= \frac{SD^*}{AM^*} \times 100 \text{ or } \frac{\sigma'}{\overline{X'}} \times 100$$

Where, σ' = Standard deviation of detrended area, production and productivity of the crop for specified period

$\overline{X'}$ = Arithmetic mean of detrended area, production and productivity of the crop for specified period

Detrended values were worked out by assuming multiplicative model as described below:

$$Y_{dt} = TSCR/T$$

Where, Y_{dt} = Detrended value of area, production and productivity of guar

T = Trend Value

S = Seasonal variation

C = Cyclical variation

R = Random variation

(iii) Instability Index 3 (I_3)

$$= CV \sqrt{(1 - r^2}$$

Where, CV = Coefficient of variance of area, production and productivity of cluster bean, r^2 = Coefficient of multiple determination of the trend equation for original time series data on area, production and productivity of cluster bean

Based on these indices, the extent of instability in area, production and productivity of cluster bean in Udaipur district of Southern Rajasthan were assessed.

RESULTS AND DISCUSSION

Area and production of cluster bean

The year wise area, production and productivity of cluster bean Udaipur district and Rajasthan state from the period 1993-94 to 2012-13 are depicted in Table 1. It was 11436 hectares during the year 2012 - 2013 and it was highest (14951 hectares) in the year 2006 - 2007. The area under cluster bean started declining at a steady pace mainly because of instability in prices. The production data revealed that Udaipur district accounted for 7790 tonnes out of total cluster bean production of 20.23 lakh tonnes in the state during the year 2012 - 2013. The productivity of guar fluctuated to a great extent in the selected district as well as in the state in

Table 1. Area, production and productivity of cluster bean (1993 - 94 to 2012 – 13)

Area (Ha), production (Tonnes) and productivity (Kg/Ha)

Particulars	Udaipur			Rajasthan		
	Area	Production	Productivity	Area	Production	Productivity
1993-94	798	165	207	1897085	287212	151
1994-95	1686	546	324	1959356	708299	361
1995-96	1547	322	208	1774724	274195	155
1996-97	2186	2067	946	1818771	739917	407
1997-98	2149	2038	948	1985257	733553	370
1998-99	5	1	200	1611907	319629	198
1998-00	6296	1593	253	2648486	231572	87
2000-01	8365	1613	193	3056272	481219	157
2001-02	7104	4696	661	2409948	823366	342
2002-03	7816	2585	331	556476	27869	50
2003-04	9610	5654	588	2278339	1163170	511
2004-05	10980	7447	501	1944348	338351	174
2005-06	13085	8233	629	2444648	593223	243
2006-07	**14951**	4881	326	2807918	658426	234
2007-08	13768	**15943**	**1158**	2909793	1243732	427
2008-09	13513	10559	781	3315732	1261215	380
2009-10	12911	4765	369	2586857	202738	78
2010-11	11888	12118	1019	2980946	1540544	517
2011-12	10545	7789	739	3094163	1846609	597
2012-13	11436	7790	681	**4526368**	**2023096**	447

Source: Vital Agricultural Statistics (Directorate of Agriculture, Pant Krishi Bhawan, Jaipur, Rajasthan)

general. The fluctuation in productivity was probably due to unfavourable climatic conditions.

Trend in area, production and productivity

The compound growth rates in area, production and productivity of cluster bean in Udaipur district were worked out and are depicted in Table 2 and growth trends are shown in Fig.1-3. A perusal of the table shows that the production growth of cluster bean recorded at 25.97 per cent per annum during the study period and it was significant at 1 per cent level of significance. It was mainly due to positive growth of 5.35 per cent in productivity and supplemented with positive and significant growth of 19.48 per cent per annum in area. The coefficient

Table 2. Compound growth rates of area, production and productivity of cluster bean in Udaipur district

(Per cent per annum)

Particulars	Area (Ha)	Production (Tonnes)	Productivity (Kg/ Ha)
Compound Growth Rate	19.48** (103.96)	25.97** (119.39)	5.35 (12.14)
r^2 (Coefficient of determination)	0.75 [0.73]	0.59 [0.57]	0.14 [0.08]

Figures in parentheses are standard errors, Figures in brackets are values of adjusted r^2

*Significant at 5 per cent level of significance

**Significant at 1 per cent level of significance

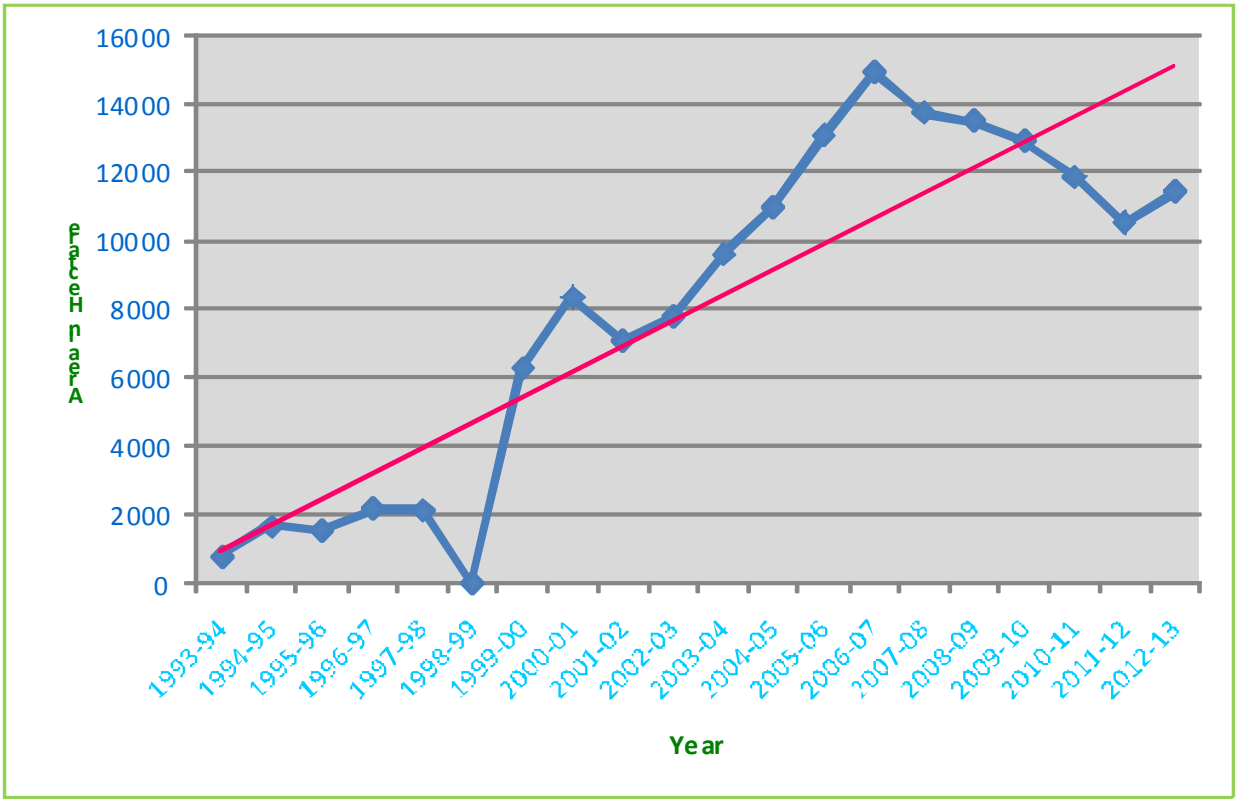

Fig. 1: Trend in area of cluster bean over time in Udaipur district

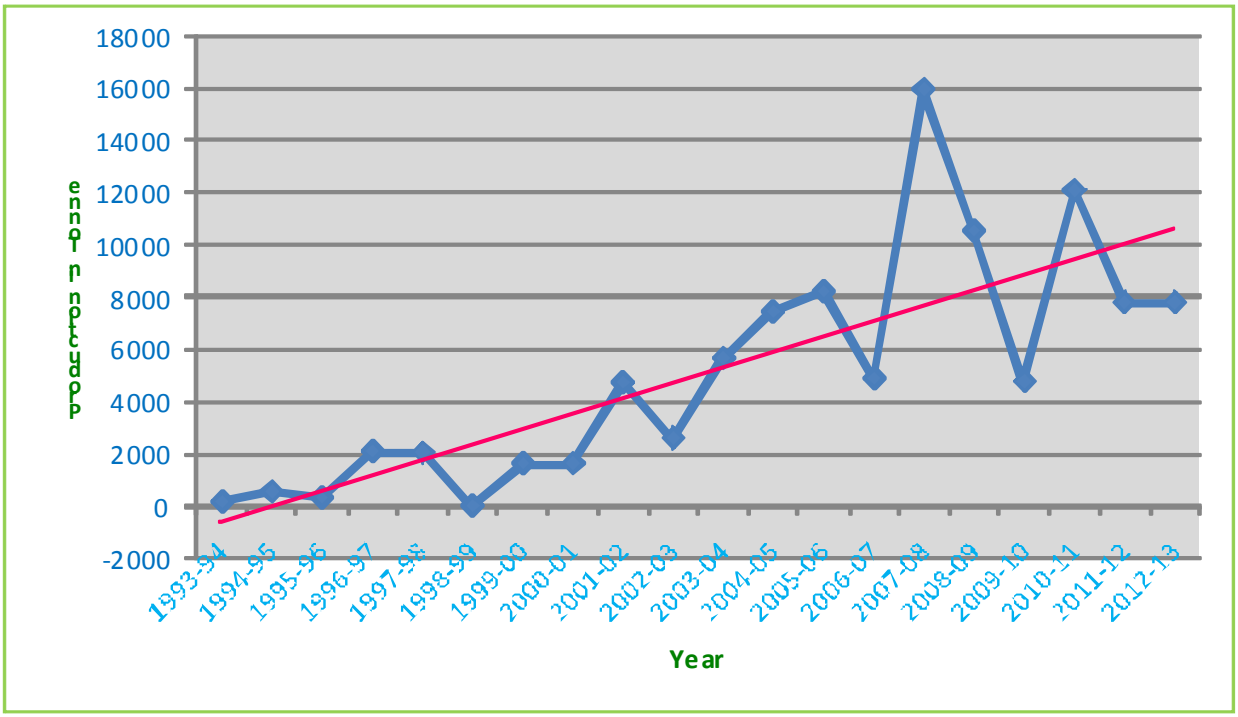

Fig. 2: Trend in Production of cluster bean over time in Udaipur district

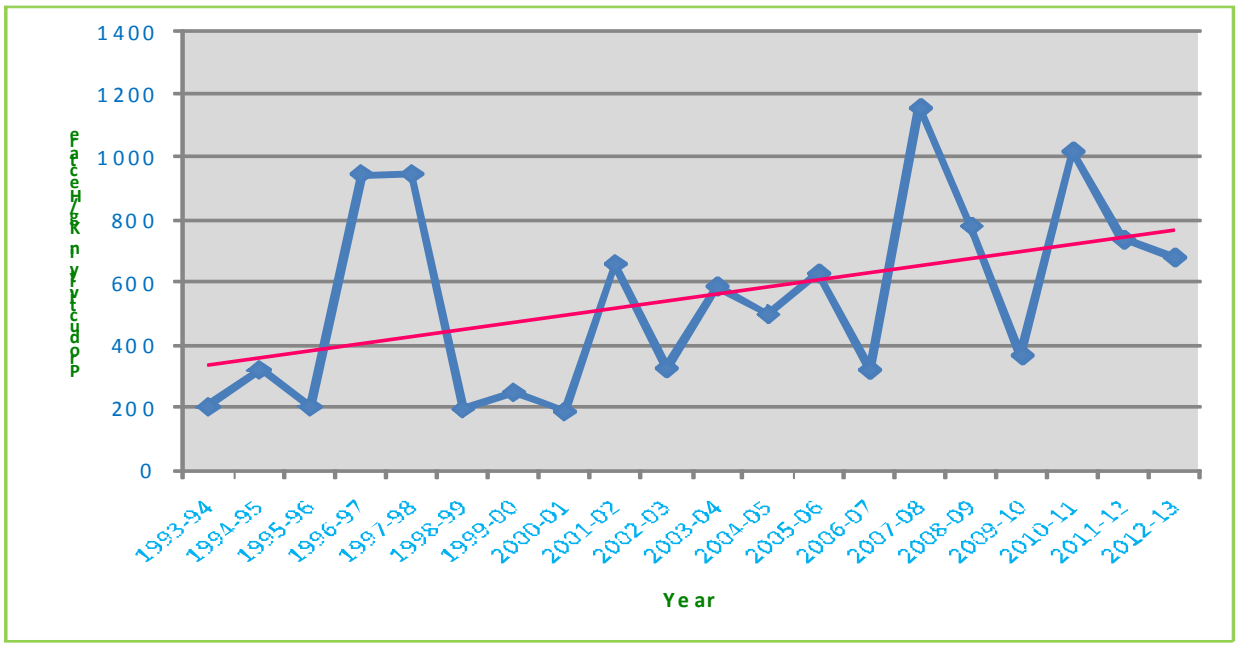

Fig. 3: Trend in productivity of cluster bean over time in Udaipur district

Table 3: Instability in area, production and productivity of cluster bean in Udaipur District of Rajasthan

Particulars		Area (Ha)					Production (Tonnes)					Productivity (Kg/ Ha)				
		I_1	I_2		I_3		I_1	I_2		I_3		I_1	I_2		I_3	
[redacted]	CV (%)	**62**	-3.9	34.84	-103.96	**31.08****	**87.6**	-0.3	243	-119.39	**55.40****	**56**	-2.38	56	-12	51.4
Udaipur	r^2		[0.01]	0.07	[0.73]	0.75		[0.08]	0.13	[0.57]	0.59		[-0.05]	0	[0.08]	0.14
[redacted]	CV (%)	**34**	-5.4	24.83	-26816	**25.21****	**73.2**	-2	60.9	-19246	**57.27****	**55**	-0.01	51	-6.6	51.7
Rajasthan	r^2		[-0.05]	6.00E-05	[0.40]	0.43		-0.1	0.06	[0.35]	0.38		[-0.04]	0	[0.06]	0.12

Figures in parentheses are standard errors, Figures in brackets are values of adjusted r^2 *Significant at 5 per cent level of significance; **Significant at 1 per cent level of significance; r^2 refers to coefficient of Determination; CV refers to Coefficient of Variation

of determination was high in case of area and production but low in case of productivity. It shows that increase in production was mainly due to increase in area along with increase in productivity. Thus, it can be concluded that area and production had shown positive and significant growth during the study period in Udaipur district.

Instability in area, production and productivity

The coefficient of variation for area, production and productivity in Udaipur district were 62.32, 87.58 & 55.46 whereas 33.65, 73.18 and 55.11

per cent, respectively for the state as a whole. The value of CV was high for production and productivity, indicating high instability. Variation in yield may be due to weather conditions, technological changes, agronomic practices followed etc. However, lower CV for area shows stability in the acreage allocation. It was mainly due to the fact that under rainfed conditions, farmers have limited alternatives in terms of crop selection, implying thereby that production of cluster bean can be stabilized with the stable yield of the crop over the years. The instability in area was more in Udaipur district compared to the state as a whole. The coefficient of variation for the area is low at state level comparatively to Udaipur district.

CONCLUSION

The instability in area was more in Udaipur district compared to the state as a whole. The following are policy implications:

1. The productivity stabilizing strategies coupled with yield growth strategies must get priority as crop production is taken up under very high risk in the state especially of output price risk.
2. Growth with stability, limiting the wide fluctuations in price, must be the guiding principle for research and extension strategies in the southern parts of the state.
3. Variation in yield may be minimized by technological changes, follow up of improved agronomic practices etc.

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SUGGESTIONS FROM MANGO ORCHARDISTS TO IMPROVING THE KNOWLEDGE AND ADOPTION OF ECO-FRIENDLY MANAGEMENT PRACTICES

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ABSTRACT

The present study was conducted in Ratangiri and Sindhudurg districts of South Konkan in Maharashtra to study the suggestions from mango orchardists to improving the knowledge and adoption of eco-friendly management practices by interviewing 200 mango orchardists.It is seen that big orchardists offered more important suggestions than small orchardists for improving knowledge and adoptions of eco-friendly management practices of mango. The study focused on all types of suggestions which directly help to solve the social, technological, economic, situational, market orientated constraints, constraint related to governmental policy, infrastructural constraints and constraint related to climate. There was significant correlation between suggestions offered by small and big orchardists with regard to assigned ranks.

INTRODUCTION

Need based and location specific eco-friendly management practices and their full use at client system is vital for maximization of agricultural production. Still there is exists a wide gap between the technology available at the research station and its adoption at the farmers level. Keeping this view in mind, an effort has been made to find out the suggestions offered by mango growers for improving the present status of eco-friendly management practices will be a valuable feedback to scientists, administrators, policy makers and public representatives to revise the strategies for implementation of eco-friendly technology of mango in the state. As a whole, it will help to improve socio-economic conditions of mango growers. The objectives are as below.

1. To find the degree of importance of suggestions offered by the mango orchardists to improve the existing level of knowledge and adoption of eco-friendly management practices.
2. To invite the various suggestions from mango orchardists to improve the existing level of knowledge and adoption of eco-friendly management practices.

RESEARCH METHODOLOGY

The present study was conducted in Ratnagiri & Sindhudurg districts of south Konkan in Maharashtra. These districts were selected purposively on the basis of maximum area under mango cultivation in the Southern Konkan. For the selection of tehsils, a complete list of all the tehsils of both the identified districts where the mango fruit is being grown extensively was prepared.

From the list so prepared, Ratnagiri and Rajapur tehsils of Ratnagiri district and Deogad and Malvan tehsils of Sindhudurg district were selected on the basis of maximum area under mango cultivation. For selection of villages, five villages having maximum area under mango cultivation were selected from each identified tehsils. Thus, in all twenty villages were selected. To select the respondents, a category-wise comprehensive list of small and big orchardists of respective villages was prepared with the help of revenue officials and officials of State Agriculture Department. From the list so prepared, five small and five big orchardists were selected randomly from each identified village. Thus, in all

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200 farmers (100 small and 100 big orchardists) were included in the sample study. The percentages, mean, standard deviation, and rank correlation etc. were used as statistical tools.

Measurement of suggestions

To measure the suggestions of the mango growers for improving knowledge and adoption of eco-friendly management practices of mango cultivation by the mango growers, a suitable schedule was developed. The schedule consisted of 34 statements pertaining to suggestions for better adoption of eco-friendly management practices of mango cultivation technology. To measure the degree of importance of suggestions, the responses were recorded on a three point continuum viz., most important, important and least important, which were assigned 3,2 and 1 score respectively. The recorded responses were counted and converted into mean percent score for each suggestion and were ranked accordingly.

RESULTS AND DISCUSSION

The results are presented herewith as below:

1. Degree of importance of suggestions offered by the mango orchardists to improve the existing level of knowledge and adoption of eco-friendly management practices.

The degree of importance of suggestions offered by the mango orchardists to improve the existing level of knowledge and adoption of eco-friendly management practices is presented in table 1.

The data accorded in Table 1 indicate that 74.50 per cent mango orchardists offered 'medium' category of suggestions, while 16 per cent and 9.50 per cent respondents fell in the category of 'most important' and 'least important' suggestions, respectively.

A close observation of data presented in table further indicate that 74 per cent small and 75 per cent big orchardists were reported under 'important' level of suggestions. Likewise 14 per cent small and 18 per cent big orchardists placed under category of 'most important' suggestions.

From the above matrix, it can be concluded that big orchardists offered more important suggestions than small orchardists for improving knowledge and adoptions of eco-friendly management practices of mango.

2. Suggestion wise distribution of mango orchardists to improve the existing level ofknowledge and adoption of eco-friendly management practices of mango

The suggestion wise distribution of mango growers for improving the existing level of knowledge and adoption of eco-friendly management practices of mango is presented in Table 2.

To know the suggestions received from orchardists, a comprehensive list of 34 suggestions was prepared and the suggestions separately for big and small orchardists were recorded accordingly. A close observation of the data indicate that 'bio fertilizers should be made available at low cost' (98.17%) was suggested by nearly all the

Table 1. Distribution of respondents according to offered suggestions to improve theexisting level of knowledge and adoption of eco-friendly management practices of mango

S. No.	Suggestions	Small orchardists		Big orchardists		Total	
		f	%	f	%	f	%
1.	Least important (< 65)	12	12.00	7	7.00	19	9.50
2.	Medium important (65 to 77)	74	74.00	75	75.00	149	74.50
3.	Most important (> 77)	14	14.00	18	18.00	32	16.00
	Total	**100**	**100.00**	**100**	**100.00**	**200**	**100.00**
	Average (score)	**71.13**	**72.62**	**71.87**			

Table 2. Suggestions to improve the existing level of knowledge and adoption of eco-friendly management practices of mango

S.No.	Suggestions	Small orchardists		Big orchardists		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Supportive role of the govt. in marketing, subsidy and loan for eco-friendly mango.	87.67	7	87.67	7	87.67	5
2.	Assuring availability of quality organic manure with reasonable prices at village level.	78.67	13	76.67	18	77.67	16
3.	Initial incentives are necessary for converting conventional orchard to eco-friendly.	74.33	21	75.67	20	75.00	20
4.	Training programmes on eco-friendly mango cultivation should be organized.	76.33	17	72.33	23	74.33	21
5.	Proper guidance is made available for proper use of bio-fertilizer and manures.	78.00	15	85.33	9	81.67	10
6.	Bio-fertilizer should be made available at low cost.	99.33	1	96.67	3	98.17	1
7.	Bio-fertilizers should be made available in village itself in time.	88.33	6	84.67	10	86.50	8
8.	Promotion of bio-fertilizer and bio-pesticides for eco-friendly mango.	83.67	8	82.67	12	83.17	9
9.	Financial support through credit facilities at village level.	74.67	20	75.33	21	75.00	19
10.	Special encouragement for eco-friendly mango products by way of adequate premium price incentives.	83.00	10	77.00	17	80.00	13
11.	Development of model eco-friendly mango plots with institutional support.	79.00	11	83.00	11	81.00	11
12.	Promoting cropping system approach with inclusion of crops, animal husbandry, fisheries as per locality and facility.	78.00	14	78.00	15	78.00	15
13.	Alternate market for eco-friendly mango and its products should be developed.	77.00	16	77.00	16	77.00	18
14.	Credit awareness among mango growers about special benefits of eco-friendly mango should be made.	48.00	34	52.00	32	50.00	33
15.	Introduction of vermicompost and other organic composting units at field level.	67.00	26	66.00	27	66.50	26
16.	Use of organic fertilizer should made compulsory by law.	71.33	22	71.00	25	71.00	24

17.	Soil testing laboratoty should be available at tehsil place and result with suggestions should be given to mango growers in specific period.	95.67	4	97.00	2	96.34	3
18.	Location specific technology should be developed.	97.33	2	97.67	1	97.50	2
19.	Farmers' suggestions should be considered while modifying the technology.	67.67	25	71.67	24	69.67	25
20.	Appropriate eco-friendly plant protection technology should be developed.	66.67	27	64.67	29	65.67	28
21.	Government should take action against the sellers of banned chemicals.	63.33	30	62.00	31	62.67	30
22.	Awareness campaign is organized for mango growers about eco-friendly management practices of mango.	66.33	28	65.00	28	65.67	29
23.	SAUs should recommend the maturity indices for mango fruits to be sold locally and in outside market.	66.33	29	66.67	26	66.50	27
24.	University should find out perfect remedy against spongy tissue.	71.00	23	76.00	19	73.50	23
25.	SAUs should find out low cost technology for PHT	74.67	19	80.67	14	77.67	17
26.	Low cost boxes which are also suitable for transport should be developed.	79.00	12	81.00	13	80.00	14
27.	Cold storage facilities should be established in the pockets on co-operative basis.	53.00	32	52.00	33	52.50	32
28.	Transport should be done on co-operative basis.	67.67	24	93.33	5	80.50	12
29.	Mango festivals should be organized in big cities for marketing of mango.	88.33	5	86.00	8	87.17	6
30.	Weather forecasting should be done properly and published in time.	96.67	3	95.33	4	96.00	4
31.	Scheme should be launched for eco-friendly mango production.	62.00	31	63.33	30	62.67	31
32.	Policy for developing processing units in the area should be made.	49.67	33	49.67	34	49.67	34
33.	Make availability of Kerosene on subsidized rate to mango growers in peak period only.	75.33	18	72.67	22	74.00	22
34.	Problems of recurrent flowering should be solved by Agricultural University by research.	83.33	9	90.33	6	86.83	7

MPS = Mean Per cent Score** = Significant at 1 per cent level of significance—**% r_s = 0.8991** '%**

orchardists in the study area and accorded rank 1st in rank order.

A fair majority of the orchardists suggested that 'location specific technology should be developed' (97.50%) and disseminated among the mango community. Similarly quite a significant number of respondents had suggested 'soil testing laboratory should be available at tehsil head quarter and (96.34%) with 3rd rank. It is interesting to note that 'weather forecasting should be done properly and published in time' (96%) and was ranked 4th in the rank order. This will makes the orchardists aware of weather and to take remedial measures in time. Mango orchardists of the study area are quite concern with the 'supportive role of the government in marketing, subsidy, and loan for eco-friendly mango' was reported as common concern to all human being (87.67%) and it was accorded 5th rank in rank order.

For increasing sale of mango fruit in market, orchardist suggested that 'mango festivals should be organized in big cities for marketing of mango' (87.17%) and ranked 6th. It seems that mango orchardists are confronting the technical problems of flowering and urged 'problems of recurrent flowering should be solve by the Agricultural University by research' (86.83%) which was accorded the 7th rank in rank order.

The other important suggestions from orchardists were 'bio-fertilizers should be made available in village itself in time' (86.50%), 'promotion of bio-fertilizer and bio-pesticides for eco-friendly mango' (83.17%), 'proper guidance be made available for proper use of bio-fertilizer and manures' (81.67%), 'development of model eco-friendly mango plots with institutional support' (81%), 'transport should be done on co-operative basis' (80.50%), 'low cost boxes which are also suitable for transport should be developed' (80.00%) and accorded 8th to 13th rank, respectively in the rank order.

The other important suggestion offered by the orchardists were 'promoting cropping system approach including crops, animal husbandry, fisheries as per locality and facility' (78.00%), 'assuring availability of quality organic manure with reasonable prices at village level' (77.67%), 'SAUs should find out low cost technology for PHT' (77.67%), 'alternate market for eco-friendly mango and its products' (77.00%), 'financial support through credit facilities at village level' (75.00%), 'initial incentives are necessary for converting conventional orchard to eco-friendly' (75.00%), 'training programmes on eco-friendly mango cultivation should be organized' (74.33%), 'make availability of kerosene on subsidized rate to mango growers in peak period' (74.00%), 'university should find out perfect remedy against spongy tissue' (73.50%), 'use of organic fertilizer should be made compulsory by law' (71.00%).

'Farmers suggestions should be considered while modifying the technology' (69.67%), 'introduction of vermicompost and other organic composting units at field level' (66.50%), 'SAUs should recommend the maturity indices for mango fruits to be sold locally and in outside market' (66.50%), 'appropriate eco-friendly plant protection technology should be developed' (65.67%), 'awareness campaign be organized for mango growers about eco-friendly management practices of mango' (65.67%), 'government should take action against the sellers of banned chemical' (62.67%), 'scheme should be launched for eco-friendly mango production' (62.67%), 'cold storage facilities should be established in the pockets on co-operative basis' (52.50%), 'credit awareness among mango growers about special benefits of eco-friendly mango should be made' (50.00%) and 'policy for developing processing units in the area should be made' (49.67%) were the suggestions by respondents with comparatively less significance.

Therank order correlation co-efficient was calculated between the ranks accorded by small and big orchardists to the suggestions offered by two category of respondents. The calculated value of rank order correlation co-efficient (rs) was found to be 0.89 which is statistically significant at 1 per cent level of significance. Thus, it was inferred that there was significant correlation between small and big orchardists with regard to assigned ranks.

This findings are in line with findings of Singh (2010), Kesarkar (2010), Anony (2011 a), Anony (2011b), Anony (2013 a), Anony (2013 b) and Anony (2014b).

CONCLUSION

1. It can be concluded that big orchardists offered more important suggestions than small orchardists for improving knowledge and adoptions of eco-friendly management practices of mango.
2. The study focused on all types of suggestions which directly help to solve the social, technological, economic, situational, market orientated constraints, constraint related to governmental policy, infrastructural constraints and constraint related to climate.
3. It was inferred that there was significant correlation between small and big orchardists with regard to assigned ranks

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OPINION OF VETERINARY STUDENTS TOWARDS INTERNET USAGE IN UDAIPUR DISTRICT OF RAJASTHAN

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ABSTRACT

The study was conducted in purposely selected College of Veterinary and Animal Science, Navania Vallabhnagar, Udaipur (Raj.) because this is the only veterinary college functioning in the district. More than 600 students are enrolled in the college in various programs. Considering the importance of internet utilization the present study "Opinion of Veterinary Students towards Internet Usage in Udaipur District of Rajasthan" was conducted. The study revealed that majority of the students had favorable opinion towards internet.

INTRODUCTION

Opinion refers to thought or belief of a person about any new idea. The opinion about something is what we think and believe about it.

The belief of a person is not based on absolute certainty or positive knowledge but on what is seen true or probable on once mind. Opinion of veterinary students towards use of internet to a large extent determine the extent to which the internet is used by them in performing their day to day academic activity and to achieve excellence in teaching and research. Considering the importance of opinion and belief system in the adoption of innovation, a study entitled Opinion of Veterinary students towards internet usage was conducted at CVAS Navania, Udaipur

RESEARCH METHODOLOGY

The study was conducted in purposely selected College of Veterinary and Animal Science, Navania Vallabhnagar, Udaipur (Raj.) because this is the only veterinary college functioning in the district. More than 600 students are enrolled in the college in various programs.

Initially a list of all the M.V.Sc. and Ph.D. research scholars registered in the college was prepared from the different departments. It was noted that total number of M.V.Sc. and Ph.D. students perusing their degree in the current academic session i.e. 2018-19 was 35. To select the sample for the present study all the students enrolled during current academic session were included in the study investigation. A semi- structured interview schedule containing 27 opinion statements were formulated for recording the data. The opinion statement was pre tested and modified so as to bring clarity in understandings of the question. The data were recorded on a three point continuum scale i.e. strongly agree, agree and partial agree which were given score of 3, 2 and 1 respectively. The recorded data were calculated and converted in to mean percent score separately for each statement. Finally the overall MPS to each statement was calculated and ranks were accorded accordingly

RESULTS AND DISCUSSION

The data in Table 1 accommodate the findings related to opinion of veterinary students towards internet usage in Udaipur District. It can be observed from the data that almost all the students (MPS 2.88) of veterinary college unanimously agreed that knowledge of internet is essential for students. It was ranked 1st in the rank order. Similarly nearly

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Table 1. Opinion of Veterinary College Students toward Internet Usage

S. No.	Statement	Strongly Agree (3)	Agree (2)	Partialy (1)	MPS	Rank
1.	Knowledge of internet is essential for veterinary students	31(88.57)	4(11.43)	0(00.00)	2.88	I
2.	Use of internet is need of the hour	16(45.71)	17(48.57)	2(5.71)	2.34	III
3.	Collecting information through internet is enjoyable	15(42.86)	18(51.43)	2(5.71)	2.31	IV
4.	Internet is an integral part of the educational process	15(42.86)	17(48.57)	2(5.71)	2.25	VI
5.	Internet is difficult to use by students	3(8.57)	2(5.71)	30(85.71)	0.37	XXVII
6.	Internet is helpful in formulation of viable research projects	3(8.57)	14(40.00)	18(51.43)	1.06	XXV
7.	Internet provides useless information	5(14.28)	15(42.85)	15(42.85)	1.28	XXII
8.	Internet use curtail the leisure time of students	7(20.00)	24(68.57)	4(11.43)	1.97	XII
9.	Internet is time saving technology for students	5(14.28)	28(80.00)	2(5.71)	2.03	XI
10.	Day to day life becomes easier and comfortable with internet	8(22.85)	22(62.86)	5(14.28)	1.94	XIII
11.	Information collected through internet is up to date	5(14.28)	11(31.43)	19(54.28)	1.06	XXIV
12.	Internet is trustworthy and reliable	5(14.28)	16(45.71)	14(40.00)	1.34	XXI
13.	Internet helps in personality development of students	14(40.00)	19(54.29)	2(5.71)	2.28	V
14.	Internet is a potential facility for effective teaching /research	11(31.43)	20(57.14)	4(11.43)	2.08	X
15.	Use of internet by student is a waste of time and money	0(00.00)	7(20.00)	28(80.00)	0.40	XXVI
16.	Internet facilitate to retrieve latest information through number of sources	8(22.85)	21(60.00)	6(17.15)	1.88	XIV
17.	Internet use decreases the actual study-hours	10(28.58)	16(45.71)	925.71)	1.48	XIX
18.	Internet services are useful and affordable to the students	9(25.71)	25(71.43)	1(2.26)	1.63	XVI
19.	Internet has a positive impact on academic excellence	9(25.71)	25(71.43)	1(2.86)	2.20	VII
20.	Internet reduces the dependency on library	14(40.00)	17(48.57)	4(11.43)	2.17	VIII
21.	Internet improves the professional competence of researcher	6(17.14)	18(51.43)	11(31.43)	1.54	XVII
22.	Internet expedite the research process	9(25.71)	13(37.14)	16(45.71)	1.51	XVIII
23.	Internet use cease the social interaction	5(14.28)	23(65.71)	7(20.00)	1.74	XV
24.	Internet use create addiction among students	18(51.43)	10(28.57)	7(20.00)	2.11	IX
25.	Internet use leads to cultural distortion	6(17.14)	13(37.14)	16(45.71)	1.25	XXIII
26.	Internet is helpful to prepare for exams	4(11.43)	19(54.28)	12(34.28)	1.43	XX
27.	Internet is a faster way to acquire new knowledge	20(57.14)	14(40.00)	1(2.26)	2.51	II

*The data in parenthesis indicate the percentage

all (MPS 2.51) respondents included in the sample opined that internet is a faster way to acquire new knowledge, which was ranked 2nd. The data further indicate that fair majority of respondents were of the opinion that use of internet is a need of the hour (MPS 2.34), collecting information through internet is enjoyable (MPS 2.31) and it is beneficial for personality development of students (MPS 2.28) which were ranked 3rd, 4th and 5th respectively. It was also found that internet is an integral part of the educational process as opined by fair majority of respondents (MPS 2.25). It can be seen from the data that internet has a positive impact on academic excellence (MPS 2.20), internet reduces the dependency on library (MPS 2.17) and internet use create addiction among students (MPS 2.11) were ranked 7th, 8th, and 9th in the rank hierarchy.

Further, it can be observed that internet is a potential tool for effective teaching and research (MPS 2.08), internet is time saving technology for students (MPS 2.03) and internet use decreases the leisure time for chatting with friends (MPS 1.97) was the expression of opinion by students hence were ranked 10th, 11th and 12th in the rank order. Interestingly, the respondents have opined that life becomes easier and comfortable with internet (MPS 1.94). It is encouraging to record that internet facilitates to retrieve latest information through number of sources as opined by the students which scored MPS 1.88 and ranked 14th in the rank order. Use of internet ceases the social interaction (MPS 1.74) was expressed by majority of respondents. Further respondents opined that internet services are affordable to students community (MPS 1.63), internet improves the professional competence of researcher (MPS 1.54) and internet expedite the research process (MPS 1.51) was also the opinion of the veterinary students and as such were accorded 16th, 17th and 18th rank respectively. The results also indicate that internet use decrease the actual study hours (MPS 1.48) of students and internet is helpful to prepare for exams (MPS 1.43) which were ranked 19th and 20th in the rank order. Substantial number of respondents were partially agree that internet provides useless information (MPS 1.28). Nearly half of the total respondents were of the opinion that internet use doesn't leads to cultural distortion (MPS 1.25). Further the students were partially agreed with the statement that internet is helpful in formulation research projects (MPS 1.06), use of internet by students is a waste of time (MPS 0.40) and internet is difficult to use by students (MPS 0.37) were simply discarded by respondents and as such were accorded 25th, 26th and 27th rank in the rank order.

CONCLUSION

With the results at hands it can be concluded that the opinion of veterinary students towards internet usage is highly encouraging and positive. They firmly believe that knowledge of internet is essential for students and it facilitates them to acquire new knowledge faster. The respondents strongly opined that internet is a need of the hour and they enjoy getting information through internet. It seems that internet has become an integral part of educational process which helps them in achieving excellence in academic matters in the veterinary college. Therefore it's recommended that usage of internet should be permitted, promoted and facilitated in the academic institutions.

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EFFECTIVENESS OF WORKSHOP ON STRESS REDUCING TECHNIQUES AMONG THE RESEARCHERS OF UTTARAKHAND

Arpita Sharma* and Naresh Kumar Kandpal**

ABSTRACT

Stress is an emotional and bodily reaction to physical, psychological or emotional demands. Today's students are suffering from Stress problem. High Competition, Peer conflict, Poor results from Research Work, Late Job, Unsatisfied from Grade, Financial hazards, Problems in Married Life are some of the reasons of frustration among the Ph.D. students. Past researches have shown that majority of Ph.D. students were frustrated due to some reasons. Keeping the above fact in mind, a study was undertaken during 2017-18 at Golden Jubilee Hostel (Ph.D. students) of GBPUA&T, Pantnagar with the objective to study the socio-economic characteristics of students, to assess the stress level of students and to organize stress reducing workshop in the Hostel. Data were collected through well semi-structured interview schedule developed for the purpose from 50 randomly selected students. Results indicated that all the respondents reported that most of the days they felt that they have less interest or pleasure in doing things followed by felt down, depressed and hopeless. More than half per cent students reported that they have trouble in sleep followed by poor appetite or overeating. Total 44 per cent respondents reported that they were feeling bad about yourself due to high level of frustration and stress. Total 40 per cent respondents reported that they felt emotional distress, anxiety, depression, unmanageable anger followed by isolation and difficulty in adjustment. Total 30 per cent respondents were feeling high stress level and excessive worrying followed by elevated or decreased mood. Less than half per cent of the respondents were feeling peer conflict followed by fatigue or social withdrawal. Total 26 per cent respondents were feeling threatening/aggressive behaviour to self or others. Total 14 per cent respondents have inability to care for self. On the basis of these results a workshop on stress management was organized in the Hostel. The result showed that students stress was reduced at some extent after attending the workshop.

INTRODUCTION

Stress management is a technique and Psychotherapy which aim is to control the person's level of stress. Generally Stress refers to negative consequences or distress. Stress produces numerous physical and mental symptoms which varies according to person's situation. According to the **World Health Organization** stress, especially that relating to work, is the second most frequent health problem, impacting one third of employed people in the European Union. Stress management provides a number of ways to manage anxiety and maintain overall well-being. This is a time of High competition. Thus, Students were suffering from anxiety, Public Phobia and stress during research period. Today is 21th Century. Thus, many stress reducing techniques are available. Some techniques provide positive feelings of control over one's life and promote general well being. **Varvogli and Darviri (2011)** observed that stress management techniques are applicable not only to people who manifest a disease or disorder, but also to healthy people, when added to daily routine practice as an effective tool for health enhancement and protection over the life span, serving thus as a valuable intervention for the healthy population as well. Keeping the above facts in mind, a research investigation was undertaken with the objectives to

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study the socio-economic characteristics of students, stress level of Ph.D. students and to organize stress reducing workshop for students.

RESEARCH METHODOLOGY

Present research investigation was carried out in GBPUA&T, Pantnagar. Total 50 Ph.D respondents were selected randomly from Golden Jubilee Hostel for research investigation. Socio-Economic Characteristics of students, mental fitness and psychological problems related data were collected through semi-structured interview schedule. Data related to feedback from the students were collected through group discussion.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Students

The results of the study on socio-personal and Communication characteristics of Ph.D. students are depicted in Table1.

Table 1. Socio-Economic Characteristics of Students

S.No.	Items	Respondents	%
1.	**Age**		
	Young (23-25)	27	54
	Middle (25-27)	15	30
	Old (Above 27)	8	16
2.	**Education**		
	Ph.D.	50	100
3.	**Member of Professional societies**		
	Yes	35	70
	No	15	30
4.	**Participation in Seminar/Conference/ Symposia**		
	Seminar	40	80
	Conference	20	40
	Symposia	15	30
	Workshop	25	50
5.	**Use of Social Media**		
	Gmail	50	100
	Facebook	45	90
	Whatsapp	50	100
6.	**Purpose of using social media**		
	Social Contact	35	70
	Latest Update News	50	100
	Email	50	100
	Official Correspondence	39	78
	Social Information	37	68
7.	**Use of Print media**		
	Times of India	50	100
	Hindustan Times	9	18
	Indian Express	39	78
	The Hindu	8	16
8.	**Purpose of using print media**		
	Information	13	26
	Latest updated News	17	34
	Knowledge and Awareness	25	50

1. **Age:** Data pertaining to age of Ph.D. students are presented in Table1. Results revealed that majority of respondents (54 per cent) belonged to young age group category (23-25 year) followed by middle age group category (30 per cent) and remaining 16 per cent population falls under old age group category.
2. **Education Qualification:** All the students were Ph.D. holder.
3. **Member of Professional societies:** Data presented in Table 1 revealed that most of the students (70 per cent) were member of the Professional societies.
4. **Participation in Seminar/Conference/ Symposia:** Result showed that total 80 per cent respondents reported that they have participated in National as well as International Seminars followed by Workshops (50 per cent) and Conferences (40 per cent).
5. **Use of Social Media:** All the students were using Gmail and Whatsapp (100 per cent) followed by Facebook (90 per cent). The findings were in concurrence with Hallikainen, 2015 that most of the people use of these social media platforms in daily routine.

6. **Purpose of using social media:** All the students were using Social media for latest update news as well as for email followed by official correspondence (78 per cent) and social contact (70 per cent). The findings gain support from Sharma (2018).

7. **Use of Print media:** Data revealed that all the respondents were reading newspaper. Total 100 per cent respondents were reading Times of India followed by Indian Express (78 per cent) and Hindustan Times (18 per cent). Total 16 per cent respondents were reading The Hindu newspaper. The above observations were similar to the findings reported by Sharma and Hasan (2012).

8. **Purpose of using print media:** Total 50 per cent respondents were using print media for knowledge and awareness followed by latest updated News (34 per cent) and information (26 per cent). This finding supports the findings of Rathore and Sharma (2012).

Mental fitness and Psychological Problems among Ph.D. Students

A. **Mental fitness:** Data in Table 2 clearly show that all the respondents reported that most of the days they felt that they have less interest or pleasure in doing things followed by felt down, depressed and hopeless (60 per cent). More than half per cent students (64 per cent) reported that they have trouble in sleep followed by poor appetite or overeating (60 per cent). Total 44 per cent respondents reported that they were feeling bad about yourself due to high level of frustration and stress. Half per cent respondents reported that they felt trouble while concentrating on things such as reading the newspaper or watching television followed by restless (30 per cent). Total 34 per cent respondents reported that they thought that they would be better off dead or of hurting yourself in some way.

B. **Psychological Problems:** Data in Table 3 clearly showed that total 40 per cent respondents reported that they felt emotional distress, anxiety, depression, unmanageable anger followed by isolation (60 per cent) and difficulty in adjustment (46 per cent). Total 30 per cent respondents were feeling high stress level and excessive worrying followed by elevated or decreased mood (20 per cent). Less than half per cent of the respondents (24 per cent) were feeling peer conflict followed by fatigue or social withdrawal (38 per cent). Total 26 per cent respondents

Table 2. Mental fitness among Ph.D. Students

S.No.	Statement	Not at all	Several days	More than half the days	Nearly every day
1	Little interest or pleasure in doing things.	-	50 (100%)		
2	Feeling down, depressed or hopeless	-	30 (60%)	10 (20%)	10 (20%)
3	Staying asleep or sleeping too much.	10 (20%)	32 (64%)	-	7 (14%)
4	Poor appetite or overeating	-	20 (40%)	30 (60%)	-
5	Feeling bad about yourself.	22(44%)	13 (26%)	12 (24%)	3 (6%)
6	Trouble concentrating on things such as reading the newspaper or watching television.	25 (50%)	12 (24%)	7 (14%)	3 (6%)
7	Moving or speaking so slowly that other people could have noticed or the opposite being so fidgety or restless.	11 (22%)	19 (38%)	15 (30%)	9 (18%)
8	Thought that you would be better off dead or of hurting yourself in some way.	2 (4%)	3 (6%)	15 (30%)	17 (34%)

were feeling threatening/aggressive behaviour to self or others. Total 14 per cent respondents have inability to care for self.

Table 3: Psychological Problems among Ph.D. Students

S. No.	Psychological Problems	Respondents	%
1.	Emotional distress, Anxiety, Depression, Unmanageable Anger	20	40
2.	Isolation	30	60
3.	Difficulty Adjustment	23	46
4.	Unusually high stress level and excessive worrying	15	30
5.	Elevated or decreased mood	10	20
6.	Peer conflict	12	24
7.	Fatigue or social withdrawal	19	38
8.	Threatening/Aggressive behaviour to self or others	13	26
9.	Inability to care for self	12	24
10.	Indication of self destructive to self or others	6	12
11.	Inability to care for self	7	14

Organization of Workshop on "Stress management Techniques to overcome Stress and Anxiety"

To overcome the stress and anxiety, a workshop on stress management and concentration development was organized at Golden Jubilee Hostel. All the students of the hostel participated in the Workshop. The aim behind this workshop was to guide the students how to overcome the stress during research work and to teach them stress management techniques to coping with the inevitable stress. Dignitaries of this workshop have expressed their views regarding stress and told them some techniques to overcome from stress.

1. **Technique 1: Strength of Positivity**: The very first technique to relieve from stress was strength of Positivity in our life. Chief Guest well explained the importance of positive thinking and positive attitude in life. He said that students most of the time find it difficult to face the changes and to cope up with such variations. Hence, this leads to stress, anxiety and tension.
2. **Technique 2: Breathe. Breathe. Breathe:** The other technique is take deep breathing. For deep Breathing, we should Place our hand on the lower abdomen and take a few deep breaths through our nose and exhale through our mouth. Sighing audibly as we exhale can help relieve even more tension. This has a harmonizing effect on our entire system.
3. **Technique 3:** Write down your thoughts: Writing is an art. We should write our views and try to publish these view on journal or newspaper. This is one to avoid the negative thought and give space to our positive feelings or thoughts.
4. **Technique 4: Yoga: A stress relaxation therapy**: Anxiety is a part of human nature, but it is important to know how to overcome it. Self Realization has always been the ultimate goal of all religions and spiritual traditions of the world. Self Realization is one way to overcome from stress. This is possible only from the practice of yoga. Once, we feel that who am I, What is the goal of my life, What is the purpose of my life, automatically we feel ourselves and this is one of the effective way to overcome from stress.
5. **Technique 5: The power of sound :** There are certain frequencies which provide relax to our body. These are a brainwave entrainment technology that can quickly put us into a kind of meditative state. There are certain other voices for eg: Relaxing Piano Music, Water sound music, Om powerful Mantra etc which relax our mind and soul.
6. **Technique 6: Acknowledge our accomplishments :** As we all are researcher, so we should start giving ourself the credit we deserve. Take time to reflect on all of the things what we have accomplished and embrace it. We should give some time to write research article and papers etc so that we should have no time for frustration

and anxiety.

Feedback: After 5 days of workshop, an interactive session was held. The feedback of this workshop was collected from the students through Group Discussion. Majority of students reported that our Warden has organized this workshop so that we all students can live a more stress free life.

CONCLUSION

Majority of students reported that the meditation was very helpful to reduce our stress level and enhance the brain's capacity for perception, awareness, and efficiency in processing. Thus, this workshop was effective in overcoming the stress level among the researchers.

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ECONOMICS OF INTEGRATED FARMING SYSTEMS IN RAIGAD DISTRICT OF MAHARASHTRA

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ABSTRACT

The present study was undertaken with specific objectives to identify the existing farming systems, to work out internal cost adjustments and returns in existing farming systems in the Raigad district. A total sample of 120 households was selected from two tehsils for the present study. Seven farming systems viz; 1. Crops + Vegetable (C+V), 2. Crops + Dairy (C+D), 3. Crops+ Poultry (C+ Po), 4. Crops+ Vegetable + Dairy (C+ V+D), 5. Crops+ Poultry + Dairy (C+ Po+D), 6. Crops+ Vegetable + Goat (C+V+G) and 7. Crops+ Vegetable + Orchard+ Dairy (C+V+O+D) were observed in Raigad district. Out of all farming systems, FS-IV (C+V+D) was followed by most of the farmers. The total cost of farming system was minimum in FS-I and maximum in FS-V. The return per rupee investment in Raigad district varied from ` 0.96 in FS-VII to`1.47 in FS-VI. Internal cost adjustment was maximum in FS -VI contributing 67.66 per cent.

INTRODUCTION

Agriculture sector occupies most crucial place in Indian economy by virtue of its contributing about 18 per cent of the national income and providing employment to more than half of the workforce in the country. In the world, India ranks second after China in terms of human population. Since independence, the population has increased three and half times, from 361.1 million in 1950-51 to 1324.17 million by the year 2015-16, whereasproduction has increased five times from 50.8 million tonnes to 252 million tonnes during the same period. The country's population is expected to reach 1660 million in the year 2050 and for which 349 million tonnes of food grains, 25 million tonnes of vegetable oil and 92 million meter^3 of industrial wood will be required. It is anticipated that land area available in 2050 would be 137 million hectares (Rangasami*et. al.* 2002).Since there is no further chance for horizontal expansion of land for cultivation of farm enterprises, the only alternative left is for vertical expansion by increasing the productivity using the obtainable resources properly and choosing the best diversified farming system.

Integrated Farming System (IFS) seems to be the possible solution to meet the continuous increase in demand for food, stability of income and diverse requirements of food grains, pulses, oilseeds, vegetable, milk egg, meat etc. thereby improving the nutrition status of the marginal and small scale farmers family with limited resources.Maharashtra is the third largest state in India in terms of geographical area (3,07,713 sq. km.) occupies nearly 9.3 per cent geographical area of the country. Maharashtra state occupies the western and central part of the country and has a long coastline stretching nearly 720 kilometers along the Arabian Sea. On the basis of rainfall, soil types and vegetation the state has been divided into nine agro-climatic zones. The agriculture in most of the part of the state is rainfed and is prone to high production risk. In order to meet the farm and family requirement, the farmers in the state have evaluated different combinations of crop, livestock, horticulture, forestry etc. Food security always remains an uncompromising goal of farm level agriculture for rural masses in most part

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of the state. Out of nine agro climatic zones of the state, the two zones *viz.,* South Konkan Coastal Zone and North Konkan Coastal Zone falls in Konkan region. Keeping in view above facts, present study was under taken on "**Economics of Integrated Farming Systems in Raigad District of Maharashtra"**

RESEARCH METHODOLOGY

In North Konkan Coastal Zone the Raigad district is relatively more diversified for crop and livestock production. Hence the Raigad district has been selected purposively for the present study. Multi-stage random sampling plan was adopted for the selection of study area and sample respondents. Mahad and Roha tehsils were selected andfrom each tehsil, four villages were selected randomly on the basis of highest area under farming systems. A list of farmers in the selected villages was obtained from revenue record. Out of which 15 farmers of each village were selected. The collected data referred to agricultural year 2015-16. The simple tabular analysis was employed to present the data regarding the existing farming systems, cost, return and profitability.

Cost and Return Estimation

The following method for estimation of costs and returns was used:

Gross Cost = Total Variable Cost (TVC) + Total Fixed Cost (TFC)

Gross Return = (Quantity of produce × Prevailing price of produce + Quantity of by-produce × Price of by-produce)

Net return = Gross return – Total cost

Operational or Variable Cost:

Operational costs were the actual costs incurred by the farmer along with incidental charges incurred towards labour and material costs. The various items of operational costs were seed, farmyard manure, fertilizers, plant protection chemicals, feeds and concentrates, fodder and straw, labour (hired and family human labour) etc.

Fixed Cost (FC):

The various items of fixed costs were land revenue, land rent and depreciation. The depreciation rates, life span and junk value for various agricultural implements and machinery were decided in consultation with the respondents. The depreciation was calculated using the straight line method and interest on fixed capital was calculated at the prevailing bank rate (12%) on the value of the farm and livestock assets. Total Cost (TC) = Total Variable Cost (TVC) + Total Fixed Cost (TFC)

Paid out cost of Integrated Farming Systems (PCIFS)

The PCIFS was work out as:

$$\textbf{PCIFS} = \Sigma\, n\, x_i * p_i$$

Where,

x_i = the i^{th} external input in quantity term

p_i = the price of i^{th} external input

NIIFS = GIIFS – PCIFS

NIIFS = Net income from integrated farming system

Cost of Internally Adjusted Input (CIAI)

CIAI = TC–PCIFS

Where,

TC = Total Cost (Fixed Cost + Variable Cost).

PCIFS = Paid out Cost of Integrated Farming System.

Return:

The returns from crop, livestock, goat rearing and poultry were estimated by multiplying the actual price realized to quantity sold by them and the quantities that was retained for seed or consumption purpose was evaluated at the rates prevailing at the time of harvest. The same method was also followed for the evaluation of by-products of various enterprises.

Gross Income from Integrated Farming System (GIIFS):

It is the value of main and byproduct received from various farming systems as:

$$\textbf{GIIFS} = \Sigma\, n\, Q_i * P_i$$

Where,

Q_i is the physical output (main and by product) of i^{th} component of IFS and

P_i is the price of i^{th} output.

RESULTS AND DISCUSSION

Existing farming systems

There are number of farming systems (FS) existed in the study area. An integrated Farming system comprises the crop production,vegetables, orchards, dairy enterprise and poultry to maximize the farm income. The status of these combinations depends on the prevailing model of these systems in a study area. Therefore, it is necessary to identify the existing major integrated farming systems of the selected districts. In the present study irrespective of climatic condition as well as location seven farming systems were observed in the selected districts as shown in Table1.

Table 1. Existing Farming Systems in Study Area

Farming Systems	Brief description	Farmers (No.)
FS–I	Crops + Vegetable (C+V)	14(11.67)
FS–II	Crops + Dairy (C+D)	24(20.00)
FS–III	Crops+ Poultry (C+ Po)	22(18.33)
FS–IV	Crops + Vegetable + Dairy (C+ V+D)	41(34.17)
FS–V	Crops+ Poultry + Dairy (C+ Po+D)	10(8.33)
FS–VI	Crops+ Vegetable +Goat (C+V+G)	4(3.33)
FS–VII	Crops+Vegetable+ Orchard+Dairy (C+V+O+D)	5(4.17)
Total		**120(100.00)**

Figures in parentheses are percentage of column total

In farming systems different crops only in *kharif* season, dairy, goat and poultry were also taken up by the farmers along with crops and vegetables. The majority of farmers (34.17%) adopted FS-IV followed by FS-II (20%), FS-III (18.33%), FS-I (11.67), FS-V (8.33%), FS-VII(4.17%) and only 3.33 per cent farmers followed FS-VI (Crop + Vegetable + Goat).

Cost and Return in different Farming systems:

The cost and return in all the farming systems are presented in Table 2. In Raigad district, the total cost of farming system was the lowest in FS-I and the highest in FS-V and it varied from ‘104005.08 in FS-I to ‘ 761864.80. Total variable cost as percentage of total cost varied from 74.22 in FS-VII to 86.45 in FS-V. The total fixed cost among the seven farming systemvaried from 13.55 per cent to 25.78 per cent. The lowest total fixed cost was 13.53 per cent in FS-V and highest total fixed cost *i.e.* 25.78 per cent was seen in FS-VII. The reason of highest total fixed cost in FS-VII was due to pacca constructed cattle shed. The net return among the seven farming systems of Raigad district varied from ‘ -12768.40 in FS-V to ‘ 193901.50 in FS-VI. The highest net return came from FS-V due to vegetable and poultry enterprises whereas lowest net return in FS-VII, farmers had taken crops, vegetables, dairyand orchard which were mostly depend upon rainfall, due to heavy rainfall crops, vegetable and orchard were badly affected hence farmers in this region obtained less profit. The return per rupee investment in Raigad district varied from ‘ 0.96 in FS-VII to ‘ 1.47 in FS-VI.

Internal Cost Adjustment in Farming Systems:

Internal cost adjustments in various systems in the study area were worked out and are presented in Table 2. Outside cost means purchase of inputs from outside market by the farmers.Cost from within farming system included the value of all those inputs required for different enterprises and are supplied from within the system like FYM cost, owned labour, green/dry fodder, seed and feed. The value of the inputs brought from outside the farm (or farming system) for different enterprises were

included in the cost incurred outside the farming system. From the total cost, the cost incurred within the farming system, show the utilization of resources within the system. The system is more feasible and sustainable when there is more utilization of resources within the system than the other system.

The Raigad district having seven farming systems of which FS – VI showed highest share of internal cost adjustment (67.66%) followed by FS – II (60.06%), FS – IV (59.84%), FS – VII (58.21%),FS – I(51.60%), FS –III (29.98%) and FS – V which had lowest share (28.99%). The FS – VI showed more self dependence due to rearing of goats therefore in this system maximum cost was adjusted internally and only 32.34 percent cost inputs were purchased from outside. FS – II also showed same trend where dairy played an important role in cost adjustment. FS – V and FS – III were more dependent on the outside cost items. Because

Table 2. Cost and Return in different Farming systems in Raigad District

(‘/Farm/Year)

Particulars	**Raigad District**						
Cost	**FS-I**	**FS-II**	**FS-III**	**FS-IV**	**FS-V**	**FS-VI**	**FS-VII**
TVC	79498.56 (76.44)	131562.00 (79.47)	151996.36 (85.63)	140254.76 (77.33)	658614.60 (86.45)	90797.00 (75.57)	231382.40 (74.22)
TFC	24506.50 (23.56)	33983.33 (20.53)	25497.72 (14.37)	41109.27 (22.67)	103250.20 (13.55)	29350.25 (24.43)	80365.00 (25.78)
TC	104005.08 (100)	165545.33 (100)	178966.68 (100)	181364.03 (100)	761864.80 (100)	120147.25 (100)	311747.40 (100)
Return							
GR	116510.15	171255.08	208355.46	195538.70	955766.30	176366.75	298979.00
NR	12505.07	5709.75	30861.38	14174.67	193901.50	5619.50	-12768.40
Return/Rupee Investment	**1.12**	**1.03**	**1.17**	**1.08**	**1.25**	**1.47**	**0.96**

Table 3. Internal Cost Adjustments in Various Farming Systems in Study Area

(Per Farm)

Integrated Farming systems	**Gross return (‘)**	**Cost**			**Cost Share (%)**		**Return/ Cost Ratio**
		Within Farming System (‘)	**Out Side Farming System (‘)**	**Total Cost (‘)**	**Within Farming System**	**Out Side Farming System**	
FS-I	116510.15	53670.00	50335.08	104005.08	51.60	48.40	1.12
FS-II	171255.08	99423.48	66121.86	165545.33	60.06	39.94	1.03
FS-III	208355.46	53216.32	124277.68	177494.08	29.98	70.02	1.17
FS-IV	195538.70	108529.07	72834.96	181364.03	59.84	40.16	1.08
FS-V	955766.30	220838.30	541026.50	761864.80	28.99	71.01	1.25
FS-VI	176366.75	81295.38	38851.88	120147.25	67.66	32.34	1.47
FS-VII	298979	181482.90	130264.50	31174.4	58.21	41.79	0.96
Overall	**303253.06**	**96269.53**	**88780.99**	**212614.50**	**50.91**	**49.09**	**1.15**

FS–V and FS – III had required more investment or long term investment in setting up of poultry enterprises. In this district on per rupee investment basis FS-VI (1.47) and FS-III (1.17) were more profitable than other systems.

CONCLUSION

Finally, it is concluded that in Raigad district total cost of farming system was lowest in FS-I and highest in FS- V. It varied from '1.04lakhs in FS-I to '7.61 lakh in FS-V. The analysis showed that on cost basis FS-I was found profitable and on the basis of net return FS-VI were more profitable than other farming systems. Similarly, it was observed, from the study that FS-IV (C+V+D) was adopted by majority of farmers. The system is more feasible and sustainable when there is more utilization of resources within the system than the other system. Internal cost adjustment was more in FS-VI among all the farming systems in Raigad district while the return per rupee investment (return cost ratio) was more in FS-V Therefore, it can be suggested that farmers should adopt FS-V(Crops+ Poultry + Dairy) to earn more net profit under resource restriction situation or limited capital situation.

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ASSOCIATION BETWEEN THE INDEPENDENT VARIABLES AND ADOPTION OF RECOMMENDED PRODUCTION TECHNOLOGY OF MUNGBEAN BY THE FARMERS

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ABSTRACT

The study was conducted in purposely selected Jaipur district of Rajasthan. Jaipur district comprises of sixteen tehsils, out of which 3 tehsils viz.,Dudu, Phulera and Phagi were selected purposely. Two gram panchayats were selected randomly from each tehsils.Two revenue villages were selected from each selected gram panchayat on the basis of random sampling method. Thus the total 12 villages were selected. Total 120 mungbean growing farmers (respondents) were selected randomly through proportional allocation to the size of sample. Regarding association the age, education, social participation, size of land holding, irrigation potential and source of information utilized were positively and significantly associated with their extent of adoption of recommended cultivation practices of mungbean while size of family and market distance was non-significantly associated with their extent of adoption of recommended production technology of mungbean.

INTRODUCTION

Pulses are the main source of quality protein and a rich source of energy, minerals and certain vitamins. They help in balancing the cereal dominated diet of low and middle income families by supplementing the essential amino acids profile of cereal proteins economically

Mungbean stands third after chickpea and pigenpea in the country among pulses. Pulses accounts 24.79 m ha area with an annual production of 19.77 million tons in the country. Mungbean occupies 29.36 lakh hectare area and contributes 12.80 lakh tones in pulse production in the country [1] (Anonymous,2012-13). The important mungbean growing states are Rajasthan, Madhya Pradesh, Uttar Pradesh, Orisha, Maharastra, Karnataka, Bihar etc.

In Rajasthan mungbean is grown over 790185 hectare with the production of 23426 tonnes. Jaipur district has 60624 hectare area under mungbean cultivation and production 9579 tonnes, which is nearly 4.09 per cent of total mungbean production in Rajasthan [2](Annoymous, 2012-13). The productivity of Jaipur district is 158 kg/ha. There is a wide scope to improve and increase the mungbean production and productivity by enhancing the knowledge and adoption of recommended production technology by farmers.

RESEARCH METHODOLOGY

The study was conducted in Dudu, Phagi and Phulera tehsils of Jaipur district of Rajasthan. Jaipur district was selected purposely on account of lowest productivity i.e. 158 kg/ha and tehsils were selected purposely because these tehsils have maximum area under mungbean crop in Jaipur district, Farmers were selected on the basis of proportinate random sampling technique from each selected village making a total sample of 120 mungbean growers.

An interview schedule was developed for data collection and the responses were recorded by conducting face to face personal interview.

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RESULTS AND DISCUSSION

The extent of association between adoption and selected independent variables was calculated by using Spearmen's Rank Correlation coefficient. The results have been presented in Table 1.

Table 1. Association between selected independent variables with adoption level of farmers

n= 120

S. No.	Independent variable	Rank Correlation Coefficient (R^2)
1	Age	0.447**
2.	Education	0.541**
3.	Social participation	0.373**
4.	Size of land holding	0.402**
5.	Size of family	0.183NS
6.	Market distance	0.191NS
7.	Irrigation potentiality	0.276**
8.	Sources of information utilized	0.723**

** Significant at 1 per cent level of significance, NS = Non-significant

Adoption and age

Data in Table 1 indicate that age was positively and significantly associated with the adoption level of farmers about recommended cultivation practices of mungbean at 1 per cent level of significance.

The null hypothesis stated that there is no association between the adoption level of farmers and their age was therefore, rejected. It could be inferred that when age increases the adoption level also increases simultaneously and vice versa.

Education and adoption

The data in Table 1 reveals that education was associated significantly with the adoption of farmers about various cultivation practices of mungbean at 1 per cent level of significance.

The null hypothesis stated that "There is no association between the extent of adoption of farmerss and their education." was therefore rejected. It could be inferred that adoption found significant association with education.

Social participation and adoption

The data in Table 1 depict that there was a significant association between social participation and the adoption of farmers about various cultivation practices of mungbean at 1 per cent level of significance.

The null hypothesis stated that "There is no association between the extent of adoption of farmers and their social participation" was rejected. It could be inferred that adoption was associated significantly with the social participation of farmers.

Adoption and size of land holding

Data in Table 1 indicate that the size of land holding is significantly associated with adoption level of farmers about recommended cultivation practices of Mungbean at 1 per cent level of significance.

The null hypothesis 'there is no association between the adoption level of farmers and their size of land, holding therefore rejected.

It means that the size of land holding make significant impact on increasing adoption level of farmers about recommended cultivation practices of mungbean.

Size of family and adoption

The data in table 1 reveal that size of family was having non-significant association with the adoption of farmers about various cultivation practices of mungbean at 1 per cent level of significance.

The null hypothesis stated that "There is no association between the extent of adoption of farmers and their size of family" was therefore, accepted.

It means that the size of family had not exerted its influence on the adoption level of farmers about various cultivation practices of mungbean.

Market distance and adoption

Data in Table 1 indicate that market distance was associated non-significantly with the adoption of farmers about various cultivation practices of mungbean at 1 per cent level of significance.

The null hypothesis stated that "There is no

association between the adoption of farmerss about various cultivation practices of mungbean and their market distance" was therefore, accepted.

Irrigation potential and adoption

The data in Table 1 reveals that irrigation potential was associated significantly with the adoption of farmers about various cultivation practices of mungbean at 1 per cent level of significance.

The null hypothesis stated that "There is no association between the extent of adoption of farmers and their irrigation potentiality" was therefore, rejected.

It could be inferred that adoption has found significant association with irrigation potential.

Sources of information utilized and adoption

The data in Table 1 reveal that sources of information utilized was associated significantly with the adoption of farmers about various cultivation practices of mungbean at 1 per cent level of significance.

The null hypothesis stated that "There is no association between the extent of adoption of farmers and sources of information utilized" was therefore, rejected. It could be inferred that significant association was found between the adoption and sources of information utilized.

Multiple regression of adoption level of farmers towards recommended production technology of mungbean crop and their selected independent variables

An association between adoption level of farmers and their eight independent variables was ascertained by computing correlation coefficient ('r' values).

The independent variables indicate significant contribution in zero order correlation for farmers, which were analyzed by multiple regression technique to determine their relative contribution and to predict. The predicting power of each multiple regression equation was estimated with the help of coefficient of multiple determinations (R^2). The significance of multiple regression coefficients was worked out by 't' values. Accordingly, the multiple regression analysis was done and the results are presented as follows:

Multiple regression of adoption level of farmers and their selected independent variables Out of eight independent variables, only four independent variables had shown significant association with adoption level of farmers about recommended cultivation practices of Mungbean in 'zero order' correlation analysis. These variables were entered in multiple regression models and computerized.

Out of eight independent variables, only four independent variables had shown significant association with attitude of farmers towards recommended production technology of Mungbean crop in 'zero order' correlation analysis. These variables were entered in multiple regression models and computerized.

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8$$

Where,

Y = Estimated value of attitude of farmers towards recommended production technology of Mungbean.

A = The intercept

B_1 = Coefficient of partial regression of Y on x_1 (age)

B_2 = Coefficient of partial regression of Y on x_2 (education level)

B_3 = Coefficient of partial regression of Y on x_3 (social participation)

B_4 = Coefficient of partial regression of Y on x_4 (size of land holding)

B_5 = Coefficient of partial regression of Y on x_5 (family size)

B_6 = Coefficient of partial regression of Y on x_6 (market distance)

B_7 = Coefficient of partial regression of Y on

Table 2. Multiple regression of adoption level of farmers about various production technology of mungbean and their selected independent variables

S.No.	Independent variables	Standardized coefficients Beta	Standard Error	't' value
1.	Age	0.350	0.297	3.124**
2.	Education	0.026	-0.047	-0.700NS
3.	Social participation	0.909	-0.061	-0.493NS
4.	Size of land holding	0.834	0.159	1.356*
5	Family Size	0.638	0.088	-1.301*
6.	Market distance	0.596	-0.005	-0.065NS
7.	Irrigation potential	0.052	0.005	0.830NS
8.	Source of information utilized	0.514	0.571	8.446**

** Significant at 1 per cent level of significance; * Significant at 5 per cent level of significance; NS = Non-Significant; Coefficient of multiple determination (R^2) = 0.617**; Multiple correlation coefficient (R) = 0.786

x_7 (irrigation potentiality)

B_8 = Coefficient of partial regression of Y on x_8 (sources of information utilized)

The R^2 value (0.617) given in Table.2 indicate that two independent variables jointly contributed towards 78.60 per cent of the variation in the adoption level of farmers towards recommended production technology of mungbean crop.

The data given in Table 2 also reveal that the calculated 't' values for the multiple regression coefficient were significant at 1 percent level of significance. Hence, it could be inferred that these variables were important in predicting the adoption of farmers towards recommended production technology of Mungbean.

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COMPARATIVE EVALUATION OF HATCHABILITY PERFORMANCE OF MEWARI AND PRATAPDHAN CHICKEN UNDER INTENSIVE SYSTEM OF REARING

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ABSTRACT

The present study was undertaken to compare hatchability performance in Mewari and Pratapdhan chicken reared under intensive system. The fertility percent was higher in Pratpadhan as compared to Mewari chicken, however the difference was found to be statistically non-significant. The mean hatchability on TES basis was59.10 ±2.33 and 66.82 ±1.03 in Mewari and Pratapdhan respectively.The hatchability on TES was significantly higher (P<0.05) in Pratapdhan as compared to Mewari.The data revealed that the hatchability recorded in Pratapdhan in all generations was higher than hatchability in Mewari first generation. Though the values of other interaction were different but found to be statistically non- significant. The hatchability on FES was73.20 ±2.29 and 80.29 ±1.01 in Mewari and Pratapdhanrespectively. The hatchability on FES was significantly higher (P<0.05) in Pratapdhan as compared toMewari .The hatchability on FES was higher (P<0.05) in Pratpdhan in all generations than Mewari in all generations. The results of the present study indicated that the hatchability performance of Pratapdhan was significantly higher than Mewari.

INTRODUCTION

Poultry farming is one of the fastest growing segments of agriculture in world. World has 23 billion poultry birds about 3 per person on the planet (FAOSTAT, 2016).The egg production of the world is 73 million tons and whereas meat production is 100 million tons (GLEAM 2, 2016). The per capita consumption of eggs in the worlds has increased from 4.55 to 8.92 kg (1961 vs 2010) and per capita consumption of poultry meat has increased from 2.88 to 14.13 kg (FAOSTAT, 2016). There are three types of production systems namely Broilers, Layers and Backyard. Backyard contributes 8% of total egg and 2% of global poultry meat production.). Indian poultry industry is better organized and is progressing towards modernization. The relative share of poultry in the national economy has remained below 1 percent, but its share in the livestock sector is continuously rising.In Rajasthan as per 19th livestock census, total poultry population is 8.02 million which about 1.1% of India, Rajasthan ranks 18th in poultry population in India.

The information with respect to hatchability in indigenous and improved chicken is very limited, therefore the present study was undertaken to know the hatchability performance of Mewari and Pratapdhan chicken under intensive system of rearing over different generations.

RESEARCH METHODOLOGY

The research work was undertaken to study performance of Mewari and Pratapdhan chicken with respect to growth and production parameters. The observations recorded in the ongoing project on AICRP on Poultry Breeding at Poultry farm, Department of Animal Production, Rajasthan College of Agriculture, Udaipurwere utilize for the present study. The experiment was conducted at Poultry farm, Department of Animal Production located in arid region at 24.35 North and Longitude

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of 74.42 East, Height from the mean sea level 582.2 Meter. Three breeds namely Mewari, local native germplasm, coloured broiler (Coloured synthetic female line, CSFL) and Rhode Island Red (RIR) were maintained at the farm to produce two and three breed crosses. The terminal three breed cross was named Pratapdhan, a dual purpose chicken developed for rural poultry production. The genetic constitutions of Pratapdhan is 25% Mewari (native), 25% Coloured Broiler (Coloured Synthetic Female Line) and 50% RIR.A total of 844, 1393 and 995 chicks of Mewari were hatched out in first, second and third generations, respectively. Similarly, 451, 775 and 409 chicks of Pratapdhan were hatched out in first, second and third generations. Standard vaccination schedule was followed for the birds and observation with respect to fertility and hatchability of eggs were recorded.

Fertility and Hatchability:

Fertility per cent and hatchability on Total Egg Set (TES) basis and hatchability on Fertile Egg Set (FES) basis were calculated.

Fertility:

Fertilityper cent =

$$\frac{\text{Number of fertile eggs}}{\text{Total number of eggs set}} \times 100$$

Hatchability: Hatchability per cent was calculated on total egg set (TES) basis and fertile egg set basis (FES).

Hatchability on FES per cent =

$$\frac{\text{Number of chicks hatched}}{\text{Total number of fertile eggs set}} \times 100$$

Hatchability on TES per cent =

$$\frac{\text{Number of chicks hatched}}{\text{Total number of eggs set}} \times 100$$

Statistical Analysis:

The data on various traits recorded were analysed using Completely Randomized Design (CRD) factorial. A non-orthogonal factorial experiment was done. Data were analysed by 2 x 3 (2 breed and 3 generation) factorial arrangement using univariateGLM procedure of SPSS 16.0 for Windows (SPSS Inc. 1998) computer programme in a CRD.

RESULTS AND DISCUSSION

The hatchability performance of Mewari and Pratapdhan chicken was studied based on observations recorded for Mewari and Pratapdhan chicken for three generations.. The data was recorded on egg fertility (%), hatchability (%) on TESand hatchability (%) on FES basis for Mewari and Pratapdhan chicken and data were analyzed statistically using CRD with main effects and two factors interaction of breed and generation respectively.

Effect of breed, Generation and their interactions on fertility

The data with respect to effect of breed, generations and interactions on fertility of Mewari and Pratapdhan eggs is presented in Table 1.

Table 1. Effect of breed, Generation and their interactions on fertility

PARAMETERS	Fertility %
Breed	
B1	80.39 ± 1.45
B2	83.28 ± 0.64
Generation	
G1	84.37^{a} ± 1.51
G2	83.81^{a} ± 0.87
G3	81.07^{b} ± 0.93
B × G	
B1G1	77.05^{b} ± 2.51
B1G2	83.72^{b} ± 2.24
B1G3	79.30^{b} ± 2.90
B2G1	88.56^{a} ± 1.90
B2G2	83.82^{b} ± 0.95
B2G3	81.27^{b} ± 0.98

*(P<0.05), Means bearing different superscripts within a column differ significantly, B1 – Mewari, B2 – Pratapdhan, G1, G2 and G3 are generations 1, 2 and 3 respectively

The fertility per cent was 80.39 ±1.45 and 83.28 ±0.64 in B1and B2 respectively. The fertility% was higher in Pratpadhan as compared to Mewari chicken, however the difference was found to be statistically non-significant.

The fertility % was 84.37 ±1.51, 83.81 ±0.87 and 81.07 ±0.93 in G1, G2 and G3. The fertility% in highest (P<0.05) in G1 followed by G2 and G3, the values recorded in G1 and G2 did not differ significantly. The fertility% were 77.05 ±2.51, 83.72 ±2.24, 79.30 ±2.90, 88.56 ±1.90, 83.82 ±0.95 and 81.27 ±0.98 in B1G1, B1G2, B1G3, B2G1, B2G2 and B2G3 respectively. The fertility % was higher (P<0.05) in B2G1 followed by B2G2, B1G2, B2G3, B1G3 and B1G1. The values recorded in all interaction except B2G1 were found to be non-significant.

Effect of breed, Generation and their interactions on Hatchability on total Egg Set basis

The data with respect to effect of breed, generation and interactions on hatchability on TES basis is presented in Table 2

Table 2. Effect of breed, Generation and their interaction on hatchability on TES

PARAMETERS	Hatchability on TES
Breed	
B1	$59.10^{b} \pm 2.33$
B2	$66.82^{a} \pm 1.03$
Generation	
G1	$63.05^{b} \pm 2.44$
G2	$64.62^{b} \pm 1.41$
G3	$67.56^{a} \pm 1.50$
B × G	
B1G1	$54.70^{b} \pm 4.04$
B1G2	$60.92^{ab} \pm 3.61$
B1G3	$61.93^{ab} \pm 4.67$
B2G1	$67.82^{a} \pm 3.05$
B2G2	$65.29^{a} \pm 1.53$
B2G3	$68.21^{a} \pm 1.58$

*(P<0.05), Means bearing different superscripts within a coloum differ significantly.

The mean hatchability on TES basis was59.10 ±2.33 and 66.82 ±1.03 in B1and B2 respectively. Thehatchability on TES was significantly higher (P<0.05) in B2 as compared to B1. The values of hatchability on TES in generations first, second and third were 63.05 ±2.44, 64.62 ±1.41 and 67.56 ±1.50respectively. The hatchability on TES was higher (P<0.05) G3 followed by G2 and G1 but difference between G1 and G2 wasstatisticallynon-significant. The hatchability on TES basis were 54.70 ±4.04, 60.92 ±3.61, 61.93 ±4.67, 67.82 ±3.05, 65.29 ±1.53 and 68.21 ±1.58 in B1G1, B1G2, B1G3, B2G1, B2G2 and B2G3 respectively. The hatchability on TES was higher in B2G3 followed by B2G1, B2G2, B1G3, B1G2 and B1G1.The perusal of data revealed that the hatchability recorded in Pratapdhan in all generations was higher than hatchability in Mewari first generation. Though the values of other interaction were different but found to be statistically non-significant.

Effect of breed, Generation and their interactions on hatchability on FES basis

The data with respect to effect of breed, generations and their interactions on hatchability on FES basis is presented in Table- 3.

Table 3. Effect of breed, Generation and B×G interaction on hatchability on FES basis

PARAMETERS	Hatchability (%) on FES
Breed	
B1	$73.20^{b} \pm 2.29$
B2	$80.29^{a} \pm 1.01$
Generation	
G1	$74.43^{b} \pm 2.39$
G2	$77.05^{b} \pm 1.38$
G3	$83.25^{a} \pm 1.47$
B × G	
B1G1	$70.44^{b} \pm 3.96$
B1G2	$72.41^{b} \pm 3.55$
B1G3	$78.19^{ab} \pm 4.58$
B2G1	$76.71^{b} \pm 3.00$
B2G2	$77.88^{b} \pm 1.50$
B2G3	$83.84^{a} \pm 1.55$

*(P<0.05), Means bearing different superscripts within a coloum differ significantly.

The hatchability on FES was73.20 ±2.29 and 80.29 ±1.01 in Mewari and Pratapdhan respectively.Thehatchability on FES was significantly higher (P<0.05) in Pratapdhanas compared to Mewari. The hatchability on TES was 74.43 ±2.39, 77.05 ±1.38 and 83.25 ±1.47 in G1, G2 and G3. The hatchability on TES higher (P<0.05) in G3 followed by G2 and G1 but G1 and G2 werestatisticallynon-significant. The hatchability on FES basis were 70.44 ±3.96, 72.41 ±3.55, 78.19 ±4.58, 76.71 ±3.00, 77.88 ±1.50 and 83.84 ±1.55 in B1G1, B1G2, B1G3, B2G1, B2G2 and B2G3 respectively. The hatchability on FES was higher (P<0.05) in B2G3 followed by B1G3, B2G2, B2G1, B1G2 and B1G1.The values of hatchability on FES basis recorded in B2G1, B2G2, B1G2 and B1G1 were non-significant.The effect of breed, generation and their interaction on fertility%, hatchability on total egg set and hatchability on fertile egg set basis were studied in the present study. The fertility % was higher in Pratapdhan though it was statistically non-significant. The effect of generation was found to be significant on fertility % being highest in first generation followed by second and third generation which may be attributed to higher number of hatches in the subsequent generations. The hatchability on total egg set as well as fertile egg set basis were found to be higher in Pratapdhan as compared to Mewari chicken. The hatchability on TES and FES also improved with the generations being highest in third generations followed by second and lowest in first generation. The fertility % and hatchability % on TES basis were lower in the present study than the values reported by Sankhyan at al 2016 in indigenous and improved chicken. Sharma *et al.* (2017) he fertility and hatchability per cent recorded were also found similar. The presentfindings were in accordance with the findings of Islam et al.(2014). Incontrast to the present findings, Kumar et al. (2005) reportedlower hatchability as 72.6 per cent in Vanaraja birds undertraditional system of rearing in Manipur.

CONCLUSION

The fertility and hatchability were higher in Pratapdhan as compared to Mewari chicken, it also improved with generations. Looking to the performance of Pratapdhan, it has shown great potential as improved germplasm for backyard poultry production.

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ANALYSIS OF COST AND RETURN OF AJWAIN PRODUCTION IN CHITTORGARH DISTRICT OF RAJASTHAN

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ABSTRACT

The study pertains specifically to Chittorgarh district of Rajasthan, which was selected on the basis of highest area under ajwain in Rajasthan. Two tehsils, Rashmi and Gangrar out of eleven tehsils were selected purposively. Four villages were randomly selected. 80 farmers were selected randomly in proportion to the pooled numbers in each category i.e. small (up to 2 ha.), medium (2 to 4 ha.) and large (above 4 ha.) farmers from the selected villages. The overall cost of cultivation of ajwain crop was estimated as Rs. 21736.05 (100 %) per hectare. The break - up of the overall cost showed that about 32.30 per cent of the total cost was in the form of Machine labour. Rental value of owned land (17.75%) stood the second highest. Remaining 49.95 per cent cost was shared by other items. Overall gross income from ajwain during 2018-19 was estimated as Rs. 52763.25 per hectare. Average net income over cost C2 and average family labour income was Rs. 31027.20 and Rs. 34935.93 per hectare, respectively. The average return per rupee was worked out to Rs. 2.42. The average cost of production was Rs. 3980.49 per quintal.

INTRODUCTION

Spices constitute an important group of agricultural commodities which were used for flavouring and are the main ingredients for any tasty food. People have used these plants since earliest times. No other commodity has played more pivotal role in development of modern civilization as spices. The trade in spices is one of the oldest and at one time one of the most important form of commerce. India is the foremost country in production, consumption and export of spices, hence popularly known as spice basket or land of spices. Spices constitute an important group of agricultural commodities, which are virtually indispensable in culinary art. Among all the spices, seed spices constitute a major portion. Seed spices include coriander, ajwain, cumin, fenugreek, fennel, anise, caraway etc.

Spices are aromatic vegetable products, usually dried and preserved food stuff. They play a very important part in the human diet by giving an agreeable flavor and aroma to food and add quality to the pleasure of eating. Spices are used as flavouring agents in beverages, active ingredients in ayurvedic medicines, colouring agents in textiles and are important constitutes in cosmetic and perfume products. From ancient times, spices are used as sacred offering in social and religious ceremonies. The Indian spices have been known for their flavor all over the world. About 7077.30 thousand tonnes spices were produced annually from 3535.40 thousand hectares of land in India during 2016-17 (Report of Horticulture Statistics Division, 2017). Among the total spices, the area under ajwain in India was 24000 hectares and their production was 14000 tonnes during the year 2015-16 (Government of Rajasthan, Department of Agriculture Report, 2016-17).

RESEARCH METHODOLOGY

Chittorgarh district comprises of 11 Tehsils, viz: Bari Sadri, Begun, Bhadesar, Bhopal Sagar, Chittorgarh, Dungla, Gangrar, Kapasan, Nimbahera, Rashmi and Rawatbhata. Out of these, two Tehsils Gangrar and Rashmi were selected purposively on the basis of ajwain growers. To have the representative sample of ajwain growers in Rashmi and Gangrar Tehsils two villages from each Tehsils were selected

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randomly. Complete lists of all the ajwain growing farmers belong to the selected villages were prepared. Twenty farmers were selected randomly in proportion to the pooled numbers in each category *i.e.* small, medium, and large farmers from each selected village. Thus, total number of ajwain growers was 80. Primary data was used for analysis. For collection of primary data, two types of schedules were developed separately. For primary data collection one questionnaire was prepared to collect the information from farmers. The other questionnaire was developed for market functionaries. To achieve cost structure in cultivation of ajwain on different size holdings and pattern of resource use was studied. The cost of cultivation of ajwain was worked out by using various cost concepts as defined below:

Cost A1: It includes

1. Value of hired human labour (₹)
2. Value of owed and hired animal labour (₹)
3. Value of owed and hired machine labour (₹)
4. Value of seeds (both farm produced and purchased) (₹)
5. Value of manures, fertilizers, insecticides and pesticides (₹)
6. Irrigation charges (₹)
7. Depreciation (₹)
8. Land revenue (₹)
9. Interest on working capital (₹)
10. Miscellaneous expenses (₹) (Raju and Rao, 2017)

Cost A_2: Cost A_1 + rent paid for leased- inland

Cost B_1: Cost A_1 + interest on fixed capital assets (excluding land)

Cost B_2: Cost B_1 + rental value of owed land + rent paid for leased-in land

Cost C_1: Cost B_1 + imputed value of family labour

Cost C_2: Cost B_2 + imputed value of family labour

Cost C_3: Cost C_2 + 10 per cent of cost C_2 as management cost.

The cost of production was work out by using following formula.

Cost of production per quintal =

$$= \frac{\text{Cost of cultivation per hectare}}{\text{Yield per hectare}}$$

Operational cost (O.C.): Paid out cost incurred for various activities for production of ajwain.

Over head cost (O.H.C.): It was the fixed cost which incurred irrespective of the size of production (Raju and Rao, 2017).

O.H.C = Cost C_2 – Operational cost

Interest on fixed capital: Interest on present value of fixed assets (excluding land) such as implements, machinery, building and well/tubewell was calculated at the rate of 10 per cent per annum.

Interest on working capital: Interest on working capital was calculated on cost items like hired human labour, bullock labour, machine labour, seeds, fertilizers, manures, insecticides and irrigation charges for half of the crop period. Interest rate was charged at the rate of 10 per cent per annum.

Depreciation: Straight line method (Raju and Rao, 2017).

Depreciation =

$$= \frac{\text{Purchase price of the asset} - \text{Junk value}}{\text{Number of useful year of life (expected life)}}$$

Rental value of owed land: It was calculated on the basis of prevailing rates in selected villages.

Land revenue: Land revenue actually paid to revenue department was considered.

Income measures: An Income measure to fulfill the second objective i.e. to work out profitability of ajwain cultivation in the study area was worked out.

Gross Income: Synonymous with value of output (both main and by- product) evaluated at harvest prices.

$$GI = Qm \times Pm + Qb \times Pb$$

Where,

GI = Gross income

Qm = Quantity of main product

Pm = Price of main product

Qb = Quantity of by-product

Pb = Price of by-product

Farm business income: Gross income – Cost A1 (cost A2 in case of instant operated land)

Family labour income: Gross income – cost B2

Net Income: Gross income – cost C2 (Raju and Rao, 2017)

Return per rupee =

$$= \frac{\text{Gross income per hectare}}{\text{total cost (cost } C_2\text{) per hectare}}$$

RESULTS AND DISCUSSION

Input use pattern: Input use by different categories of sample farm is presented in table 1. Data showed different variable costs on different items are as follows:

I. Human labour

It can be observed from the table 4.5 that, on an average 16.50 man days human labour was used for ajwain cultivation, comprising 12.86 family labour man-days and 3.72 hired human labour man-days. The use of human labour was found to be maximum for large (16.77 man-days) and minimum (16.33 man-days) small size category of holdings. The use of family labour was found to be maximum for small (13.32 man-days) and minimum for large (12.32 man-days) size of holdings, because nearly all family members of small farmer were engaged themselves on farm to perform various agricultural operations. The use of hired labour was found to be maximum for large (4.45 man-days) and minimum for small (3.01 man-days) size of holdings, because of their large land holdings. The exact opposite relationship was found between the usage of family labour and hired human labour among the sample households across various land size categories.

II. Machine labour

As per table 1 overall uses of machine labour was observed to be 14.03 hrs for ajwain cultivation. Per hectare utilization of machine labour was observed maximum (14.88 hrs) in case of large farmers followed by medium (13.68 hrs) and small size farmers (13.55 hrs). The use of machine power showed an increasing trend with the increase in size of holding, due to high labour cost of machine per hour, which cannot be afforded by small farmers Hence some of the operations like harvesting, threshing and ploughing were performed by large farmers only.

III. Seed

Both hybrid and local seeds were used in the cultivation of ajwain. On an average, 8.61 kg of seed was used for per hectare ajwain cultivation. Nearly 8.5 kg of seed was used by all category of land holding for per hectare ajwain cultivation.

IV. Manures

The overall usage of manure for per hectare ajwain cultivation was found to be 1.51 tonnes. Which was highest for small (1.85 tonnes/ha.) followed by medium (1.78 tonnes/ha.) and lowest for large (1.20 tonnes/ha.) farmers Per hectare use of manure showed decreasing trend with land size holding, because manure becomes a scarce resource for application as size of land holding increases.

V. Fertilizers

On an average, the per hectare use of chemical fertilizer (urea) was observed to be 61.89 kg per ha. The usage of fertilizer was highest for large (75.77 kg/ha.) followed by medium (57.92 kg/ha.) and small (52.00 kg/ha) farmers as shown in table 4.5.

VI. Plant protection charges

The overall plant protection chemicals usage was observed to be 0.68 liter per ha. The large and medium size farmers used more plant protection chemicals than small farmers. Because plant protection chemicals are costly and might not be

afford by all small farmers.

Thus it can be concluded from the analysis of physical quantities of input use that use of family labour (man-days) and manure (tonnes) was found to be decreased with increase in land size categories while hired human labour (man-days), machine labour (hrs), fertilizer (kg) and plant protection charges (Rs.) were increased with increase in land size categories.

Cost of cultivation:

The cost of cultivation per hectare of ajwain in Chittorgarh district, for three size groups of farms in the year 2018-19, is worked out and presented in table 5.

The overall total cost of cultivation of ajwain crop was estimated as Rs. 21736.05 per hectare out of which total variable cost was Rs. 16614.15 and total fixed cost was Rs. 5121.91 when expressed in per cent term 76.98 incurred variable cost and 23.73 per cent of total fixed cost. The break-up of the overall cost showed that about 32.30 per cent of the total cost was in the form of machine labour. Rental value of owned land Rs. 3847.85 (17.75%) stood the second highest. Remaining 50.00 per cent cost was shared by other items. Among other items the most important one was charges toward family labour followed by cost of manure, interest on working capital, plant protection chemicals, hired human labour, depreciation, seed, interest on fixed capital, and fertilizer which accounted for 11.84, 11.31, 6.94, 4.52, 4.28, 3.71, 3.46, 2.14 and 1.75 per cent of the total cost, respectively.

The total cost of cultivation of ajwain on small, medium and large size farms was Rs. 21515.77, Rs. 21633.30 and Rs. 22059, respectively. The structure of cost was also different in all size groups. The cost of family labour on large size group was Rs. 2465.20 (11.17 % of total cost) per hectare, which was lower than the other size groups of sample farms. On medium size group the cost of family labour was Rs. 2592.64 per hectare which was more than the overall (Rs. 2574.03). On small size group the cost of family labour was Rs. 2664.27 per hectare (12.43% of total cost).

The overall cost of hired human labour on sample farms was Rs. 931.63 per hectare. The cost of hired human labour was maximum on large farms i.e. Rs. 1114.38 (5.08 % of total cost) per hectare. It was probably due to less availability of family labour on the large size groups. The cost of hired human labour was minimum (Rs. 752.69/ha) in case of small size group due to involvement of family labour on their farms.

The overall cost of using machine labour on sample farmers was Rs. 7021.83 per hectare. The cost of machine labour was lowest (Rs. 6775.60/ ha) on small size farms because farmers of this group used more family labour in comparison to others. It was more on large size group of farms (Rs. 7444.69/ ha) than the overall use. The results indicated that the cost of machine labour increased with the increase in the size of holding.

The cost of seed in the case of small size group was Rs. 720.24 (3.39 % of total cost) per hectare which was lower than the overall cost (Rs. 752.16) per hectare; it was probably due to fact that the farmers of small size group used more home produced local seed. The cost of seed on large size group was Rs. 810.57 (3.67 % of total cost) per hectare. The main reason for high cost of seed on large size farms was that these farmers used ajwain seeds of improved quality.

The cost of fertilizer was more on the large farms i.e. Rs. 467.27 (2.11 % of total cost) per hectare than overall cost (Rs. 381.72 /ha). It was low in the case of small size than the overall cost of fertilizer because farmers of small size group used less quantity of fertilizers due to poor financial condition.

The overall cost of manures on sample farms was Rs. 2458.74 per hectare. In case of small size group the cost of manures was Rs. 2992.14 (13.95 % of total cost) per hectare which was more than other size groups. The cost of manure was low in the case of large size group due to use of lesser quantity of FYM. The cost of insecticides shared only 3.35 per cent of the total cost on small farms. This was due to the fact that small size group of

farmers used less amount of insecticides because of poor financial condition. On large and medium size group the cost of insecticides was Rs. 1120.00 per hectare each which was 5.07 and 5.17 per cent of their total cost. On large size group the cost of insecticides was Rs. 1120.00 per hectare, which was more than overall cost of (Rs. 983.64 per hectare). Thus, it can be concluded that the use of insecticides increased with increase in the size of holding.

The interest charges on working capital were observed to be more in case of large size and medium size Rs. 1537.83 and Rs. 1499.64 per hectare, respectively compared to small size group. It was due to more availability of working assets on large and medium farms. The rent paid for leased-in land was nil in the case of all size groups of sample farmers. The rental value of owned land was more on large size group i.e. Rs. 3897.11 (17.66 % of total cost) per hectare than the other size groups.The depreciation charges were more on small farms i.e. Rs. 857.60 (3.98 % of total cost) per hectare than other size groups of sample farms. It was low in the case of large size group i.e. Rs. 778.30 (3.52 % of total cost) per hectare. Thus, it could be seen that the depreciation charges decreased with the increase in the size of farms. The total cost of cultivation of ajwain crop was Rs. 21515.77 per hectare on small size group. In case of medium size group the cost of cultivation was Rs. 21633.30 per hectare which was less than the overall cost of cultivation (Rs. 21736.05 per hectare). The reasons of lower cost in this group were that they used less hired human labour, improved seed, less machine labour, fertilizer, plant protection chemicals, interest on working capital less and having less rental value of owned land.

Cost groups:

The cost items were grouped under cost A1 to cost C3, operational and overhead costs which are given in table 3.

The operational cost exceeds overhead cost in all farm size groups (small, medium and large). The average proportion of operational and overhead cost, in the total cost was 76.43 and 23.56 per cent, respectively.

The overall cost A1 and cost A2 accounted 68.31 per cent of total cost as there was no leased in leased out tendency. The B1 and B2 costs were 70.45 and 88.15 per cent of total cost, respectively. The cost C1 accounted 82.29 per cent of total cost.

On the overall basis to grow one hectare of ajwain a farmer required about Rs. 14848.62. It was Rs. 14623.51 per hectare in case of small size and Rs. 14693.07 per hectare for medium and about Rs. 15229.26 per hectare for large size group of farms.

Labour cost:

The operation wise labour cost per hectare of ajwain is given Table 4. The results of the table showed that overall total labour cost for all operation was Rs. 10527.49 per hectare. It was lowest (Rs. 10192.56/ha.) in the case of small size group and highest in case of large size group of farms (Rs. 11024.27). Out of the overall total labour cost, more than 69.58 per cent cost was imparted towards harvesting, ploughing, threshing, manual weeding, seed bed preparation i.e., 15.98, 14.94, 13.95, 13.79, and 10.92 per cent, respectively. The remaining labour cost was due to transport of FYM to field, spread of FYM, basal fertilizer application, cleaning, top dressing, plant protection chemicals, packing, transport of fertilizer which accounted as 8.91, 6.89, 5.89, 4.43, 1.60, 1.36, 0.73, and 0.61 per cent, respectively. The labour cost for all the operations on the basis of overall cost was increased with the increase in the size of farm. It showed that the efficient utilization of human labour was on small size group of farms.

Break - up of variable cost:

The different components of variable cost were worked out and are given in Table 6. These figures helped in judging the relative importance of each of the component.

Machine labour was the most important input claimed as much as about 42.34 of the total variable cost. Another important item was family labour which

claimed about 15.54 percent share of all farm size groups. It was significant to note that the per cent age expenditure on machine labour increased with the increase in the size of operational holdings. This indicated that the large farmers can afford to use machine labour to do various field operations for the crop. Similarly manure also claimed about 14.82 percent share in the total variable cost. Charges of manure decrease with the increase in the size of operational holdings. Machine labour, family labour and manure accounted for about 72.50 per cent of the total variable cost on all categories of farms. The lowest variable cost was incurred by the farmers of 0 to2 hectare (small size group) and net returns were lowest on small size group. Both gross return and net return was highest in the case of large size group of farms (above 4 ha.). The net return was lowest in the case of small size group. It is expressed that increased net income with the increase in the size of holding.

Income:

Comparison of cost, income and returns per rupee of ajwain in Chittorgarh district are shown in table 7. Overall gross income from ajwain during 2018-19 was estimated as Rs. 52763.25 per hectare. Average net income over cost C2 and average family labour income was Rs. 31027.20 and Rs. 34935.93 per hectare, respectively. The average return per rupee was worked out to Rs. 2.42. The average cost of production was Rs. 3980.49 per quintal.

Gross income from ajwain during 2018-19 for large size group was estimated as Rs. 55027.13 per hectare which was more than the overall gross income (Rs. 52763.25/ha). This was due to the fact that in this group, yield and price was higher than the overall yield and price.

Net income on large size farms was Rs. 32968.03 per hectare. It was more than the overall estimate of net income. Family labour income on large farms was Rs. 39433.22 per hectare. The net return per rupee (2.49) of large size farms was more as compared to overall per rupee return (2.42).

Gross Income from ajwain during 2018-19 for medium size group was estimated as Rs. 53158.32 per hectare. In this group, the cost of cultivation was Rs. 21633.30 per hectare which was less than large size group of farmers. It was less due to using less hired human labour, less machine labour, less use of improved seed and fertilizer charges than the large size group. Net income was Rs. 31525.02 per hectare. Return per rupee expenditure was Rs. 2.45.

Gross income from ajwain for small size group of farms was estimated as Rs. 50108.41 per hectare which was lower than other size groups (medium and large) of cultivator. It was due to low production of ajwain per hectare on these farms. In this group cost of cultivation per hectare (Rs. 21515.77) was minimum. The main reason for this was less use of machine labour per hectare. Cost of production was more (Rs. 4137.72/ha) as compared to large size group and the medium size group. Return per rupee obtained (2.32) was less than the large size group due to high cost of production per quintal in this group than the large size group.

An overview of results presented above showed that the cost of cultivation of ajwain varied between Rs. 21515.77 to Rs. 22059.10 per hectare with an average of Rs. 21736.05 per hectare. The important items of the cost were machine labour, rental value of owned land, family labour, manure which contributed about 73.20 per cent of the total cost. The machine labour alone contributed about 32.30 per cent followed by rental value of owned land (17.75%), family labour (11.84%) and manure (11.31%) in the total cost. The remaining 26.80 per cent cost was shared by hired human labour, seed, fertilizer, plant protection charges, interest on working capital, depreciation and interest on fixed capital etc.

The average cost of production was Rs. 3980.49 per hectare. The average gross income farm ajwain was Rs. 52763.25 per hectare. It was more in the case of large size group as compared to small and medium size group. It was mainly due to higher

Table 1. Input uses by different categories of sample farms (Quantity per Hectare)

Particulars	Small (<2 ha)	Medium (2-4 ha)	Large (>4 ha)	Overall
Seed (kg/ha)	8.25	8.31	9.28	8.61
FYM (tone/ha)	1.85	1.50	1.20	1.51
Fertilizer (kg/ha)	52.00	57.92	75.77	61.89
Plant protection chemicals (lit./ha)	0.50	0.75	0.75	0.67
Family labour (man-days)	13.32	12.96	12.32	12.86
Hired human labour (man-days)	3.01	3.71	4.45	3.72
Human labour (family + hired)	16.33	16.67	16.77	16.50
Machine labour (hrs)	13.55	13.68	14.88	14.03

Table 2. cost of cultivation per hectare of ajwain

(₹ /ha)

Cost items	Small	Medium	Large	Overall
Family Labour	2664.27	2592.64	2465.20	2574.03
	(12.43)	(11.98)	(11.17)	(11.84)
Hired Human Labour	752.69	927.84	1114.38	931.63
	(3.54)	(4.28)	(5.08)	(4.28)
Machine Labour	6775.60	6845.20	7444.69	7021.83
	(31.54)	(31.64)	(33.74)	(32.30)
Seed	720.24	725.69	810.57	752.16
	(3.39)	(3.35)	(3.67)	(3.46)
Manure	2992.14	2427.88	1956.22	2458.74
	(13.95)	(11.22)	(8.86)	(11.31)
Fertilizer	320.67	357.22	467.27	381.72
	(1.54)	(1.65)	(2.11)	(1.75)
Plant protection charges	710.92	1120	1120	983.64
	(3.35)	(5.17)	(5.07)	(4.52)
Interest on working capital	1493.65	1499.64	1537.83	1510.37
	(6.49)	(6.93)	(6.97)	(6.94)
Total variable cost	16430.18	16496.11	16916.16	16614.15
	(76.36)	(76.25)	(78.34)	(76.98)
Rental Value of owned land	3765.67	3880.58	3897.11	3847.85
	(17.60)	(17.93)	(17.66)	(17.75)
Depreciation on Farm implements	857.60	789.60	778.30	808.50
	(3.98)	(3.14)	(3.52)	(3.71)
Interest on fixed capital	462.32	467.01	467.54	465.63
	(2.19)	(2.71)	(2.15)	(2.14)
Total fixed cost	5085.59	5137..22	5142.94	5121.91
	(23.63)	(23.73)	(23.81)	(23.73)
Total cost	21515.77	21633.30	22059.10	21736.05
	(100)	(100)	(100)	(100)

Table 3. Size group wise different costs of ajwain cultivation

(₹ /ha)

Size group	Small	Medium	Large	Overall
O.C.	16430.18	16496.11	16916.16	16614.50
	(76.36)	(76.25)	(76.68)	(76.43)
O.H.C.	5085.59	5137.22	5142.94	5121.91
	(23.63)	(23.74)	(23.31)	(23.56)
Cost A1	14623.51	14693.07	15229.26	14848.62
	(67.96)	(67.91)	(69.03)	(68.31)
Cost A2	14623.51	14693.07	15229.26	14848.62
	(67.96)	(67.91)	(69.03)	(68.31)
Cost B1	15085.83	15160.08	15696.80	15314.23
	(70.11)	(70.07)	(71.15)	(70.45)
Cost B2	18851.50	19040.66	15593.91	19162.02
	(87.61)	(88.01)	(88.82)	(88.15)
Cost C1	17750.10	17752.72	18162.00	17888.27
	(82.49)	(82.06)	(82.33)	(82.29)
Cost C2	21515.77	21633.30	22059.11	21736.06
	(100)	(100)	(100)	(100)
Cost C3	23667.34	23796.63	24265.02	23909.66
	(110)	(110)	(110)	(110)

Figures in parenthesis are the per cent ages of column totals.

Table 4. Operation wise labour cost of ajwain

(₹ /ha)

OperationsSize group	Overall	Small	Medium	Large
Ploughing	1405.20	1656.94	1656.89	1573.01
	(13.78)	(15.98)	(15.02)	(14.94)
Seed bed preparation	1060.89	1043.07	1314.69	1139.55
	(10.40)	(10.06)	(11.92)	(10.92)
Transport of FYM to field	907.20	869.54	1007.63	928.12
	(8.96)	(8.40)	(9.20)	(8.91)
Spread of FYM	768.27	637.68	740.20	715.35
	(7.53)	(6.15)	(6.71)	(6.89)
Transport of Fertilizer	87.18	65.34	42.57	65.03
	(0.85)	(0.63)	(0.38)	(0.61)
Basal Fertilizer Application	607.33	538.87	524.97	557.05
	(5.95)	(5.19)	(4.76)	(5.89)

Manual weeding	1510.87	1335.80	1320.19	1388.95
	(14.82)	(12.88)	(11.97)	(13.79)
Plant protection chemicals	165.43	135.68	126.52	143.55
	(1.62)	(1.38)	(1.14)	(1.36)
Top dressing	177.50	172.67	157.22	169.13
	(1.74)	(1.66)	(1.42)	(1.60)
Harvesting	1585.60	1660.57	1724.57	1656.91
	(15.55)	(16.01)	(15.64)	(15.98)
Threshing	1435.69	1705.82	1797.84	1446.45
	(14.08)	(16.45)	(16.30)	(13.95)
Packing	88.75	78.95	65.30	77.66
	(0.87)	(0.76)	(0.59)	(0.73)
Cleaning	392.65	461.67	545.76	466.93
	(3.85)	(4.45)	(4.95)	(4.43)
Total	10192.56	10365.68	11024.27	10527.49
	(100)	(100)	(100)	(100)

Figures in parenthesis are per cent ages of column totals.

Table 5. total cost of cultivation of different cost items

Cost items	Small	Medium	Large	Overall
Family Labour	2664.27	2592.64	2465.20	2574.03
	(12.43)	(11.98)	(11.17)	(11.84)
Hired Human Labour	752.69	927.84	1114.38	931.63
	(3.54)	(4.28)	(5.08)	(4.28)
Machine Labour	6775.60	6845.20	7444.69	7021.83
	(31.54)	(31.64)	(33.74)	(32.30)
Seed	720.24	725.69	810.57	752.16
	(3.39)	(3.35)	(3.67)	(3.46)
Manure	2992.14	2427.88	1956.22	2458.74
	(13.95)	(11.22)	(8.86)	(11.31)
Fertilizer	320.67	357.22	467.27	381.72
	(1.54)	(1.65)	(2.11)	(1.75)
Plant protection charges	710.92	1120	1120	983.64
	(3.35)	(5.17)	(5.07)	(4.52)
Interest on working capital	1493.65	1499.64	1537.83	1510.37
	(6.49)	(6.93)	(6.97)	(6.94)
Total variable cost	16430.18	16496.11	16916.16	16614.15
	(76.36)	(76.25)	(78.34)	(76.98)

Rental Value of owned land	3765.67	3880.58	3897.11	3847.85
	(17.60)	(17.93)	(17.66)	(17.75)
Depreciation on Farm implements	857.60	789.60	778.30	808.50
	(3.98)	(3.14)	(3.52)	(3.71)
Interest on fixed capital	462.32	467.01	467.54	465.63
	(2.19)	(2.71)	(2.15)	(2.14)
Total fixed cost	5085.59	5137..22	5142.94	5121.91
	(23.63)	(23.73)	(23.81)	(23.73)
Total cost	21515.77	21633.30	22059.10	21736.05
	(100)	(100)	(100)	(100)

Table 6. Returns over variable cost on sample farms (2018-19)

(₹ /ha)

Particulars	**Size group**			**Overall**
	Small	**Medium**	**Large**	
Family labour	2664.27	2592.64	2465.20	2574.03
	(16.21)	(15.65)	(14.60)	(15.54)
Hired human labour	752.69	927.84	1114.38	931.63
	(4.58)	(5.80)	(6.58)	(5.65)
Machine labour	6775.60	6845.20	7444.69	7021.83
	(41.23)	(41.49)	(44.00)	(42.34)
Seed	720.24	725.69	810.57	752.16
	(4.38)	(4.39)	(4.79)	(4.38)
Manure	2992.14	2427.88	1956.22	2458.74
	(18.21)	(14.64)	(11.56)	(14.82)
Fertilizer	320.67	357.22	467.27	381.72
	(1.95)	(2.16)	(2.76)	(2.29)
Plant protection chemicals	710.92	1120.00	1120.00	983.64
	(4.35)	(6.78)	(6.62)	(5.90)
Interest on working capital	1493.65	1499.64	1537.83	1510.33
	(9.09)	(9.09)	(9.09)	(9.08)
Total variable cost	16430.18	16496.11	16916.16	16614.00
	(100)	(100)	(100)	(100)
Gross income	50108.41	53158.32	55027.13	52763.25
Net income	33678.23	36662.21	38110.97	36149.25

Figures in parenthesis are per cent ages of column totals.

Table 7. Size group wise income measures on sample farms (2018-19)

(₹ /ha)

Particular	Size group			Overall
	Small	Medium	Large	
Yield in quintal (per ha)	5.19	5.50	5.69	5.46
Price (per qtl)	9654.80	9665.15	9670.85	9663.60
Gross income (per ha)	50108.41	53158.32	55027.13	52763.25
Cost of cultivation (per ha)	21515.77	21633.30	22059.10	21736.05
Net income	28592.64	31525.02	32968.03	31027.20
Family labour income	31256.91	34117.66	39433.22	34935.93
Farm business income	35484.90	38465.25	39797.87	37916.00
Cost of production (per qtl)	4137.72	3933.32	3870.43	3980.49
Return per rupee	2.32	2.45	2.49	2.42

output per hectare. Average net income and average family labour income were Rs. 31027.20, Rs. 33601.23 per hectare whereas return per rupee from growing ajwain was Rs. 2.42, respectively.

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IMPACT OF RKVY IN TERMS OF INCREASE IN PRODUCTION AND PRODUCTIVITY OF WHEAT CROP IN UDAIPUR DISTRICT OF RAJASTHAN

Sunita Kumari*

ABSTRACT

The present study was conducted in two tribal (Jhadol and Sarada) and two non-tribal (Bhinder and Mavli) panchayat samities of Udaipur district of Rajasthan. Four beneficiary villages from each selected panchayat samiti were taken and 10 respondents were selected randomly from each selected village for the study. Data were collected through pre-structured interview schedule. It was concluded that Rastriya Krishi Vikash Yojana was most effective in terms of increase in production and productivity of wheat crop in Udaipur district of Rajasthan.

INTRODUCTION

The Rastriya Krishi Vikas Yojana (RKVY) was launched in the year 2007with the specific aims at achieving 5.5% annual growth in the agriculture sector during 12th plan period by ensuring a holistic development of agriculture and allied sectors. The scheme is essentially a State Plan Scheme that seeks to provide the States and Territories of India with the autonomy to draw up plans for increased public investment in agriculture by incorporating information on local requirements, geographical/ climatic conditions, available natural resources/ technology and cropping patterns in their districts so as to significantly increase the productivity of agriculture and its allied sectors and eventually maximize the returns of farmers in agriculture and its allied sectors.

Initially, it was decided that a sum of Rs. 5875 crore would be released by the Central Government every year under the 11th Five Year Plan and Rs. 1500 crore was allocated in 2007-08. During the first three years of the implementation of the RKVY, an amount of Rs. 8462.11 crore, which is roughly 33.00 per cent of the total allocation under the RKVY of Rs. 25000 crore was released to states for this programme. Budget 2012-13 provides Rs. 9217.00 crore for this scheme which included two new sub-components, namely: (a) Special initiative for pulse and oilseed development in selected pulses /oilseed growing villages in rainfed areas as supplementary programmes specially targeted to rainfed areas and will be implemented on same parameter as ongoing programmes for oilseed and pulses. (b) Scheme to bridge yield gap in agriculture in east India. Allocation of budget in 2013-14 and 2014-15 are Rs. 9954.02 crore and Rs. 9954 crore, respectively.

The pattern of funding is 100 per cent Central grant and the eventual goal is that the additional investments made through the RKVY scheme will lead to at least 4 per cent growth in agriculture. The states are given sufficient flexibility under the scheme to make appropriate local choices so that the outcomes are as envisaged in the RKVY objectives. In this context, the present study was undertaken in Udaipur district of Rajasthan.

RESEARCH METHODOLOGY

The present paper presents the data gathered in a randomly selected sample of the beneficiary and non-beneficiary farmers towards recommended interventions of wheat crop introduced under RKVY programme in two tribal (Jhadol and Sarada) and two non-tribal (Bhinder and Mavli) panchayat samities of Udaipur district of Rajasthan. Total160 beneficiary farmers were selected for the study. The increase in production and productivity of wheat crop under RKVY was measured with the help of self constructed tool under the guidance of advisory

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committee and field functionaries of Department of agriculture, Udaipur. The tool consisted of before becoming the beneficiaries' area and production and after becoming the beneficiaries' area and production. Then calculate the productivity. The respondents were divided into three categories (low, medium and high) on the basis of mean and S.D. of their productivity of wheat crop.

RESULTS AND DISCUSSION:

(a) Distribution of the respondents according to increase in productivity of wheat crop

The increase in production and productivity of wheat crop was calculated of beneficiary respondents. On the basis of productivity of wheat crop, the respondents were categorized into three groups *viz.,* (i) low (up to 20.98 qt/ha) (ii) medium (between 20.98 to 27.02 qt/ha) and (iii) high (above 27.02 qt/ha). These categories were made on the basis of mean and standard deviation of the productivity obtained from the cultivation of wheat crop by the respondents.

Table 1 reveals that a comparative view of productivity derived from wheat crop before and after initiation of RKVY highlights that out of 160 respondents after becoming beneficiaries of RKVY, 84 (52.50%) and before RKVY, 54 (33.75%) respondents in medium level of productivity group. Whereas, 64 wheat growers after initiation of RKVY (40.00%) and only 22 (13.75%) respondents before RKVY could be placed under high level of productivity group. It was further noted that only 12 (7.50%) wheat growers after the programme and 84 (52.50%) respondents before the programme possessed low level of productivity of wheat crop.

From the above discussion it could be concluded that more than 90.00 per cent after becoming beneficiaries of RKVY were either in high or medium level of productivity group. This was due to the fact that after initiation of RKVY project in the study area the respondents adopted the wheat interventions introduced under Rastriya Krishi Vikash Yojana. Hence, there was a positive impact of RKVY in terms of increase in production and productivity of wheat crop in Udaipur district of Rajasthan.

Table 1. Distribution of respondents according to increase in productivity of wheat crop

n =160

S. No.	Category	Before the programme						After the programme						Grand total	
		Tribal Area		Non-Tribal Area		Total		Tribal Area		Non-Tribal Area		Total			
		f	%	f	%	f	%	f	%	f	%	f	%	f	%
1.	Low (upto 20.98 qt/ha)	40	50.00	44	55.00	84	52.50	8	10.00	4	5.00	12	7.50	61	25.42
2.	Medium (between 20.98 to 27.02 qt/ha)	30	37.50	24	30.00	54	33.75	41	51.25	43	53.75	84	52.50	135	56.25
3.	High (above 27.02 qt/ha)	10	12.50	12	15.00	22	13.75	31	38.75	33	41.25	64	40.00	44	18.33
	Total	80	100	80	100	160	100	80	100	80	100	160	100	240	100

f = frequency, % = per cent

On the basis of results it can be recommended that RKVY on wheat may be continued for next five years in Udaipur district so that all wheat growers may benefitted by this scheme.

The present finding are in line with the findings of Singh *et al.* (2009) who revealed that increase in crop yield has been recorded in NATP adopted districts as compared to non-NATP districts. Diversified farming system and adoption of improved farming practices increased crop yield, which resulted in increase of income of respondents. Samota (2011) also reported that 50.66 per cent of the total respondents were relatively in medium B: C ratio group, whereas, 46.71 and 2.63 per cent of the total respondents were found in the high and low B: C ratio group respectively.

(b) Year wise area, production and productivity of wheat crop varieties

The results of the Table 2 shows that before becoming the beneficiary of RKVY, total area, production and productivity of wheat crop was 83.45 hectares, 1851 quintals and 22.18 qt/hectare respectively. Whereas, after becoming the beneficiary the total area, production and productivity was recorded 103.45 hectares, 2813.24 quintals and 27.19 qt/hectare respectively in the year 2009.

In the year of 2010, total area increased under both the varieties of wheat but productivity was decreased due to adverse climatic condition at the time of maturity crop so that some less productivity was

Table 2. Year wise area, production and productivity of wheat crop variety

n =160

S.No.	Year	Variety	Area(ha)	Production (qt)	Productivity (qt/ha)
(a)	Before RKVY programme	Locale/ Deshi Varieties	83.45	1851	22.18
(b)	After RKVY programme				
1	2009	Raj-4037	54.24	1490.88	27.48
		Lok-1	49.21	1322.36	26.87
		Total	103.45	2813.24	27.19
2	2010	Raj-4037	58.49	1618.18	27.66
		Lok-1	71.16	1838.70	25.83
		Total	129.65	3456.88	26.66
3	2011	Raj-4037	68.49	1939.22	28.31
		Lok-1	71.16	1866.16	26.22
		Total	139.65	3805.28	27.25
4	2012	Raj-4037	81.16	2428.17	29.91
		Lok-1	42.29	1165.14	29.92
		Total	123.45	3693.31	29.92
5	2013	Raj-4037	65.71	1925.17	29.29
		Lok-1	48.29	1440.40	29.83
		Total	114	3365.57	29.53
	Grand total	Raj-4037	328.09	9401.62	28.67
		Lok-1	282.11	7732.76	27.41
		Total	610.20	17140.38	28.09

recorded in this year as compare to previous year. Whereas, in the year 2011, total area, production and productivity of wheat varieties was found with 139.65 hectares, 3805.38 quintals and 27.25 qt^{-1} respectively which was increased because of in this year the suitable environment was observed during crop period.

Further, analysis of the table reveals that in the year 2012 and 2013 the area sown under wheat varieties was decreased with 123.45 and 114 hectares respectively as compare to previous year and productivity was increased with the extent of 29.92 qt^{-1} and 29.53 qt^{-1} respectively.

From the above discussion, it is inferred that production and productivity of wheat varieties given through RKVY along with other interventions was quit high after becoming the beneficiaries in the study area. It is apparent and obvious that this increased production and productivity of wheat crop is only due to the RKVY interventions given to the respondents. It means that RKVY played important role in increase the production and productivity of wheat in the study area. Therefore, it is strongly recommended that the present consortia of RKVY project in the study area should be continued even after its termination. It must be repeated at some other place with more budgetary provision.

From the above results it can safely be concluded that Rastriya Krishi Vikash Yojana is most effective in terms of increase in production and productivity of wheat crop in Udaipur district.

The present finding are in line with the findings of Singh *et al.* (2009) who revealed that increase in crop yield has been recorded in NATP adopted districts as compared to non-NATP districts. Diversified farming system and adoption of improved farming practices increased crop yield, which resulted in increase of income of respondents. Kumar (2012) who revealed that more than 90.00 per cent beneficiary farmers were either in high or medium economic benefit group. This was due to the fact that beneficiary farmers adopted the wheat interventions introduced under National Food Security Mission. Hence, there was a good impact on beneficiary farmers so that they obtained economic benefits at higher level from cultivation of wheat.

CONCLUSION

It is concluded that more than 90.00 per cent after becoming beneficiaries of RKVY were either in high or medium level of productivity group. This was due to the fact that after initiation of RKVY project in the study area the respondents adopted the wheat interventions introduced under Rastriya Krishi Vikash Yojana. Hence, there was a positive impact of RKVY in terms of increase in production and productivity of wheat crop in the study area.

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GROWTH PERFORMANCE OF NON-DESCRIPT GOAT OF BANSWARA DISTRICT OF RAJASTHAN

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ABSTRACT

The present study was carried out at Borwat village in Banswara district of Rajasthan. Twenty healthy non-descript local female kids (4-6 months) and the body weight between 9.00 to 13.50 kg were divided randomly into two groups of ten each. Animals were dewormed before the start of experiment. Kids in group-I were maintained solely on grazing for 6-8 hr on community grazing land, kids of group-II were fed concentrate mixture @ 1.5 % of body weight along with grazing. The total body weight gain (kg) was significantly ($P < 0.05$) higher in group T2 as compared to T1. Average daily gain (g) was significantly ($P<0.05$) higher in group T2 as compare to control group. Additional weight gain and net return (Rs. /goat) was higher as compared to control group.

INTRODUCTION

Banswara is a tribal dominant district. The total population of the district is 17.98 lac. Out of this more than 75 % population belongs to scheduled tribe category. The literacy rate is 57.20%. The district is having 19.03 lac livestock population including 6.58 lac cattle, 2.59 lac buffaloes, 4.51 lac goats, 5.02 lac poultry and 0.31 lac other animals. The productivity of non-descriptive cattle and buffaloes is only 2.37 and 3.17 litre/day, respectively. Due to less profit in the agriculture enterprise and increase in work force in farm families, youth are not adopting agriculture for their livelihood and employment. Goat and poultry play a vital role in sustaining livelihood of tribal families

Goat farming, because of its low capital investment and quick economic returns, has been integrated into flexible and vulnerable animal agriculture production systems. As a source of milk, meat, fiber, skin, hair, horns, manure and other valuable byproducts, goat husbandry calls for multifunctional management systems. These management systems range from extensive to the intensive with many combinations. It has been shown that goats are a uniquely successful earner of cash for small farmers or landless laborers. Goats are excellent at utilizing unfavorable marginal environments, and in better terrain can be integrated with crop production as an extra source of profit. Many specialized breeds of goats have been developed to exploit these different opportunities. Further it may not be possible to continue rearing goat under extensive system due to shrinkage of grazing land both in quality and quantity and we will have to switchover to semi-intensive and intensive system of goat farming. Supplementation of critical nutrients (Pi *et al*., 2005) or their combination (Pachauri *et al*., 2010) is the most promising and practical methods.

RESEARCH METHODOLOGY

The present study was carried out at Borwat village in Banswara district of Rajasthan. Twenty healthy non-descript local female kids (4-6 months) and the body weight between 9.00 to 13.50 kg were divided randomly into two groups of ten each. Animals were dewormed before the start of experiment. Kids in group-I were maintained solely on grazing for 6-8 hr on community grazing land, kids of group-II were fed concentrate mixture @ 1.5 % of body weight along with grazing. Feed and fodder samples were collected, dried and ground to pass through 1 mm sieve. They were analysed for proximate principles (AOAC, 2005). Fresh and clean drinking water was provided twice daily

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Table 1. Growth performance of kids in different feeding groups

Particular	Group1 (Control)	Group 2
No. of Animals	10	10
Initial body weight (kg)	12.40 + 0.48	12.60 + 0.72
Final body weight (kg)	17.20 + 0.90	20.35 + 1.02
Total body weight gain (kg)	$4.80 + 0.64^{c}$	$7.75 + 0.42^{b}$
Average daily gain (g)	$40.00 + 3.32^{c}$	$64.58 + 3.46^{b}$
Total addition feed intake (kg /head)	-	30.00
Additional cost of feed (Rs)*	-	540.00
Additional weight gain (kg)	-	2.95
Return cost (Rs) per animal weight gain @ Rs. 250/kg	-	737.50
Net return (Rs/goat)	-	197.50
B:C ratio	1.30	1.70

Means having different superscripts in a row differ significantly ($P < 0.05$)
*Cost of concentrate mixture @ 18.00/kg

throughout the experiment the trial was conducted for 120 days and the body weights of the kids were recorded at fortnightly intervals. The data were statistically analyzed as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The concentrate mixture comprised of 42% maize, 18% groundnut cake, 27% wheat bran, 10% Urad churi, 2% mineral mixture and common salt. The DM content was found to be 90.92%. The contents of CP, EE, CF, NFE and total ash were found to be 16.18, 3.02, 21.98, 49.74 and 9.08% (DM basis), respectively. The CP was 16.29 %, which was lower than reported by Ishtiyak and Kumar (2012). The growth performance of kids in different feeding group is presented in Table1. The total body weight gain (kg) was significantly ($P < 0.05$) higher ($7.75 + 0.42$) in group T_2 as compared to T_1 ($4.80 + 0.64$). Average daily gain (g) was significantly ($P<0.05$) higher in group T_2 as compare to control group. Similarly results reported by (Yadav and Khan, 2011; Chopade *et al.* 2010). Therefore, addition of concentrate mixture at 1.5% of body weight along with grazing improved growth performance in goats. Additional weight gain and net return (Rs. /goat) was higher as compared to control group. The average daily gain (g/ day) was significantly ($P < 0.05$) higher in T_2 (64.58 ± 3.46) as compared to T_1 (40.00 ± 3.32) groups.

CONCLUSION

Hence, it was concluded that feeding of concentrate mixture along with grazing improved growth performance in growing goats.

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PREFERENCE OF INTERNET ON OTHER MEDIA FOR GETTING INFORMATION BY AGRICULTURAL RESEARCH SCHOLARS

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ABSTRACT

The present study was conducted at Rajasthan College of Agriculture, MPUAT, Udaipur.The RCA was selected because it is the oldest agriculture college in Rajasthan state and have adequate facilities of internet surfing for students, especially for research scholar at Central Library, departments and hostels as compared to other agriculture colleges in Rajasthan.Considering the importance of the internet utilization the present investigation "Attitude and Utilization Pattern of Internet among the Research Scholars of Agriculture Science in MPUAT, Udaipur Rajasthan". The sample size was 117 respondents (90 male and 27 female).The Present study was conducted to analysis usasge of different search engines and preference of internet on media for getting information by research scholars.This study include different category for search engines like google, yahoo,lycos, infoseek etc.

INTRODUCTION

Internet in education has been incredibly useful as it facilitates both information and communication. The Internet has increased the accessibility of education at all levels and has turned out to be a giant repository of knowledge. Students can access free video lectures online and refer to encyclopedias and study material in multimedia formats; teachers can make their lessons interesting by incorporating online-based projects in their study plans; and educational institutions can reach out to a wider audience by offering quality online courses. Internet also acts as a platform for retired teachers to reach out children in poor countries and educate them. It can improve the quality of education in many ways. It opens doorways to a wealth of information, knowledge and educational resources, increasing opportunities for learning in and beyond the classroom. Teachers use online materials to prepare lessons, and students to extend their range of learning. Internet is not only a great place to gather and store information but also allows its easy retrieval whenever desired. In fact, it has turned out to be better than libraries when it comes to gathering information and doing research work.Online encyclopedias and variety of other resources allow students to study any desired topic in much greater detail. Teachers too suggest students to refer to specific websites at home for topics being covered in class.MHRD and IGNOU have also developed Sakshat Portal on the lines of MIT OCW as a digital repository of eBooks, study material and eJournals for students. IGNOU's eGyankosh is another digital repository of learning material.

The 21st century is witnessing a communication revolution with information processing and retrieving which are being reliably done at incredible speeds. The most striking invention in the field of education is the integration of Information and Communication Technology (ICT) in education. One of the most significant developments in this technology is the growth of the "Internet". The word Internet is derived from the words "global" and "network". The internet can be defined as network of networks and is the world's largest and most widely used network. According to Oxford dictionary "Internet is an international computer network connecting other networks and computers from companies, universities, NGOs etc." The internet is a useful

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tool for all in a technologically sophisticated world (Rehman *et al.,* 2010).

The Internet has reshaped the way we communicate, work, play and how we understand the world around us. With the rise of the Internet as a digital highway for messages and images, people now have a fast, convenient and reliable means to transmit and receive information. Internet use is spreading rapidly into daily life and has an impact in many areas including the higher education system. Internet heralded the development and implementation of new and innovative teaching strategies in higher education institutions. Educators who advocate technology integration in learning process believe that it will improve learning and prepare students to effectively participate in the 21st century workplace. It is now widely used as a research tool for news, education, entertainment and informal web-based education.

RESEARCH METHODOLOGY

The study was purposively conducted in Rajasthan College of Agriculture. Udaipur due to the reason that this College is the oldest Agricultural College in Rajasthan state and enjoys more and adequate facilities of internet surfing for agricultural students, especially for research scholars at central library as well as in their respective departments and Hostels as compared to other Agricultural Colleges in Rajasthan From the RCA, Udaipur, a list of all the PG and Ph.D. research scholars was prepared from the student section of the college. There were 150 PG and 110 Ph. D research scholars, i.e. a total of 260 research scholars registered in second semester during the session 2011-12. Since the whole population was not too big, hence, the whole population as such of 260 research scholars (150 PG and 110 Ph. D research scholars) was treated as the respondents for the purpose of the study. The total size of the sample taken was 117 respondents (90 male and 27 female).

RESULTS AND DISCUSSION

1.1 Use of different search engines: The data in Table 1 depict that majority of the male (MS 2.99) and female (MS 2.78) agricultural research scholars used Google and accorded it first rank, about 98.89 per cent of the male agricultural research scholars used it mostly and only 1.11 per cent used it sometimes whereas, 88.89 per cent of the female agricultural research scholars used Google mostly and only 11.11 per cent had never used it. In case of male agricultural scholars, Rediff (MS 2.28) was ranked second followed by Gmail (MS 2.04), Orkut (MS 1.86), Yahoo (MS 1.71), India times (MS 1.21), MSN (MS 1.14), Live (MS 1.13), Info Seek (1.11), Khoj (MS 1.10), Netscape (MS 1.09), Bing (MS 1.07), Vibisimo (MS 1.06), Lycos (MS 1.02), Ask jeeves (MS 1.01) and Alta vista (MS 1.01) which were ranked third, fourth, fifth, sixth, seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteenth, fifteenth and sixteenth respectively. Whereas, in case of female agricultural research scholars Gmail (MS 2.44) was ranked second, followed by Yahoo (MS 2.08), Orkut (MS 1.81) and Rediff (MS 1.70) which were ranked third, fourth and fifth respectively. The search engines like India times, MSN, Live, Info seek, Khoj, Netscape, Bing, Vibisimo, Lycos, Ask jeeves and Alta vista were never been used by female agricultural research scholars .

The value of rank order correlation (r_s) was found to be 0.58 for which the calculated value of 't' (2.76) was higher than its tabulated value at 5 per cent level of significance. Hence the null hypothesis ($H_{0.2.14}$) was rejected and alternate hypothesis was accepted. This leads to the conclusion that there is significant correlation between the male and female agricultural research scholars with regard to their usage of different search engines.

This might be due to the reason that male and female agricultural research scholars learnt from each other and mostly browsed together in their respective department and college library. These findings are in line with the findings of Mulimani and Gudimani (2008), Mishra *et al.* (2011),

1.2 Preference of internet on other media for getting information by agricultural research scholars: Table 2 reveal that majority of the male agricultural research scholars preferred "internet"

Table 1. Preference of internet on other media for getting information by agricultural research scholars

n=117

S.No.	Media Categories	Male agricultural research scholars (n=90)						Female agricultural research scholars (n=27)					
		Most preferred	Preferred	Less preferred	Not preferred	MS	Rank	Mostly preferred	Preferred	Less preferred	Not preferred	MS	Rank
1	Radio	27 (30.00)	36 (40.00)	20 (22.22)	7 (7.78)	2.92	V	4 (14.81)	12 (44.44)	6 (22.22)	5 (18.52)	2.56	VI
2	Television	53 (58.89)	26 (28.89)	7 (7.78)	4 (4.44)	3.42	III	19 (70.37)	3 (11.11)	4 (14.81)	1 (3.70)	3.48	II
3	Newspapers	62 (68.89)	19 (21.11)	7 (7.78)	2 (2.22)	3.57	II	18 (66.67)	5 (18.52)	4 (14.81)	0 (0.00)	3.52	I
4	Magazines	27 (30.00)	39 (43.33)	19 (21.11)	5 (5.55)	2.64	VII	4 (14.81)	16 (59.26)	4 (14.81)	3 (11.11)	2.78	V
5	Exhibition	4 (4.44)	28 (31.11)	36 (40.00)	22 (24.44)	2.15	X	0 (0.00)	7 (25.92)	12 (44.44)	8 (29.63)	1.96	VIII
6	Posters/chart	9 (10.00)	28 (31.11)	32 (35.56)	21 (23.33)	2.78	VI	0 (0.00)	5 (18.82)	15 (55.56)	7 (25.92)	1.92	IX
7	Kisan mela	21 (23.33)	27 (30.00)	25 (27.78)	17 (18.89)	2.58	IX	3 (11.11)	7 (25.92)	11 (40.74)	6 (22.22)	2.26	VII
8	Face to face communication	37 (41.11)	27 (30.00)	12 (13.33)	14 (15.56)	2.97	IV	8 (29.63)	11 (40.74)	3 (11.11)	5 (18.52)	2.81	IV
9	Internet	65 (72.22)	16 (17.78)	5 (5.56)	4 (4.44)	3.58	I	16 (59.26)	4 (14.81)	1 (3.70)	6 (22.22)	3.11	III
10	Film show	27 (30.00)	22 (24.44)	22 (24.44)	19 (21.11)	2.63	VIII	1 (3.70)	8 (29.63)	4 (14.81)	14 (51.85)	1.85	X

Rank correlation coefficient (r_s) = 0.81 t= 2.83* (Significant at 0.05 level of probability)

Tabulated value of t at 0.05 level of probability with 8 degrees of freedom = 2.31

Table 2. Usage of different search engines by agricultural research scholars

n = 117

S.No.	Category	Male agricultural research scholars (n=90)					Female agricultural research scholars (n=27)				
		Mostly	Sometimes	Never	MS	Rank	Mostly	Sometimes	Never	MS	Rank
1	Google	89(98.89)	1(1.11)	0(0.00)	2.99	I	24(88.89)	0(0.00)	3(11.11)	2.78	I
2	Yahoo	31(34.44)	49(54.44)	10(11.11)	1.71	V	9(33.33)	11(40.74)	7(25.93)	2.07	III
3	Lycos	2(2.22)	0(0.00)	88(97.78)	1.02	XIV	0(0.00)	0(0.00)	27(100.00)	1.00	VI
4	Info seek	4(4.44)	2(2.22)	84(93.33)	1.11	IX	0(0.00)	0(0.00)	27(100.00)	1.00	VII
5	Ask Jeeves	0(0.00)	1(1.11)	89(98.89)	1.01	XV	0(0.00)	0(0.00)	27(100.00)	1.00	VIII
6	Alta vista	0(0.00)	1(1.11)	89(98.89)	1.01	XVI	0(0.00)	0(0.00)	27(100.00)	1.00	IX
7	Khoj	0(0.00)	9(10.00)	81(90.00)	1.10	X	0(0.00)	0(0.00)	27(100.00)	1.00	X
8	Rediff	17(18.89)	42(46.67)	31(34.44)	2.28	II	4(14.81)	11(40.74)	12(44.44)	1.70	V
9	India times	4(4.44)	11(12.22)	75(83.33)	1.21	VI	0(0.00)	0(0.00)	27(100.00)	1.00	XI
10	Vibisimo	1(1.11)	4(4.44)	85(94.44)	1.06	XIII	0(0.00)	0(0.00)	27(100.00)	1.00	XII
11	Bing	0(0.00)	6(6.66)	84(93.33)	1.07	XII	0(0.00)	0(0.00)	27(100.00)	1.00	XIII
12	Netscape	1(1.11)	6(6.67)	83(92.22)	1.09	XI	0(0.00)	0(0.00)	27(100.00)	1.00	XIV
13	Gmail	27(30.00)	40(44.44)	23(25.56)	2.04	III	15(55.56)	9(33.33)	3(11.11)	2.44	II
14	Orkut	15(16.67)	47(52.22)	28(31.11)	1.86	IV	4(14.81)	14(51.85)	9(51.85)	1.81	IV
15	MSN	1(1.11)	11(12.22)	78(86.67)	1.14	VII	0(0.00)	0(0.00)	27(100.00)	1.00	XV
16	Live	3(3.33)	6(6.67)	81(90.00)	1.13	VIII	090.00)	0(0.00)	27(100.00)	1.00	XVI

Rank correlation coefficient (r_s) = 0.58 t= 2.76* (significant at 0.05 level of probability)

Tabulated value of t at 0.05 level of probability with 15 degrees of freedom =2.13

(MS 4.44) for getting information as compared to other media, as 72.22 per cent most preferred it, 17.78 per cent preferred it, 5.56 per cent less preferred it and only 4.44 per cent not preferred it, and ranked it first followed by "Newspaper" (MS 3.57), "Television" (MS 3.42), "Face to face communication" (MS 2.97), "Radio" (MS 2.92), "Posters/ Charts" (MS 2.78), "Magazine" (MS 2.64), "Film show" (MS 2.63), "Kisan mela" (MS 2.58) and "Exhibition" (MS 2.15) which were ranked second, third, fourth, fifth, sixth, seventh, eighth, ninth and tenth respectively. Whereas, majority of the female agricultural research scholars most preferred "Newspaper" (MS 3.52) for getting information as compared to other media as 66.67 per cent most preferred it, 18.52 per cent preferred it and 14.81per cent less preferred it and ranked it first. It was followed by "Television" (MS 3.48), "Internet" (MS 3.11), "Face to face communication" (MS 2.81), "Magazine" (MS 2.78), "Radio" (MS 2.56), "Kisan mela" (MS 2.26), "Posters/Chart" (MS 1.92), "Film show" (MS 1.85) and "Exhibition" (MS 1.67) which were ranked second, third, fourth, fifth, sixth, seventh, eighth, ninth and tenth, respectively.

The value of rank order correlation (r_s) was found to be 0.81 for which the calculated value of 't' (2.83) was higher than its tabulated value at 5 per cent level of significance. Hence the null hypothesis ($H_{02.21}$) was rejected and alternate hypothesis was accepted. This leads to the conclusion that there is a significant correlation between the male and female agricultural research scholars with regard to their preference of internet on other media for getting information.

CONCLUSION

Majority of the male and female agricultural research scholars used Google search engine, used Gmail services for e-mail, were highly aware about e- mail services of internet, most preferred the websites to search information, browsed the required information from the internet through "typing the web address directly", most satisfied with the internet and rated it as a good source of information and partially satisfied with internet facility. Majority of male agricultural research scholars preferred college library for internet access, had spent Rs. 50 to 100 per month to use internet, used internet to collect information for class assignments and preferred the internet for getting information as compared to other media. Whereas female agricultural research scholars preferred mostly department for internet access, had used internet without any expenditure, used internet mostly to communicate with others, and preferred the newspaper for getting information as compared to other media.

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OPINION OF RURAL YOUTH TOWARDS SECURITY GUARD AND ELECTRICAL TRADE UNDER SKILL DEVELOPMENT PROGRAMMES OF RSLDC

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ABSTRACT

Looking to the importance of skill development, the present study entitled "Assessment of Skill Development in Rural Youth through Rajasthan Skill and Livelihood Development Corporation (RSLDC) in Chittorgarh district of Rajasthan" was conducted in the purposely selected Electrical and Security guard Trade of Chittorgarh district of Rajasthan. Two trades were taken on the basis of maximum number of beneficiary rural youth. Thus, total two trades were selected for the study. Out of the prepared list, 50 rural youth were selected from each trade on the basis of random sampling technique. Thus, total 100 rural youth were selected for present investigation. Data were collected through pre structured interview schedule. The study indicated that majority of respondents fell in medium level opinion towards skill development trades of RSLDC. The study revealed that duration sufficient for training was the most important opinion aspect as expressed by majority of the rural youth.

INTRODUCTION

The youth of India of today is potentially excellent force of tomorrow who are often indicated as a person between the age where they leaves compulsory education and the age at which, they finds their first employment. Today, almost one in every five person in the world is aged between 15 to 24 years and 85 percent of them are residing in development countries where many of them are especially vulnerable to extreme poverty. The major youth of India faces major hurdles due to the reason of high poverty, low education and low level of human capital. Though educational attainment by rural youth has risen quickly in these years after 90's decade, gaining a handsome job in the market remains elusive for many rural young people of India. The backwardness of a country is not determined by lack of resource or dearth of capital or lack of education but it is also decided by the lack of entrepreneurial talents in its society.

Rajasthan is the first state in India to establish a mission for livelihood in September 2004. In view of the importance regarding skill development for enhancing employability of working population, Rajasthan Mission on Skill and Livelihood (2009-10) formulated specific action plans to provide further impetus to the skill trainings. The Mission was incorporated on 17th August, 2010 and the Chief Secretary was appointed as the Chairman. During Post-budget announcement in 2011-12, the cabinet approved its conversion as corporation in November, 2011 and it was converted into a corporation. The present study was conducted with an objective to study opinion of rural youth towards about development of RSLDC.

RESEARCH METHODOLOGY

The present study was conducted in the purposely selected electrical and security guard trade of Chittorgarh district of Rajasthan. Two trades were taken on the basis of maximum number of beneficiary rural youth. Thus, total two trades were selected for the study. Out of the prepared list, 50 rural youth were selected from each trade on the basis of random sampling technique. Thus, total 100 rural youth were selected for present investigation. Data were collected through pre structured interview schedule. Thereafter, data were analysed and results were interpreted.

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RESULT AND DISCUSSION

The existing status of opinion of the respondents towards skill development trade of RSLDC was measured. The response of respondents towards opinion was recorded on a five point continuum scale. Thereafter, data were analysed and results are presented in following tables. On the basis of obtained opinion score of respondents towards skill development trades of RSLDC, the respondents were categorized into three groups on the basis of standard deviation and average opinion score as presented in Table 1.

Table 1 reveals that out of 100 respondents, majority of the respondents i.e. 63.00 per cent had medium level opinion towards skill development trades of RSLDC whereas, 28.00 per cent rural youth had low level opinion towards skill development trades of RSLDC and remaining 9.00 per cent respondents possessed high level opinion towards skill development trades of RSLDC.

Findings are in agreement with the findings of Ahmad *et al.* (2012) revealed that majority of respondents 63.42 per cent opined that training programmes was fully based on their needs and problems followed by those 23.44 per cent reporting that it were partially need based. About four-fifth of the respondents felt that the training courses were balanced as per the proportion of theory and practical concerned. Almost three-fourth have benefitted from the KVKs trainings of which about half 52.29 per cent have realized increase in productivity of enterprise followed by generally/ domestically useful 37.03 per cent and gainful employment 10.68 per cent.

Opinion of rural youth, aspect-wise opinion of rural youth was worked out. For working out the opinion of respondents (both electrical and security guard trade) toward different aspects, in all 15 statements were considered. The mean per cent score (MPS) was calculated for each statement and rank was assigned accordingly. The results have been present in Table 2.

Table 2 reveals that "duration sufficient for training" was opined as most important statement by the majority of the rural youth with MPS 88.20 and was ranked first. "Satisfied with time of organization of the training programme" was second aspect which was perceived by the rural youth with MPS 84.00 and was ranked second.

Table 1. Distribution of respondents according to their opinion toward skill development trades of RSLDC

n=100

S.No.	Opinion Level	f	%
1.	High (> 60.81 score)	9	9.00
2.	Medium (51.02-60.81 score)	63	63.00
3.	Low (< 51.02 score)	28	28.00
	Total	**100**	**100**

f= frequency, % = per cent

The rural youth observed the statement "satisfied with the course content of training" with 83.40 MPS and ranked third. "Teaching method used appropriate" was another important opinion aspect with 82.20 MPS and was ranked fourth by the rural youth followed by "training content relevant to your needs" with 81.60 MPS and was ranked fifth by the rural youth. "Follow-up programme arranged after this training" with 77.00 MPS was ranked sixth by the rural youth followed by satisfied with the boarding and lodging arrangement with 76.20 MPS and was ranked seventh by the rural youth. Another opinion aspect which was important for rural youth was "trainers of security guard follow the rule while they train candidates for security guard" with 75.00 MPS and was ranked eighth by the rural youth.

"Any provision of stipend during training programme" was assigned ninth rank with 73.80 MPS by the rural youth followed by opinion like RSLDC as important as other programme from the view point of employment with 71.20 MPS and was ranked tenth by the rural youth. The next opinion aspect of the rural youth was youth in utilizing their time properly for productive purpose with 69.40 MPS and was ranked eleventh by the rural youth.

Table further shows that opinion like "instructor having adequate technical knowledge of his trade" was assigned twelth rank with 67.20 MPS by the rural youth followed by opinion towards "training

Table 2. Aspect-wise opinion of respondents towards skill development trades of RSLDC

n=100

S.No.	Aspects	MPS	RANK
1.	Duration sufficient for training	88.2	I
2.	Satisfied with time of organization of the training programme	84	II
3.	Satisfied with the course content of training	83.4	III
4.	Teaching method used appropriate	82.2	IV
5.	Training content relevant to your needs	81.6	V
6.	Follow-up programme arranged after this training	77	VI
7.	Satisfied with the boarding and lodging arrangement	76.2	VII
8.	Trainers of security guard follow the rule while they train candidates for security guard	75	VIII
9.	Any provision of stipend during training programme	73.8	IX
10.	RSLDC as important as other programme from the view point of employment	71.2	X
11.	Youth in utilizing their time properly for productive purpose	69.4	XI
12.	Instructor having adequate technical knowledge of his trade	67.2	XII
13.	Training institutions equipped with basic physical facilities	65	XIII
14.	Programme, provision made for refresher training	63.2	XIV
15.	RSLDC scheme more effective than any other skill development corporation	61	XV
	Average Opinion Score (MPS)	74.56	

MPS = Mean per cent score

institutions equipped with basic physical facilities" with 65.00 MPS and ranked thirteenth. Another opinion aspect which was related to the rural youth was "programme provision made for refresher training" with 63.20 MPS and was ranked fourteenth by the rural youth. "RSLDC scheme more effective than any other skill development corporation" with 61.00 MPS and was ranked fifteenth by the rural youth.

CONCLUSION

The rural youth are required to improve the opinion of rural youth towards various aspects of skill development programmes of RSLDC in order to avail the maximum benefits of the RSLDC. The finding of the study will be of utmost practical utility for rural youth, decision makers, planners, administrators and field personnel involved in skill development programmes in India. More studies should be conducted to explore all possible factors that might influence the rural youth. After knowing weighted value of each of the delineated constraints, efforts can be rightly triggered to eliminate them in priority basis.

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A STUDY ON SOCIO-PERSONAL PROFILE OF THE STUDENTS AND KNOWLEDGE ABOUT PSYCHOLOGICAL ASPECTS OF DIGITAL EMPOWERMENT

Lokesh Kumar*

ABSTRACT

In the age of digital India, we give more emphasis on e-governance, high speed internets in urban as well as rural India, introducing mobile phones or digital tools in education.This study was conducted at Banaras Hindu University during the years 2015-16. All the respondents were postgraduate students of various departments from Institute of Agricultural Sciences. The majority of the respondents, 67.50 per cent belonged to rural area followed by 19.17 per cent from urban & 16.33 per cent from semi urban.In case of mothers, it was found that majority of them 23.33 per cent qualified primary followed by middle school 20.83 per cent, high school 16.67 per cent, and middle school 13.79 per cent. In case of fathers' education, it was found that highest percentage 21.67 per cent qualified Graduation followed by, 12th pass (21.67%), High School (19.67%). In evident of fathers occupation, the result indicates that majority of them (60.83 per cent) were in farmer and In case of mothers occupation, the result indicates that majority of them (95.00 per cent) were house wife. The family type, majority of the respondents were belong from Joint family (53.33%) followed by nuclear family (46.67%). In case of social participation that majority of family had no membership (71.67%) followed by member of one organization (22.50%) and member of more than one organization (2.50%). Majority of the respondents done the training course (52.50%) and 47.50 % of the respondents are not done any training course. In case of farm power indicates that majority of the respondents had medium (58.33%) farm power material. Respondents had high access to farm power material had (10.33%) and (30.83%) of respondents had low access to farm power material. The aspiration level indicates that medium level of aspiration (69.17%) followed by low (9.17%) and high level (21.67%) of aspiration. This leads to understanding that level of aspiration for healthy life was good and (21.67%) had high aspiration for life but (9.17%) had low aspiration than majority of them. Achievement motivation indicates that 81.67% respondents had medium achievement motivation this leads to understanding that they had motivated about their work and use of technology in future. 12.50% had high motivation to achieve the goal but 5.83% had low achievement motivation about technology use and their work and communication behavior that medium communication behavior respondents (75.83%) followed by high communication behavior (16.67%) and low communication behavior (7.50%). This leads to understanding that they use gadgets to connect with others they were active in using applications and social networking sites but had this showed that they were lest active in social site and using technology.

INTRODUCTION

Digital usually refers to something using digits, particularly binary digits. The term empowerment originates from American community psychology and is associated with the social scientist. Empowerment is viewed as a process: the mechanism by which people, organizations, and communities gain mastery over their lives (Rappaport's, 1984). Empowerment refers to measures designed to increase the degree of autonomy and self-determination in people and in communities in order to enable them to represent their interests in a responsible and self-determined way, acting on their own authority. Digital Empowerment is develops communication skills by using creative tools media techniques, focused on

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peoples' own lives, through story-telling, photography, music, video and narrative Petrou, (2012). Digital Empowermentis an innovative digital empowering project that uses a creative approach to teaching basic information communication technology (ICT) skills and provides an effective entry route for learners, who are disengaged with the learning process, or who are unconfident with new technologies.In social work, empowerment forms a practical approach of resource-oriented intervention. In the field of citizenship education and democratic education, empowerment is seen as a tool to increase the responsibility of the citizen. Empowerment is a key concept in the discourse on promoting civic engagement. Empowerment as a concept, which is characterized by a move away from a deficit-oriented towards a more strength-oriented perception, can increasingly be found in management concepts, as well as in the areas of continuing education and self-help.Digital literacy does not replace traditional forms of literacy. It builds upon the foundation of traditional forms of literacy.Digital literacy is the marrying of the two terms digital and literacy; however, it is much more than a combination of the two terms. Digital information is a symbolic representation of data, and literacy refers to the ability to read for knowledge, write coherently, and think critically about the written word Henry, *et al.* (2009).

RESEARCH METHODOLOGY

The methodology followed for the study is discussed in the following sequence under the below mentioned headings. 1. Selection and description of study area, 2. Selection of respondents, 3.Variables and their measurement, 4.Research design and statistical analysis, 5. Data collection tools procedures, the total number of students in Institute of Agricultural Science was 480 in both first year and final year students of post graduate program. The researcher have selected 120 which are 25% of total number PG student for study. The data collected from respondents were manually processed. Each respondent was serialized and information received from him/her tabulated on a master table sheet. Weight age was given to different item with regard to their relative position in the scale and scoring was done accordingly. (i) Frequency: it was calculated to find out the number of respondents in a particular cell.(ii) Arithmetic Mean: mean was obtained by dividing the sum of the scores by the total number of cases involved. (iii) Percentage:the term 'percentage' means a fraction whose denomination is 100 and the numeration of the fraction is called percentage. For calculating percentage, frequency was multiplied by 100 and divided by total respondents.(vi) Standard deviation:the standard deviation is the square root of the arithmetic average of the squared deviation of various from their arithmetic mean.

RESULTS AND DISCUSSION

Socio-economic profile of the respondents

Table 1. Distribution of background of the parents of respondents

S.No.	Background (Native)	f	%
1	Rural	81	**67.50**
2	Semi urban	23	**19.17**
3	Urban	16	**16.33**
	TOTAL	**120**	**100**

Table 1 shows that majority of the respondents, 67.50 per cent belonged to rural area followed by 19.17 per cent from urban & 16.33 per cent from semi urban. Since, most of the population in India belongs to rural areas so majority of the respondents observed were in rural area.Mishra et al. (2002) observed same result.

Table 2. Distribution of respondent according to their caste

S.No.	Caste	f	%
1	scheduled tribe	15	**12.50**
2	scheduled caste	25	**20.83**
3	other backward caste	50	**41.67**
4	General	30	**25.00**
	TOTAL	**120**	**100**

It is clear in Table 2 the caste of respondents was

categorized under four categories. This Table indicates that maximum number of respondents (41.67%) belonged to Other Backward Caste followed by General (25%), Scheduled Caste (20.83%) and Scheduled Tribe (12.50%). Thus, it can be concluded that majority of respondents area belong to other backward caste and general. Devi and Roy (2012) observed similar findings.

Table 3 clear the educational background of respondents' parents. In case of mothers, it was found that majority of them 23.33 per cent qualified primary followed by middle school 20.83 per cent, High school 16.67 per cent, Middle school 13.79 per cent, Post-Graduation (1.67%), Primary school(2.59%), Graduation(2.50%) and 20.83 per cent were Illiterate. Whereas, in case of fathers' education, it was found that highest percentage 21.67 per cent qualified Graduation followed by, 12th pass (21.67%), High School (19.67%), Primary school (12.50%), Middle school (11.67%), Post-Graduation (9.17%) and 4.17 per cent were Illiterate. In case of mother's education, highest percentage was observed in Primary school and middle schoolwhereas in case of father's education, highest percentage was observed in graduation and 12th pass.

In evident of fathers, the resultindicates that majority of them (60.83 per cent) were in farmer followed by Govt.service 22.50 per cent, 0.83 per cent were Labourer. Private sector, business and Administrative service were indicated 0 per cent. In same case of Mothers, the result indicates that majority of them (95.00 per cent) were House wife followed by Govt. service (3.33%), Farmer (1.67

Table 3. Distribution of respondent parents according to their education

S.No.	Education	Father Frequency	Father Percentage	Mother Frequency	Mother Percentage
1	Illiterate	5	**4.17**	25	**20.83**
2	Primary school	15	**12.50**	28	**23.33**
3	Middle school	14	**11.67**	25	**20.83**
4	H.S	23	**19.17**	20	**16.67**
5	12th class	26	**21.67**	17	**14.17**
6	Graduation	26	**21.67**	3	**2.50**
7	Post-graduation	11	**9.17**	2	**1.67**
	TOTAL	**120**	**100**	**120**	**100**

Table 4. Distribution of respondent parents according to their occupation

S.No.	Education	Father Frequency	Mother Percentage	Mother Percentage
1	Farmer	**60.83**	2	**1.67**
2	Govt. service	**22.50**	4	**3.33**
3	Business	**5.83**	0	**0**
4	Private sector	**0.00**	0	**0**
5	Admin. service	**0.00**	0	**0**
6	Labourer	**0.83**	0	**0**
7	House wife (in case of mother)	**0**	114	**95.00**
	TOTAL	**100**	**120**	**100**

%), Business, Private sector, Administrative service and Labourer were indicated 0 per cent. NTIA (2001) observed similar findings.

Table 5. Distribution of respondents according to their Type of Family

S. No.	Family Type	f	%
1	Joint Family	64	**53.33**
2	Nuclear Family	56	**46.67**
	TOTAL	**120**	**100**

Table 5 clear that the family type, Majority of the respondents were belong from Joint family (53.33%) followed by Nuclear family (46.67%)

Table 6: Distribution of respondents according to their Family size

S. No.	Family Type	f	%
1	Small (2-3 members)	13	**10.83**
2	Medium(4-6 members)	73	**60.83**
3	Large (7-9 members)	24	**20.00**
4	Very large (above 9)	9	**7 .50**
	TOTAL	**120**	**100**

Table 6 clear the evident the family size of respondents, Majority of respondent were from Medium family (60.83%) followed by large(20.00%), very large (7.50%) and small family (10.83%).

Table 7: Distribution of respondents according to their land holding

S. No.	Land holding	f	%
1	Land less	8	**6.67**
2	Marginal (0.1-1.0 ha)	34	**28.33**
3	Small (1.1-2 ha)	41	**34.17**
4	Low medium (2.1-4.0 ha)	23	**19.17**
5	High medium (4.1-10 ha)	8	**6.67**
6	Large (Above 10 ha)	6	**5.00**
	TOTAL	120	100

Table 7 Indicates that the majority of respondents had small holding (34.17%) followed by marginal holding (28.33%), low medium (19.17%), land less (6.67%), high medium (6.67%) and the large land holding amongst the respondents were only 5.00%. Mishra et al. (2002) observed same result.

Table 8: Distribution of respondents according to their family income

S. No.	Family income (per month)	f	%
1	<20000/-	20	**25.00**
2	20,000-30,000/-	38	**30.67**
3	30,000-50,000/-	28	**23.33**
4	More than 50000/-	24	**20.00**
	TOTAL	**120**	**100**

Table 8 indicates that majority of family had 20,000-30,000/- per month (30.67%) followed by family had 30,000- 50,000 per month (23.33%), more than 50,000/-(20.00%) and only(25.00%) family had less than 20,000/-per month, this table clear that majority of M.Sc students had good family income to support their study or had no family pressure to getting job. Mishra *et al.* (2002) and NTIA (2001) observed similar result.

Table 9: Distribution of respondents according to theirSocial participation

S. No.	Social participation	f	%
1	Member of one organization	27	**22.50**
2	Member of more than one organization	3	**2.50**
3	Office holder	4	**3.45**
4	Public leader e.g MP, MLA etc.	0	**0**
5	No membership	86	**71.67**
	TOTAL	**120**	**100**

Table 9 indicates that majority of family had no membership (71.67%) followed by member of one organization (22.50%), member of more than one organization (2.50%) and only 0.% were public

leader.

Table 10. Distribution of respondents according to theirhouse.

S. No.	House	f	%
1	No own House	2	**1.67**
2	Kachcha House	6	**5.00**
3	Pakka house	112	**93.33**
4	Mansion	0	**0**
	TOTAL	**120**	**100**

Table 10 indicates that majority of respondents had pakka house (93.33%) followed by no house (1.67), mansion (0%) and only 5% had kachcha house.

Table 11: Distribution of respondents according to training course

S. No.	Training course	f	%
1	Yes	63	**52.50**
2	No	57	**47.50**
	TOTAL	**120**	**100**

Table 11 indicates that majority of the respondents done the training course (52.50%) and 47.50 % of the respondents are not done any training course.

Table 12: Distribution of farm power according to on the basis of formula mean ±S.D

S. No.	Category	f	%
1.	Low	37	30.83
2.	Medium	70	58.33
3.	High	13	10.33

Table 12 indicates that majority of the respondents had medium (58.33%) farm power material. Respondents had high access to farm power material had (10.33%) and (30.83%) of respondent had low access to farm power material.

Table 13: Distribution of material possession according to on the basis of formula mean ±S.D.

S. No.	Category	f	%
1.	Low	21	18
2.	Medium	77	64
3.	High	22	18

Mean 13.13, Standard deviation 4.79

Table 13 that the majority of respondents had medium (64%) material possession followed by low (18%) and 18% had high material possession. This shows that maximum number of respondents had all necessary material which is required for healthy life and 7.76% had high material possession which may considered as luxurious good.

Table 14. Distribution of respondents according to level of aspiration the basis of formula mean ±S.D.

S. No.	Category	f	%
1.	Low	11	9.17
2.	Medium	83	69.17
3.	High	26	21.67

Mean 40.13, Standard deviation 4.66

Table 14 indicates that medium level of aspiration (69.17%) followed by low (9.17%) and high level (21.67%) of aspiration. This leads to understanding that level of aspiration for healthy life was good and (21.67%) had high aspiration for life but (9.17%) had low aspiration than majority of them.

Table 15: Distribution of respondents according to achievement motivation the basis of formula mean ±S.D.

S. No.	Category	f	%
1.	Low	7	5.83
2.	Medium	98	81.67
3.	High	15	12.50

Mean 36.10, Standard deviation 5.41

Table 15 indicates that 81.67% respondents had medium achievement motivation this leads to understanding that they had motivated about their work and use of technology in future. 12.50% had high motivation to achieve the goal but 5.83% had low achievement motivation about technology use and their work.

Table 16: Distribution of respondents according to communication behavior the basis of formulamean ±S.D.

S. No.	Category	f	%
1.	Low	9	7.50
2.	Medium	91	75.83
3.	High	20	16.67

Mean 28.09, Standard deviation 7.80

Table 16 clear that medium communication behavior respondents (75.83%) followed by high communication behavior (16.67%) and low communication behavior (7.50%).this leads to understanding that they use gadgets to connect with others they were active in using applications and social networking sites but had this showed that they were lest active in social site and using technology.

Table 17: Distribution of respondents according to psychological aspect the basis of formulamean ±S.D

S. No.	Category	f	%
1.	Low	14	11.67
2.	Medium	90	75.00
3.	High	16	13.33

Mean 21.6 Standard deviation 4.09

Table 17 clears that (75.00 %) respondents were medium in psychology aspect followed by (13.33%) high in psychology aspect and (11.67%) had low level of psychological aspect.

CONCLUSION

Digital technologies have spread rapidly in much of the world. In many instances digital technologies have boosted growth, expanded opportunities, and improved service delivery. The technologies to benefit everyone everywhere require closing the remaining digital divide, especially in internet access. This is the internet, mobile phones, and all the other tools to collect, store, analyze, and share information digitally have spread quickly. The digital revolution has brought immediate private benefits easier communication and information, greater convenience, free digital products, and new forms of leisure. It has also created a profound sense of social connectedness and global community. But have massive investments in information and communication technologies (ICTs) generated faster growth, more jobs, and better services.

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IMPACT OF KVK TRAINING PROGRAMME ON KNOWLEDGE AND ADOPTION OF POMEGRANATE CROP TECHNOLOGIES IN BHILWARA DISTRICT OF RAJASTHAN

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ABSTRACT

The present study was under taken with objective to review the level of knowledge and adoption of improved pomegranate crop as advocated by Krishi Vigyan Kendra, Bhilwara. The pomegranate is one of the leading fruit crops of district. After assessing the training needs, complete package of training programme on pomegranate crop were conducted for selected pomegranate growers in two villages by the Krishi Vigyan Kendra, Bhilwara. Majority of trainees were aware of recent technological advancement about pomegranate crop like varieties, proper distance and irrigation management but not known about nutrient management, training & pruning, grading and packaging, pest disease management and marketing. Impact indicates that there has been significant difference between the trainees & non-trainees with regard to their Knowledge and Adoption of fruit pomegranate production technologies.

INTRODUCTION

Knowledge may be defined as those behavior and test situations, which emphasized the remembering, either by recognition or recall of ideas. One of the important mandates of Krishi Vigyan Kendra is to provide and improve the knowledge of the trainees about the advanced crop technologies and upgrade their skills in new technologies and the vocational training of farm youths. Activities of KVK also include skill training of farmers by providing work experience, through the principal of "teaching by doing" and "learning by doing" in agriculture and allied areas followed by on farm testing to identify the location specificity of technologies in various farming systems. One of the main tasks of Krishi Vigyan Kendra is to provide and improve the level of knowledge of the trainees about the improved farm practices (Malabasari and Hiremath, 2016). The knowledge is cognitive component of individual's mind and plays an important role in adoption of advanced technologies. Once knowledge is acquired and retained in the mind, it undergoes and produces changes in the thinking process and of mental alchemy. Lack of correct and adequate knowledge lead to under or over adoption of innovation, which prove harmful to the farming communities. Therefore, inattentive in this study to analyze as to what extent of the training programme affected the level of knowledge of its trainees. In the present study, adoption means the degree of actual use of any recommended package of practices of pomegranate fruit crops production technology. The present study was undertaken to study the Impact of Training programme on knowledge level of respondents about the pomegranate crop production technology.

RESEARCH METHODOLOGY

Pomegranate is one of the most important fruit crop of Rajasthan. The Bhilwara district is very potential for pomegranate production. A training programme was organized by Krishi Vigyan Kendra, Bhilwara regarding pomegranate crop production technology. After that an enquiry was conducted on 25 trainees and 25 non-trainees of the covering area of the KVK and testing their level of knowledge and extent of adoption by means of a well structured scheduled. The level of knowledge was categorized as low, medium and high on the basis of scores obtained

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by interview scheduled. Adoption was measured with the help of adoption scale developed by Fulzele (1986) with suitable modifications. Data were recorded by personally interviewing with the help of an interview schedule by the investigator. Extent of adoption was measured in terms of percentage of pomegranate growers adopting recommended package of practices. Scoring was done on the basis of correctness of the responses and scoring was given for full adoption 2, Partial adoption 1 and non-adoption 0, and the total adoption score was calculated accordingly. Adoption behavior was further categorized on the basis of total scores obtained by the individual respondent for all the recommended practices.

RESULTS AND DISCUSSION

The data accommodated in Table 1 reveal that majority of the trainees respondents had high (64 per cent) level of knowledge, followed by medium level of knowledge (36 per cent), whereas in the case of non-trainees, 68 per cent respondents had medium level of knowledge and 12 per cent had high level of knowledge. It is therefore, concluded that pomegranate crop growers trainees had high level of knowledge than the non-trainees. It is cleared from data depicts in the Table 2 that majority of the trainee farmers had fully adopted the use of nutrient management i.e (96 per cent), keep the plant to plant and row to row distances i.e. (88 per cent),

Table 1. Distribution of respondents according to level of knowledge about pomegranate crop technology

Level of knowledge	Trainee		Non-trainee	
	No. of Farmers	Per cent	No. of farmers	Per cent
Low (Up to 5)	00	00	05	20
Medium (Above 5 up to 10)	09	36	17	68
High (Above 10)	16	64	03	12
Total	**25**	**100**	**25**	**100**

Table 2. Distribution of respondents of pomegranate crop according to the extent of adoption

S. No.	Recommended package of practices	Extent of adoption (%)					
		Trainees			Non-Trainee		
		Fully Adopted	Partially Adopted	Non-Adopted	Fully Adopted	Partially Adopted	Non-Adopted
1.	Follow the plant to plant and row to row distances	22 (88)	2 (8)	1 (4)	19 (76)	4 (16)	2 (8)
2.	Planting procedure (Depth of pit)	14(56)	3(12)	8 (32)	8 (32)	-	17 (68)
3.	Time of planting	21 (84)	3 (12)	1 (4)	18 (72)	5 (20)	2 (8)
4.	Irrigation through drip system	16 (64)	-	8 (32)	11 (44)	-	14 (56)
5.	Training and pruning operation	18 (72)	5 (20)	2 (8)	16 (64)	5 (20)	4 (16)
6.	Nutrient Management	24 (96)	1 (4)		17 (68)	4 (16)	4 (16)
7.	Intercultural operation	18 (72)	4 (16)	3 (12)	15 (60)	7 (28)	3 (12)
8.	Grow suitable intercrops	17 (68)	5 (20)	3 (12)	13 (52)	10 (40)	2 (8)
9.	Spray of Insecticides and pesticides	20 (80)	3 (12)	2 (8)	14 (56)	5 (20)	6 (24)
10.	Water management	21(84)	2 (8)	2 (8)	19 (76)	4 (16)	2 (18)
11.	Proper harvesting method	20 (80)	3 (12)	2 (8)	15 (60)	8 (32)	2 (8)
12.	Grading and Packaging of fruits	18 (72)	4 (16)	3 (12)	14 (56)	7 (28)	4 (16)
13.	Marketing of fruits	21 (84)	3 (12)	1 (4)	16 (64)	8 (32)	1 (4)

marketing of fruits and water management (84 per cent) followed by time of planting (84%) and proper harvesting method (80%). Depth of planting pit and proper spray of pesticides is very important feature in success of an orchard and adoption of both the technologies increase to a greater extent after training.

CONCLUSION

Majority of the trainees respondents have high level of knowledge (64%), followed by medium level of knowledge (30%), whereas in the case of non-trainees the medium level respondents were maximum (68%). There is observed difference between trainees and non-trainees regarding their knowledge about improved production technology of pomegranate. We therefore, concluded that trainees had greater knowledge than the non-trainees about improved production technology of pomegranate and KVK Training Programmes had influenced in enhancing the level of knowledge and adoption level of technologies of pomegranate crop growers.

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A SHORT REVIEW ON ASSESSMENT OF OCCUPATIONAL HEALTH AND RISK FACTORS OF WORKERS OF SMALL SCALE INDUSTRIES

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ABSTRACT

The small scale industries (SSIs) play a very important role in the Indian economy. Small scale industries contribute in terms of industrial production, export, employment and creation of an entrepreneurial base for the country. Work-related diseases and occupational accidents affect a significant number of workers globally. The majority of these diseases and accidents are reported from developing countries; and a large percentage of the workforce in developing countries is estimated to be employed in small-scale industries. Industry plays a significant role in building up of a country in terms of its share in employment, output production and wealth creation. The SSI sector produces more than 6,000 products including handloom products, brick, carpets, garment, cotton spinning, food and bakery, foot ware, saw meal, soaps, pickles, auto and machine parts for Indian and foreign markets. In most of the SSIs in India, either traditionally designed tools are used or manual work is performed. Long hours of work with traditionally designed tools and un-ergonomic work places can cause musculoskeletal disorders (MSDs) and other occupational health problems among workers.. This review paper aims to identify various occupational health problems and risk factors among workers in small scale industries. This review gives a quick overview of ergonomic issues in Indian SSIs. In India a lot of work is required in the field of ergonomic intervention in SSIs which would greatly help the economy of the country. Selected for review were dealing with occupational risk factor among workers. Some studies concern working environments, equipment design, and factors affecting individual workers. The workers engaged in this industry are victims of different occupational disorders and psychosocial stresses. It is true that the work place is not proper and wages are also not adequate, working conditions are non-congenial in most of the cases and involve risk factors. They are victims of headache, backache, joint pains, skin diseases, lung disorders like silicosis, other muscular skeletal disorders, and so on.

INTRODUCTION

Any industry plays a significant role in building up of a country in terms of its share in employment, output production and wealth creation. Copper *et al* (2001.) The SSI sector produces more than 6,000 products including handloom products, brick, carpets, garment, cotton spinning, food and bakery, foot ware, saw meal, soaps, pickles, auto and machine parts for Indian and foreign markets. However, most of the SSIs are labour intensive in which the use of traditionally designed hand tools and un-ergonomic work places result MSDs among workers. MSDs are the most common injuries related to poor ergonomics. If these injuries are taken lightly, these will progress to permanent problems (Cooper and Kleiner, 2001).

In recent years, there has been an increasing interest in quality, health and safety requirement in several occupations. Recently, researches have shown an increased interest in occupational safety and health issue. It is becoming gradually more difficult to ignore the issue related to occupational workplace ergonomics risk assessment due the recent studies and statistics. V.S.Vyas. (2007). The SSIs are backbone for the growth of the country. This sector contributes about 40 percent of the gross industrial value added in the economy of India (MSME, 2014). Ergonomic intervention in SSIs reduces MSDs among workers. Wellbeing of workers increases productivity, revenue and reduces rejection cost which would greatly help the economy of the country.

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LITERATURE REVIEW

Small Scale Industries face serious occupational health and safety challenges (Hasle et al., 2006) and the scenario is also same for the India (Mukhopadhyay and Srivastava,2010). The level of awareness about ergonomics, good work environment and good postures in the SSIs and the unorganized sector is very low. Musculoskeletal disorders (MSDs) are always there with the manual activities carried out in SSIs where a number of workers are working in awkward postures. It is therefore, required to avoid the awkward body postures (Qutubuddin et al., 2013; Meena et al., 2014). MSDs are very common health problems in allover world and also a major cause of workplace disability. Most commonly affected body regions are the low back, neck, shoulder, forearm and hand (Punnett and Wegman, 2004). Most of the work related MSDs are cumulative disorders which result from exposures to high or low intensity repeated loads over a long period of time (Singh et al., 2012).

Ergonomic interventions are the best solutions for the prevention of work related MSDs (Gangopadhyay et al. 2014, Meena et al. 2014a). The Indian SSIs workers particularly sand core making workers, gold smiths and carpenters are highly benefited by ergonomic interventions as modified workstations and newly designed tools (Gangopadhyay et al. 2014).Also the carpet industry and bakeries are high risk occupations to develop various types of MSDs, respiratory disorders, injuries, eyesight problems, nerve disorders and skin problems (Choobineh et al., 2007; Wani et al., 2012).

The poor environmental conditions combined with unhygienic conditions have been found the reasons for developing various occupational disorders. Lack of awareness among the weavers deteriorates already existing problems in the carpet industry. Most of the diseases and occupational health problems in carpet industry can be minimized by following ergonomic principles. The safety equipments like facemasks, gloves, first aid facility, and proper uniform, must be used for the protection of workers (Wani et al., 2012). Thus, improvement of working conditions and control of MSDs and other risk factors seemed essential. Work related MSDs, low back pain and other health problems result in increased absenteeism and lost working time, adverse effects on labour relations, higher insurance and compensation costs, increased probability of accidents and errors, job transfer and higher turnover of workers, more scrap and decreased production, low-quality work and high administrative and personnel costs (Niu, 2010; Widanarko et al., 2012).

Mukhopadhyay, and Ghosal (2008) worked on improving productivity and facilitating the occupational health and safety of the workers involved in incense stick (agarbatti) manufacturing at Ahmedabad in the Gujarat state of India. After using ergonomic interventions productivity was increased by 15 per cent and pain in different parts of the body was also reduced. It might be in the economic interest of management to take a more active role to prevent MSDs and other occupational health problems among workers in SSIs by using ergonomic interventions. Design teams can play an important role for meeting ergonomic goals jointly with productivity goals (Neumann et al., 2006).

A comprehensive study was conducted in carpet industry with the objectives of determination of MSDs symptoms prevalence, identification of major factors associated with MSDs symptoms in carpet weaving occupation and development of guidelines for weaving workstation design. The study consisted of two phases. In the first phase, MSDs symptoms in nine Iranian provinces were surveyed by questionnaire among 1439 randomly selected weavers. The results of this phase revealed that symptoms from the musculoskeletal system occurred in high rate among weavers. It was found that the majority of ergonomics shortcomings originated from ill-designed weaving workstation. Based on the findings, some general guidelines for workstation design were presented. In the second phase, considering the general guidelines, an adjustable workstation was designed and constructed. To develop quantitative guidelines for optimizing

workstation set-up, in the laboratory, nine sets of experimental conditions were tested and working posture and weavers' perceptions were measured. The results of this lab work showed that working posture was acceptable for both the researchers and the weavers when the weaving height was adjusted 20 cm above the elbow height and a high seat with forward slope was used. By combining the results of the two phases, guidelines for weaving workstation design were presented. It is believed that the recommended workstation improves working posture and results in reduced postural stress on weavers' bodies and, consequently, reduced prevalence of MSDs symptoms Choobineh*, et al. (*2007).

Mukhopadhya *et al*. (2010) studied on evaluating ergonomic risk factors in non-regulated stone carving units of Jaipur. He identified different ergonomic risk factors associated in this profession. Objective measurements (heart rate and skin temperature) were recorded with stop watch and digital thermometer. The working heart rate after 30 minutes of work was 112.4 beats per minute categorizing the work as moderately heavy. These indicated vulnerability of many of the postures to musculoskeletal disorders and injury. Tiwari et al (2003). Studied was carried 514 cotton textile workers at Wardha. His study prevalence of low back pain was found to be 11.1%. Age more than equal to 35 years was found to have 9 times more risk as compared to <35 years. Smokers were found to have significant higer risk for development of low back pain than non-smokers. He suggested that ergonomic principles should be used for controlling occupational risk factors. The study was conducted on 20 factories belonging to textile, printing, publishing and paper products industries in Jeddah and found that textile, publishing and paper products industries are the most noisy industries , Nowier *et al*(2003). Workers well-being is highly associated with the productivity and cost benefits of small scale industries. Based on the literature, the most significant ergonomic risk aspects are awkward posture in handling job task, force and repetition of specific movement including vibration and noise. Other ergonomics risk aspects includes uncomfortable static position, contact stress of muscles and tendon and also extreme temperature and environment conditions, this increase stress level which is significantly related with musculoskeletal disorders, effective ergonomic interventions for improved musculoskeletal health in the workplace.

CONCLUSION

Small scale industry is a high risk occupation to develop various types of occupational disorders, respiratory disorders, injuries, eyesight problems, nerve disorders and skin problems. Lack of awareness among the workers already existing problems in these industries. Most of these diseases and health risk factors found in these industries can be avoided by proper precautions. Awareness programs and local group discussions are essential for improving the health status of these among workers. There must be some provision of protecting equipments e.g. face masks, first aid facility, gloves and proper uniform, for the protection of workers of handicraft industry. There should be proper lighting at the place of work so that eye strain can be avoided. The literature regarding MSDs and other occupational health problems in various labour intensive SSIs has been reviewed in order to identify occupational health problems and benefits through ergonomic interventions, to develop a future research strategy. It is observed that MSDs and other occupational health problems are common in SSIs due to manual work and un-ergonomic design of tools and work places. Work-related musculoskeletal pain was much more common than the general health issues reported. Health promotional programs at workplaces focusing ergonomics will benefit the workers at small-scale industries. It is also observed that the ergonomic intervention improves wellbeing of workers which ultimately increases productivity, revenue and reduces rejection cost. This review gives a quick overview of ergonomic issues in Indian SSIs. In India a lot of work is required in the field of ergonomic intervention in SSIs which would greatly help the economy of the country.

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